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Class I FOMC – Restricted Controlled (FR)

Report to the FOMC on Economic Conditions and Monetary Policy



Book B

Monetary Policy: Strategies and Alternatives

December 10, 2015

Prepared for the Federal Open Market Committee
by the staff of the Board of Governors of the Federal Reserve System

Authorized for Public Release

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Monetary Policy Strategies

The top panel of the first exhibit, “Policy Rules and the Staff Projection,” provides near-term prescriptions for the federal funds rate from four policy rules: the Taylor (1993) rule, the Taylor (1999) rule, an inertial version of the Taylor (1999) rule, and a first-difference rule.¹ These prescriptions take as given the staff’s baseline projections for real activity and inflation in the near term, shown in the middle panels. All of the Taylor-type rules prescribe an immediate increase in the federal funds rate. The Taylor (1993) and Taylor (1999) rules call for sizable adjustments in the policy rate to values near 2½ percent over the near term. By contrast, the inertial Taylor (1999) rule prescribes a level of the federal funds rate of only ½ percent in the first quarter of 2016 because this rule places a considerable weight on keeping the federal funds rate close to its previous value. The first-difference rule, which also places considerable weight on the lagged federal funds rate, calls for the policy rate to edge above the current target range next quarter. The prescriptions of the Taylor type rules are generally close to those reported in the October Tealbook while those of the first-difference rule are somewhat less accommodative, reflecting a faster closing of the output gap in the Tealbook projection.

The bottom panel of the first exhibit reports the Tealbook-consistent estimate of a notion of the equilibrium real federal funds rate, r^* , generated using the FRB/US model. This measure is an estimate of the real federal funds rate that, if maintained over a 12-quarter period, makes the output gap equal to zero in the final quarter of that period. The current estimate of r^* , at 1.24 percent, is 50 basis points higher than the corresponding estimate in the October Tealbook. The increase reflects the fact that the staff projects higher resource utilization than in the previous Tealbook, largely due to an upward revision in federal government spending, as discussed in Tealbook A. The panel also reports the average of the real federal funds rate in the Tealbook baseline projection for the same 12-quarter period used to compute r^* .² This average is 0.36 percent,

¹ The appendix to this section provides details on each of the four rules.

² While r^* and the average projected real federal funds rate are calculated over the same 12-quarter period, they need not be associated with the same macroeconomic outcomes even when their values are identical. The reason is that, in the r^* simulations, the real federal funds rate is held constant over the entire 12-quarter period whereas, in the Tealbook baseline, the real federal funds rate can vary over time. Distinct paths of real short-term rates can, in turn, generate different paths for inflation and economic activity, even if they have the same 12-quarter average.

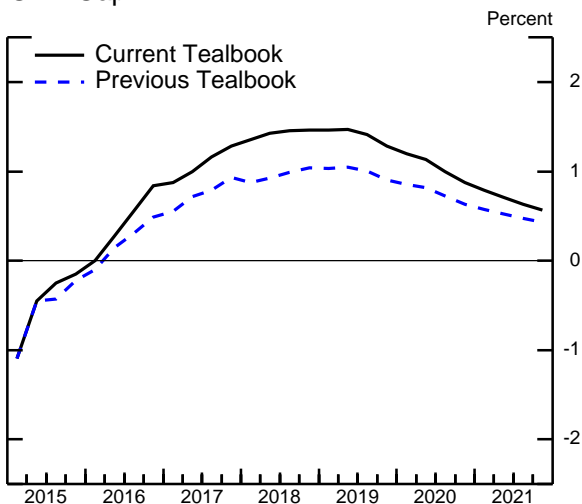
Policy Rules and the Staff Projection

Near-Term Prescriptions of Selected Policy Rules¹

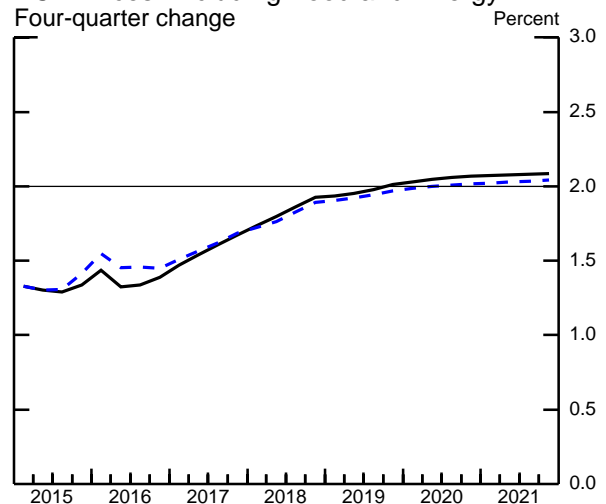
	(Percent)	
	<u>2016:Q1</u>	<u>2016:Q2</u>
Taylor (1993) rule	2.41	2.37
<i>Previous Tealbook</i>	2.53	2.50
Taylor (1999) rule	2.41	2.51
<i>Previous Tealbook</i>	2.48	2.57
Inertial Taylor (1999) rule	0.51	0.81
<i>Previous Tealbook outlook</i>	0.52	0.83
First-difference rule	0.37	0.54
<i>Previous Tealbook outlook</i>	0.25	0.34

Key Elements of the Staff Projection

GDP Gap



PCE Prices Excluding Food and Energy
Four-quarter change



Real Federal Funds Rate Estimates²

	(Percent)	
	Current Tealbook	<i>Previous Tealbook</i>
Tealbook-consistent FRB/US r^*	1.24	0.74
Current real federal funds rate	-1.16	-1.17
Average projected real federal funds rate	0.36	0.21

1. For rules that have a lagged policy rate as a right-hand-side variable, the lines denoted "Previous Tealbook outlook" report rule prescriptions based on the previous Tealbook's staff outlook, but jumping off from the average value for the policy rate thus far in the current quarter.
2. The "Tealbook-consistent FRB/US r^* " is the level of the real federal funds rate that, if maintained over a 12-quarter period in the FRB/US model, sets the output gap equal to zero in the final quarter of that period. The "current real federal funds rate" is the difference between the federal funds rate and the trailing four-quarter change in core PCE. The "average projected real federal funds rate" is the 12-quarter average of the current real federal funds rate and its projected values under the Tealbook baseline over the next 11 quarters.

0.88 percentage point below the estimate of r^* . The panel further reports a measure of the current real federal funds rate constructed as the difference between the mid-point of the prevailing target range for the federal funds rate and the trailing four-quarter change in the core PCE price index. This measure, at -1.16 percent, is almost unchanged from the October Tealbook.

The second exhibit, “Policy Rule Simulations,” reports dynamic simulations of the FRB/US model under the Taylor (1993) rule, the Taylor (1999) rule, and a first-difference rule.³ These simulations reflect the endogenous responses of inflation and the output gap when the federal funds rate follows the paths implied by the different policy rules, subject to an effective lower bound of $12\frac{1}{2}$ basis points for the federal funds rate.⁴ The results for each rule presented in these and subsequent simulations depend importantly on the assumptions that policymakers will adhere to the rule in the future and that market participants as well as price and wage setters fully understand the policy rule that will be pursued and its implications for real activity and inflation.

The second exhibit also displays the implications of following the baseline monetary policy assumptions in the current staff forecast.⁵ As Tealbook A discusses, the staff assumes that the first increase in the federal funds rate will occur at the December FOMC meeting. After departing from its effective lower bound, the federal funds rate is assumed to follow the prescriptions of the inertial version of the Taylor (1999) rule. The federal funds rate increases about 30 basis points per quarter for the first three years after liftoff, reaching about $3\frac{1}{2}$ percent by the end of 2018. The pace of tightening subsequently slows, and the federal funds rate peaks at around $4\frac{1}{4}$ percent in 2020—consistent with the high projected level of resource utilization around that time—before eventually returning to its longer-run normal level of $3\frac{1}{4}$ percent later in the decade.

The Taylor (1993) and Taylor (1999) rules call for a sharp tightening of policy starting next quarter and produce paths for the real federal funds rate that lie significantly

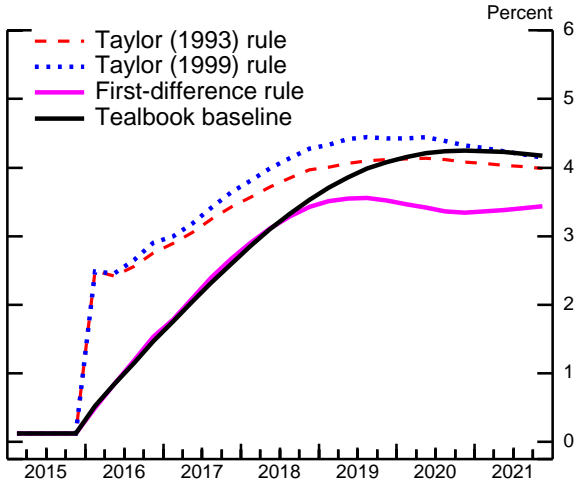
³ Simulations pertaining to the inertial Taylor (1999) rule have been dropped from the exhibit because policy prescriptions and macroeconomic outcomes are, at present, nearly indistinguishable from those under the staff’s baseline. For reference, the tables “Outcomes under Alternative Policies” and “Outcomes under Alternative Policies, Quarterly” continue to report results for the inertial Taylor (1999).

⁴ Because of these endogenous responses, prescriptions from the dynamic simulations can differ from those shown in the top panel of the first exhibit.

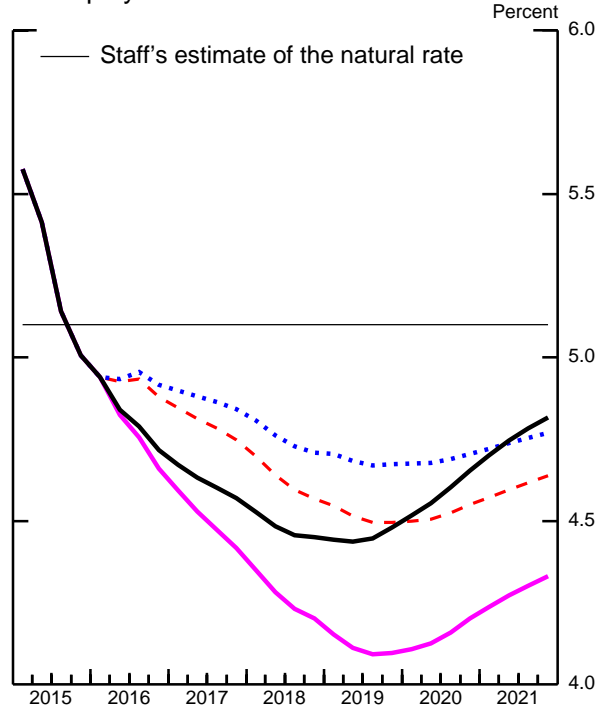
⁵ The dynamic simulations discussed here and below incorporate the assumptions about underlying economic conditions that are used in the staff’s baseline forecast, including the macroeconomic effects of the Committee’s asset holdings from the large-scale asset purchase programs.

Policy Rule Simulations

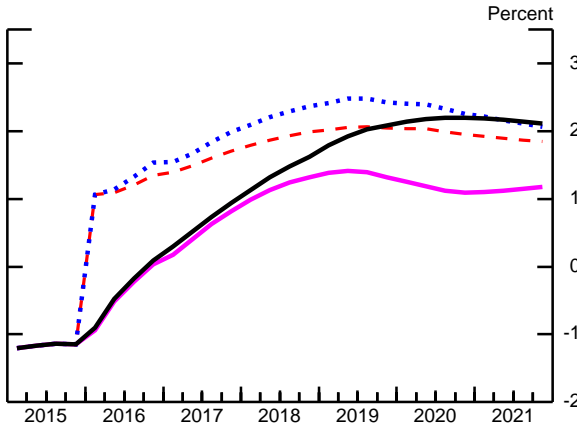
Nominal Federal Funds Rate



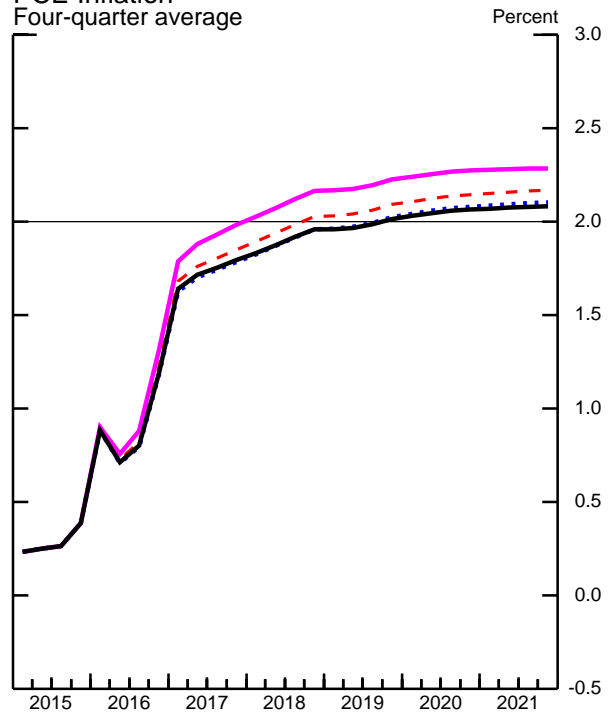
Unemployment Rate



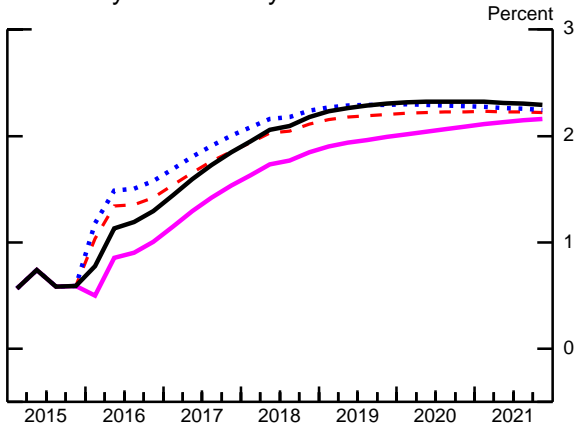
Real Federal Funds Rate



PCE Inflation
Four-quarter average



Real 10-year Treasury Yield



Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation. This choice of rule specification was made in light of the tendency for current and near-term core inflation rates to outperform headline inflation rates as predictors of the medium-term behavior of headline inflation.

above the Tealbook baseline path over the next few years. As a result, these rules lead to less pronounced undershooting of the natural rate of unemployment than the baseline policy through 2018. The Taylor (1999) rule prescribes somewhat higher policy rates than the Taylor (1993) rule over the period shown because it places more weight on the output gap. As a consequence, the Taylor (1999) rule also generates a higher trajectory of the unemployment rate and a lower trajectory of inflation than the Taylor (1993) rule.

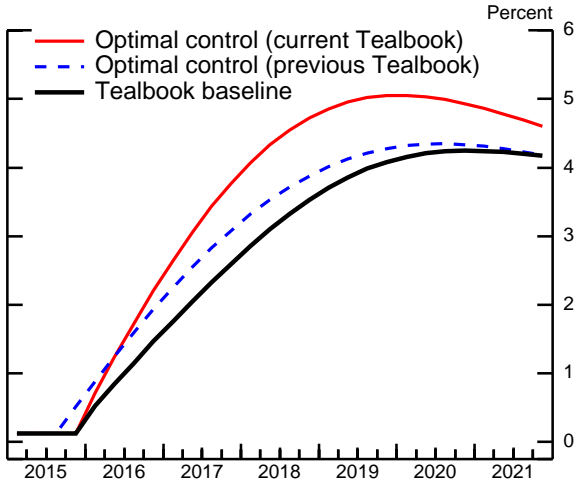
In contrast to the Taylor-type rules, the first-difference rule prescribes a pace of increases in the federal funds rate that is similar to the Tealbook baseline through 2018. At that point, the federal funds rate levels off under the first-difference rule whereas it keeps rising for a time under the Tealbook baseline. This divergence occurs because the first-difference rule, which responds to the expected change in the output gap rather than to its level, reacts to the slower pace of economic growth projected late in the decade. The lower path of the federal funds rate in the medium run under the first-difference rule, in conjunction with expectations of higher price and wage inflation in the future, leads to lower long-term real rates and thus to higher levels of resource utilization and inflation in the short run. The first-difference rule generates outcomes for the unemployment rate over the forecast period that are markedly below the staff's estimate of the natural rate and the unemployment rate paths generated under the other policy rules. Relative to the other simple policy rules, inflation runs a bit closer to the Committee's 2 percent longer-run inflation objective over the next few years before overshooting the target by a greater margin and for a longer time later on.

