

October 13, 2010

## **Issues Related to Specifying a Policy Framework in the Current Environment**

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### **Introduction**

Monetary policy is generally conducted within a policy framework that can be viewed in terms of the following four elements:

- (1) the objectives that the central bank seeks to attain;
- (2) the tools used to foster those objectives;
- (3) the strategy for implementing those tools; and
- (4) the approach to making information about monetary policy available to the public.

Generally speaking, maintaining broad continuity of the monetary policy framework contributes to the effectiveness of the central bank's actions and to the clarity of its communications. Thus, policymakers ordinarily prefer to make gradual enhancements to the existing framework through an evolutionary process. Under exceptional circumstances, however, they may judge larger modifications to be appropriate.

Discussion at recent FOMC meetings suggests that some participants think the Committee should consider modifying its policy framework by enhancing the clarity of its longer-run objectives and refining its strategy for promoting those objectives. Prior to the crisis, both policymakers and the public understood the approach that the Committee took to adjusting the federal funds rate in response to changes in economic and financial conditions. However, with the funds rate now effectively at its lower bound and policy being implemented through asset purchases, participants have expressed concern that the framework for policy decisions is no longer clear.

Agreeing on a new framework that integrates balance sheet adjustments and federal funds rate adjustments could facilitate the Committee's decision-making about whether additional monetary stimulus is warranted under present circumstances. Such a framework could also be helpful down the road in deciding when and how to shift to a less accommodative policy stance. Moreover, an enhanced framework might help policymakers communicate their decisions and intentions to the public and thus help the public gain a better understanding of the reasons for the Committee's actions and more insight into its likely future policy decisions; greater public understanding, in turn, could make monetary policy more effective and thereby aid policymakers in promoting a faster recovery and bringing inflation to a more desirable level. Finally, such a framework might diminish adverse tail risks by increasing public confidence that the Federal Reserve will prevent the emergence of a deflationary trap.

The next section of this memo outlines three alternative approaches to providing further clarification of the Committee's longer-run objectives:

- (1) more specific but still qualitative assessments of current and projected inflation and resource utilization relative to levels the Committee considers consistent with its mandate;

(2) an explicit inflation objective along with quantitative information regarding participants' views about the sustainable rates of unemployment over the longer run that are judged to be consistent with the dual mandate; and

(3) an explicit target path for the price level along with quantitative information regarding participants' judgments about the longer-run sustainable unemployment rate.

Later sections of the memo consider policy strategies for making adjustments to the Federal Reserve's intended holdings of longer-term securities.<sup>1</sup> In particular, we compare the relative strengths and weaknesses of policy strategies that result in large but infrequent adjustments to the amount of securities holdings with those of strategies that produce smaller but more frequent adjustments. We consider some specific examples of simple policy rules for adjusting SOMA holdings, and we use model simulations to gauge the additional stimulus that might be provided through a mix of policy actions and forward guidance. The final part of the memo considers possible adjustments to FOMC meeting statements as well as other potential enhancements to the Committee's communication strategy.

### **Longer-Run Objectives**

To improve the public's understanding of the Committee's goals and to help keep inflation expectations well anchored, a new framework could contain a more explicit statement of policymakers' interpretation of their legal mandate to promote "maximum employment, stable prices, and moderate long-term interest rates" than the Committee has previously provided.

#### *(1) Qualitative dual-mandate approach*

This approach would be similar to the September statement, but with a more explicit comparison of current and projected inflation and unemployment to the levels that the Committee sees as most consistent with its statutory objectives. In addition, the statement would indicate whether policymakers see employment and inflation as likely to converge toward (or remain near) longer-run goals at an acceptable rate without further policy action in the near future.

Such an approach would be a fairly modest change from the Committee's past practice, and so would be unlikely to confuse market participants. It would not require an appreciable change in the FOMC's decision-making process; in particular, members would not have to agree on an inflation target, and the Committee would preserve its current flexibility in making decisions about how quickly and how strongly to respond to shocks that threaten to push inflation or unemployment (or both) away from the Committee's implicit targets. Consequently, this approach would provide little or no additional structure to the Committee's internal deliberations. Moreover, this qualitative approach might not deliver much additional clarity about the Committee's objectives and its plans for achieving those objectives, and thus might not be sufficient to keep inflation expectations firmly anchored.

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<sup>1</sup> For discussion of other potential tools that the Committee may wish to consider, see the staff memo on "Strategies for Targeting Interest Rates Out the Yield Curve" that was sent to the Committee on October 13, 2010.

*(2) Explicit inflation objective and quantitative judgments about maximum employment*

Under this approach, the Committee would report an explicit numerical inflation objective in its post-meeting statement. The objective could be drawn from the most recent Summary of Economic Projections (SEP) or, if the Committee wanted to formally affirm or revise its inflation target on a regular basis, it could do so at each year's organizational meeting or in conjunction with the semiannual Monetary Policy Reports (MPR).

An explicit inflation objective could help keep inflation expectations well anchored by increasing the public's confidence that the Federal Reserve will keep inflation close to its objective, particularly if the FOMC also offers more information about what it will do to keep inflation close to target. In turn, more firmly anchored inflation expectations might allow the Committee greater flexibility to put in place still-more-stimulative monetary policy in the near term. An explicit inflation objective also could help the Committee reach agreement on policy steps by reducing concerns that a more accommodative policy in the short term would confuse the public into thinking that the Committee had lost its commitment to maintaining low inflation.

