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Issues Concerning the Timing and Pace of Policy Firming

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Introduction

In the December 2014 Summary of Economic Projections (SEP), 15 of the 17 FOMC participants anticipated that it would be appropriate to begin raising the target range for the federal funds rate during 2015. Participants also generally expected that, once increases in the federal funds rate begin, the firming sequence probably would be gradual, with median projected increases of less than 1¼ percentage points per year on average through 2017. As shown in Figure 1, these projections are broadly in line with, albeit slightly higher than, both the December Tealbook projection and the median of the modal forecasts reported in the December Survey of Primary Dealers. The mean path derived from recent OIS quotes does, however, imply an appreciably-lower trajectory, perhaps reflecting an assessment on the part of investors that the risks to real activity and inflation are skewed to the downside.

This memo discusses various considerations that could potentially influence the Committee's decisions regarding the timing and pace of adjustments to its policy stance over the next few years.[1] Among other things, these considerations include: prescriptions from standard policy benchmarks; differences among participants about the economic outlook; the likelihood of scenarios in which a return of the federal funds rate to its effective lower bound (ELB) might be necessary; and a number of other potential costs and benefits associated with maintaining an unusual degree of monetary accommodation for some time, including risks to financial stability. We conclude with some brief observations on the communication challenges likely to face the Committee in the months ahead.

Prescriptions from Standard Tealbook Benchmarks

To establish an initial point of reference, we review prescriptions from simple policy rules and other benchmarks for setting the path of the federal funds rate. Later in the memo, we turn to considerations that bear on the appropriateness of using such benchmarks as guides for actual policy.

[1] Our focus is broader than the more limited issue of when tightening should begin because previous simulation analysis by the staff—see Erceg, Kiley, and Tetlow (2014), for example—indicates that advancing or delaying the timing of the initial raising of the federal funds rate above its effective lower bound by a quarter or two does not have an appreciable impact on economic conditions, as long as policy is subsequently adjusted appropriately in response to movements in real activity and inflation. This result, however, rests on the assumption that financial market participants and others understand the strategy guiding both the timing and subsequent pace of firming. In practice, however, some of the differences in opinion among participants about the appropriate conditions (and hence timing) for raising the funds rate may in fact reflect material differences in views concerning the appropriate Committee reaction function. In addition, a strategy of moving later, but thereupon tightening at a more rapid pace in compensation, could—at least provided that the increases in the federal funds rate were especially steep—have adverse effects on financial institutions and markets not captured by staff models. A final point to note is that we cannot be certain about the market reaction to the initial increase in the federal funds rate, even if that increase is widely anticipated.

Although policymakers' forecasts of the policy rate path in December were reasonably well aligned with both the Tealbook and survey measures of market expectations, the median SEP path contrasts sharply with the trajectories of some—but by no means all—of the benchmarks for monetary policy regularly reported in the "Monetary Policy Strategies" section of Tealbook, Book B.[2] The first type of benchmark consists of the prescriptions of simple policy rules, conditioned on the December Tealbook forecast for real activity and inflation. These rules include variants of the Taylor rule, a first-difference rule, and a nominal income targeting (NIT) rule. The second benchmark is the federal funds rate path implied by optimal-control (OC) policy, again conditioned on the Tealbook baseline outlook.

Figure 2 reports results from dynamic simulations of the FRB/US model when the federal funds rate path follows the prescriptions of the various benchmark rules; these results are the same as those reported in the December Tealbook and are conditioned on the assumptions underlying the outlook for economy embedded in the staff's December projection.[3] The implications of these results for the timing and pace of policy firming and for the longer-run stance of policy are as follows:

- *Near-term*. With the exception of the NIT rule, all the rules called for the funds rate to be moved immediately above its effective lower bound, in some cases by a substantial amount. In particular, the Taylor (1993) rule and Taylor (1999) rule prescribed federal funds rates for the current quarter of 2.6 percent and 2.0 percent, respectively. However, the inertial Taylor (1999) rule, which incorporates interest-rate smoothing and thereby permits a less abrupt break with the effective-lower-bound policy, called for a much more modest initial tightening, with prescribed policy rates of only 0.4 percent and 0.6 percent in the first two quarters of 2015, respectively. Similarly, the first-difference rule called for only a modest increase in the federal funds rate during the first half of this year.[4]
- *Medium-term*. With the exception of the non-inertial versions of the Taylor (1993 and 1999) rules, the simulated rules in the December Tealbook all called for a gradual pace of increase of the federal funds rate once it is raised. This gradual pace was forecast to facilitate a more-rapid return of inflation toward the Committee's 2 percent objective, in part because this tightening sequence allows the unemployment rate to run below the staff's estimate of the natural rate of unemployment for a time. In contrast, the much more rapid pace of tightening associated with the Taylor (1993) rule or the Taylor (1999) rule implied a slower return of inflation to the 2 percent objective and also was associated with a more moderate undershoot on the part of the unemployment rate.