The third exhibit, "Optimal Control Policy under Commitment," compares optimal control simulations for this Tealbook's outlook with those reported in October. Policymakers are assumed to place equal weights on keeping headline PCE inflation close to the Committee's 2 percent goal, on keeping the unemployment rate close to the staff's estimate of the natural rate of unemployment, and on minimizing changes in the federal funds rate. The concept of optimal control that is employed here corresponds to a commitment policy under which the plans that policymakers make today are assumed to constrain future policy choices.⁶

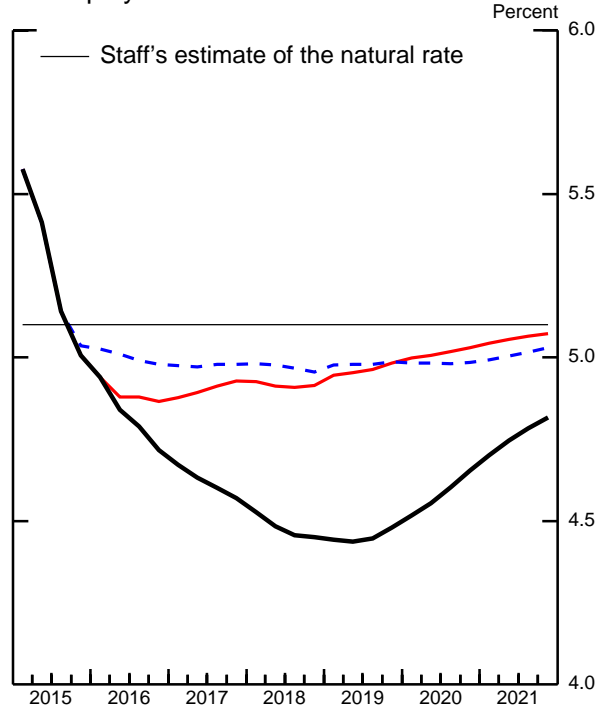
⁶ The results for optimal control policy under discretion (in which policymakers cannot credibly commit to carrying out a plan involving policy choices that would be suboptimal at the time that these choices have to be implemented) are similar.

Optimal Control Policy under Commitment

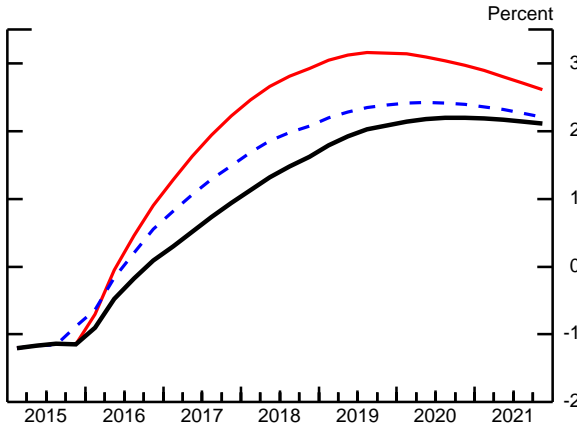
Nominal Federal Funds Rate



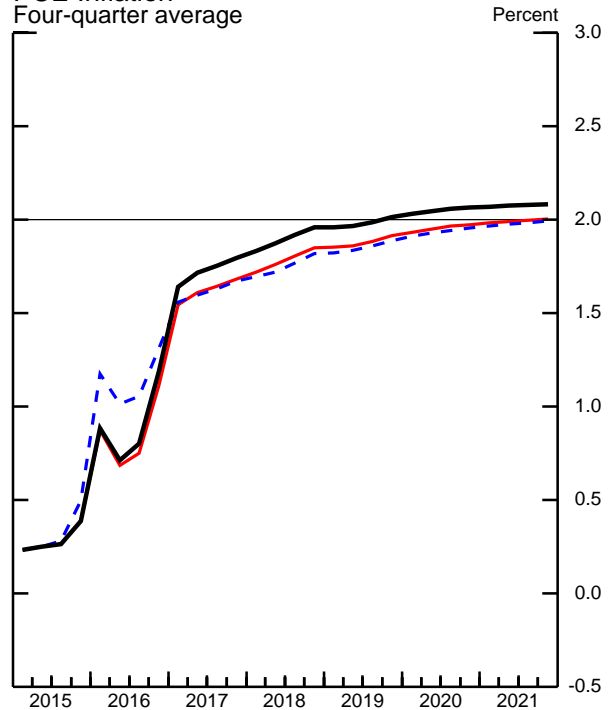
Unemployment Rate



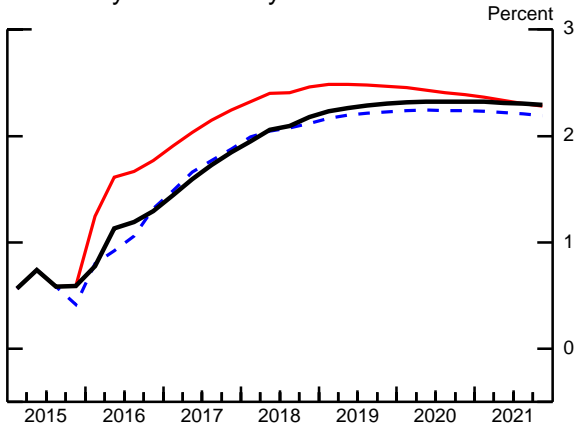
Real Federal Funds Rate



PCE Inflation Four-quarter average



Real 10-year Treasury Yield



In the Tealbook baseline projection, unemployment falls well below the staff's estimate of the natural rate over the next several years. Under the preferences embedded in optimal control, policymakers judge this undershooting of the natural rate to be costly, leading them to tighten policy more than in the Tealbook baseline. Accordingly, the path for the real federal funds rate is almost 1 percentage point higher, on average, than the Tealbook baseline path over the period shown. The trajectory for the real 10-year Treasury yield is also higher. The tighter policy under optimal control results in a path of the unemployment rate that runs substantially closer to the staff's estimate of the natural rate than the Tealbook baseline projection. Headline PCE inflation is also slightly lower than in the baseline over the simulation period, consistent with lower levels of resource utilization.⁷

OPTIMAL CONTROL IN THE PRESENCE OF TERM-PREMIUM SHOCKS

Longer-term yields, which are at the center of the monetary policy transmission mechanism, depend not only on current and expected future short-term rates but also on term premiums. These premiums can vary for many reasons that are often not well understood. The special exhibit, "Optimal Control in the Presence of Term-Premium Shocks," examines the implications for policy of two scenarios in which term premiums deviate from their baseline paths around the time of the first increase in the federal funds rate. The first scenario explores the risk that financial markets could overreact, resulting in a greater tightening of financial conditions than intended—a "tightening tantrum." The other scenario considers the risk that term premiums could decline for a time relative to their expected levels after the onset of tightening, as was the case during the "conundrum" episode of 2004-2005.⁸

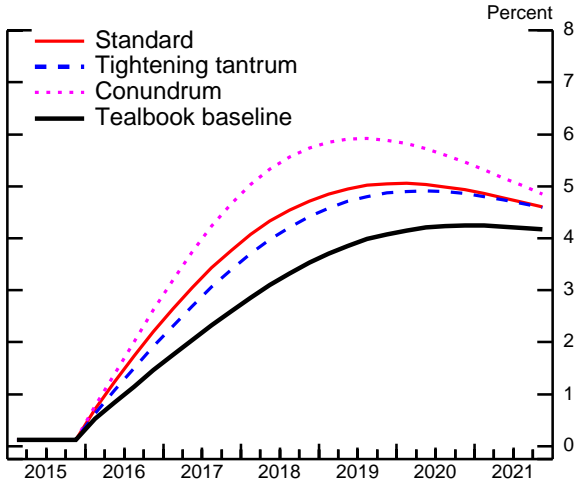
In the "tightening tantrum" scenario, the term premiums on the FRB/US model's 5-year, 10-year, and 30-year Treasury rates are assumed to jump 100 basis points in the first quarter of 2016 and then return to their baseline values over the course of about year, as shown by the blue dashed line in the middle-left panel of the exhibit. This calibration

⁷ In the simulations shown in this section of the June and July Tealbooks, the optimal control path for the federal funds rate was very similar to the Tealbook baseline path. Since then, the optimal control paths have been higher than the corresponding Tealbook path, with the average difference between the two paths rising with each Tealbook.

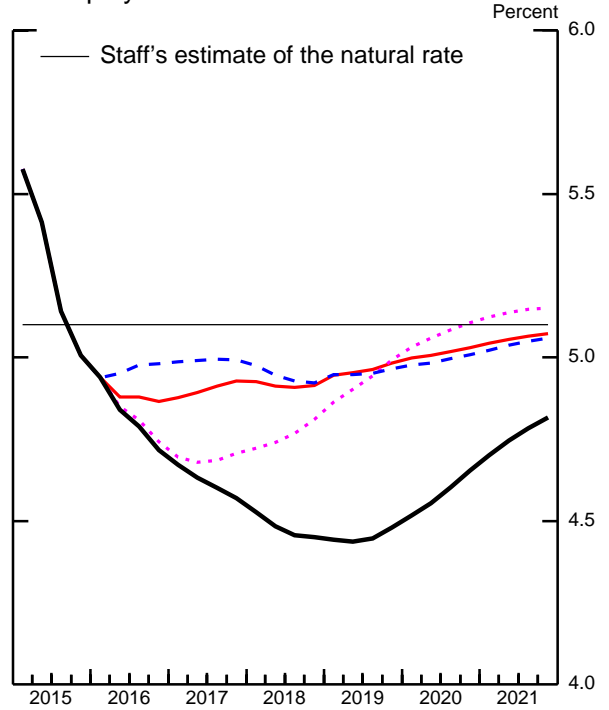
⁸ The box "Financial Market Responses to Episodes of Tightening" in the September Tealbook B provides a discussion of term premiums during the 2004–2005 "conundrum" and 2013 "taper tantrum" episodes.

Optimal Control in the Presence of Term-Premium Shocks

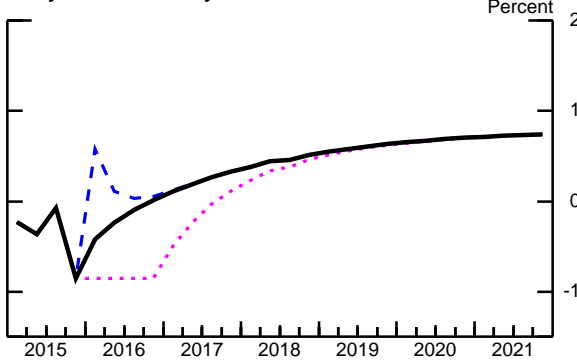
Nominal Federal Funds Rate



Unemployment Rate

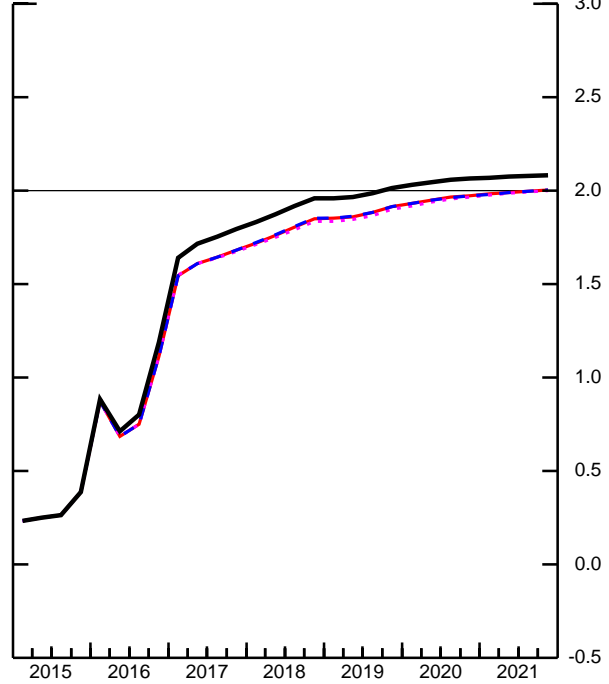


10-year Treasury Term Premium

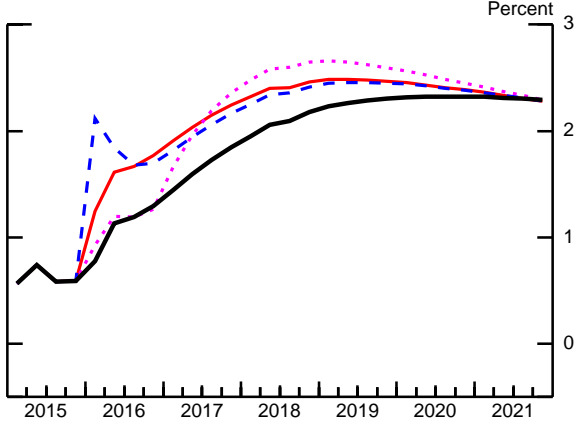


Note: The Tealbook baseline and standard optimal control embed identical term premium assumptions.

PCE Inflation
Four-quarter average



Real 10-year Treasury Yield



of the shock is largely illustrative; however, a shock of this magnitude and duration is near the upper edge of the range of the estimated cumulative increase in 10-year Treasury term premiums during the “taper tantrum” episode over the late spring and summer of 2013.⁹

As shown in the bottom-left panel, the temporary increase in term premiums in the tightening-tantrum scenario results in a sharp spike in the real 10-year Treasury yield in early 2016. Optimal control does not offset much of the effects of the spike in term premiums on longer-term real rates because the contractionary shock helps raise unemployment closer to the staff’s estimate of the natural rate in the near term.¹⁰ As in the standard optimal control, this scenario calls for tightening policy gradually starting next quarter. The federal funds rate is, on average, about 25 basis points lower from 2016 to 2020 than in the standard optimal control. This lower path for the federal funds rate results in real 10-year Treasury yields that are slightly below those of the standard optimal control in mid-2016 through 2019.

The initial spike in longer-term real interest rates implies that the unemployment rate is 0.1 percentage point higher and consequently closer to the staff’s estimate of the natural rate than in the standard optimal control simulations, on average, through the beginning of 2018. Inflation is little changed from its path in the standard optimal control simulation because of the low sensitivity of inflation to slack in the model.

In the conundrum scenario, term premiums fall below their baseline path for four quarters and revert back to baseline over the subsequent two years.¹¹ The fall in term premiums, which is larger and more persistent than initially expected by policymakers, leads to a 10-year nominal Treasury rate that rises more slowly than in the standard optimal control simulation, despite a steeper trajectory of the federal funds rate. Because policymakers do not foresee the full sequence of shocks resulting in persistently low longer-term rates, they tighten policy less than would be appropriate if they had fully

⁹ The simulation starts in the first quarter of 2016, at which time policymakers and the public observe the jump in term premiums and understand that these premiums will subsequently revert back to baseline.

¹⁰ Departure from the effective lower bound in the presence of a 100-basis-point spike in term premiums is robust to the choice of the interest rate smoothing parameter in the loss function. Even with a smoothing parameter near zero, optimal control departs from the effective lower bound immediately.

¹¹ In the conundrum scenario, a sequence of four unexpected shocks lowers the 5-year, 10-year, and 30-year term premiums by around 1 percentage point below the baseline path by the end of 2016. Term premiums then gradually return to their baseline values.

anticipated the fall in term premiums. The trough in the unemployment rate is $\frac{1}{4}$ percentage point lower than that under the standard optimal control. Thereafter, policymakers set out a higher path for the federal funds rate in order to make up for their previous errors, pushing up real 10-year Treasury yields and inducing an unemployment rate above the standard optimal control path beginning in late 2020.

An important caveat associated with this analysis is that the term premium movements in these simulations are exogenous events, occurring in isolation, and unrelated to other factors such as changes in expected domestic and foreign economic growth that might drive such fluctuations. If, for example, longer-term yields were to remain persistently low because of economic weakness abroad that leads to increased demand for long-term Treasuries, an appreciation of the dollar, lower net exports and economic activity, then a complete analysis would require the inclusion of more shocks to represent those factors.

The final two exhibits, “Outcomes under Alternative Policies” and “Outcomes under Alternative Policies, Quarterly,” tabulate the simulation results for key variables under the policy rules described earlier.