If the Committee were to adopt a numerical inflation target without providing a numerical estimate of the sustainable unemployment rate, some observers might mistakenly conclude that the Federal Reserve was no longer concerned about high unemployment. Thus, if the Committee chose to define the "price stability" portion of its dual mandate in terms of an explicit inflation target, it might wish to provide quantitative information about "maximum employment" as well. For example, each FOMC meeting statement could include the range or central tendency of participants' estimates of the longer-run sustainable unemployment rate that corresponds to "maximum employment," along with language emphasizing that estimates of the natural rate are uncertain and subject to change. The SEP would continue to provide more detailed information about participants' estimates of the longer-run sustainable rate of unemployment.

The Committee might also be able to forestall criticism about neglecting its employment objective by underscoring how its policy strategy is aimed at promoting both aspects of the dual mandate. For example, Federal Reserve communications could continue to emphasize that these dual objectives are generally complementary and that maintaining low and stable inflation helps promote economic growth and maximum employment over the longer run. Policymakers might also point to the international experience with inflation targeting: Central banks that have an explicit inflation objective have continued to place substantial weight on economic activity, and the stability of output and employment in those economies appears to be at least as good as in countries that do not have an inflation target.<sup>2</sup>

*(3) Price level objective and quantitative judgments about maximum employment*

The Committee could consider framing its policy strategy in terms of a target path for the price level, at least over the medium term until the economy returns to its balanced-growth path, the price level has returned to the targeted trend, and inflation has settled in at the longer-term rate judged to be most consistent with the dual mandate. In effect, a temporary price-level targeting framework would embody a strategy in which monetary policy would aim to raise inflation moderately above its longer-term desired rate for a while in order to compensate for inflation having previously fallen short of that desired rate. Such an approach would presume that the

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<sup>2</sup> For further discussion, see Ball and Sheridan (2005) and Levin, Natalucci, and Piger (2004).

Committee's current decisions will be viewed by policymakers and the public as binding commitments going forward.

In implementing a temporary price-level targeting framework, the Committee would need to select the starting point and the slope of the target price path, and those choices would then imply the magnitude of the current deviation from the target path. For example, if the target path starts in late 2007 (just prior to the onset of the recession) and rises at an annual rate of 2 percent (consistent with most participants' assessments of the mandate-consistent rate), then the current level of the PCE price index is about 1½ percent below that path. Thus, under this framework, policymakers would intentionally promote a temporary modest overshooting of inflation—perhaps to rates of around 2½ percent for three years—that would be sufficient to bring the price level back up to the target path. From that point onward, the Committee would aim to keep inflation near its mandate-consistent rate. This strategy would automatically adjust to changes in near-term inflation and hence could have a stabilizing effect on economic activity; for example, lower-than-desired inflation outcomes (or actual deflation) in the near term would lead to expectations of greater policy accommodation and a period of moderately elevated inflation.

Price level targeting likely would be more difficult to communicate to the public than the other two approaches described above. Moreover, how price-level targeting would perform in practice is an open question, given that no major industrial country has adopted price-level targeting for a sustained period.<sup>3</sup> The existing theory indicates that price-level targeting will help stabilize inflation expectations and output in a context where households, firms, and investors have forward-looking expectations and fully understand the policy framework; however, the robustness of those results to alternative and perhaps more realistic settings is somewhat unclear. To the extent that inflation expectations are not sufficiently forward-looking, or the policy framework is not well understood, price-level targeting could fail in the objective of improving near-term outcomes but would still saddle the policymaker with the commitment to follow through with policies that would cause inflation to be moderately elevated over time in order to bring the price level back to the specified target path. Moreover, this approach might be seen as implying that the Committee's inflation objective could be subject to further changes.

### **Monetary Policy Strategies**

Under any of the options for specifying policy objectives discussed in the previous section, the Committee may wish to reconsider its strategy for adjusting its policy instruments to achieve its policy goals. In particular, the Committee might choose to focus on the issues of the preferred policy instrument and the magnitude, timing, and communication of adjustments in this instrument. The following discussion focuses on adjustments to the federal funds rate and the intended quantity of longer-term securities held in the SOMA.<sup>4</sup> It should be noted, however, that most of the points regarding the benefits and costs of different strategies for adjusting the policy stance would carry over to the use of other tools.

The framework used to guide adjustments in the federal funds rate before it reached its effective lower bound in late 2008 may provide a useful benchmark for thinking about the strategic issues

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<sup>3</sup> The Swedish monetary authorities used a price-level targeting framework for a brief period in the 1930s, but no industrial economy has followed such an approach since then.

<sup>4</sup> We abstract from the technical issue of how rapidly the Desk would execute the transactions necessary to achieve an adjustment in the size of the SOMA portfolio.

associated with management of the SOMA portfolio. The strategy for setting the target funds rate generally involved small and reasonably frequent changes in the rate (typically in steps of 25 or 50 basis points) as the FOMC responded to the evolving outlook for inflation and real economic activity. The Committee never literally followed a policy rule; nonetheless, simple policy rules provided both a reasonable approximation to the Committee's behavior and a useful point of reference in discussing policy alternatives. As a result, the prescriptions from such rules (and accompanying exercises such as the optimal control simulations reported in the Tealbook) helped to inform internal Committee deliberations and to shape private-sector expectations regarding the future course of policy. Indeed, such rules likely informed investors' understanding of policy decisions and expectations for policy going forward, contributing to the ability of the Committee to achieve its goals by producing more systematic effects of expected policy actions on asset prices and on business and household expectations generally.