Figure 2 also plots the simulated optimal-control (OC) path of the federal funds rate that was reported in the December Tealbook. Under this policy, the federal funds rate path is guided by

[2] The Tealbook path for the federal funds rate is mechanically generated using the inertial Taylor (1999) rule, subject to an independently-set date of liftoff.
[3] In these dynamic simulations, financial market participants and wage-price setters are assumed to have rational expectations while others base their expectations on forecasts from a small-scale vector autoregression (VAR).
[4] In contrast, the NIT rule calls for keeping the federal funds rate at its effective lower bound until the second half of the year. However, this rule in effect embeds an assumption that policymakers seek to make up for past periods of inflation below 2 percent by endeavoring to push inflation above this rate for a time in the future—an aim that does not seem to characterize the actual intentions of the Committee. Consequently, the low prescriptions for the federal funds rate from this rule are of questionable relevance to the current situation.

the criterion of minimizing an assumed policymaker loss function, conditional on the assumptions underlying the December Tealbook baseline and the dynamics of the FRB/US model.[5] As with some of the rule-based benchmarks, the OC path implies a gradual pace of tightening, in part reflecting the assumption that the Committee wishes to smooth quarter-to-quarter variations in the funds rate.[6] Although OC policy calls for tightening to begin in 2015:Q1, it otherwise prescribes a path for the federal funds rate fairly close to the median SEP path, with OC policy implying a funds rate of 1.1 percent at the end of 2015 and 2.3 percent at the end of 2016.[7]

Comparison of Tealbook Benchmarks to Participants' Forecasts

The policy benchmarks just discussed were conditioned on staff projections of slack, inflation, and the economy's long-run equilibrium real rate, *inter alia*. But participants' views about these factors may differ appreciably from the staff's assessments, implying that benchmark calculations may need to be adjusted to incorporate these differences. Views regarding these factors also may vary appreciably across participants, leading to situations in which individual participants can reach different conclusions from seemingly-similar benchmark calculations.

In the December SEP, for example, one participant put the longer-run equilibrium levels of the unemployment rate and the real funds rate at 5.8 percent and 2.25 percent, respectively, while another participant put them at 5 percent and 1.25 percent. These differing assessments might lead the former participant to estimate that the current prescription of the Taylor (1999) rule is about 4 percent, and the latter to conclude that it is closer to 1¼ percent.[8] The December SEP also indicated other potential sources of differences in benchmark calculations across participants. For example, some participants expressed the view that the economy's equilibrium real interest rate—which in principle is the intercept in Taylor-type rules with specific inflation targets—is currently much lower than it is likely to be in the longer run, implying that they might calculate much lower near-term policy prescriptions than those who see less time-variation in the equilibrium real rate.[9] Differences in views on the relationship between the unemployment gap

[5] In line with the notion that OC implies a decision about the *path* for the federal funds rate, the concept of optimal control embedded in the simulations corresponds to a commitment policy, under which decisions are made today concerning the federal funds rate in future periods and those decisions are binding on future policymakers.
[6] If the weight on interest-rate smoothing in the OC loss function is lowered to 0.1 from its baseline setting of 1.0, the prescribed date for tightening to begin is delayed until 2015:Q2.
[7] The Committee's planned gradual reduction in its holdings of longer-term securities will also contribute to the tightening of the overall stance of monetary policy over time, as the staff estimates that the effect of the Federal Reserve's balance sheet on the term premiums embedded in longer-term interest rates will decline by 18 basis points on average each year from 2015 to 2017. Both the policy rule simulations and the OC simulation discussed here incorporate the macroeconomic effects associated with these changes in term premiums.
[8] The Taylor (1999) rule is $R_t = r^* + \pi_t + 0.5(\pi_t - 2) + 1.0y_t$, where R is the federal funds rate, r^* is each participant's projection of the long-run equilibrium real federal funds rate, π is the four-quarter rate of core PCE inflation, and y is the output gap. For these calculations, π is assumed to equal 1.5 percent and the output gap is assumed to equal $-2(u_t - u^*)$, where the unemployment rate u is assumed to equal 5.6 percent and u^* is each participant's assessment of its long-run value.
[9] Participants who believe that the current level of the equilibrium nominal interest rate is substantially below its longer-run level may, however, be employing a concept of the equilibrium real rate that is inconsistent with the concept that typically guides the specification of the intercept in simple policy rules, as variations in the intercept are typically meant to represent only the low-frequency movements in the value of the real funds rate that are consistent with maximum sustainable employment.

and the true amount of slack in labor and product markets could also alter individual estimates of the prescriptions from benchmark rules. Finally, participants who are more optimistic regarding prospects for real activity and inflation will compute OC trajectories for the federal funds rate that rise faster and by more than participants who are more pessimistic about underlying economic conditions over the projection period.

To generate benchmark comparisons that take account of some (but not necessarily all) of these differences in participants' views about the outlook, Figure 3 reports the difference between each participant's projected path for the federal funds rate and the path prescribed by the Taylor (1999) rule when the rule is conditioned on the individual forecasts for inflation, the unemployment gap, and the equilibrium real interest rate. The figure clearly shows that participants' policy-rate paths run substantially below the Taylor (1999) rule prescriptions, notwithstanding the conditioning of both paths on policymakers' individual economic forecasts.

What accounts for these systematic deviations from a standard benchmark? As the deviations decline over time, one explanation could be that policymakers seek interest-rate smoothing, a property that is not embedded in either of the non-inertial Taylor rules. Although the Committee as a whole has never explicitly indicated that it has such a preference, individual participants have mentioned this motive in their SEP comments; also, research suggests that policy-rate inertia of this sort does improve expected macroeconomic performance in a range of models.[10] In addition, the gradual nature of the projected closing of the output gap could reflect elevated uncertainty about the economic outlook, which may lead participants to prefer a cautious approach to tightening, especially during the early stages of the normalization process when the Committee would be learning about the true strength of the economy and the initial effects of changes to the stance of monetary policy. Finally, other concerns, including risks associated with the ELB constraint and possible benefits from allowing the unemployment rate to fall below its estimated natural rate for a time, may also point to the desirability of a gradualist approach—although, as discussed below, there are also potential costs associated with such a strategy. In the sections below, we consider each of these possibilities in turn.