Outcomes under Alternative Policies

(Percent change, annual rate, from end of preceding period except as noted)

Measure and policy	2015		2016	2017	2018	2019
	H1	H2				
<i>Real GDP</i>						
Extended Tealbook baseline ¹	2.3	1.9	2.5	2.0	1.9	1.6
Taylor (1993)	2.3	1.9	2.2	2.0	2.0	1.8
Taylor (1999)	2.3	1.9	2.1	1.8	1.9	1.8
Inertial Taylor (1999)	2.3	1.9	2.5	2.0	1.9	1.6
First-difference	2.3	1.9	2.6	2.3	2.1	1.8
Optimal control	2.3	1.9	2.2	1.6	1.6	1.7
<i>Unemployment Rate²</i>						
Extended Tealbook baseline ¹	5.4	5.0	4.7	4.6	4.5	4.5
Taylor (1993)	5.4	5.0	4.9	4.7	4.6	4.5
Taylor (1999)	5.4	5.0	4.9	4.8	4.7	4.7
Inertial Taylor (1999)	5.4	5.0	4.7	4.6	4.4	4.5
First-difference	5.4	5.0	4.7	4.4	4.2	4.1
Optimal control	5.4	5.0	4.9	4.9	4.9	5.0
<i>Total PCE prices</i>						
Extended Tealbook baseline ¹	0.1	0.7	1.2	1.8	2.0	2.0
Taylor (1993)	0.1	0.7	1.2	1.9	2.0	2.1
Taylor (1999)	0.1	0.7	1.2	1.8	2.0	2.0
Inertial Taylor (1999)	0.1	0.7	1.2	1.8	2.0	2.0
First-difference	0.1	0.7	1.3	2.0	2.2	2.2
Optimal control	0.1	0.7	1.1	1.7	1.9	1.9
<i>Core PCE prices</i>						
Extended Tealbook baseline ¹	1.4	1.3	1.4	1.7	1.9	2.0
Taylor (1993)	1.4	1.3	1.4	1.7	2.0	2.1
Taylor (1999)	1.4	1.3	1.4	1.7	1.9	2.0
Inertial Taylor (1999)	1.4	1.3	1.4	1.7	1.9	2.0
First-difference	1.4	1.3	1.5	1.9	2.1	2.2
Optimal control	1.4	1.3	1.3	1.6	1.8	1.9
<i>Nominal federal funds rate³</i>						
Extended Tealbook baseline ¹	0.1	0.2	1.5	2.6	3.5	4.1
Taylor (1993)	0.1	0.2	2.8	3.4	4.0	4.1
Taylor (1999)	0.1	0.2	2.9	3.6	4.3	4.4
Inertial Taylor (1999)	0.1	0.2	1.5	2.6	3.5	4.1
First-difference	0.1	0.2	1.5	2.7	3.4	3.5
Optimal control	0.1	0.2	2.2	3.8	4.7	5.1

1. In the Tealbook baseline, the federal funds rate first departs from an effective lower bound of 12½ basis points in December of 2015. Thereafter, the federal funds rate follows the prescriptions of the inertial Taylor (1999) rule.

2. Percent, average for the final quarter of the period.

3. Effective rate in percent, average for the final quarter of the period.

Outcomes under Alternative Policies, Quarterly
(Four-quarter percent change, except as noted)

Measure and policy	2016				2017			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Real GDP</i>								
Extended Tealbook baseline ¹	2.4	2.1	2.3	2.5	2.4	2.3	2.2	2.0
Taylor (1993)	2.4	2.0	2.1	2.2	2.1	2.1	2.0	2.0
Taylor (1999)	2.4	2.0	2.0	2.1	2.0	1.9	1.9	1.8
Inertial Taylor (1999)	2.4	2.1	2.3	2.5	2.4	2.3	2.2	2.0
First-difference	2.4	2.2	2.3	2.6	2.6	2.5	2.4	2.3
Optimal control	2.4	2.0	2.1	2.2	2.0	1.8	1.7	1.6
<i>Unemployment Rate²</i>								
Extended Tealbook baseline ¹	4.9	4.8	4.8	4.7	4.7	4.6	4.6	4.6
Taylor (1993)	4.9	4.9	4.9	4.9	4.8	4.8	4.8	4.7
Taylor (1999)	4.9	4.9	5.0	4.9	4.9	4.9	4.9	4.8
Inertial Taylor (1999)	4.9	4.8	4.8	4.7	4.7	4.6	4.6	4.6
First-difference	4.9	4.8	4.8	4.7	4.6	4.5	4.5	4.4
Optimal control	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
<i>Total PCE prices</i>								
Extended Tealbook baseline ¹	0.9	0.7	0.8	1.2	1.6	1.7	1.8	1.8
Taylor (1993)	0.9	0.7	0.8	1.2	1.7	1.8	1.8	1.9
Taylor (1999)	0.9	0.7	0.8	1.2	1.6	1.7	1.7	1.8
Inertial Taylor (1999)	0.9	0.7	0.8	1.2	1.6	1.7	1.8	1.8
First-difference	0.9	0.8	0.9	1.3	1.8	1.9	1.9	2.0
Optimal control	0.9	0.7	0.8	1.1	1.5	1.6	1.6	1.7
<i>Core PCE prices</i>								
Extended Tealbook baseline ¹	1.4	1.3	1.3	1.4	1.5	1.5	1.6	1.7
Taylor (1993)	1.4	1.3	1.4	1.4	1.5	1.6	1.7	1.7
Taylor (1999)	1.4	1.3	1.3	1.4	1.5	1.5	1.6	1.7
Inertial Taylor (1999)	1.4	1.3	1.3	1.4	1.5	1.5	1.6	1.7
First-difference	1.5	1.4	1.4	1.5	1.6	1.7	1.8	1.9
Optimal control	1.4	1.3	1.3	1.3	1.4	1.4	1.5	1.6
<i>Nominal federal funds rate³</i>								
Extended Tealbook baseline ¹	0.5	0.8	1.1	1.5	1.8	2.0	2.3	2.6
Taylor (1993)	2.5	2.4	2.6	2.8	2.9	3.1	3.2	3.4
Taylor (1999)	2.5	2.5	2.7	2.9	3.0	3.2	3.4	3.6
Inertial Taylor (1999)	0.5	0.8	1.1	1.5	1.8	2.0	2.3	2.6
First-difference	0.5	0.8	1.2	1.5	1.8	2.1	2.4	2.7
Optimal control	0.7	1.2	1.7	2.2	2.6	3.1	3.4	3.8

1. In the Tealbook baseline, the federal funds rate first departs from an effective lower bound of 12½ basis points in December of 2015. Thereafter, the federal funds rate follows the prescriptions of the inertial Taylor (1999) rule.

2. Percent, average for the quarter.

3. Effective rate in percent, average for the quarter.

Appendix

POLICY RULES USED IN “MONETARY POLICY STRATEGIES”

The table below gives the expressions for the selected policy rules used in “Monetary Policy Strategies.” In the table, R_t denotes the effective nominal federal funds rate for quarter t , while the right-hand-side variables include the staff’s projection of trailing four-quarter core PCE inflation for the current quarter and three quarters ahead (π_t and $\pi_{t+3|t}$), the output gap estimate for the current period (gap_t), and the forecast of the three-quarter-ahead annual change in the output gap ($\Delta^4 gap_{t+3|t}$). The value of policymakers’ longer-run inflation objective, denoted π^{LR} , is 2 percent.

Taylor (1993) rule	$R_t = r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 0.5gap_t$
Taylor (1999) rule	$R_t = r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + gap_t$
Inertial Taylor (1999) rule	$R_t = 0.85R_{t-1} + 0.15(r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + gap_t)$
First-difference rule	$R_t = R_{t-1} + 0.5(\pi_{t+3 t} - \pi^{LR}) + 0.5\Delta^4 gap_{t+3 t}$

The first two of the selected rules were studied by Taylor (1993, 1999), while the inertial version of the Taylor (1999) rule has been featured prominently in analysis by Board staff.¹ The intercepts of these rules are chosen so that they are consistent with a 2 percent longer-run inflation objective and a longer-run real interest rate, denoted r^{LR} , of 1¼ percent, a value used in the FRB/US model. The prescriptions of the first-difference rule do not depend on the level of the output gap or the longer-run real interest rate; see Orphanides (2003).

Near-term prescriptions from the four policy rules are calculated using Tealbook projections for inflation and the output gap. For the rules that include the lagged policy rate as a right-hand-side variable—the inertial Taylor (1999) rule and the first-difference rule—the lines labeled “Previous Tealbook outlook” report prescriptions derived from the previous Tealbook projections for inflation and the output gap, while using the same lagged funds rate value as in the prescriptions computed for the current Tealbook. When the Tealbook is published early in a quarter, this lagged funds rate value is set equal to the actual value of the lagged funds rate in the previous quarter, and prescriptions are shown for the current quarter. When the Tealbook is published late in a quarter, the prescriptions are shown for the next quarter, and the lagged policy rate, for each of these rules, including those that use the “Previous Tealbook outlook,” is set equal to the average value for the policy rate thus far in the quarter. For the subsequent quarter, these rules use the lagged values from their simulated, unconstrained prescriptions.

¹ See, for example, Erceg and others (2012).

REAL FEDERAL FUNDS RATE ESTIMATES

The bottom panel of the exhibit, “Policy Rules and the Staff Projection,” provides an estimate of one notion of the equilibrium real federal funds rate, r^* . This measure is an estimate of the real federal funds rate that, if maintained over a 12-quarter period (beginning in the current quarter), makes the output gap equal to zero in the final quarter of that period using the output projection from FRB/US, the staff’s large-scale econometric model of the U.S. economy. This “Tealbook-consistent FRB/US r^* ” depends on broad array of economic factors, some of which take the form of projected values of the model’s exogenous variables. It is generated after the paths of exogenous variables in the FRB/US model are adjusted so that they match those in the extended Tealbook forecast. Model simulations then determine the value of the real federal funds rate that closes the output gap conditional on the exogenous variables in the extended baseline forecast.

The “current real federal funds rate” reported in the panel is constructed as the difference between the midpoint of the prevailing target range for the federal funds rate and the trailing four-quarter change in the core PCE price index.

The “average projected real federal funds rate” reported in the panel is constructed as the 12-quarter average of the current real federal funds rate described above and its projections over the next 11 quarters under the Tealbook baseline. This calculation is comparable to the one used to generate r^* . However, while r^* and the average projected real federal funds rate are calculated over the same 12-quarter period, they need not be associated with the same macroeconomic outcomes even when their values are identical. The reason is that, in the r^* simulations, the real federal funds rate is held constant over the entire 12-quarter period to close the output gap at the end of this timeframe whereas, in the Tealbook baseline, the real federal funds rate can vary over time. Distinct paths of real short-term rates can, in turn, generate different paths for inflation and economic activity.

FRB/US MODEL SIMULATIONS

The exhibits of “Monetary Policy Strategies” that report results from simulations of alternative policies are derived from dynamic simulations of the FRB/US model. Each simulated policy rule is assumed to be in force over the whole period covered by the simulation; this period extends several decades beyond the time horizon shown in the exhibits. The simulations are conducted under the assumption that market participants as well as price and wage setters have perfect foresight, and are predicated on the staff’s extended Tealbook projection, which includes the macroeconomic effects of the Committee’s large-scale asset purchase programs. When the Tealbook is published early in a quarter, all of the simulations begin in that quarter. However, when the Tealbook is published late in a quarter, all of the simulations begin in the subsequent quarter.

COMPUTATION OF THE OPTIMAL CONTROL POLICY UNDER COMMITMENT

The optimal control simulations posit that policymakers minimize a discounted sum of weighted squared deviations of four-quarter headline PCE inflation (π_t^{pce}) from the Committee's 2 percent objective, of squared deviations of the unemployment rate from the staff's estimate of the natural rate (this difference is also known as the unemployment rate gap, $ugap_t$), and of squared changes in the federal funds rate. The resulting loss function, shown below, embeds the assumptions that policymakers discount the future using a quarterly discount factor $\beta = 0.9963$ and place equal weights on squared deviations of inflation, the unemployment gap, and federal funds rate changes (that is, $\lambda_\pi = \lambda_{ugap} = \lambda_R$).

$$L_t = \sum_{\tau=0}^T \beta^\tau \{ \lambda_\pi (\pi_{t+\tau}^{pce} - \pi^{LR})^2 + \lambda_{ugap} (ugap_{t+\tau})^2 + \lambda_R (R_{t+\tau} - R_{t+\tau-1})^2 \}$$

The optimal control policy is the path for the federal funds rate that minimizes the above loss function in the FRB/US model, subject to the effective lower bound constraint on nominal interest rates, under the assumption of perfect foresight, and conditional on the staff's extended Tealbook projection. Policy tools other than the federal funds rate are taken as given and subsumed within the Tealbook baseline. The path chosen by policymakers today is assumed to be credible, meaning that decision makers in the model see this path as being a binding commitment on the future Committees; the optimal control policy takes as given the lagged value of the federal funds rate but is otherwise unconstrained by policy decisions made prior to the simulation period. The discounted losses are calculated over a period that ends sufficiently far into the future that extending that period farther would not affect the policy prescriptions shown in the exhibits.

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Monetary Policy Alternatives

This month's meeting presents the Committee with three key policy decisions: first, whether to raise the target range for the federal funds rate;¹ second, what guidance to give the public regarding the most likely future path for the federal funds rate; and third, what to say about conditions that would result in a different path for the federal funds rate.

With regard to the first decision, the Committee set out, in March, two criteria for increasing the target range, namely "further improvement" in labor market conditions (later amended to "some further improvement") and "reasonable confidence" that inflation would return, over the medium term, to the Committee's 2 percent longer-run goal. Nonfarm payroll gains have averaged about 200,000 per month over the nine months since February—the latest month for which data were available when the Committee set out the criteria—and the two labor market reports received since the October meeting show that the lull in employment gains in late summer has given way to renewed strength. The unemployment rate declined ½ percentage point since February, to 5.0 percent, and long-term unemployment has fallen about ½ percentage point.² More recently, while net exports have continued to be a drag on GDP growth, manufacturing sector output has firmed and real GDP has been expanding at a moderate pace with notable improvement in domestic final sales, suggesting labor market conditions will likely continue to strengthen. On the inflation front, core and headline inflation, measured on a 12-month basis, have remained at subdued levels, and the recent oil price declines will likely add, for a time, to the downward pressure that is temporarily holding down headline inflation. Meanwhile, market-based measures of longer-term inflation compensation remain low and some measures of longer-term survey expectations edged down.

The draft statements presented below—labeled Alternative A, Alternative B, and Alternative C—offer different assessments of realized and expected progress toward the Committee's dual mandate objectives and its two criteria for liftoff, along with

¹ A decision to raise the target range for the federal funds rate would be accompanied by decisions to increase the interest rates paid on excess reserves and overnight reverse repos, as well as the primary credit rate.

² Both the October and November employment reports were regarded as positive surprises by financial markets, with strength perceived in many labor market indicators.

corresponding policy choices. On inflation, Alternatives B and C acknowledge that it has continued to run below the Committee's objective, but then state that inflation is "expected to rise to 2 percent over the medium term," and that the Committee is "reasonably confident" that this will occur as "the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further." Alternative B also states that market-based measures of inflation compensation "remain low" and that "some" survey-based measures have "edged down." Alternative C is more sanguine in its assessment of longer-term inflation expectations, stating that market-based measures have "stabilized" and that survey-based measures have "generally remained stable." Alternative B retains the cautionary note from the October statement's second paragraph that says the Committee "continues to monitor inflation developments closely," whereas Alternative C drops this language. Alternative A, by contrast, emphasizes that "inflation, core inflation, and gains in labor compensation all [remain] subdued," and highlights that the Committee "will closely monitor measures of actual and expected inflation."

In contrast, the three alternatives describe developments in the labor market (and real activity) identically: There has been "further improvement" in labor market indicators that "confirms" that underutilization of labor resources has diminished "appreciably" since early this year.

Alternatives B and C state that both of the criteria for raising the federal funds rate have been met and therefore announce an increase in the target range. Alternative A recognizes the improvement in the labor market, but emphasizes that inflation, core inflation, and gains in labor compensation all remain subdued and so maintains the current target range.

With regard to the second decision, namely what forward guidance the Committee might choose to provide about its current view of the modal path for the federal funds rate, it is useful to review market expectations and policymakers' role in their evolution over time. On the eve of the October FOMC meeting, market participants placed less-than-even odds on liftoff occurring before the end of this year. However, the postmeeting statement for October, and the minutes for that meeting, emphasized that an increase in the target range for the federal funds rate at the December meeting was a distinct possibility, provided that incoming data turned out to be consistent with the Committee's

outlook.³ In combination, FOMC communications and the uniformly strong labor market reports for October and November boosted the perceived probability of liftoff in December to around 90 percent.⁴ All told, surveys and market conditions suggest that money market rates will be about in the target range immediately after a liftoff decision is announced; see the accompanying box “Expectations For Money Market Rates Following Liftoff”.

Market participants have long expected that normalization of the stance of monetary policy will proceed more gradually this time than during the 1994 and 2004 tightening cycles, and more gradually than was anticipated at the onset of those episodes. Recent policy communications appear to have reinforced those expectations. Currently, federal funds rate futures suggest that market participants anticipate approximately two 25 basis point increases in the federal funds rate per year in 2016 and 2017, while the Survey of Primary Dealers and the Survey of Market Participants point to three or four such increases per year. In contrast, the December Tealbook assumption is for approximately five increases over each of the two years. The accompanying box, “The Federal Funds Rate Path: Market Expectations and Risk Scenarios” surveys the available information on this subject.