Since late 2008, when the federal funds rate reached its effective lower bound, the Committee has taken a different approach to adjusting the stance of policy. In particular, the Committee has made substantial adjustments to the size and duration of its SOMA portfolio on three discrete occasions: November 2008, March 2009, and August 2010. The first two adjustments involved very large changes in the size and composition of the balance sheet in response to very substantial cumulative changes in the economic outlook. For example, the March 2009 decision to expand the SOMA portfolio by \$1.15 trillion was a substantial shift in policy, whose effect in reducing long-term interest rates was estimated to be broadly similar to that of a sustained 200 basis point reduction in the federal funds rate. This policy action was taken in light of the substantial deterioration in economic conditions that occurred in late 2008 and early 2009. Taken together, the Committee's choices regarding asset purchases and sales over the past two years suggest that a high bar has been set for making decisions to change the degree of policy accommodation via this tool. The implication is that future Committee actions would likely be undertaken only infrequently and would involve large changes in the size of the SOMA portfolio.

The nature of the adjustments in the SOMA portfolio undertaken to date is therefore noticeably different from the strategy followed in adjusting the federal funds rate before the rate reached its effective lower bound. In light of this contrast, the Committee may wish to consider the benefits and costs associated with an alternative approach to managing the SOMA portfolio—one that would feature more-frequent, smaller adjustments in response to more modest shifts in economic conditions. Greater clarity about the nature of likely policy adjustments, under either the approach that the Committee has been following or a more continuous approach, could facilitate both the Committee's own deliberations and its public communication of policy actions. For example, establishing a number of basic parameters of the policy strategy—such as the most likely (positive and negative) increments to the size of the SOMA portfolio in each policy step (perhaps \$250 or \$500 billion), the period over which such purchases would occur given market conditions, and the overall sensitivity of asset holdings to changes in economic conditions or the outlook—would help structure the Committee's discussions and communications.

Our discussion of these strategic issues first compares the benefits and costs of large, infrequent adjustments in the SOMA portfolio with those associated with more modest and frequent adjustments. We then illustrate the implications of alternative assumptions regarding the sensitivity of the policy instrument to the economic outlook using model simulations that compare results generated conditional on the September Tealbook projection to those conditioned on alternative scenarios for future economic developments.

*Benefits and costs of larger, less frequent adjustments*

An approach in which policy actions are large and infrequent is analogous to the use of “S,s” rules in decision-making. Such rules amount to a policy in which instrument adjustments are triggered only when the outlook for the Committee’s objectives has drifted substantially away from a path deemed desirable, at which time the FOMC would initiate a large policy move designed to bring the outlook back to the desired path. Under this approach, the target size of the SOMA portfolio would be revised only when the current level of holdings of longer-term assets is sufficiently inconsistent with the long-run plan for achieving the goal variables to call for a very sizable shift. As a result, the plans for the target level of asset holdings might be revised only rarely.

There are several possible benefits to an “S,s” rule. First, the approach would be similar to the adjustments to the SOMA portfolio already undertaken; if the Committee judges the outcomes from past actions to have been desirable and believes that the private sector has a clear understanding of this approach, it may wish to stick with such a strategy. Likewise, a “no change” policy decision may be more common within this framework and thus would avoid the risk of being misunderstood. In addition, sizable policy actions may elicit larger and hence potentially more desirable responses if, for example, consumer and business confidence responded more markedly in the short run to the announcement of a new major LSAP program than to a sequence of smaller announcements. This effect seems reasonable because the fact that changes are sizable and infrequent under an S,s rule likely conveys a larger significance to the change in policy, and the resultant greater attention accorded to such actions should reinforce their impact on asset prices and private sector decision-making. This heightened response may be seen as especially valuable if the Committee felt it was “far behind the curve.” Moreover, the policy could enhance the Committee’s ability to achieve clarity about its intentions for the size of the balance sheet for longer stretches of time. Finally, because this strategy is arguably one-sided, it is potentially better aligned with a strategy of making additional purchases if more stimulus is needed, but reverting to the use of the federal funds rate as the primary instrument for responding to revisions in the outlook when the time comes to begin withdrawing stimulus, with the sale of securities put on a fixed, gradual path—an approach that in April the Committee indicated it intended to implement at the appropriate time.

An S,s strategy also may involve costs. One cost is that, because the strategy would require large shifts in the outlook in order to justify policy action, it may prove insufficiently responsive to a gradual accumulation of news on the outlook. Such an approach may increase the risk of undesirably low inflation rates if a large amount of additional stimulus was judged unnecessary at the current juncture and economic activity weakened further. Moreover, despite the Federal Reserve’s best communication efforts, the public could become unnerved if and when it observed the Fed taking no countervailing action in the face of modest downgrades in the economic situation. Costs could also arise when large actions are undertaken. In particular, the effects of LSAPs are uncertain, and hence the economic effects of large changes in the portfolio could prove much different from that intended, potentially increasing economic volatility. Finally, the Committee may judge that its experience with large, infrequent adjustments has underlined the difficulty of explaining the current stance of policy when FOMC actions are so infrequent. Infrequent adjustments also may make it more difficult for the public to discern the connection between incoming economic data and the Committee’s subsequent policy decisions.

*Benefits and costs of smaller, more frequent adjustments*

An alternative approach would be to follow a more continuous strategy, under which policy adjustments would occur on a more frequent basis and would typically (though not always) be on a more modest scale. Relative to an *S,s* strategy, this approach would have a number of potential benefits. It could allow for better calibration of policy to incremental changes in the economic outlook. By suggesting that the threshold for action is lower, a more continuous rule may reassure some members of the public that policy will be adjusted more rapidly, thereby helping to keep the economy on track through management of expectations and, potentially, confidence. In addition, given the greater similarity of this approach to the approach the Committee had followed in adjusting the federal funds rate prior to reaching the effective lower bound, this approach could improve public understanding of the Committee's "policy rule." Such understanding could be bolstered by the provision of additional information from the Committee regarding its approach. Greater public understanding of the policy rule should allow the public to improve its forecasts of future Committee actions, thereby helping expectations to adjust in a predictable way to incoming economic data and so increasing the stability of the economy. Moreover, given the considerable uncertainty regarding the links between the size of the SOMA portfolio and economic outcomes, smaller adjustments might be more appealing because they would reduce the risk of missing the Committee's objectives by a large amount—either because infrequent adjustments raise the risk of "falling behind the curve" or because larger adjustments, given their uncertain link to inflation and real activity, induce added volatility.