Asymmetric Efficacy of Policy and Uncertainty about the Economic Outlook

As just noted, one possible reason for taking a gradual approach to tightening relates to concerns about the asymmetric ability of monetary policy to respond to unexpected movements in real activity and inflation. According to this argument, if real activity and inflation were to prove stronger than expected, the FOMC has ample scope to stabilize the economy by raising interest rates to the degree required, provided that its normalization tools deliver control over short-term market interest rates. In contrast, if real activity and inflation were to prove weaker than expected, it is possible that the Committee's scope to provide additional support to real activity and inflation might be significantly circumscribed once the federal funds rate was brought back to its effective lower bound because of the potential costs and risks associated with balance-sheet

[10] Such inertia is arguably consistent with the evidence on Committee behavior in the twenty years or so prior to the financial crisis, as indicated by estimates of Taylor-type rules that include the lagged funds rate. However, as discussed by Rudebusch (2002, 2006), a large coefficient on the lagged funds rate could reflect a choice by the Committee to deviate systematically from rule prescriptions in response to persistent economic shocks, rather than from monetary policy inertia *per se*.

policies. Such asymmetries in the scope of policy to provide accommodation shift the distribution of possible outcomes for the economy in an undesirable direction, pushing the mean expected paths for employment and inflation below their modal paths and increasing the likelihood of persistently high unemployment or persistently low inflation. In principle, these distributional shifts can be offset, at least partially, by keeping policy more accommodative than it otherwise would be in the absence of the constraint imposed by the ELB.

A number of staff analyses have reviewed, directly or indirectly, the magnitude of these asymmetries using macroeconomic models. We highlight several key results from this work, drawing mainly on the accompanying memo by de Groot, Gagnon, and Tetlow.[11] In general, simulation results from the FRB/US model and other models suggest that the ELB constraint causes the probability distribution of outcomes for the unemployment rate to be modestly higher over the next few years. In contrast, asymmetries in the simulated distribution of inflation outcomes are more muted, as inflation responds only to a modest degree to higher or lower unemployment in the models used in these analyses and longer-run inflation expectations are assumed to remain well-anchored in these simulations. Interestingly, these relatively-sanguine results prevail even though the models place relatively high odds on the federal funds rate falling back to near zero sometime over the medium term, assuming that policy follows the prescriptions of a Taylor-type policy rule.[12] Overall, the evidence obtained thus far from macroeconomic models does not point to large asymmetries in the outlook—a view that appears to be consistent with the balance-of-risks assessment provided by most FOMC participants in the December SEP.

Participants may be concerned that the staff's model-based analysis may understate the consequences of the ELB constraint, perhaps because they envision elevated risks to employment and output in the current (and still unusual) environment that are not adequately captured in the stochastic simulations.[13]

- As discussed in Chung and others (2012), macroeconomic models may significantly understate the risks posed by the ELB constraint, possibly reflecting their failure to incorporate some important interactions between the financial sector and the real

[11] See de Groot, Gagnon, and Tetlow (2015). The probability estimates reported in this memo are derived from stochastic simulations of the FRB/US model using the December Tealbook projection as a baseline. In evaluating their results, it is important to note that the staff projection showed a pace of policy firming that is more rapid than is expected by some observers; it thus could understate the effects of the ELB constraint. Distributional asymmetries associated with the ELB constraint and other factors were also the subject of a memo to the Committee in June of last year by de Groot, Gagnon and Kiley; this study used a DSGE model in addition to the FRB/US model, and reported broadly similar results.

[12] The macroeconomic consequences of the federal funds rate falling back to its effective lower bound are estimated to be small because relatively few of the stochastic simulations feature short-term interest rates remaining near zero for very long. As a result, the ELB constraint has only minor implications for longer-term interest rates.

[13] Some participants may interpret the marked decline in the unemployment rate over the past year and the recent pickup in real GDP growth as demonstrating that the headwinds have essentially disappeared. However, these developments do not necessarily indicate that the value of the equilibrium real interest rate has returned to normal because they were accompanied by highly-accommodative monetary policy. If the equilibrium real interest rate were in fact now in the vicinity of 1¾ percent (the midpoint of the longer-run SEP values for the real federal funds rate), then one would expect the current stance of monetary policy to be generating even stronger real growth. Consistent with this view, the Tealbook-consistent estimate of medium-term equilibrium nominal federal funds rate reported in Book B of the December Tealbook was –0.8 percent; similarly, the current estimate of the long-run nominal interest rate generated by the Laubach-Williams (2003) model is just below zero.

economy. For example, these models generally apportion little role in the sluggish pace of recovery to impaired private-sector balance sheets, restrictive lending conditions, and other aftereffects of the financial crisis.

- The economy may still be somewhat fragile despite the considerable progress that has been made in improving the balance-sheet positions of financial institutions and households because the pickup in growth is so recent. A risk may therefore exist that confidence in the sustainability of the current expansion could be undermined by even a mildly adverse shock, prompting a more serious retrenchment in spending and hiring.
- State and local governments are not well-positioned at this time to withstand another downturn in the economy, as their tax receipts are still recovering and they have yet to replenish their rainy-day funds.
- The potential for a very slow recovery and the expected persistence of near-zero policy rates in the euro area and Japan, and the uncertainties connected with the effects of unconventional policy actions, imply that the asymmetries in the foreign outlook are likely more sizable than those for the U.S. in isolation. For example, the unusually-large divergence in policy stances across the major advanced economies could conceivably give rise to a large overshooting of the dollar under some conditions, and staff macroeconomic models do not account directly for this asymmetric risk.
- Looking farther into the future, some observers worry that the economy could experience a form of "secular stagnation" in which appropriate stabilization policy may require permanently keeping real interest rates at levels appreciably below the values envisioned in either the Tealbook or the long-run estimates of the SEP.