Returning to the statements, Alternatives B and C both note that “the stance of monetary policy remains accommodative” after liftoff, with Alternative B suggesting that this policy stance is intended to support further improvement in the labor market and a return of inflation to 2 percent, while Alternative C is silent on this issue. In addition, Alternatives B and C shift the emphasis of policy communication from “how long to maintain” the target range, as in the October statement, to “the timing and size of future adjustments” of the target range. While this new language would be read, initially, as

³ As of the October meeting, the Committee expected economic activity to expand at a moderate pace, labor market indicators to continue to improve, and inflation to rise gradually toward 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate.

⁴ Market assessments of the probability of liftoff occurring December rose from about 30 percent just before the October FOMC, to about 55 percent after the postmeeting statement; subsequent communications from FOMC participants raised the probability a bit further. The probability rose from about 60 percent just prior to the employment situation report for October to about 70 percent afterward; the employment situation report for November had only small additional effects. Federal funds futures now suggest the probability of a December liftoff is about 80 to 95 percent. Respondents to the Desk’s Survey of Primary Dealers and Survey of Market Participants estimate, on average, that the probability is around 90 percent, up from 37 percent in the October survey. The “Financial Developments” section of Tealbook A provides more details.

Expectations For Money Market Rates Following Liftoff

Term money market rates have moved up notably in recent weeks, reflecting market expectations for an increase in policy rates at the December FOMC meeting. As shown in the figure below, the 3-month Treasury bill yield and the 3-month LIBOR rate have increased since the end of October and are currently 25 basis points and 17 basis points, respectively, above their monthly averages prior to the October FOMC meeting. These rates, and other term money market rates, can be used to calculate implied forward interest rates that market prices imply will prevail following the December FOMC meeting.¹ Implied forward rates can supplement measures of expectations derived from surveys or from interest rate derivatives, the latter of which are regularly presented in Tealbook A to project the path of the federal funds rate.

The implied forward rates reported in the table below point to an increase in money market rates immediately following the December FOMC meeting. We calculate market expectations for money market rates for the week immediately following the December FOMC meeting conditional on liftoff, using a liftoff probability of 90 percent from the Desk's December Survey of Primary Dealers and ignoring term premiums. The implied forward rates, presented in the top panel, range from 25 basis points to 47 basis points, about 20 basis points above their current levels. These results suggest that markets seem to anticipate that, in the event of liftoff, money market rates will roughly be in the assumed target range for the federal funds rate of 25 to 50 basis points.²

Market prices suggest that the OIS rate, the Treasury GC repo rate, and Treasury bill yields will remain within or slightly above the 25 to 50 basis point range in early 2016, as shown in the bottom panel of the table. Eurodollar, LIBOR, as well as AA financial and non-financial commercial paper rates are expected to be at similar levels in early 2016, ranging from 41 basis points to 59 basis points.

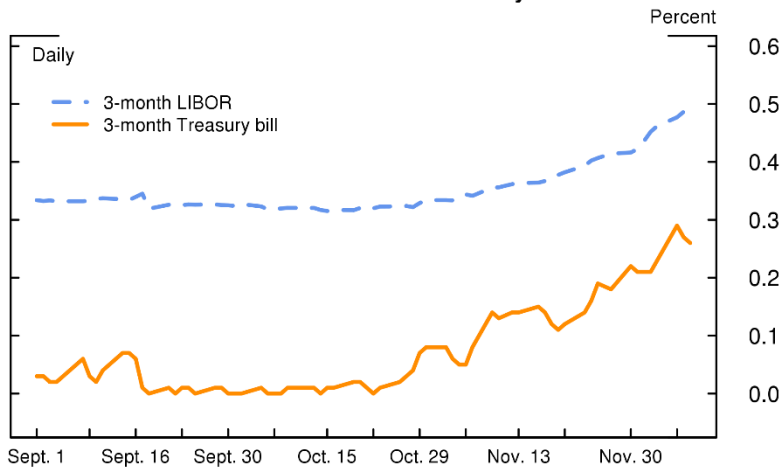
The implied forward rates presented are based on specific assumptions. Alternative assumptions would imply different, and potentially much different, expected money market rates. First, market participants may demand a positive term premium for holding longer-dated money market instruments, which would suggest that the implied rates reported here are too high. Second, using a lower (or higher) probability of liftoff in December would lead to higher (or lower) implied post-liftoff rates. In addition, term pricing may reflect market participants' views of rate distortions that are associated with reporting dates, and some term contracts extend beyond the January FOMC meeting to which some market participants may assign a positive

¹ A forward rate is the interest rate that is implied from two spot rates of differing maturities for the period of time between the two maturities. For example, a 1-week spot rate and a 2-week spot rate can be used to calculate a 1-week rate that would prevail one week from now.

² Treasury bill yields are subject to year-end pressures and other pricing dynamics, which might lead to their levels being a bit below the anticipated target range for the federal funds rate.

probability of an increase in the target range. Nonetheless, these market-implied expectations are broadly consistent with expectations for money market rates from the Desk's December Survey of Primary Dealers. The median expectations from the survey for the effective federal funds rate, the Treasury GCF repo rate, and the 3-month Treasury bill yield immediately following liftoff are 34, 40, and 25 basis points, respectively, a noticeable upward shift from their current levels.

3-month LIBOR and 3-month Treasury Bill Yield



Source: Federal Reserve Board and Bloomberg.

**Implied Forward Rates Conditional on Liftoff
(percent, annual rate)**

	1-week rate, Dec. 17, 2015	Memo: 1-week spot rate, Dec. 3, 2015
OIS	0.36	0.12
Treasury GC Repo	0.47	0.24
Treasury bill	0.25	0.05
	2-month rate, Jan. 3, 2016	Memo: 2-month spot rate, Dec. 3, 2015
OIS	0.36	0.30
Treasury GC Repo	0.52	0.43
Treasury bill	0.31	0.16
Eurodollar	0.43	NA
LIBOR	0.59	0.35
Fin. CP	0.58	0.31
Nonfin. CP	0.41	0.24

Note: All rates are conditional on liftoff with a probability of 90 percent (and a 10 percent probability that forward rates are the same as the overnight spot rates as of Dec. 3). Term premiums are set to zero basis points for each instrument. In the top panel, 2- and 3-week term instruments are used; in the bottom panel, 1-month and 3-month instruments are used. Source: Federal Reserve Board, Staff calculations, Primary Dealer Survey, and Bloomberg.

Alternatives

The Federal Funds Rate Path: Market Expectations and Risk Scenarios

Financial market quotes indicate that investors currently place high odds on a rate increase at the December FOMC meeting, higher than was the case immediately before the 1994 tightening move and only modestly lower than the near-certain odds seen ahead of the 2004 interest rate increase (table 1).

By comparison, the expected pace of tightening after liftoff, measured from money market futures rates, remains significantly below both the expected and the actual pace of tightening in the two previous episodes (table 1).¹ Moreover, the expected pace has declined slightly over the past year, in contrast to the 1994 tightening, when the expected pace remained about unchanged over the preceding 12 months, as well as the 2004 tightening, when the expected pace increased sharply over the preceding three months in response to rapid improvements in the labor market (figure 2). Meanwhile, uncertainty about the expected policy path changed little over the past year, and is well below the levels seen during the previous tightening episodes (figure 3). Overall, money market quotes indicate a strong conviction that the increase in the target rate after the liftoff will be gradual.

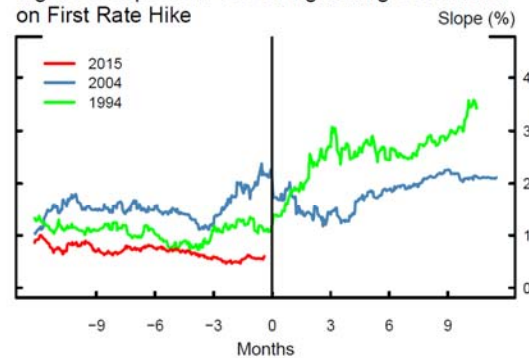
Alternatives

Table 1: Liftoff Probability and Cumulative Amount of Tightening Twelve Months After Liftoff

	Probability of liftoff the day before the FOMC*	Expected tightening* (basis points)	Actual tightening (basis points)
1994	67%	126	275
2004	100%	224	200
2015	80–95%**	57	–

* Probability of liftoff derived from implied rates on federal funds futures contracts. Expected tightening derived from Eurodollar futures and basis swap.
 ** As of Dec. 8, based on the contract expiring in December 2015. Estimates of the probability of liftoff fall in the reported range depending on the technical assumptions underlying the calculations.
 Source: CME, staff calculations.

Figure 2: Expected Pace of Tightening Conditional on First Rate Hike

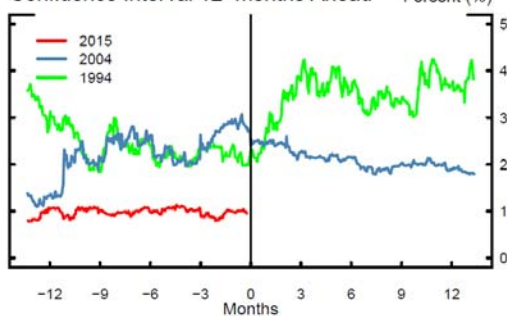


Note: The difference in expected federal funds rate one year after liftoff and federal funds rate upon liftoff based on Eurodollar futures and basis swap.
 Source: CME, staff calculations.

According to data collected by the CFTC, non-commercial net long positions in interest rate futures declined in recent months, suggesting that speculative traders now have little exposure to increases in short-term interest rates (figure 4). By contrast, before the taper tantrum in the summer of 2013, speculative investors had accumulated a large amount of net long positions in interest rate futures, which were quickly unwound in subsequent months, amplifying the initial interest rate increase.

¹ The expected pace of tightening after the initial rate hike is measured as the difference between the futures-implied expected policy rates on two dates—the date where the expected policy path crosses the value corresponding to first hike and the date one-year thereafter. For the current episode, we assume that the federal funds rate will trade in the middle of the new target range of 25 to 50 basis points after liftoff.

Figure 3: Width of 90% Federal Funds Rate Confidence Interval 12-months Ahead Percent (%)



Note: Computed from the term structures for the expected federal funds rate and implied volatility.
Source: CME; staff calculations.

Figure 4: Net Non-Commercial Positions in Interest Rate Futures Thousands of Contracts



Source: CFTC.

The experience from the taper tantrum suggests that, even when asset prices indicate a subdued level of uncertainty surrounding the expected policy path, futures rates and spot interest rates can still jump higher if incoming information leads investors to substantially revise their views about the future course of monetary policy. Below we discuss two possible scenarios in which such a sharp increase could occur in response to policy tightening.

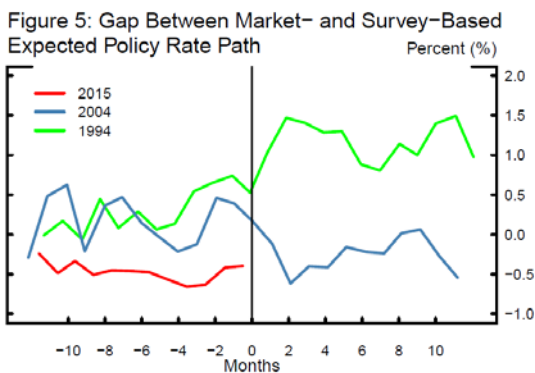
First, market participants appear to have placed for some time now very low odds on the possibility of a pace of federal funds rate increases similar to or above the one prevailing during 2004–05. While over the most recent period economic activity has expanded at a moderate pace, a sharp upward revision in the expected policy rate path might occur if economic data comes in notably above market expectations in coming months. That said, investors did not appear to revise their expectations about the pace of tightening significantly in response to data surprises such as those associated with nonfarm payroll releases. Indeed, the expected pace of tightening has been nearly flat over the past year and remained much more stable than that seen ahead of the 1994 and 2004 tightenings.

Second, survey respondents appear to see a somewhat faster pace of tightening than that implied by futures rates. For example, the median dealer in the latest Desk survey sees the target rate at about 2 percent at the end of 2017. This is roughly in line with the median projections from the September SEP that are consistent with the target range for the federal funds rate being raised about 4 to 5 times a year by 25 basis points each. Although both the SEP and primary dealer projections indicate a notably slower pace of tightening than what actually occurred during the 1994 and 2004 episodes, both projections currently lie well above the futures-based policy path. A convergence of the futures-based path towards the survey-based one would result in significant increases in money market futures rates and the market-based policy rate path.

An examination of the historical behavior of the gap between market- and survey-based paths suggests that its current negative level is somewhat unusual: although the gap had at times turned negative, those instances occurred mostly when interest rates were declining amid a darkening economic outlook. The gap was positive ahead of the 1994 and 2004 tightenings, with survey-based forecasts somewhat below market-based paths, but it moved in opposite directions following the initial rate increases (figure 5).

Several explanations have been proposed to explain the current negative gap, including: (1) The lower futures rates might be a reflection of more pessimistic views among traders about the future economic outlook than survey respondents; (2) Concerns about downside tail risks would have reduced mean expectation measures, such as those derived from future rates, but would leave little imprint on modal expectation measures, such as survey forecasts; (3) Some investors are said to have repeatedly suffered losses in the past from positions aimed at profiting in rising rate scenarios and are currently wary of establishing similar positions despite their conviction that liftoff is imminent; (4) Investors might have increasingly viewed interest rate futures and Treasury securities as good hedges against economic downturns and so stand willing to accept relatively low expected returns on these instruments in light of their “insurance value” in some adverse scenarios, and (5) The perception of a persistent policy divergence between the U.S. and other advanced economies, as many foreign central banks have continued to ease to stimulate their economies while the FOMC moves closer to tightening, might have led to increased investor demand from overseas for long positions in U.S. money market futures, reducing their implied rates.

The evolution of the market-based expected policy path during the process of policy normalization depends critically on which combination of these factors are at work. If (1) and (2) are the main reasons behind the negative gap and the onset of policy tightening is seen as a positive signal that leads investors to scale back significantly their assessment of the downside risks to the economy, the futures-based policy path could be revised upward significantly. Revisions in the expected policy path could be even more significant if policy tightening triggers a large amount of positions being established that are predicated upon additional rate increases, as in the case of (3). In contrast, if risk premium-based explanations, such as (4) and (5), are the major drivers of the negative gap, the gap may not change significantly after liftoff, as covariance patterns that determine the hedging properties of money market futures or the degree of policy divergence across countries are unlikely to be altered significantly by a gradual process of policy tightening.



Note: The difference between the implied rates on Eurodollar futures contracts maturing in one year and the 1-year ahead forecast of 3-month LIBOR from Blue Chip Financial Forecasts.
Source: CME and Blue Chip Financial Forecasts.

pointing to further increases in the target range, it would also allow for future reductions if they become appropriate.

By contrast, Alternative A would not only reaffirm that the current target range remains appropriate and that the liftoff criteria remain unchanged, it would also signal concerns about the future course of inflation. In particular, Alternative A includes a sentence indicating that the Committee “is prepared to provide additional accommodation if incoming information does not soon indicate that inflation is moving up toward 2 percent.” Thus, unlike the October statement, Alternative A would suggest that a decision against lifting off from the effective lower bound at this meeting would be more than a minor adjustment in the timing of liftoff. Alternative A would therefore likely result in a substantial pushing out of the date of liftoff expected by market participants.

Alternatives B and C state that, in determining “the timing and size” of future “adjustments” to the target range, the Committee will assess realized and expected economic conditions relative to its mandated objectives. Alternative B provides guidance indicating that the Committee expects economic conditions to evolve in a manner that will warrant “only gradual” increases in the federal funds rate; Alternative C differs by omitting the word “only.” Both also state that the level of the federal funds rate will probably remain, “for some time,” below levels likely to prevail in the longer run.

Turning to the Committee’s third decision, the conditions that would result in a different path for the funds rate than the modal one, Alternatives B and C state that the “actual path of the federal funds rate” would be informed by how the incoming data affect the economic outlook. In this context, Alternative B signals some concern regarding the inflation outlook by including, in paragraph 4, a sentence—one that does not appear in Alternative C—that states that “In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal.” All three Alternatives drop the “balanced approach” language that for quite some time has been used to characterize how the Committee might have responded to changes in the economic outlook once normalization begins.

Finally, regarding communication of the Committee’s policy for SOMA portfolio reinvestment, the three Alternatives span the range of qualitative guidance discussed during the September 2015 meeting. In particular, Alternative A simply says that the Committee is continuing its existing reinvestment policy, while Alternative B indicates that the Federal Reserve anticipates continuing to reinvest until normalization of the

federal funds rate “is well under way,” and Alternative C has the Federal Reserve continuing to reinvest “at least during the early stages” of normalization.⁵

The next pages contain the October postmeeting statement, the three draft statements, and summaries of the arguments for each alternative. These elements are followed by the draft directive for Alternative A, then by a draft implementation note (which includes the directive for Alternatives B and C), and finally by a draft of a desk statement regarding overnight reverse repurchase operations. If the Committee were to adopt Alternative B or C, the implementation note would be released with the Committee’s postmeeting statement, and the Desk statement would be released shortly thereafter.