Finally, a continuous strategy would allow the Committee to initiate sales in modest increments in response to a sufficient improvement in the economic outlook, even as it continued to leave the federal funds rate near zero. However, the Committee might prefer to avoid a situation in which it has to wrestle with determining the appropriate settings of two policy instruments simultaneously. Accordingly, once the recovery is sufficiently far advanced, the Committee might want to announce its intention to sell off its excess asset holdings at a fixed pace from that point forward, while switching to the federal funds rate as the active tool to adjust the overall stance of monetary policy in response to changing economic conditions.

By the same token, a strategy of more frequent policy adjustments has potential costs, especially if that approach were excessively incremental and inertial. For example, a sequence of small adjustments in response to progressively weaker-than-anticipated incoming data might leave the Committee behind the curve, at least for a time, allowing unemployment to rise and inflation to fall further below the Committee's longer-run objective before sufficient policy accommodation is put in place. Indeed, if deflation is considered the most significant downside risk, the Committee may wish to act quickly to remove that risk even if the implied policy action is larger than the Committee normally would employ. Another possible cost is that a policy based on modest adjustments could lead some investors ahead of each FOMC meeting to treat as equally likely an increase or a decrease in the size of the SOMA portfolio—a position that the Committee might judge was not correct and so might want to address with forward guidance. Finally, some of the potential benefits of an *S,s* strategy correspond to the potential costs of a continuous adjustment approach, such as the possibility that a sequence of small actions may not influence consumer and business sentiment as much as the announcement of a single, major action, even if the two approaches result in the same path for the SOMA portfolio.

#### *Simple benchmark rules for adjusting the SOMA portfolio*

A strategy for adjusting the SOMA portfolio (or alternative instruments) could be guided by quantitative benchmarks for assessing whether the current stance of policy is consistent with the

Committee's objectives. Such benchmarks are familiar in the context of the target federal funds rate.

As a first illustration, consider the simple interest rate rules presented in Taylor (1993), Taylor (1999), and Henderson and McKibbin (1993).<sup>5</sup> Staff research has found that these rules can sometimes approximate important aspects of optimal control policies for the federal funds rate. The Taylor (1993) rule is less responsive than the Taylor (1999) rule to the estimated level of the output gap (but equally responsive to inflation); the Henderson-McKibbin rule is more responsive to both the output gap and inflation than the Taylor (1999) rule. Policymakers might find the Taylor (1993) rule to be an appealing benchmark if they see measures of resource slack as subject to an unusually high degree of uncertainty. In contrast, the Taylor (1999) rule or the Henderson-McKibbin rule might be viewed as a better benchmark in present circumstances, if policymakers judge that the costs of erring on the side of too much policy stimulus are smaller than the costs of inadvertently providing too little stimulus.

To construct a SOMA-rule analogue to these interest rate rules, we employ a simple method to translate the changes in the federal funds rate prescribed by each rule into adjustments in SOMA holdings of longer-term assets. Specifically, we use the staff's baseline estimate that additional long-term security purchases of \$150 to \$200 billion would lower long-term interest rates by about 5 basis points, an amount similar to that which has resulted, on average, from a sustained 25 basis point reduction in the nominal federal funds rate, to map prescribed changes in the federal funds rate from the simple interest rate rules into adjustments of SOMA holdings of longer-term securities.<sup>6</sup>

The prescriptions for the funds rate from each of the three rules can then be translated into prescriptions for the level of SOMA holdings.<sup>7</sup> We first determine whether the rule would prescribe a nominal federal funds rate below its effective lower bound. If so, we compute the level of the SOMA portfolio that would provide the amount of additional stimulus that would be achieved by lowering the nominal federal funds rate to the prescribed (but unattainable) level. We also assume that the Committee makes adjustments to the intended size of its SOMA holdings at a moderate pace in response to changes in economic conditions, consistent with the typical pattern of funds rate adjustments over past couple of decades.

The rule for adjusting intended SOMA holdings remains in effect as long as the actual funds rate is constrained by its effective lower bound, that is, as long as the funds rate prescription from the relevant interest rate rule is below that bound. Once the effective lower bound is no longer a binding constraint, however, the rule is used to set the funds rate, and SOMA asset holdings no longer respond to changes in macroeconomic conditions but are assumed from that point onward to be wound down gradually at a rate of 10 percent per quarter. Other exit strategies are possible, but this approach is both simple and consistent with the guidance provided by the Committee in April 2010.

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<sup>5</sup> These policy rules all relate the federal funds rate to inflation and the output gap; they differ only in how strongly the funds rate responds to changes in these variables.

<sup>6</sup> This rule of thumb is a rough approximation. The effects of asset purchases on longer-term rates will depend on expectations for how long the change in holdings will be sustained, which in turn reflects the expected pace of purchases and the anticipated timing and pace of subsequent reductions in holdings.

<sup>7</sup> The algebraic expression for this process is given in the Appendix.

This approach implies that active policy adjustments are always made on a single margin: The SOMA portfolio is adjusted actively as long as the funds rate is pinned to its lower bound, and then the SOMA portfolio is adjusted passively once the funds rate is reinstated as the policy instrument.

The behavior of policy instruments, the long-term interest rate, and implications for the outlook, under each rule are illustrated using the baseline staff projection from the September Tealbook. In each simulation, financial market participants are assumed to have full understanding of the policy framework that determines the trajectory of SOMA holdings and the path of the fund rate, while the expectations of households and firms are based on more limited information.