Of course, participants may not be greatly concerned about limits on the extent to which reductions in the federal funds rate can be deployed, if necessary, to shore up the economy in the face of an adverse shock, provided that they believe they have alternative tools to mitigate its consequences for employment and inflation. Accordingly, participants may anticipate that, in the event that economic growth were to falter and projected inflation were to shift down further, the Committee would not only bring the federal funds rate back to its lower bound but would also resume large-scale asset purchases. Under such circumstances, the Committee might also wish to employ forward guidance to communicate its intention to pursue a "lower-for-longer" strategy regarding the future path of the federal funds rate. Nevertheless, past experience suggests that asset purchases and forward guidance are far from a panacea for the constraints imposed by the ELB, at least on the scale that they have been used in practice; for that reason, the Committee may wish to reduce the chance that such tools will be needed again by proceeding cautiously with the pace of tightening, particularly in the initial stages when the Committee would be learning about the true durability of the recovery and the validity of judgments that inflation will see a return to 2 percent over the next few years. Furthermore, in view of the fact that the Federal Reserve's balance sheet already stands at such an elevated level, participants may also wish to reduce the likelihood of needing to resume asset purchases in the near future.

Other Potential Costs and Benefits of a Gradual Approach to Tightening

A number of other factors may also bear on the desirability of more (or less) accommodation than currently anticipated by the benchmarks we reviewed earlier. The costs of unemployment may not be symmetric around the natural rate of unemployment. In addition, a more-

accommodative monetary policy stance may encourage former workers to reenter the labor force—that is, a reverse-hysteresis mechanism may be set in motion—and policymakers, at least for a time, may find it desirable to probe the economy's room to grow as a way of ascertaining the importance of such channels. A consideration that works in the other direction is the possibility of nonlinearities in the Phillips curve relationship or an unmooring of inflation expectations, either of which could lead inflation to step up to an undesirable level in the event that the unemployment rate fell even moderately below its natural rate for a time. Finally, concerns related to financial stability may limit the desirability of more accommodative policy or even point to the need for a somewhat tighter policy stance. The remainder of this section explores these issues.

The costs (*or benefits*) *of unemployment falling below the natural rate*

The analysis of OC policies in the Tealbook embeds the assumption that the direct cost of positive deviations of unemployment from the natural rate are the same as that generated by negative deviations, abstracting from any associated changes in the costs of fluctuations in inflation. But these direct costs may in fact be judged by policymakers to be asymmetric, with declines in the unemployment rate below the natural rate viewed as less problematic than equally-sized increases, holding inflation constant.[14] Policymakers who perceived such an asymmetry and rated it as appreciable might be willing to continue providing substantial accommodation for a protracted period, as the desire to remove accommodation in order to limit a fall in the unemployment rate would figure less heavily in their decisions. However, an asymmetry of this kind would have to be large to have a sizable effect on the prescriptions for "optimal policy" because attempting to hold the unemployment rate persistently below its long-run sustainable level would have adverse consequences for inflation over time, especially in light of the likelihood that such a strategy would eventually undermine the credibility of policymakers.[15]

Within limits, however, allowing the unemployment rate to fall *temporarily* below estimates of the natural rate could potentially prove to be beneficial. First, such a development would likely speed up the return of inflation to 2 percent, as seems to be envisioned in some participants' SEP projections. Second, allowing the labor market and the broader economy to tighten appreciably could lead to a reversal of some of the adverse supply-side developments experienced in the wake of the financial crisis, severe recession, and slow recovery. For example, although the staff projection attributes much of the decline in labor-force participation over the past few years to structural factors such as demographics, the long period of severe labor market weakness may have contributed to the decision of some workers to leave the labor force. A strong labor market may witness the unwinding of some of these effects. In view of the latter scenario, some

[14] Similarly, there may be asymmetries in costs associated with deviations of inflation from the Committee's goal of 2 percent, with some considerations (money illusion, taxation of nominal capital income, and nominal price and wage rigidities) implying that positive deviations are more disruptive than negative ones, and others (downward nominal wage rigidity, the ELB constraint) pointing in the opposite direction. For a discussion of these issues, see Kiley, Mauskopf, and Wilcox (2007) and Coibion, Gorodnichenko, and Wieland (2012).

[15] See, for example, Erceg, Kiley, and Tetlow (2014). In this analysis of the implications for OC policy of asymmetric costs of unemployment, a policy of holding, for a time, the unemployment rate below its natural rate does not adversely affect the credibility of the FOMC and the stability of long-run inflation expectations.

policymakers may judge that it is desirable to explore the possibility that a tighter labor market for a time could boost the long-run level of potential output.