⁵ The median respondent in the Survey of Primary Dealers anticipated that reinvestment would end 12 months after liftoff, for both Treasury securities and MBS, up from 9 months reported in the October survey.

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OCTOBER 2015 FOMC STATEMENT

1. Information received since the Federal Open Market Committee met in September suggests that economic activity has been expanding at a moderate pace. Household spending and business fixed investment have been increasing at solid rates in recent months, and the housing sector has improved further; however, net exports have been soft. The pace of job gains slowed and the unemployment rate held steady. Nonetheless, labor market indicators, on balance, show that underutilization of labor resources has diminished since early this year. Inflation has continued to run below the Committee's longer-run objective, partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation moved slightly lower; survey-based measures of longer-term inflation expectations have remained stable.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that, with appropriate policy accommodation, economic activity will expand at a moderate pace, with labor market indicators continuing to move toward levels the Committee judges consistent with its dual mandate. The Committee continues to see the risks to the outlook for economic activity and the labor market as nearly balanced but is monitoring global economic and financial developments. Inflation is anticipated to remain near its recent low level in the near term but the Committee expects inflation to rise gradually toward 2 percent over the medium term as the labor market improves further and the transitory effects of declines in energy and import prices dissipate. The Committee continues to monitor inflation developments closely.
3. To support continued progress toward maximum employment and price stability, the Committee today reaffirmed its view that the current 0 to $\frac{1}{4}$ percent target range for the federal funds rate remains appropriate. In determining whether it will be appropriate to raise the target range at its next meeting, the Committee will assess progress—both realized and expected—toward its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. The Committee anticipates that it will be appropriate to raise the target range for the federal funds rate when it has seen some further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term.
4. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.
5. When the Committee decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent. The Committee currently anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions

may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.

ALTERNATIVE A FOR DECEMBER 2015

1. Information received since the Federal Open Market Committee met in ~~September~~ **October** suggests that economic activity has been expanding at a moderate pace. Household spending and business fixed investment have been increasing at solid rates in recent months, and the housing sector has improved further; however, net exports have been soft. ~~The pace of job gains slowed and the unemployment rate held steady.~~ Nonetheless, **A range of recent labor market indicators, on balance, including ongoing job gains and declining unemployment, show further improvement and confirms** that underutilization of labor resources has diminished **appreciably** since early this year. **In contrast, both overall and core inflation has have** continued to run below the Committee's longer-run objective, **only** partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation ~~moved slightly lower~~ **remain low; some** survey-based measures of longer-term inflation expectations have ~~remained stable~~ **edged down**.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that, with appropriate policy accommodation, economic activity will expand at a moderate pace, with labor market indicators continuing to move toward levels the Committee judges consistent with its dual mandate. The Committee continues to see the risks to the outlook for economic activity and the labor market as nearly balanced but is monitoring global economic and financial developments. Inflation is anticipated to remain near its recent low level in the near term but the Committee expects inflation to rise gradually toward 2 percent over the medium term as the labor market improves further and the transitory effects of declines in energy and import prices **eventually** dissipate. The Committee continues to **will closely** monitor **measures of actual and expected** inflation developments closely.
3. ~~To support continued progress toward maximum employment and price stability~~ **With inflation, core inflation, and gains in labor compensation all subdued, and with market-based measures of inflation compensation and survey-based measures of longer-term inflation expectations both low,** the Committee today reaffirmed its view that the current 0 to ¼ percent target range for the federal funds rate remains appropriate. In determining ~~whether it will be appropriate to raise the~~ **how long to maintain this** target range ~~at its next meeting,~~ the Committee will assess progress—both realized and expected—toward its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. ~~The Committee anticipates that it will be appropriate to raise the target range for the federal funds rate when it has seen some further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term.~~ **The Committee is prepared to provide additional accommodation if incoming information does not soon indicate that inflation is moving up toward 2 percent.**
4. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency

mortgage-backed securities and of rolling over maturing Treasury securities at auction. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.

5. ~~When the Committee decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer run goals of maximum employment and inflation of 2 percent. The Committee currently anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.~~

ALTERNATIVE B FOR DECEMBER 2015

Alternatives

1. Information received since the Federal Open Market Committee met in ~~September~~ **October** suggests that economic activity has been expanding at a moderate pace. Household spending and business fixed investment have been increasing at solid rates in recent months, and the housing sector has improved further; however, net exports have been soft. ~~The pace of job gains slowed and the unemployment rate held steady. Nonetheless,~~ **A range of recent labor market indicators, on balance, including ongoing job gains and declining unemployment, show further improvement and confirms** that underutilization of labor resources has diminished **appreciably** since early this year. Inflation has continued to run below the Committee's **2 percent** longer-run objective, partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation ~~moved slightly lower~~ **remain low; some** survey-based measures of longer-term inflation expectations have ~~remained stable~~ **edged down**.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee **currently** expects that, with appropriate policy accommodation **gradual adjustments in the stance of monetary policy**, economic activity will **continue to** expand at a moderate pace, with **and** labor market indicators ~~continuing to move toward levels the Committee judges consistent with its dual mandate~~ **will continue to strengthen. Overall, taking into account domestic and international developments,** the Committee ~~continues to see~~ the risks to the outlook for **both** economic activity and the labor market as ~~nearly balanced but is monitoring global economic and financial developments.~~ Inflation is anticipated to remain near its recent low level in the near term but the Committee expects inflation **expected** to rise gradually toward **to** 2 percent over the medium term as the labor market improves further and the transitory effects of declines in energy and import prices dissipate **and the labor market strengthens further.** The Committee continues to monitor inflation developments closely.
3. ~~To support continued progress toward maximum employment and price stability, the Committee today reaffirmed its view that the current 0 to ¼ percent target range for the federal funds rate remains appropriate.~~ **The Committee judges that there has been considerable improvement in labor market conditions this year, and it is reasonably confident that inflation will rise, over the medium term, to its 2 percent objective. Given the economic outlook, and recognizing the time it takes for policy actions to affect future economic outcomes, the Committee decided to raise the target range for the federal funds rate to ¼ to ½ percent. The stance of monetary policy remains accommodative after this increase, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.**
4. In determining whether it will be appropriate to raise **the timing and size of future adjustments to** the target range **for the federal funds rate** at its next meeting, the Committee will assess ~~progress both realized and expected~~ **economic conditions** toward **relative to** its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation

expectations, and readings on financial and international developments. **In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal.** The Committee anticipates **expects** that it will be appropriate to raise the target range for the federal funds rate when it has seen some further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the ~~medium term~~ **economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.**

5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, **and it anticipates doing so until normalization of the level of the federal funds rate is well under way.** This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.
6. ~~When the Committee decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent. The Committee currently anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.~~

ALTERNATIVE C FOR DECEMBER 2015

Alternatives

1. Information received since the Federal Open Market Committee met in ~~September~~ **October** suggests that economic activity has been expanding at a moderate pace. Household spending and business fixed investment have been increasing at solid rates in recent months, and the housing sector has improved further; however, net exports have been soft. ~~The pace of job gains slowed and the unemployment rate held steady. Nonetheless,~~ **A range of recent labor market indicators, on balance, including ongoing job gains and declining unemployment, show further improvement and confirms** that underutilization of labor resources has diminished **appreciably** since early this year. Inflation has continued to run below the Committee's **2 percent** longer-run objective, partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation ~~moved slightly lower~~ **stabilized**; survey-based measures of longer-term inflation expectations ~~have~~ **generally** remained stable.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee **currently** expects that, with appropriate policy accommodation **adjustments in the stance of monetary policy,** economic activity will **continue to** expand at a moderate pace, with **and** labor market indicators ~~continuing to move toward~~ **will continue to strengthen** levels the Committee judges consistent with its dual mandate. **Overall, taking into account domestic and international developments,** the Committee ~~continues to see~~ the risks to the outlook for **both** economic activity and the labor market as ~~nearly~~ balanced but is monitoring global economic and financial developments. Inflation is anticipated to remain near its recent low level in the near term but the Committee expects inflation **expected** to rise gradually toward **to** 2 percent over the medium term as the labor market improves further and the transitory effects of declines in energy and import prices dissipate **and the labor market strengthens further.** The Committee ~~continues to monitor inflation developments closely.~~
3. ~~To support continued progress toward maximum employment and price stability, the Committee today reaffirmed its view that the current 0 to ¼ percent target range for the federal funds rate remains appropriate.~~ **The Committee judges that there has been considerable improvement in labor market conditions this year, and is reasonably confident that inflation will rise, over the medium term, to its 2 percent objective. Given the economic outlook, and recognizing the time it takes for policy actions to affect future economic outcomes, the Committee decided to raise the target range for the federal funds rate to ¼ to ½ percent. Even after this increase, the stance of monetary policy remains accommodative.**
4. In determining whether it will be appropriate to raise **the timing and size of future adjustments to** the target range **for the federal funds rate** at its next meeting, the Committee will assess ~~progress both realized and expected~~ **economic conditions** toward **relative to** its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. The Committee ~~anticipates~~ **expects** that it will be appropriate to raise the target range for

~~the federal funds rate when it has seen some further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term~~ **economic conditions will evolve in a manner that will warrant gradual increases in the target for the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.**

5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, **and anticipates doing so at least during the early stages of normalization of the federal funds rate.** This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.
6. ~~When the Committee decides to begin to remove policy accommodation, it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent. The Committee currently anticipates that, even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run.~~

THE CASE FOR ALTERNATIVE B

Alternatives

Policymakers may see the two labor market reports received since the October FOMC and, in particular, the breadth of labor market improvements reported therein, as supporting the view that “further improvement” has been realized in labor market conditions. Other labor market data, such as new claims for unemployment insurance, may reinforce that assessment. Policymakers might also regard recent information about consumer spending and the housing sector, and developments in fiscal policy, as suggesting that the ongoing expansion in the domestic economy is strong enough to sustain further labor market gains. Moreover, with the unemployment rate at 5.0 percent, policymakers may anticipate that further strengthening of the labor market might generate some welcome upward pressure on inflation. Policymakers may observe that while all-items inflation generally has continued to run well below 2 percent, core measures, such as CPI inflation excluding food and energy prices, and trimmed-mean inflation, have come in closer to 2 percent and about as expected, and show signs of turning up. They might also take comfort from analyses indicating that low levels of market-based measures of long-term inflation compensation can largely be attributed to liquidity and inflation-risk premiums, and from the observation that these measures have edged up, on net, in recent weeks. They might further note that although some survey-based measures have declined recently, these movements might be attributable to recent low levels of energy prices and headline inflation, and therefore probably do not indicate a deterioration in longer-term inflation expectations themselves. For these and other reasons, policymakers might be “reasonably confident” that headline inflation will move back to the Committee’s 2 percent objective over the medium term, once the downward pressure on domestic consumer prices from the pass-through of declines in global commodity prices and appreciation of the dollar dissipate, and as the labor market strengthens further. Thus policymakers may regard the criteria for policy firming introduced in the Committee’s March statement as having been satisfied and therefore support Alternative B, which announces a 25 basis point increase in the target range for the federal funds rate to $\frac{1}{4}$ to $\frac{1}{2}$ percent.

At the same time, policymakers may see room for some further improvement in the labor market along margins such as labor force participation or the number of persons employed part time for economic reasons, and it may judge that a further increase in labor utilization could help speed the return of inflation to the 2 percent objective. Moreover, policymakers may expect the economic forces that have long been restraining economic growth to recede only slowly. Accordingly, they may conclude that gradual

post-liftoff adjustments of the federal funds rate would be appropriate, at least for a time, to support further strengthening of labor market conditions and to mitigate the risks of returning to the effective lower bound. They might also judge that the message of gradualism in Alternative B is properly tempered by its emphasis that it is the expected “evolution of economic conditions” that “will warrant only gradual increases in the federal funds rate,” and that “the actual path” will depend on how incoming data inform the Committee’s economic outlook.

The data received over the past few months, combined with participants’ communications about their interpretations of those data, have succeeded in pulling forward market expectations of the time of liftoff: in contrast to the situation in October, respondents to the Desk’s Survey of Primary Dealers and its Survey of Market Participants now place odds of about 90 percent on a rate hike at this meeting. Moreover, the expected future path for the target range is in line with “only gradual increases in the federal funds rate.” In light of the data and market participants’ response to those data, policymakers might regard the December meeting as a propitious time for the first increase in the federal funds rate in nine years. Market reaction to a statement along the lines of Alternative B is likely to be muted. However, the indication in paragraph 3 that the Committee is seeking further improvement in labor market conditions, the hint at downside risks for inflation in paragraph 2, and the sentence in paragraph 4 indicating that “In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal,” might be construed as more accommodative than expected. Insofar as this is the case, medium- and longer-term real interest rates, and the foreign exchange value of the dollar, would decline, and equity prices would rise. Whether inflation compensation would rise or fall would depend on perceptions of the efficacy of monetary policy: the signal of downside risk to inflation could push inflation compensation down, all else equal, but noting in the statement an awareness of the issue, together with the positive sentiment communicated by the liftoff decision itself, may push in the opposite direction. Of course, the SEP and the Chair’s postmeeting press conference will also affect market reactions.

THE CASE FOR ALTERNATIVE C

Some policymakers may concur with proponents of Alternative B that the criteria for liftoff of the federal funds rate from the effective lower bound have been met, but might not see the same downside risks to inflation, and may judge that with the

unemployment rate at 5.0 percent, slack in the labor market has essentially been absorbed.

On inflation, these policymakers might be encouraged by the recent stability in market-based measures of longer-term inflation compensation and be unconcerned by the recent modest declines in certain survey measures of inflation expectations on the grounds that the latter can be largely explained by recent declines in energy prices and headline inflation, and are therefore not a harbinger of an unanchoring of inflation expectations. They might judge that the other prominent sources of downward pressure on inflation—the recent appreciation of the dollar and the decline in nonoil import prices—are likely restraining core as well as headline inflation, but only temporarily. They might instead worry that allowing the unemployment rate to undershoot its longer-run normal level for an extended period as a conscious act of policy risks eliciting an upward drift of inflation expectations, possibly along the lines of the alternative scenario “Faster Growth with Higher Inflation.” For these reasons, among others, these policymakers might prefer Alternative C’s omission of the reference to “the current shortfall of inflation from 2 percent” that appears in paragraph 4 of Alternative B.

Regarding the labor market, the breadth of the improvement in recent job market reports might lead these policymakers to conclude that there is little in the way of “hidden slack.” Accordingly, they might argue that the Committee should not signal, as does the language of Alternative B, that the still-accommodative stance of monetary policy, after liftoff, is designed to support “further improvement in labor market conditions and a return to 2 percent inflation.”

In addition, some policymakers may note that, for about a year now, most of the simple policy rules and optimal control simulations in the “Monetary Policy Strategies” section of Tealbook B have called for policy tightening to begin. They might agree that there were good risk-management reasons to delay liftoff, relative to the prescriptions of these risk-neutral, perfect-foresight simulations. But given the recent re-emergence of strength in the labor market, these policymakers might choose, contrary to Alternative B, to restrict references to “gradualism” to paragraph 4 and thus for paragraph 2 prefer the language of Alternative C which says that the Committee expects adjustments in the future stance of monetary policy without suggesting that these adjustments will be gradual. These policymakers might emphasize that, because it is the interest- and consumer-confidence-sensitive sectors of the economy, such as motor vehicle sales, that

have shown the most noteworthy improvement of late, it may be that the current stance of policy is more accommodative than commonly believed.

These policymakers might further argue that the language of Alternative B could create the impression that “gradualism” is a promise rather than a conditional expectation, and it might therefore foster expectations of a prolonged, unconditionally shallow path for the federal funds rate, creating incipient excess demand, and thus running the risk that inflation will persistently overshoot 2 percent. Alternatively, some policymakers may see the emphasis on a gradually rising path for the federal funds rate that is a central feature of Alternative B as likely to induce further “reaching for yield,” which could leave leveraged investors unduly exposed to adverse economic or financial market events.

On average, respondents to the Desk’s Survey of Primary Dealers and its Survey of Market Participants expect that the federal funds rate is likely to climb only very slowly—notably more slowly, for example, than the staff assumed in constructing the Tealbook forecast. On the whole, the differences between Alternative C and Alternative B are not large. Nevertheless, two features of Alternative C—less emphasis on gradualism and less concern for the future path of inflation, relative to Alternative B—might be regarded as more restrictive than financial market participants expect. Hence, if the Committee were to adopt Alternative C, medium- and longer-term real interest rates would likely rise, equity prices and inflation compensation would likely decline, and the dollar would appreciate. To the extent, however, that market participants were to conclude that the Committee’s guidance is a reflection of a more optimistic outlook than markets perceive, equity prices and inflation compensation could rise.