As shown in Figure 1, the SOMA-adjustment rule that corresponds to the Taylor (1993) rule (blue dashed lines) does not call for further purchases of longer-term securities; indeed, the path of SOMA holdings is just a bit below the baseline trajectory in the September Tealbook, and the associated macroeconomic outcomes are quite similar to those in the staff's September projection. In contrast, the SOMA-adjustment rule that corresponds to the Taylor (1999) rule (red dashed lines) calls for a sizable increase in the SOMA portfolio to about \$3½ trillion by the end of 2011. Consequently, term premiums on long-term Treasuries drop nearly 60 basis points relative to baseline. (The 10-year Treasury yield only declines about 40 basis points, because expected short-term interest rates rise and the expected departure of the funds rate from its lower bound is pulled forward to the first half of 2012.)

The associated macroeconomic outcomes under the Taylor (1999) version of the SOMA rule are somewhat better than in the baseline projection but may still be unappealing in terms of promoting the Committee's dual objectives. The more active approach prescribed by the Henderson-McKibbin rule yields appreciably better macroeconomic outcomes (as shown by the green dashed lines) but would involve a trajectory of SOMA holdings that would exceed \$6 trillion by the end of next year. Policymakers may view such a trajectory as neither feasible nor desirable.

### *Combining forward guidance with adjustments to the SOMA portfolio*

We now consider an optimal control policy that prescribes both the size of SOMA holdings and the funds rate path. The optimal control simulations take account of the potential for using forward policy guidance about the likely future paths of both asset holdings and the federal funds rate to influence financial market expectations and hence long-term interest rates.

We continue to translate federal funds prescriptions in the lower-bound environment into SOMA rule prescriptions using the method described earlier. In the optimal control case, we further assume that changing the SOMA portfolio is costly (so as to highlight alternatives to sharply increasing the SOMA portfolio as suggested by the Henderson-McKibbin version of the simple rule), and that the Committee will actively adjust the SOMA portfolio only while the effective lower bound on the federal funds rate binds.<sup>8</sup> As with the simple rules, once the funds rate rises

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<sup>8</sup> The optimal control simulations reported in the Tealbook assume that the policymaker's loss function equally weights (squared) changes in the nominal federal funds rate and (squared) deviations of both unemployment and inflation from their assumed objectives (which equal the staff NAIRU and 2 percent, respectively). In the optimal control exercises that add the size of the SOMA portfolio as an additional policy instrument, (squared) changes in the SOMA portfolio (relative to GDP) are penalized by 10 times as much as the other elements of the loss function. Absent a high penalty on changes in the SOMA portfolio, optimal control simulations of the FRB/US model would

above its effective lower bound, SOMA adjustment becomes automatic and the funds rate becomes the sole policy instrument varied in response to the state of the economy.

Figure 2 shows the prescriptions of the optimal control policy and the resulting macroeconomic outcomes. This policy prescribes a gradual increase in the SOMA portfolio to \$3.25 trillion by the end of 2013, and the funds rate remains at its effective lower bound until the first half of 2014. The combination of a protracted period of increased SOMA holdings with a policy of keeping the funds rate at its effective lower bound for several quarters longer than indicated by the simple interest rate rules produces an immediate drop in longer-term interest rates because financial markets are assumed to understand the optimal control strategy, which embeds commitments about future policy actions. As a result, the unemployment rate is lower, while inflation runs higher and eventually overshoots its long-run goal. Indeed, these simulations bring out the potential benefits of allowing a temporary overshooting of inflation relative to the long-run goal. Such a strategy, entailing a more accommodative policy, lowers real long-term interest rates and contributes to stronger activity and inflation that is, on balance over the simulation period, closer to its long-run objective; it yields outcomes similar to those of the Henderson-McKibbin version of the SOMA rule without the very large changes in the SOMA portfolio prescribed by that rule. This result is part of the rationale for a price-level objective, which may produce adjustments in expectations about future policy that are even stronger than those shown here.

Putting these results together, the simulations demonstrate that a key consideration in any strategy going forward is the overall sensitivity of policy actions to projected movements in the policy objectives. In addition, policies that involve sustained periods of accommodative policy and are well understood by the public, as assumed in the optimal control simulation, are particularly effective because of their impact on expectations.

## **FOMC Communications**

We now turn to a discussion of how the Committee's communications might evolve in conjunction with other modifications to its policy framework. Such modifications would presumably be reflected in existing modes of communication, such as FOMC meeting statements and minutes, the Summary of Economic Projections (SEP), the Monetary Policy Report to Congress (MPR), and other testimony and speeches. In addition, we briefly discuss the possibility that the Chairman could hold a press conference after each FOMC meeting.

### *FOMC Meeting Statements*

To illustrate how potential modifications to the policy framework might be reflected in the FOMC's post-meeting statement, the following pages present three draft statements labeled as 1, 2, and 3. These drafts reflect hypothetical decisions to (1) offer a more explicit but still qualitative summary of the Committee's goals; (2) adopt a numerical inflation target and provide quantitative estimates of the unemployment rate that is sustainable over the longer run; and (3) adopt a price-level target and provide quantitative estimates of the unemployment rate that is

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prescribe a more rapid increase and a higher peak level for the SOMA portfolio in response to current deviations of output and inflation from their assumed objectives, similar to the Henderson-McKibbin (1993) version of the SOMA rule. The timing of the departure from the effective lower bound is an endogenous component of the simulation. These assumptions are made for simplicity and to facilitate comparison to the simple rules.

sustainable over the longer run. The drafts also suggest language that could be used to indicate that the Committee will retain its *S,s* approach to adjusting the size of its securities portfolio, and language that would indicate a shift to making smaller but potentially more frequent adjustments.