The quantitative importance of this supply-side mechanism is difficult to ascertain, as the relevant research on this point is not extensive.[16] A couple of qualitative observations can nonetheless be advanced. First, workers who retire or leave on grounds of disability have historically been disinclined to return to the labor force, and the sizable contribution of such transitions to the overall decline in the participation rate suggests that the scope to reverse the decline in participation (beyond expectations already embedded in the staff projection) may be somewhat limited. That said, not all workers who left the labor force fall into these categories, and what reentry into the labor force was achieved would likely comprise a lasting increase in economic potential. Second, because attempting to promote labor-market healing via stimulative policy would require sustaining an overheated labor market for a time, any probing of the limits to sustainable expansion would tend to generate a rise in inflation irrespective of whether hysteresis effects were indeed present and potentially reversible. With inflation projected to run systematically below the Committee's objective for the next couple of years, such a development could be beneficial because it would speed up the attainment of the Committee's dual mandate objectives. But past some point, policymakers who sought to expand the labor supply in this manner could run the risk of sowing the seeds of a persistent inflation problem because the strategy, to be successful, might require creating a significant excess of employment over its sustainable maximum for a prolonged period of time.[17]

Finally, some policymakers may have reservations regarding any effort to systematically pursue unemployment below its natural rate even for a few years, even if arguments can be marshalled that doing so would exploit perceived asymmetries in costs and benefits. A substantial literature has emphasized that the incentives facing policymakers who view unemployment costs as asymmetric around the natural rate would tend to push inflation expectations, and hence realized inflation, to be persistently above policymakers' desired levels. To avoid such an un-anchoring of inflation expectations, this literature suggests that society should require central bankers to disregard such asymmetries or to reduce the weight on unemployment gaps in policy decisions.[18]

Nonlinearities in the Phillips curve and other inflation risks

Both the staff forecast and many participants' SEP projections see the unemployment rate falling somewhat below its natural rate for a time. Additional accommodation would imply, all else equal, a more-significant undershooting of the unemployment rate. With a relatively-flat Phillips

[16] Mechanisms through which job loss generates permanent loss in employment are typically referred to as "hysteresis" in the research literature (see Blanchard and Summers, 1986). Ball (2014) suggests that hysteresis is empirically important, but he focuses on broad set of countries and the importance for the United States is not clear. Song and von Wachter (2014) suggest only a moderate role for job losses in long-run employment outcomes in the United States and suggest that a portion of it may be reversible.

[17] An earlier memo provided some illustrations of the possible outcomes. The results in that memo highlighted the wide range of uncertainty associated with these effects, as well as the possibility that growth gambles could increase employment notably or result in an inflation rate persistently above 2½ percent, if accommodative policies were pursued aggressively and the volume of structural labor supply did not expand. See de Groot, Gagnon, and Kiley (2014).

[18] The classic references on these matters are Barro and Gordon (1983) and Rogoff (1985).

curve and anchored inflation expectations, such undershooting would generate only mild upward pressure on inflation—something that, as already noted, many participants may view as a desirable development in circumstances in which most anticipate only a gradual return of inflation to the Committee's 2 percent objective.

However, the attribution of the moderate disinflation in recent years to a low value for the coefficient on economic slack and anchored inflation expectations within the Phillips curve may be incorrect, and nonlinearities in the Phillips curve may prove to be a more significant factor than generally expected. Under this alternative interpretation, the moderate disinflation since 2008 has occurred because large amounts of slack have placed only minor downward pressure on price and wage inflation, while a tight labor market could exert sizable upward pressure. If this interpretation is accepted, then a material undershooting of the natural rate of unemployment would generate higher inflation than expected—perhaps to an undesirably-high level. Although evidence on this matter is mixed, policymakers may find it prudent to place some weight on this possibility.[19]

Other risks to the outlook for inflation also may be seen as important. The staff's analytical framework for inflation dynamics placed significantly less importance on anchored inflation expectations prior to the crisis than subsequently. Although the generally-steady behavior of inflation expectations is reassuring, there is no guarantee that inflation expectations will remain stable irrespective of economic developments. It is difficult to judge whether it is more likely that the persistently low level of inflation in recent years may lead to a pronounced decline in inflation expectations—a possibility underscored by the declines in inflation compensation recorded in the past year—or if the combination of substantial monetary accommodation and a rapidly-improving labor market may eventually bolster inflation expectations.

Considerations related to financial stability

As discussed in recent Quantitative Surveillance (QS) assessments, the prolonged low level of short- and long-term interest rates has appeared to give rise to pressure on asset valuations—especially in corporate credit markets, in which ebullience has been evident over the past year (despite the recent increase in spreads on corporate bonds). But this pressure on asset valuations has not been accompanied by rapid growth in overall nonfinancial borrowing, and leverage and maturity transformation within the financial system remain notably below levels in the mid-2000s. Consequently, the staff judges the risks to financial stability at the present time to be moderate.

Market participants have indicated concern that markets may react strongly once policy firming is imminent, with the possibility of sizable adjustments in positions by some investors and large asset price movements.[20] To the extent that some price volatility precedes the onset of increases in short-term interest rates, collateral damage to the financial system may be lower if investors are not complacent and leverage and maturity transformation within the financial system are at moderate levels, as is the case currently. In addition, some increase in volatility in advance of the first rate increase would not necessarily be an unwelcome development.

[19] See Kumar and Orrenius (2014), Fisher and Koenig (2014), and Clark, Laxton, and Rose (1996).
[20] Such concerns are reminiscent of the behavior witnessed during the "taper tantrum" in 2013.

A policy approach in which the increase in policy interest rates in delayed could, in activity or inflation exceed expectations, require a faster-than-expected increase in rates. Such a rapid pace of interest rate increases may create stability concerns. For example, the Committee may face challenges in its attempts to bring market interest rates in line with desired levels because of the large balance sheet and deployment of novel tools, and these challenges may be more acute if the Committee needs to raise rates rapidly.