THE CASE FOR ALTERNATIVE A

Both core and headline inflation have run below 2 percent for several years, and renewed declines in oil and other commodity prices, along with downward pressure on non-commodity import prices stemming from the appreciation of the dollar, suggest that headline inflation will linger at very low levels well into 2016. Some policymakers may see substantial risk that inflation will not rise to 2 percent over the medium term. They also might note that staff and FOMC participants have systematically overpredicted inflation in recent years.

These policymakers might express concern about measures of long-term inflation expectations, noting that some survey-based measures have declined below their previous ranges, and that market-based measures have been at low levels for so long that attributing the low readings to liquidity and risk premiums strains credulity. They might point to the global disinflationary pressures that seem prevalent at the moment. These observations may lead some participants to conclude that there is little reason to be “reasonably confident” that inflation will return to 2 percent, even given the current stance of policy, and therefore that the criteria for liftoff of the federal funds rate from the effective lower bound have not been met. Moreover, these policymakers might argue that the chronic failure to get inflation moving up has put at risk the credibility of the FOMC’s commitment to achieving 2 percent inflation and suggests that the Committee’s meeting-by-meeting approach to policy is not working. They might therefore prefer Alternative A, which states that the “Committee is prepared to provide additional accommodation if incoming information does not soon indicate that inflation is moving up toward 2 percent.”

These policymakers might be heartened by hints that growth in labor compensation might be picking up, but argue that it is, at best, far too early to lean on these observations as justification for liftoff. They might note that the best evidence available says that inflation is not very responsive to aggregate demand conditions, suggesting that it would take a substantial period of high levels of labor utilization to raise inflation from its current very low level to 2 percent. They might buttress this claim by arguing that the social costs of *over*employment are less than the social costs of *under*employment which, all else equal, would call for “running the economy a little hot,” and thus for deferral of liftoff.

Turning to risks and their management, while acknowledging that the more dire scenarios for the global outlook seem less likely than in September, some policymakers might still see sizable downside risks from foreign sources. More generally, policymakers might see the case for deferring liftoff as strengthened by the risk of a potentially costly return of the federal funds rate to the effective lower bound, if liftoff were to turn out to have been premature. And they might reinforce this argument by noting the possibility that the neutral rate of interest might be persistently lower than once imagined; to the extent that this is so, it would mean that the current stance of monetary policy is tighter than one might have thought.

Just one respondent to the Desk's Survey of Primary Dealers expects liftoff to occur next year, and no respondent anticipates that the Committee would indicate the possibility of greater accommodation. In response to a statement along the lines of Alternative A, investors would likely push out their expectations about the most probable date of the first increase in the target range for the federal funds rate well into next year; they might also revise down their expectations of how quickly the Committee would raise the target range thereafter. Longer-term real yields would decline, and equity prices and inflation compensation could rise. However if investors were to see a statement such as Alternative A as reflecting a downbeat assessment of economic conditions, equity prices and inflation compensation might increase less than otherwise, or even fall.

DIRECTIVE AND IMPLEMENTATION NOTE

The directive adopted at the October FOMC meeting appears on the next page; the same directive would be issued in December if the Committee adopts Alternative A, which maintains the current target range for the federal funds rate. The directive for Alternatives B and C, which raise the target range, is included in an implementation note that would be released with the FOMC’s policy statement; that note, which appears after the directive for Alternative A, would communicate operational decisions taken to implement the policy stance announced by the Committee.¹ The current draft of the implementation note differs in one important respect from the version shown in the October Tealbook: the current draft adds the per-counterparty limit for ON RRP parameters to the list of ON RRP parameters that the Committee would specify in the directive.

The Desk would release, separately, a statement regarding overnight reverse repurchase agreements. A draft of the Desk statement appears after the draft implementation note.

On the following pages, struck-out text indicates language deleted from the current (October) directive; bold red underlined text indicates language added to the current directive; blue underlined text indicates text that will be links to websites.

¹ The implementation note was first proposed to the Committee in June (see the memo sent to the Committee on June 10, 2015, titled “Proposal for Communicating Details Regarding the Implementation of Monetary Policy at Liftoff and After” by Deborah Leonard and Gretchen Weinbach).

OCTOBER 2015 DIRECTIVE**(ALSO THE DIRECTIVE FOR DECEMBER 2015 ALTERNATIVE A)**

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to undertake open market operations as necessary to maintain such conditions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The System Open Market Account manager and the secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

IMPLEMENTATION NOTE FOR DECEMBER 2015 ALTERNATIVES B AND C

Release Date: December 16, 2015

Decisions Regarding Monetary Policy Implementation

The Federal Reserve has made the following decisions to implement the monetary policy stance announced by the Federal Open Market Committee in its [statement](#) on December 16, 2015:

- The Board of Governors of the Federal Reserve System voted [unanimously] to raise the interest rate paid on required and excess reserve balances to 0.50 percent, effective December 17, 2015.
- As part of its policy decision, the Federal Open Market Committee voted to authorize and direct the Open Market Desk at the Federal Reserve Bank of New York, until instructed otherwise, to execute transactions in the System Open Market Account in accordance with the following domestic policy directive:¹

~~“Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. **Effective December 17, 2015,** the Committee directs the Desk to undertake open market operations as necessary to maintain such conditions **the federal funds rate in a target range of ¼ to ½ percent, including: (1) overnight reverse repurchase operations (and reverse repurchase operations with maturities of more than one day when necessary to accommodate weekend, holiday, or similar trading conventions) at an offering rate of 0.25 percent, in amounts limited only by the value of Treasury securities held outright in the System Open Market Account that are available for such operations and by a per-counterparty limit of \$30 billion per day; and (2) term reverse repurchase operations to the extent approved in the resolution on term RRP operations approved by the Committee at its March 17–18, 2015, meeting.**~~

~~“The Committee directs the Desk to maintain its policy of **continue** rolling over maturing Treasury securities into new issues and its policy of **to continue** reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve’s agency mortgage-backed securities transactions.” ~~The System Open Market Account manager and the secretary will keep the Committee informed of ongoing developments regarding the System’s balance sheet that could affect the attainment over time of the Committee’s objectives of maximum employment and price stability.~~~~

More information regarding open market operations may be found on the Federal Reserve Bank of New York’s [website](#).

¹ This directive supersedes the resolution on ON RRP test operations approved by the Committee at its December 16–17, 2014 meeting.

- In a related action, the Board of Governors of the Federal Reserve System voted [unanimously] to approve a $\frac{1}{4}$ percentage point increase in the primary credit rate to 1.00 percent, effective December 17, 2015. In taking this action, the Board approved requests submitted by the Boards of Directors of the Federal Reserve Banks of . . .

This information will be updated as appropriate to reflect decisions of the Federal Open Market Committee or the Board of Governors regarding details of the Federal Reserve's operational tools and approach used to implement monetary policy.

DESK STATEMENT FOR DECEMBER 2015 ALTERNATIVES B OR C

Release Date: December 16, 2015

Statement Regarding Overnight Reverse Repurchase Agreements

During its meeting on December 15-16, 2015, the Federal Open Market Committee (FOMC) directed the Open Market Trading Desk (the Desk) at the Federal Reserve Bank of New York (New York Fed), effective December 17, 2015, to undertake open market operations as necessary to maintain the federal funds rate in a target range of $\frac{1}{4}$ to $\frac{1}{2}$ percent, including overnight reverse repurchase operations (ON RRP) at an offering rate of 0.25 percent and in amounts limited only by the value of Treasury securities held outright in the System Open Market Account (SOMA) that are available for such operations and by a per-counterparty limit of \$30 billion per day.

To determine the value of Treasury securities available for ON RRP operations, several factors need to be taken into account, as not all Treasury securities held outright in the SOMA will be available for use in such operations. First, some of the Treasury securities held outright in the SOMA are needed to conduct reverse repurchase agreements with foreign official and international accounts.¹ Second, some Treasury securities are needed to support the [securities lending operations](#) conducted by the Desk. Additionally, buffers are needed to provide for possible changes in demand for these activities and for possible changes in the market value of the SOMA's holdings of Treasury securities.

Taking these factors into account, the Desk anticipates that around \$2 trillion of Treasury securities will be available for ON RRP operations to fulfill the FOMC's domestic policy directive.² In the highly unlikely event that the value of bids received in an ON RRP operation exceeds the amount of available securities, the Desk will allocate awards using a single-price auction based on the stop-out rate at which the overall size limit is reached, with all bids below this rate awarded in full at the stop-out rate and all bids at this rate awarded on a pro rata basis at the stop-out rate.

These ON RRP operations will be open to all eligible RRP counterparties, will settle same-day, and will have an overnight tenor unless a longer term is warranted to accommodate weekend, holiday, and other similar trading conventions. Each eligible counterparty is permitted to submit one proposition for each ON RRP operation, in a size not to exceed \$30 billion and at a rate not to exceed the specified offering rate. The operations will take place from 12:45 p.m. to 1:15 p.m. (Eastern Time). Any changes to these terms will be announced with at least one business day's prior notice on the New York Fed's website.

The results of these operations will be posted on the New York Fed's website. The outstanding amounts of RRP are reported on the Federal Reserve's H.4.1 statistical release as a factor absorbing reserves in Table 1 and as a liability item in Tables 5 and 6.

¹ The outstanding amounts of RRP with foreign official and international accounts are reported on the Federal Reserve's H.4.1 statistical release as a factor absorbing reserves in Table 1 and as a liability item in Tables 5 and 6.

² This amount will be reduced by any term RRP operations outstanding on the day of each ON RRP operation.

Projections

BALANCE SHEET AND INCOME

The staff has developed a projection of the Federal Reserve’s balance sheet and income statement that is broadly consistent with the monetary policy assumptions incorporated in the staff’s forecast presented in Tealbook A. We assume that the Committee will decide to commence policy normalization at its December meeting and that reinvestments of maturing Treasury securities and principal received on agency debt and agency MBS will continue through the second quarter of 2016. Once reinvestments cease, the SOMA portfolio shrinks through redemptions of maturing Treasury and agency debt securities as well as paydowns of principal from agency MBS. Regarding the Federal Reserve’s use of its policy normalization tools, we assume that the level of overnight reverse repurchase agreements (ON RRP) runs at \$100 billion through the end of 2018 before falling to zero by the end of 2019, and that term deposits and term RRP are not used during the normalization period.^{1,2} The bullets below highlight some key features of the projections for the Federal Reserve’s balance sheet and income statement under these assumptions.

- **Balance sheet.** As shown in the exhibit “Total Assets and Selected Balance Sheet Items” and in the table that follows, the size of the portfolio is normalized in the third quarter of 2021, about a quarter later than in the October Tealbook.³ Once

¹ Use of term RRP or term deposits would result in a shift in the composition of Federal Reserve liabilities—a decline in reserve balances and an equal increase in term RRP or term deposits—but would not produce a change in the overall size of the balance sheet.

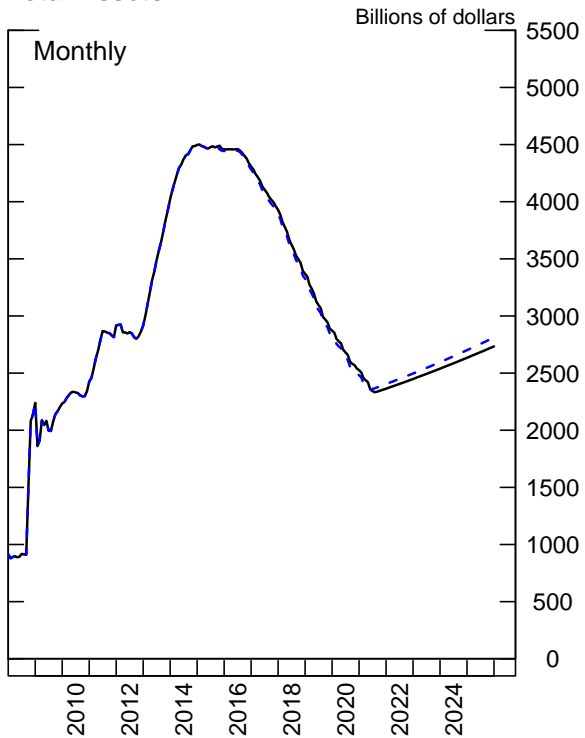
² We also assume that RRP associated with foreign official and international accounts remain around (their October 30, 2015 level of) \$201 billion throughout the projection period.

³ The size of the balance sheet is assumed to be normalized when the securities portfolio reverts to the level consistent with its longer-run trend, which is determined largely by currency in circulation and a projected steady-state level of reserve balances. The projected timing of the normalization of the size of the balance sheet depends importantly on the level of reserve balances that is assumed to be necessary to conduct monetary policy; currently, we assume that level of reserve balances to be \$100 billion. However, ongoing regulatory and structural changes could lead to a higher demand for reserve balances in the new steady state. In turn, a higher steady-state level for reserve balances would, all else equal, imply an earlier normalization of the size of the balance sheet. For instance, with a \$500 billion steady-state level of reserve balances, the balance sheet would likely normalize in mid-2020. Alternatively, a lower assumed steady-state level of reserve balances, such as \$10 billion, would induce a delay in the normalization of the balance sheet until the final quarter of 2021.

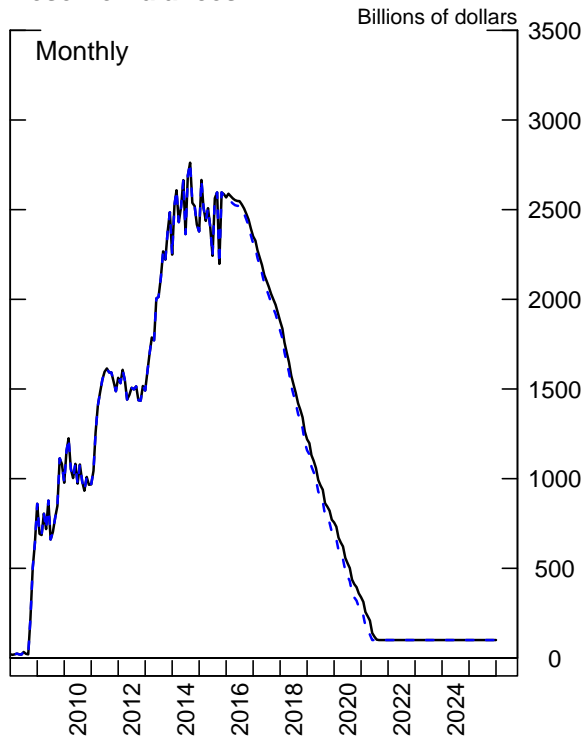
Total Assets and Selected Balance Sheet Items

— December Tealbook - - - October Tealbook

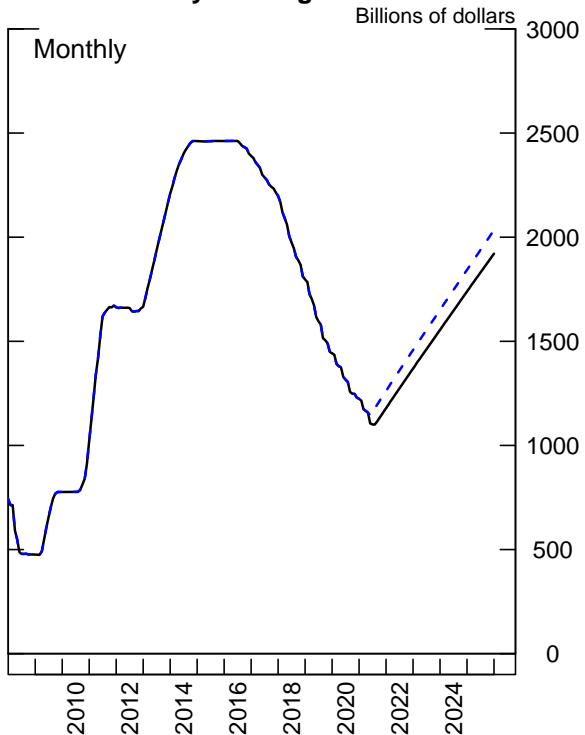
Total Assets



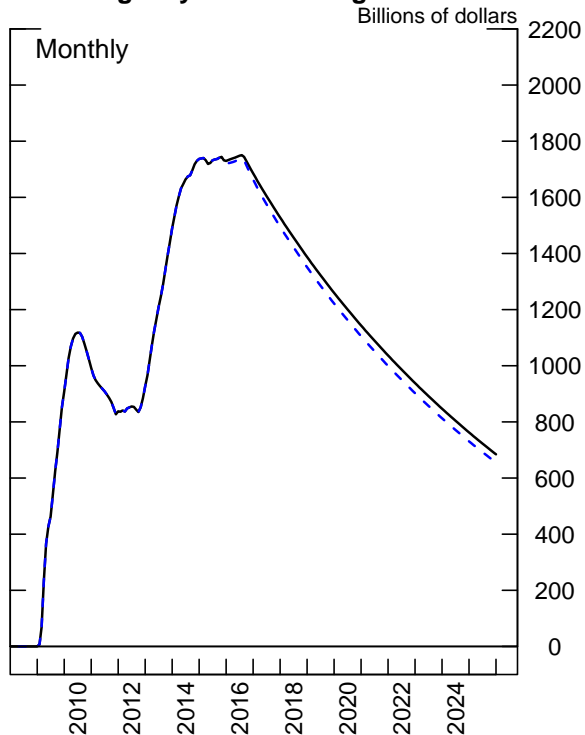
Reserve Balances



SOMA Treasury Holdings



SOMA Agency MBS Holdings



Projections

Federal Reserve Balance Sheet
End-of-Year Projections -- December Tealbook
 (Billions of dollars)

	Oct 31, 2015	2015	2017	2019	2021	2023	2025
Total assets	4,490	4,458	3,928	2,872	2,364	2,539	2,734
Selected assets							
Loans and other credit extensions*	2	0	0	0	0	0	0
Securities held outright	4,240	4,224	3,730	2,704	2,218	2,404	2,607
U.S. Treasury securities	2,462	2,462	2,198	1,442	1,179	1,555	1,921
Agency debt securities	34	33	4	2	2	2	2
Agency mortgage-backed securities	1,744	1,730	1,528	1,260	1,037	847	684
Unamortized premiums	192	188	150	116	93	80	71
Unamortized discounts	-17	-17	-14	-11	-9	-7	-6
Total other assets	53	55	55	55	55	55	55
Total liabilities	4,432	4,399	3,884	2,819	2,300	2,460	2,637
Selected liabilities							
Federal Reserve notes in circulation	1,350	1,370	1,545	1,702	1,839	2,000	2,176
Reverse repurchase agreements	426	301	301	201	201	201	201
Deposits with Federal Reserve Banks	2,649	2,723	2,034	911	255	255	255
Reserve balances held by depository institutions	2,596	2,568	1,879	756	100	100	100
U.S. Treasury, General Account	23	150	150	150	150	150	150
Other deposits	30	5	5	5	5	5	5
Interest on Federal Reserve Notes due to U.S. Treasury	2	0	0	0	0	0	0
Total capital**	59	59	44	53	64	79	97

Projections

Source: Federal Reserve H.4.1 statistical releases and staff calculations.