All three draft statements begin with a paragraph that characterizes current economic conditions; the specific wording of that paragraph is intended solely for purposes of illustration and would naturally evolve over time in response to incoming information. In each draft statement, the second and third paragraphs summarize the FOMC's objectives, its expectations about progress toward those goals, and its decisions about the intended size of its securities holdings. The remaining paragraphs provide information about the likely trajectory of the federal funds rate and the potential for further adjustments to the SOMA portfolio.

Statement 1 follows a purely qualitative approach in characterizing the deviation of inflation and unemployment from levels judged to be most consistent with the dual mandate. Statement 2 provides a quantitative description of the mandate-consistent inflation rate, with brackets enclosing two plausible choices for that characterization. For example, the phrase "about 2 percent or a bit less" could be used to convey a modest degree of asymmetry, roughly similar to the European Central Bank's objective of keeping inflation "below but close to 2 percent over the medium run." In contrast, specifying the objective as "about 2 percent" would presumably be read as suggesting that policymakers would not be overly concerned with very small deviations in either direction; that formulation might also be viewed as a means of expressing the inflation objective as clearly and simply as possible. Both Statement 1 and Statement 2 indicate that undesirably low inflation poses risks to the economic outlook. The key distinguishing feature of statement 3 is that this approach establishes an explicit target path for the price level that starts in the fourth quarter of 2007, just prior to the NBER date for the onset of the recession, and then rises at a 2 percent rate. Given that the PCE price index is currently about 1½ percentage points below that target path, the statement indicates that the Committee will intentionally push inflation above its longer-run target rate in order to return the PCE price index to the target path.

Statements 2 and 3 include estimates of the unemployment rate that is sustainable over the longer run, along with language explaining why the Committee's characterization of its employment objective is fundamentally different from the characterization of its inflation objective. In particular, these statements note that the sustainable unemployment rate is determined by a variety of economic and demographic factors and point to the "considerable uncertainty" that surrounds those estimates.

All three statements explain the Committee's decision to purchase additional longer-term Treasury securities, thereby expanding the intended size of the SOMA portfolio. As discussed above, a decision to purchase \$500 billion of such securities would correspond roughly to a sustained reduction of about 75 basis points in the target federal funds rate; the amount of purchases is enclosed in brackets to underscore that policymakers could decide on a different quantity, perhaps specified using increments of \$250 billion to help convey the analogy with funds rate target adjustments. Each statement also makes note of the time horizon over which the additional purchases would be executed and indicates that the Federal Reserve will continue to reinvest the principal payments from its securities holdings.

Statement 1 concludes with a set of four alternative formulations of the Committee's "forward guidance" regarding the prospects for further adjustments to the SOMA portfolio; those options

could also be considered in conjunction with statements 2 or 3. The first pair of options would be suitable for conveying the Committee's expectation that any further adjustments to the intended size of the SOMA portfolio would tend to be large and infrequent. In contrast, the second pair of options would state that the Committee would make such determinations "each time it meets" and hence would point to a shift in the policy framework toward smaller and more frequent adjustments to the SOMA portfolio. The first and third options would likely be read as fairly neutral with regard to the likely sign of the next policy action, whereas the second and fourth options refer to the possibility of a further increase in the SOMA portfolio and hence would convey the notion of a "tilt" in the direction of policy.

Now looking a bit further ahead, if policymakers decided to take no further policy action at the December meeting, the policy portion of the December FOMC statement might read: "*The Committee decided today to make no additional securities purchases beyond those already planned, leaving the total intended size of the SOMA portfolio at approximately \$[2.50] trillion. These purchases will be executed by the end of [May] 2011.*" Alternatively, if policymakers decided on a further expansion of the SOMA portfolio, the relevant portion of the statement might read: "*The Committee decided today to purchase an additional \$[250] billion of longer-term Treasury securities beyond those already planned, bringing the total intended size of the SOMA portfolio to approximately \$[2.75] trillion. These purchases will be executed by the end of [August] 2011.*" Conversely, if conditions improved significantly and the Committee decided to purchase a smaller volume of longer-term securities than it had previously been planning, the relevant part of the statement might read as follows: "*The Committee decided today to reduce its planned purchases of longer-term Treasury securities by \$[250] billion, bringing the total intended size of the SOMA portfolio to approximately \$[2.25] trillion. The planned purchases will be executed by the end of [February] 2011.*" In each case, the statement would indicate that the Committee would be maintaining its policy of reinvesting principal payments. Moreover, policymakers could convey a tilt to policy going forward using the wording of the final paragraph.

Looking even further ahead, the economic outlook and financial conditions will eventually call for the commencement of policy firming. That firming might begin with a statement indicating that the Committee had decided to suspend the reinvestment of principal payments. The next step might be to start actively shrinking the balance sheet at a faster pace than would result slowly from allowing maturing or pre-paid securities to roll off: "*The Committee decided today to reduce its holdings of longer-term Treasury securities by [\$250 billion] over the next [X] months, thereby bringing the total intended size of the SOMA portfolio to approximately \$[n.n] trillion. The Committee estimates that sales of roughly [\$Y billion] will be necessary to achieve this reduction.*"

As noted above, the policy framework could be oriented towards active adjustments for only a single instrument. In that case, the Committee eventually would need to determine and communicate the likely date at which it would begin to use the funds rate rather than its securities holdings to implement policy.