Policymakers may also be concerned about the degree to which fragility in the financial system may build if the economy notably overshoots potential. During the two most recent episodes in which the unemployment rate fell below the staff assessment of the natural rate of unemployment, financial excesses were considerable; at the same time, inflationary pressure was moderate, especially as measured by core inflation series. Such excesses in the late 1990s were brought out in the bursting of the information-technology bubble, severe strains internationally associated with the Asian crisis, and the related problems at Long-Term Capital Management. The housing bubble of the mid-2000s played an important role in setting in motion the financial crisis. Although a link between resource utilization and financial excesses is not an element of core macroeconomic models, the U.S. and international experience of the past two decades points to the need for more research in this area.[21]

There are also risks to financial stability that might arise from an overly-early withdrawal of accommodation. An early commencement of normalization might have the inadvertent effect of undermining the recovery. The resulting weaker recovery would heighten the likelihood that the policy rate would need to be returned to its ELB, and downside risks to financial stability associated with a weak economy would be heightened.

Communication Challenges

The preceding discussion indicated a number of factors that might influence the Committee's choice of a general strategy for adjusting and communicating the stance of monetary policy over time in response to economic events as they unfold. Communications clearly are a key element in the implementation of any strategy, as expectations of financial market participants, households, and firms play such a critical role in the various transmission channels that determine the ultimate response of employment and inflation to monetary policy actions. In this connection, it would be highly desirable to ensure that the private sector's expectations regarding monetary policy are well aligned with the actual intentions of the Committee.[22] Securing this degree of understanding is difficult, however, because the Committee may find it hard to come to a consensus on some elements of its implicit reaction function, and because the factors motivating the Committee's strategy may be varied and hence complicated to explain.

[21] On the notion that financial excesses may be more common than embedded in macroeconomic discussions, see Romer (2013). On the links between output gaps and financial excesses, see Arseneau and Kiley (2014).
[22] Such alignment does not imply that policymakers and financial market participants necessarily anticipate highly similar trajectories for the most likely future path of the federal funds rate, because the two groups may legitimately have markedly different outlooks for the real economy and inflation. Expectations about the mean path of the federal funds rate may also fail to coincide because policymakers and investors differ in their assessments of risks to the outlook.

A companion memo discusses some of the issues involved in communicating the Committee's intentions regarding the timing and pace of policy firming, and in particular provides some specific examples of how statement language might evolve.[23] In addition, we would note several general points that the Committee may wish to emphasize in other forums, including the FOMC minutes, press conferences, Congressional testimony, and speeches:

- Once the Committee's firming phase commences, the federal funds rate will not follow a predetermined trajectory amounting, for example, to a sequence of 25-basis-points-per-quarter increases. Instead, all adjustments will be data-dependent. As a result, the future path of the funds rate could be appreciably higher or lower than the Committee and market participants currently expect.
- The outlook for the real economy and inflation is highly uncertain, as are the values of such key influences on policy such as the economy's equilibrium real interest rate and the natural rate of unemployment. For these reasons, the economy may develop in ways that make it appropriate for the Committee to raise interest rates appreciably faster than currently expected; similarly, events may make it appropriate to slow the pace of tightening or even to reverse direction. In these circumstances, data-driven differences between the actual path of the federal funds rate and current expectations of that path would not imply a policy error on the part of the Committee regarding its decision to commence policy firming or its subsequent actions; rather, they would represent an appropriate response to unexpected events.
- In the present unusual economic environment, the Committee's policy actions may be influenced by considerations that were usually not major factors in its historical deliberations, such as heightened risks associated with the ELB or the uncertain foreign economic outlook, the potential for reversing past supply-side damage, or concerns associated with uncertain inflation dynamics and financial stability. If there is general agreement on what these considerations are, the Committee may wish to look for ways to discuss the nature of these concerns and their implications for policy.

[23] See English, Laubach, and Reeve, "Options for Evolving the Statement Language in Preparation for Liftoff," memorandum to the Committee, January 16, 2015.

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Figure 1
Expected Federal Funds Rate Paths