Note: Components may not sum to totals due to rounding.

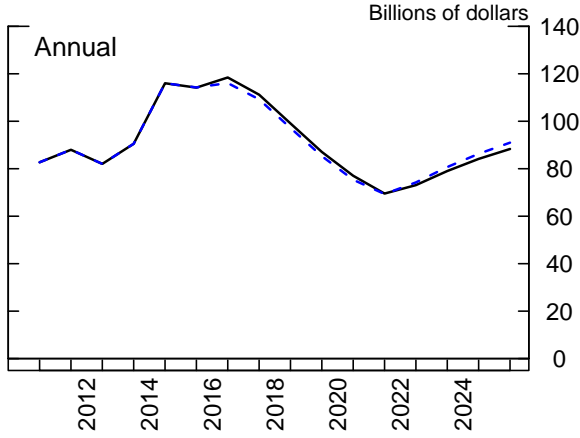
*Loans and other credit extensions includes primary, secondary, and seasonal credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.

**Total capital includes capital paid-in and capital surplus accounts.

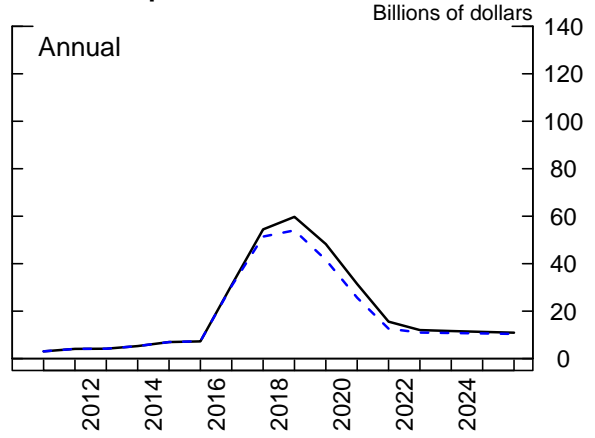
Income Projections

— December Tealbook - - - October Tealbook

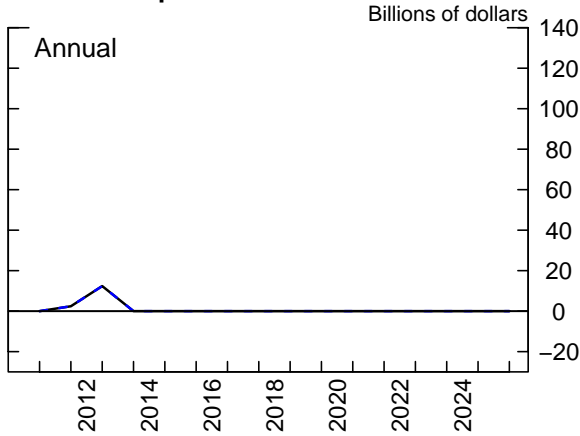
Interest Income



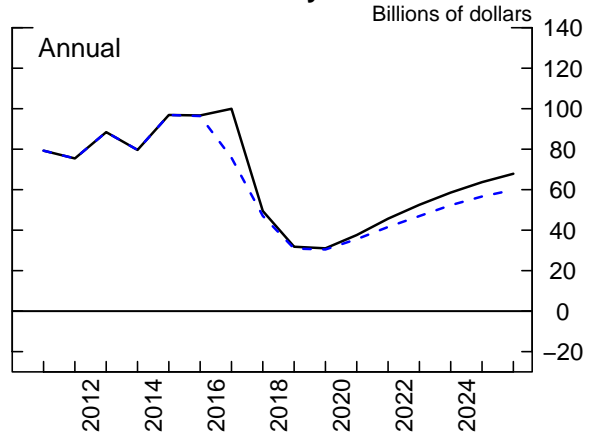
Interest Expense



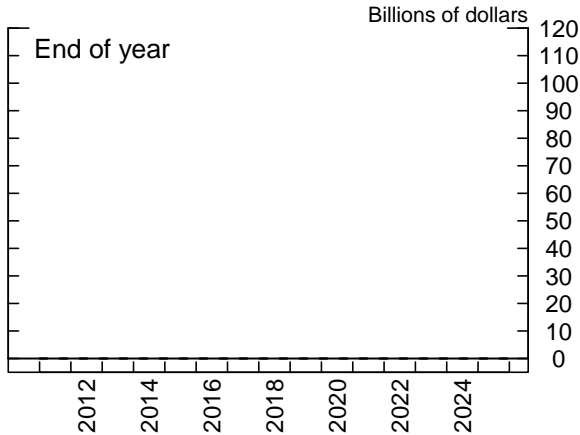
Realized Capital Gains



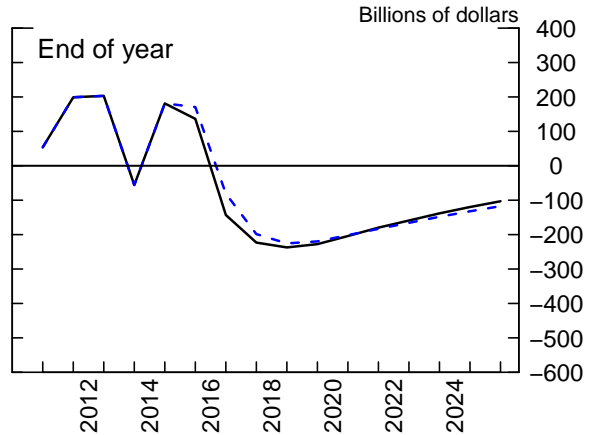
Remittances to Treasury



Deferred Asset



Memo: Unrealized Gains/Losses



Projections

reserve balances reach their steady-state level, total assets stand at \$2.3 trillion, with about \$2.2 trillion in total SOMA securities holdings. Total assets and SOMA holdings increase thereafter, keeping pace with the rise in both currency in circulation and Federal Reserve Bank capital.

- ***Federal Reserve remittances.*** The exhibit “Income Projections” shows the implications of the balance sheet projection and interest rate assumptions for Federal Reserve income.⁴ Remittances to the Treasury are projected to be about \$100 billion this year and the next, close to the \$100 billion level recorded in 2014. Subsequently, annual remittances fall to their trough of roughly \$30 billion in 2019, with no recorded deferred asset.⁵ The Federal Reserve’s cumulative remittances from 2009 through 2025 are about \$1.1 trillion. Relative to the October Tealbook, projected remittances for 2016 have been revised up nearly \$25 billion, and cumulative remittances over the projection period are roughly \$100 billion higher, reflecting the effects of the Fixing America’s Surface Transportation Act, which was signed on December 4, 2015. This Act permanently reduces the Federal Reserve’s capital surplus account from its current level of \$29 billion to a maximum of \$10 billion and cuts dividends of large depository institutions from 6 percent to the lesser of 6 percent and the prevailing rate on the Treasury 10-year rate.⁶
- ***Unrealized gains or losses.*** The unrealized gain or loss position of the SOMA portfolio depends importantly on the level of interest rates. The staff estimates that the portfolio was in an unrealized gain position of about \$125 billion as of the end of November.⁷ Because of the assumed rise in longer-term interest rates over

⁴ As firming of the policy rate begins, the spread between the interest rate paid on reserve balances and the ON RRP rate is 25 basis points. Moreover, we assume that the effective federal funds rate will average about 15 basis points below the interest rate paid on reserve balances and about 10 basis points above the ON RRP rate.

⁵ In the event that a Federal Reserve Bank’s earnings fall short of the amount necessary to cover its operating costs and pay dividends, a deferred asset for interest on Federal Reserve notes would be recorded.

⁶ The Federal Reserve pays dividends on member depository institutions’ capital paid-in. Large depository institutions are defined as those with total assets over \$10 billion. These institutions account for roughly \$27 billion of the total \$29 billion of total capital paid-in.

⁷ The Federal Reserve reports the level and the change in the quarter-end net unrealized gain/loss position of the SOMA portfolio to the public in the “Federal Reserve Banks Combined Quarterly Financial Reports,” available on the Board’s website at

http://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm#quarterly.

Projections for the 10-Year Treasury Term Premium Effect
(Basis Points)

Date	December Tealbook	October Tealbook
Quarterly Averages		
2015:Q4	-109	-108
2016:Q1	-105	-103
Q2	-100	-99
Q3	-95	-94
Q4	-91	-90
2017:Q4	-75	-74
2018:Q4	-62	-62
2019:Q4	-52	-52
2020:Q4	-43	-44
2021:Q4	-37	-37
2022:Q4	-31	-32
2023:Q4	-25	-26
2024:Q4	-20	-20
2025:Q4	-14	-15

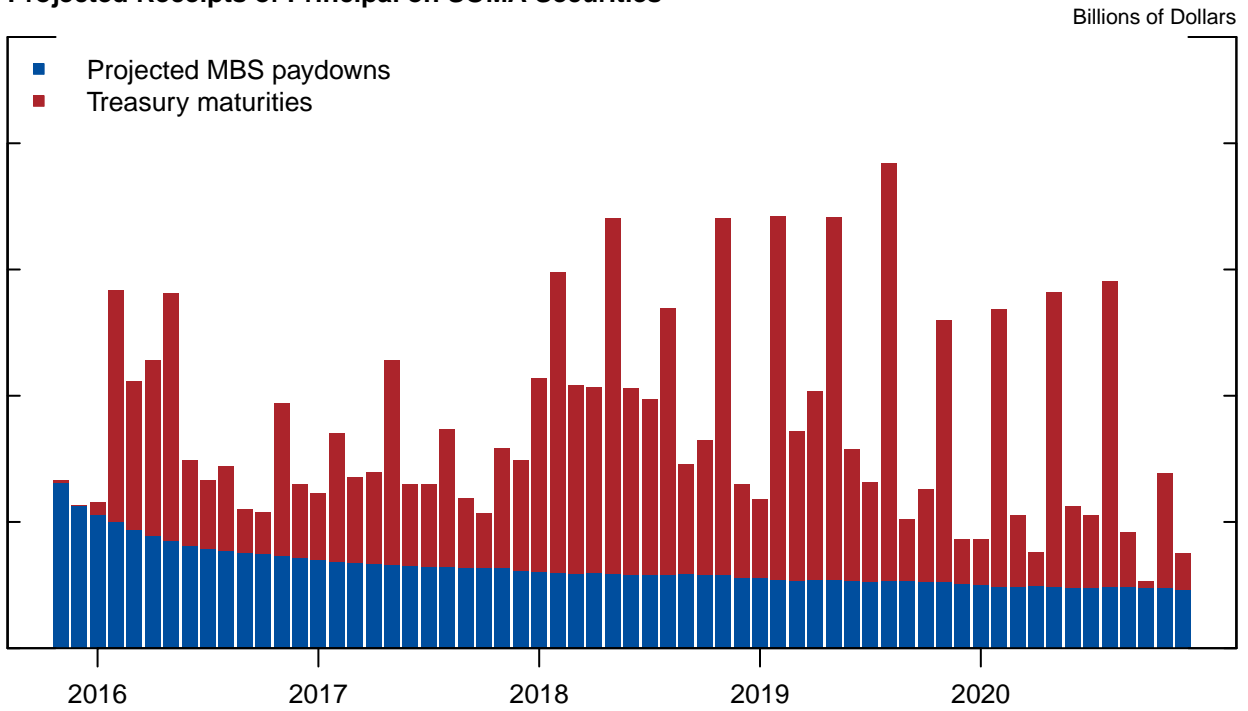
the next several years, the position is projected to shift to an unrealized loss by mid-2016 and then to record a peak unrealized loss of about \$235 billion at the end of 2018, about \$10 billion larger than in the October Tealbook. At that time, almost \$110 billion of the unrealized losses can be attributed to the portfolio of Treasury securities and a little less than \$130 billion to the portfolio of agency MBS. The unrealized loss position then narrows through 2025, as the value of securities acquired under the large-scale asset purchase programs returns to par when these securities approach maturity and then mature, and new securities are added to the portfolio at par.

- ***Projected uncertainty and income risks.*** To help quantify the degree of uncertainty surrounding the path of the balance sheet and the interest rate risk embedded in the SOMA portfolio, the accompanying box, “Confidence Interval Projections of the Balance Sheet,” reports confidence intervals for the Federal Reserve’s balance sheet and income projections based on paths of macroeconomic variables generated by stochastic simulations of the staff’s FRB/US model.
- ***Term premium effects.*** As shown in the table “Projections for the 10-Year Treasury Term Premium Effect,” the Federal Reserve’s elevated stock of longer-term securities is estimated to hold down the term premium embedded in the 10-year Treasury yield in the fourth quarter of 2015 by 109 basis points. Over the next couple of years, the estimated term premium effect diminishes at a pace of about 5 basis points per quarter, reflecting in part the projected shrinking of the portfolio; this projection is roughly unchanged from the October Tealbook.
- ***SOMA Characteristics.*** The exhibit “Projections for the Characteristics of SOMA Holdings” shows that under the staff baseline balance sheet assumptions, approximately \$1.4 trillion in SOMA Treasury holdings will mature between 2016 and 2020, with the amounts maturing varying considerably from month to month; this pattern differs notably from projected MBS paydowns. During the first half of 2016, the maturing \$143 billion in SOMA’s Treasury securities holdings are reinvested in notes and bonds.⁸ As a result, the weighted-average