#### *Summary of Economic Projections*

If the Committee decided to move forward with a quantitative policy framework, it might wish to consider enhancing the SEP to include quantitative information about individual participants' assessments of the appropriate path of policy. That step might be particularly compelling in

conjunction with the announcement of an explicit inflation objective and quantitative information about the longer-run sustainable unemployment rate, because the policy projections would help the public understand the Committee's intentions regarding the likely path of policy that best fosters those objectives over time.

Committee participants' projections for unemployment and inflation are based on their individual assessments of the appropriate path of policy; thus, including information about their funds rate projections would seem to be a natural direction for enhancing the SEP. For example, the SEP could collect and report participants' projections for the average level of the federal funds rate in the fourth quarter of each year included in the SEP (the same reporting convention as for the unemployment rate). In addition, or instead, the SEP could collect participants' views about the likely date on which the funds rate rises above the effective lower bound and report a histogram that depicts the distribution of those dates. The SEP narrative would need to emphasize the conditionality of such forecasts, whether of the federal funds rate or the anticipated date on which the funds rate will begin to rise. Over time, that conditionality would also be evident from the evolution of the funds rate projections in response to incoming information; indeed, publishing those projections could become very helpful in elucidating the link between participants' assessments of the economic outlook and their individual judgments regarding the likely duration of the "extended period."

The effectiveness of incremental adjustments to the balance sheet would depend crucially on financial markets' perceptions of the likely trajectory of the Federal Reserve's securities holdings as well as the conditionality of that trajectory. Thus, the Committee might also wish to consider the possibility of including participants' balance sheet projections in the SEP. For example, the SEP could collect and report on projections of the Federal Reserve's securities holdings at the end of each calendar year over the forecast horizon. Or the SEP could include a histogram depicting the distribution of the anticipated date of the peak in those holdings if that information were collected. In either case, the accompanying narrative would underscore the conditionality of these balance sheet projections. Over time, such projections might become very helpful in elucidating the link between the size of the balance sheet and participants' assessments of the economic outlook and financial conditions.

In carrying out any significant enhancement of the SEP, it would be necessary to settle a number of substantive and technical details. Such an enhancement would require guidance from the Committee and would likely take some time to implement.

#### *Monetary Policy Report to Congress*

For frameworks that involve numerical objectives, the Committee may want to provide the public with regularly updated assessments of outcomes relative to the objectives, together with projections of key variables going forward. While that information could be summarized in FOMC meeting statements and would be discussed in the minutes, it might be reasonable for the MPR to become the primary platform for providing these assessments and accompanying explanations. In particular, it would be important to explain misses relative to explicit targets over time in order to avoid losing credibility, especially in instances where policymakers judged that the miss reflected transitory factors and hence did not warrant any change in the stance of monetary policy.

#### *Press Conferences*

A number of major central banks regularly use press conferences as part of their communication policies. For example, the President of the ECB's Governing Council, with assistance from the Vice President, holds a monthly press conference that begins 45 minutes after the release of the ECB's policy decision; the Bank of Japan also holds a monthly press conference on the day of its policy meeting. The Bank of Canada and the Bank of England hold press conferences in conjunction with the release of their quarterly monetary policy reports. On balance, press conferences are generally viewed by these central banks as an effective means of communicating to the public about the economic outlook and monetary policy decisions, although it is unclear how much press conferences add to the information they provide through press releases, speeches, or minutes of their policy meetings.<sup>9</sup>

Post-FOMC press conferences could offer an opportunity to inform the public about the Committee's decisions and the key factors that entered into each decision in more detail than a brief statement allows. Press conferences could be particularly useful in unusual times to prevent or dispel potential misinterpretations of the Committee's decisions. However, the Chairman would have to speak for the entire Committee and would need to provide explanations of any dissenting views. Policymakers and staff would have to devote time to prepare for each press conference, and that preparation would come on top of preparing for the FOMC meeting. Finally, press conferences pose some risk that policymakers' views may be misinterpreted, although other this risk can be mitigated to some degree by the timing and structure of the press conference.

If the Committee decided to adopt a new quantitative framework at its November meeting, policymakers might consider whether it would be helpful for the Chairman to give a press conference or briefing immediately afterwards in order to provide further background and clarification of the FOMC meeting statement. Nonetheless, it should be recognized that a press conference, if held once, might well establish a precedent that could lead to having a press conference after every meeting.

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<sup>9</sup> For further discussion, see the note by Linda Kole, Trevor Reeve, and Beth Anne Wilson on "Press Conferences at Major Foreign Central Banks" dated December 8, 2008.

## Appendix: Algebraic Expressions for Simple Interest Rate Rules and SOMA Policy Rules

This appendix presents algebraic representations of the simple benchmark rules discussed in the text. The basic interest rate rule, for a 2 percent inflation objective, is:

$$R(t) = 2 + \pi(t) + \mathbf{a} \cdot y(t) + \mathbf{b} \cdot [\pi(t) - 2].$$

where  $R(t)$  denotes the federal funds rate,  $\pi(t)$  is the four-quarter rate of core PCE inflation, and  $y(t)$  denotes the output gap. In Taylor (1993),  $\mathbf{a}$  and  $\mathbf{b}$  both equal 0.5; in Taylor (1999),  $\mathbf{a}$  equals 1 and  $\mathbf{b}$  equals 0.5; in Henderson and McKibbin (1993),  $\mathbf{a}$  equals 2 and  $\mathbf{b}$  equals 1.