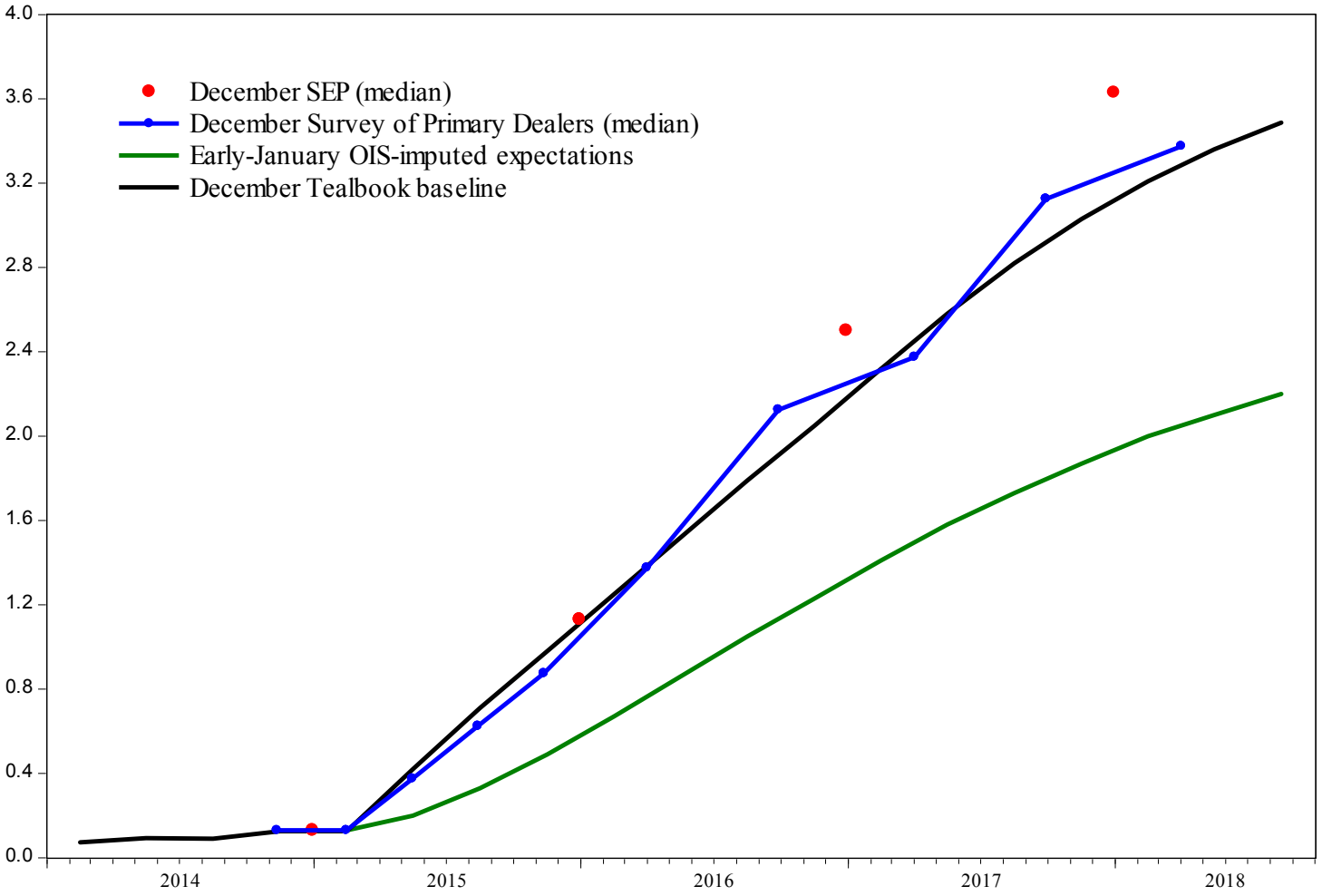
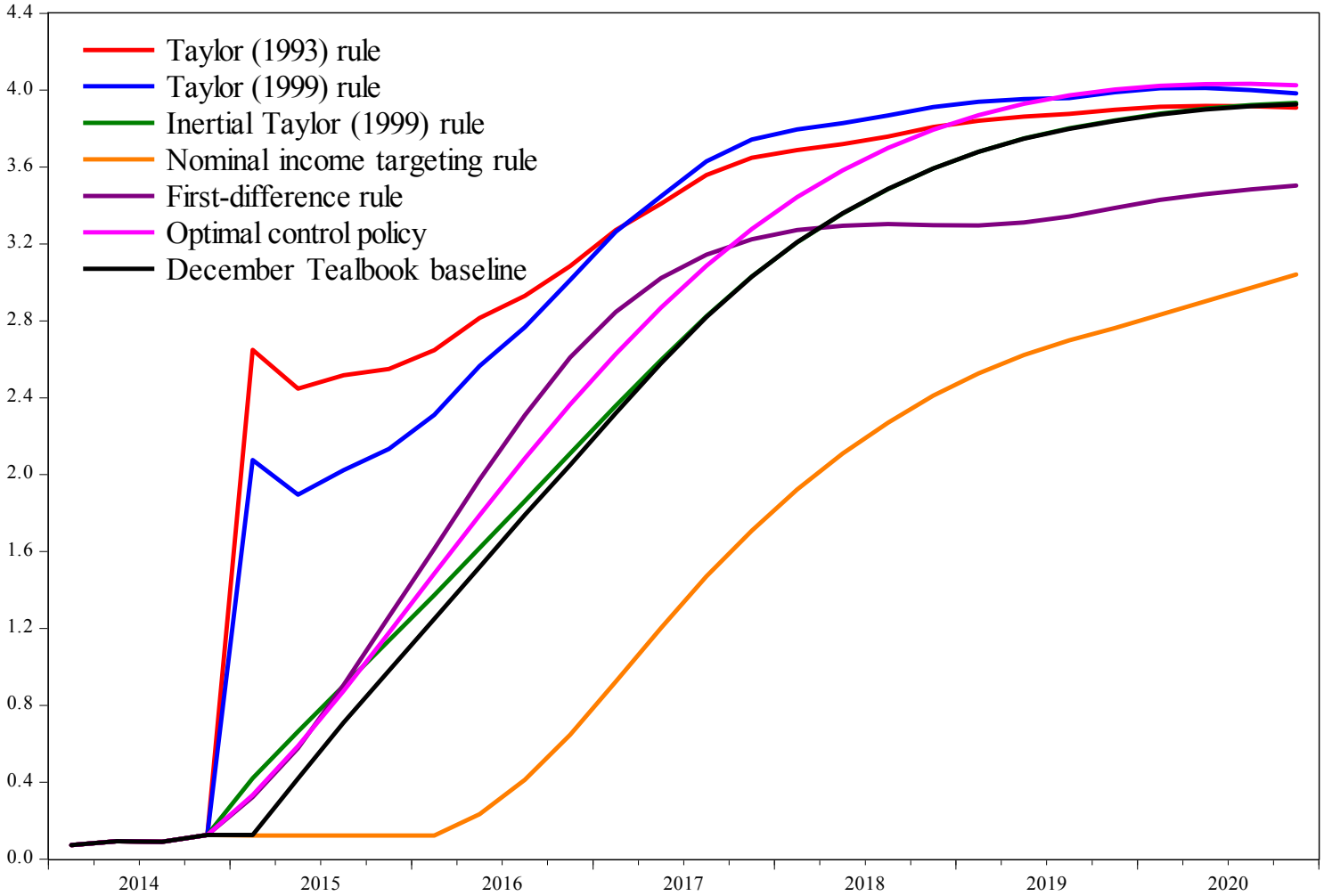
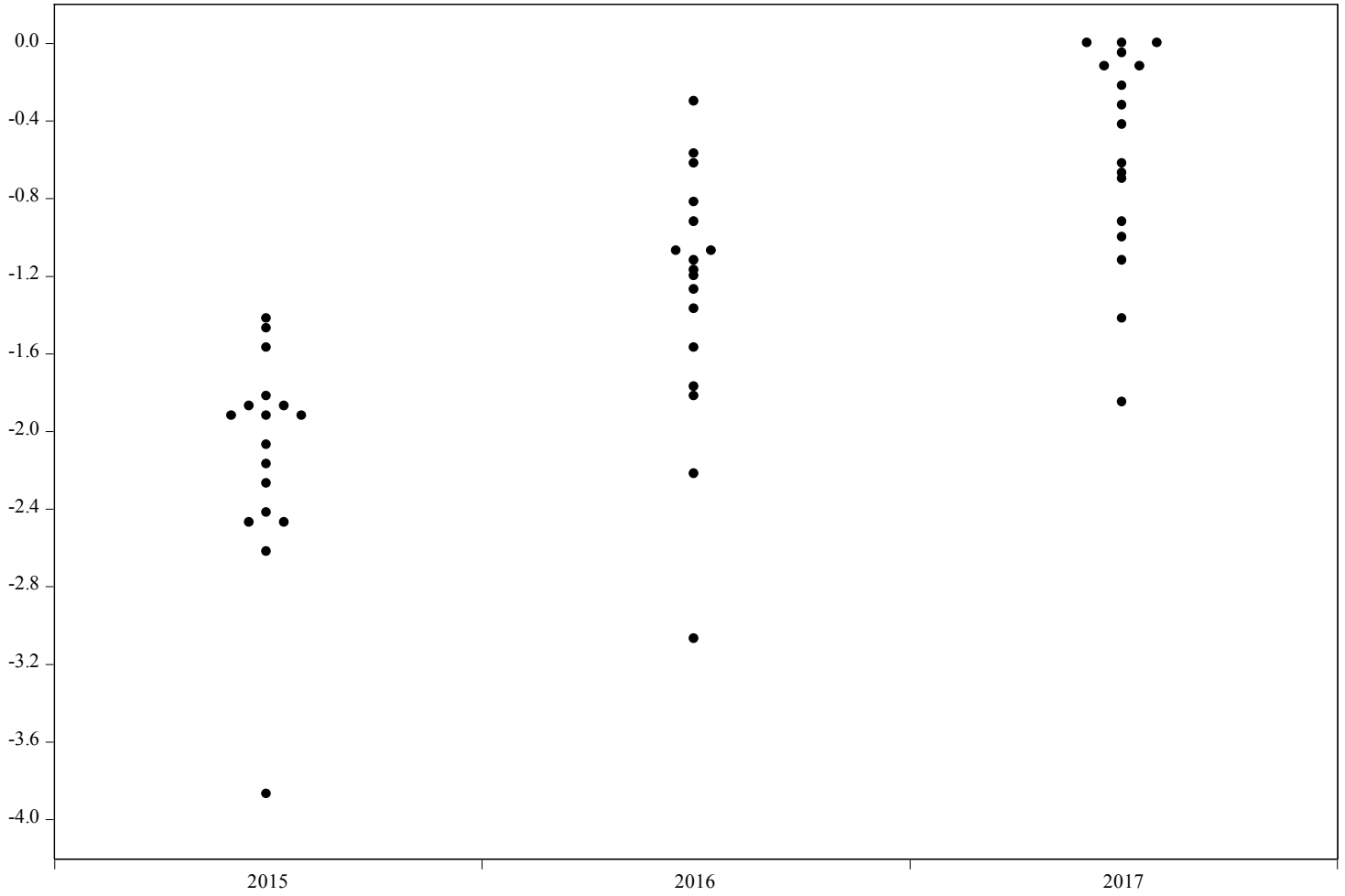


Figure 2
Federal Funds Rate Perscriptions from Policy Benchmarks
Conditonal on the December Tealbook Forecast



Note. Paths incorporate the effects of endogenous responses of resource utilization and inflation to changes from baseline in the federal funds rate.

Figure 3
Deviations of Participants' Federal Funds Rate Projections in the December SEP
from Individualized Prescriptions from the Taylor (1999) Rule



Note. Rule calculations use each participant's long-run forecast of the real federal funds rate as the rule's intercept, while the output gap is assumed to equal 2*[U(t)-U*], where U(t) denotes each participant's forecast of the unemployment rate in year t, and U* denotes the long-run projection of the unemployment rate.