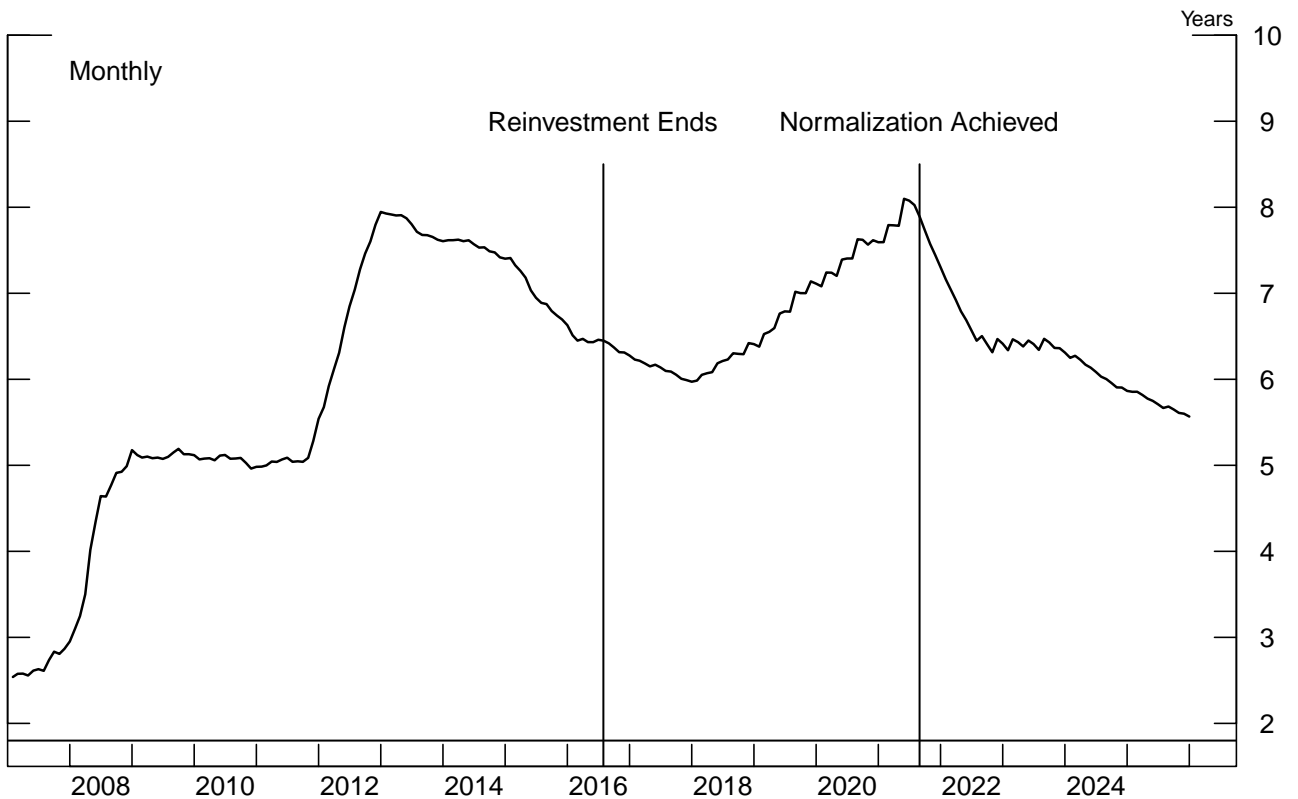
⁸ The Desk replaces maturing securities holdings with newly issued debt at Treasury auctions. Consistent with longstanding practice, these rollovers are carried out at Treasury auctions by placing bids for the SOMA with par amount equal to the value of holdings maturing on the issue date of a new security. Moreover, across the various maturities, these bids are placed proportionately to the issue

Projections for the Characteristics of SOMA Holdings

Projected Receipts of Principal on SOMA Securities



SOMA Weighted-Average Treasury Duration



Projections

duration of SOMA Treasury holdings through mid-2016 remains near its current level of nearly 7 years.⁹ Thereafter, reflecting the end of reinvestment as well as the composition of the aging portfolio, the weighted-average duration declines through 2017, but then it rebounds until 2021, when the size of the balance sheet is normalized. After the normalization, Treasury duration is projected to resume its decline as the Desk starts purchasing securities again to expand the size of the portfolio in order to keep pace with currency growth. This projection is based on the key assumption that the Federal Reserve will initially rebuild a sizable Treasury bill portfolio until those holdings are equal to approximately 30 percent of the portfolio, similar to the pre-crisis composition of the portfolio (currently there are no Treasury bill holdings). Thereafter, purchases are assumed to be spread across the Treasury maturity spectrum.

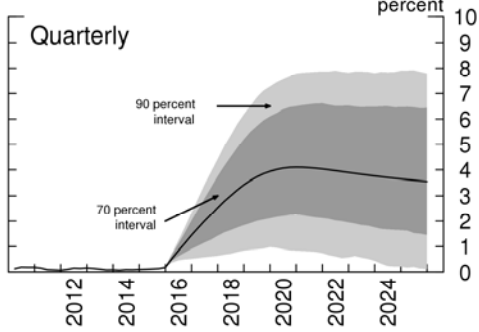
amounts of the new securities. Bids at Treasury auctions are placed at noncompetitive tenders and are treated as add-ons to announced auction sizes.

⁹ Duration is the weighted average of the times until bonds' fixed cash flows are received. The July 2015 Tealbook B box "History and Projections for the Characteristics of SOMA Treasury Holdings" provides more information on the duration of the SOMA Treasury portfolio.

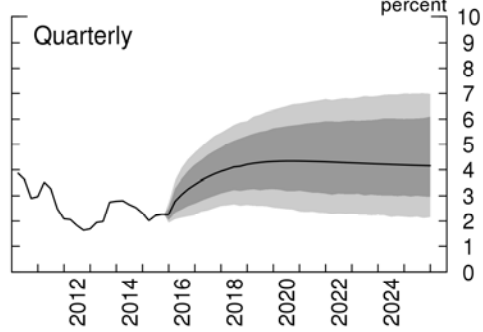
Interest Rates and Selected Assets and Liabilities of the Balance Sheet

— December Tealbook

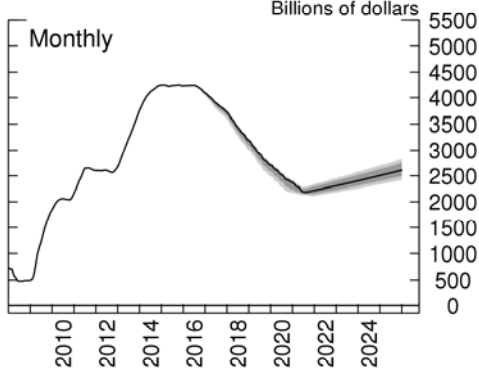
Federal Funds Rate



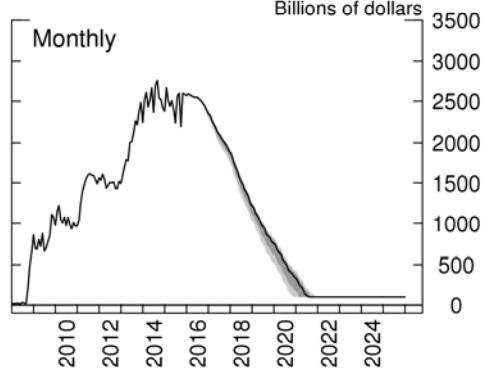
10-Year Treasury Rate



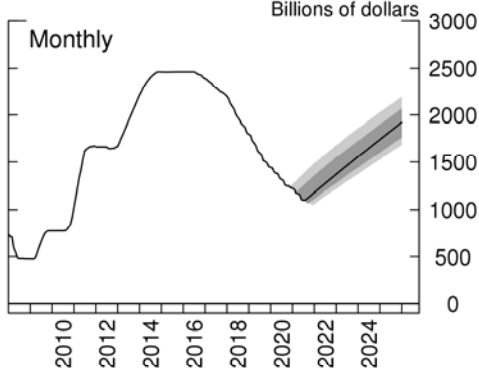
SOMA Holdings



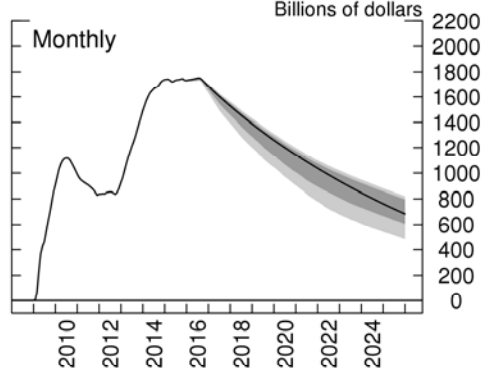
Reserve Balances



SOMA Treasury Holdings



SOMA Agency MBS Holdings



Projections

Confidence Interval Projections of the Balance Sheet

The elevated size of the Federal Reserve's portfolio and the duration mismatch between its assets and liabilities have long prompted discussions regarding possible financial losses when interest rates rise. To help quantify the Fed's interest rate risk, this box analyzes a range of potential macroeconomic outcomes and their implications for the Federal Reserve's balance sheet and income.¹ We use the paths of macroeconomic variables generated by stochastic simulations of the FRB/US model around the December Tealbook baseline and a staff MBS prepayment model to project confidence intervals for the evolution of SOMA holdings, reserve balances, and income.² Key inputs are the paths for the federal funds rate and the 10-year Treasury yield, shown in the upper two panels of the exhibit titled "Interest Rates and Selected Assets and Liabilities of the Balance Sheet."³

The size and composition of the Federal Reserve's balance sheet as well as the associated income can shift with macroeconomic outcomes. In particular, because agency MBS have an embedded prepayment option, the stock of MBS held in the SOMA depends importantly on interest rates and economic conditions. Moreover, changes in agency MBS holdings can, in turn, bring about different paths for SOMA Treasury holdings once the size of the balance sheet is normalized.⁴ The middle left panel of the first exhibit shows that the set of simulated paths for SOMA holdings before the normalization of the size of the balance sheet mostly lies below the baseline path. Most of this skew reflects the asymmetric effects of different interest rate paths on MBS prepayments. Specifically, interest rates rising above the baseline path would slow refinancing activity only slightly more, thereby producing a relatively muted effect on the path of prepayments for agency MBS. Alternatively, rates below the baseline path will likely hasten prepayments, thus reducing the amount of agency MBS holdings. As shown in the lower right panel, SOMA agency MBS holdings are projected to range from \$485 billion to \$820 billion in 2025.

Variation in the path for interest rates will also influence two other measures reported to the public: remittances to the Treasury and the unrealized gain or loss on the Fed's

¹ Academic research also addresses this issue; for example, one method is to use a probabilistic approach to study the interest rate risk of the SOMA portfolio. See Jens H.E. Christensen, Jose A. Lopez, and Glenn D. Rudebusch (2015), "A Probability-Based Stress Test of Federal Reserve Assets and Income," *Journal of Monetary Economics*, vol. 73 (April), pp. 26–43.

² We assume that the Federal Reserve does not respond with unconventional policy tools to future economic conditions, i.e., no further asset purchases will be conducted in response to adverse shocks. We also assume that liftoff occurs in December 2015 and that reinvestment ends six months after liftoff.

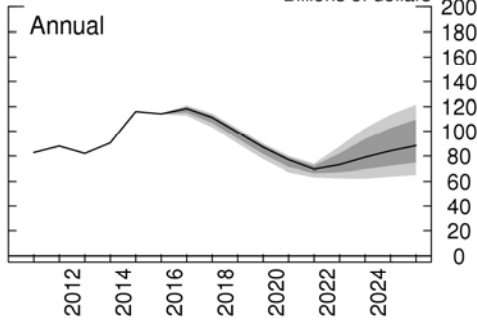
³ These interest rate paths are the same as those used in constructing the panels shown in December Tealbook A, p. 72. The solid line is the staff's baseline projection. The dark and lighter grey areas represent the 70 and 90 interpercentile ranges, respectively.

⁴ In addition, because currency largely determines the longer-run size of the balance sheet, the assumption that currency expands at a rate equal to that of projected nominal GDP growth implies that different simulated paths for nominal GDP result in different balance sheet projections.

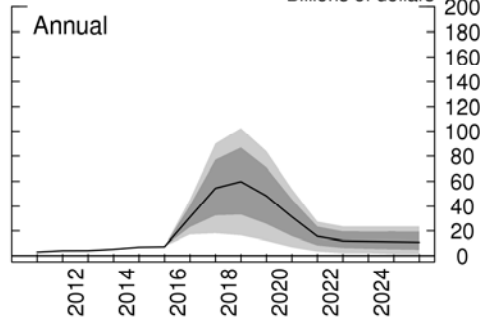
Income Projections

— December Tealbook

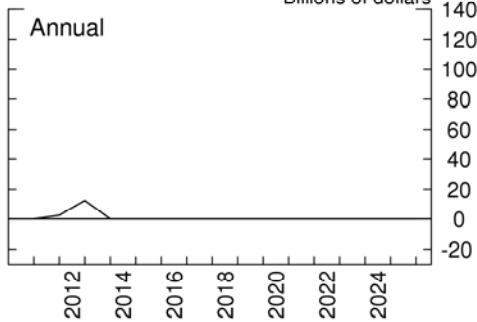
Interest Income



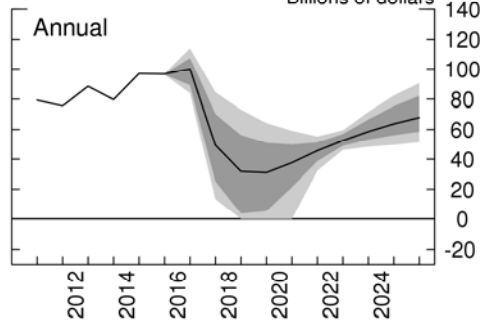
Interest Expense



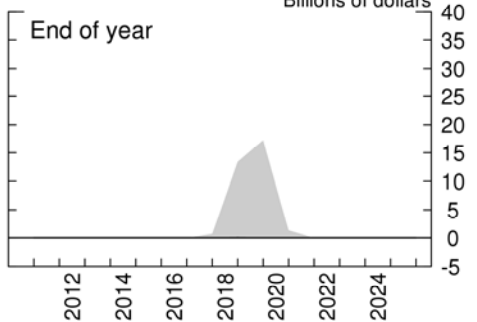
Realized Capital Gains



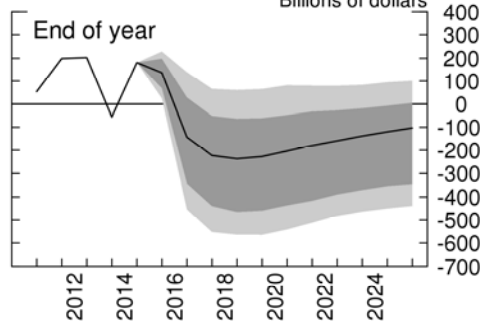
Remittances to Treasury



Deferred Asset



Memo: Unrealized Gains/Losses



Projections

securities holdings. Remittances largely reflect the net interest income of the Federal Reserve. As shown in the upper two panels of the exhibit labeled “Income Projections,” in the years prior to the normalization of the size of the balance sheet, interest income displays substantially less dispersion than interest expense under a range of macroeconomic scenarios. Consequently, the confidence intervals associated with Federal Reserve remittances (the middle right panel) primarily reflect the sensitivity of interest expense to changes in short-term interest rates. Conversely, after the size of the balance sheet is normalized, interest income exhibits more variability than interest expense. Specifically, the higher dispersion of interest income reflects the purchases of new securities with yields that track market interest rates at the time of purchase, whereas the assumption of relatively low reserve balances restrains total interest expense. As exhibited in the lower left panel, only about 15 percent of the simulations are associated with interest rates high enough to induce a deferred asset.

As shown in the lower right panel, the portfolio is projected to shift to an unrealized loss position by the middle of 2016 and record a peak unrealized loss of about \$235 billion at the end of 2018. However, as shown by the lower edge of the 90 percent confidence interval, the unrealized loss in some scenarios could reach \$570 billion or more. Although the baseline path implies that the unrealized loss position subsequently narrows through 2025, some simulations result in an unrealized loss position larger than \$400 billion in 2025. Under the assumption that no securities are being sold from the portfolio in any of the scenarios, no realized losses are incurred and unrealized losses fall to zero as the securities mature.⁵

⁵ The Committee does not anticipate selling agency mortgage-backed securities as part of the normalization process. Instead, the FOMC intends to reduce the Federal Reserve’s securities holdings in a gradual and predictable manner primarily by ceasing to reinvest repayments of principal on securities held in the SOMA. Nevertheless, the quarter-end market value of the SOMA portfolio is published in the Federal Reserve Banks Combined Quarterly Financial Reports, available at http://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm#quarterly and could garner some public attention. Weekly remittances are reported in the H.4.1 statistical release.

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Abbreviations

ABS	asset-backed securities
BEA	Bureau of Economic Analysis, Department of Commerce
BHC	bank holding company
CDS	credit default swaps
CFTC	Commodity Futures Trading Commission
C&I	commercial and industrial
CLO	collateralized loan obligation
CMBS	commercial mortgage-backed securities
CPI	consumer price index
CRE	commercial real estate
Desk	Open Market Desk
ECB	European Central Bank
EDO	Estimated, dynamic, optimization-based model
EME	emerging market economy
FDIC	Federal Deposit Insurance Corporation
FOMC	Federal Open Market Committee; also, the Committee
GCF	general collateral finance
GDI	gross domestic income
GDP	gross domestic product
GSIBs	globally systemically important banking organizations
HQLA	high-quality liquid assets
ISM	Institute for Supply Management
LIBOR	London interbank offered rate
MBS	mortgage-backed securities
MMFs	money market funds
NIPA	national income and product accounts
OIS	overnight index swap

ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
repo	repurchase agreement
RMBS	residential mortgage-backed securities
RRP	reverse repurchase agreement
SCOOS	Senior Credit Officer Opinion Survey on Dealer Financing Terms
SEP	Summary of Economic Projections
SFA	Supplemental Financing Account
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
TBA	to be announced (for example, TBA market)
TGA	U.S. Treasury's General Account
TIPS	Treasury inflation-protected securities
TPE	Term premium effects