The SOMA equivalent to the interest rate rules can be specified in algebraic terms as follows:

$$X(t) = 0.75X(t-1) + 0.25\mathbf{c} \cdot \{R(t) - [2 + \pi(t) + \mathbf{a} \cdot y(t) + \mathbf{b} \cdot (\pi - 2)]\} \text{ if } R(t) \leq 0.25 \text{ and}$$

$$X(t) = 0.9X(t-1) \text{ if } R(t) > 0.25.$$

where  $X(t)$  denotes SOMA holdings of longer-term securities as a share of nominal GDP (relative their normal share of about 5 percent) at a given date  $t$ . The SOMA rule responds to lagged SOMA holdings ( $X(t-1)$ ) and to the gap between the actual funds rate and the simple rule's prescription as defined above. The coefficient  $\mathbf{a}$  determines how strongly the rule responds to an output gap and the coefficient  $\mathbf{b}$  determines how strongly the rule responds to the deviation of inflation from the assumed objective of 2 percent. In the SOMA equivalent of the Taylor (1993) rule,  $\mathbf{a}$  and  $\mathbf{b}$  both equal 0.5; in the SOMA equivalent of the Taylor (1999) rule,  $\mathbf{a}$  equals 1 and  $\mathbf{b}$  equals 0.5; in the Henderson-McKibbin SOMA rule,  $\mathbf{a}$  equals 2 and  $\mathbf{b}$  equals 1. The coefficient  $\mathbf{c}$  translates federal funds rate adjustments into the equivalent change in SOMA holdings of longer-term securities. The SOMA rule is specified as a partial-adjustment process and hence tends to prescribe a smoothed path of SOMA holdings. These rules assume that active adjustments to SOMA holdings occur while the federal funds rate is less than or equal to 25 basis points. When the federal funds rate is greater than 25 basis points, SOMA holdings are assumed to return to a normal level at a rate of 10 percent per quarter.

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## **Draft Statement 1: Qualitative Dual-Mandate Approach**

1. Information received since the Federal Open Market Committee met in September confirms that the pace of recovery in output and employment remains slow. Household spending is increasing gradually, but continues to be constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software is rising, though not strongly, and investment in nonresidential structures remains weak. Employers continue to be reluctant to add to payrolls. Housing starts remain at a depressed level. Measures of underlying inflation have trended lower in recent quarters, and longer-term inflation expectations have remained stable.
2. The FOMC seeks to foster maximum employment and price stability. Currently, the rate of unemployment is well above the rate that the Committee assesses to be sustainable in the longer term, and measures of underlying inflation are at levels somewhat below those the Committee judges to be most consistent, over the longer run, with its objectives. Although the Committee anticipates a gradual return to higher levels of resource utilization, it judges that, without further policy stimulus, the pace of economic recovery likely would be too slow to make acceptable progress toward maximum employment; moreover, underlying inflation likely would remain undesirably low for some time, posing risks to the economic outlook.
3. To promote a stronger pace of economic recovery and to return inflation, over time, to levels consistent with its mandate, the Committee decided today to purchase an additional [\$500] billion of longer-term Treasury securities, bringing the total intended size of the SOMA portfolio to about [\$2.50] trillion. These purchases will be executed by the end of [May 2011]. The Committee also will maintain its existing policy of reinvesting principal payments from its securities holdings.
4. In addition, the Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period.
5. The Committee will continue to monitor the economic outlook and financial developments and is prepared to take further action if necessary to support progress toward maximum employment and price stability.

OR

The Committee will continue to monitor the economic outlook and financial developments. In current circumstances, the Committee is prepared to expand its securities holdings as necessary to support progress toward maximum employment and price stability.

OR

The Committee will continue to monitor the economic outlook and financial developments and will determine, each time it meets, whether a further adjustment to its securities holdings is needed to foster maximum employment and price stability.

OR

The Committee will continue to monitor the economic outlook and financial developments. In current circumstances, the Committee will determine, each time it meets, whether a further increase in its securities holdings is needed to foster maximum employment and price stability.

## **Draft Statement 2: Explicit Inflation Objective and Quantitative Judgments about Maximum Employment**

6. Information received since the Federal Open Market Committee met in September confirms that the pace of recovery in output and employment remains slow. Household spending is increasing gradually, but continues to be constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software is rising, though not strongly, and investment in nonresidential structures remains weak. Employers continue to be reluctant to add to payrolls. Housing starts remain at a depressed level. Measures of underlying inflation have trended lower in recent quarters, and longer-term inflation expectations have remained stable.
7. The FOMC seeks to foster maximum employment and price stability. The lowest unemployment rate that is sustainable over the longer run is determined by a variety of economic and demographic factors that evolve over time; in light of the available information, the Committee currently estimates that rate to be around [5 to 5¼ percent], though considerable uncertainty surrounds this range. The Committee judges that the longer-run rate of inflation that best promotes its objectives is [about 2 percent | 2 percent or a bit less], as measured by the price index for personal consumption expenditures.
8. The Committee anticipates a gradual return to higher levels of resource utilization but judges that, without further policy stimulus, the pace of economic recovery likely would be too slow to make acceptable progress in bringing unemployment toward its longer-run sustainable rate; moreover, underlying inflation likely would remain undesirably low for some time, posing risks to the economic outlook. To better meet its objectives, therefore, the Committee decided today to purchase an additional [\$500] billion of longer-term Treasury securities, bringing the total intended size of the SOMA portfolio to about [\$2.50] trillion. These purchases will be executed by the end of [May 2011]. The Committee also will maintain its existing policy of reinvesting principal payments from its securities holdings.
9. In addition, the Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period.
10. The Committee will continue to monitor the economic outlook and financial developments and is prepared to take further action if necessary to support progress towards its dual objectives of maximum employment and price stability.

### **Draft Statement 3: Price Level Objective and Quantitative Judgments about Maximum Employment**

1. Information received since the Federal Open Market Committee met in September confirms that the pace of recovery in output and employment remains slow. Household spending is increasing gradually, but continues to be constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software is rising, though not strongly, and investment in nonresidential structures remains weak. Employers continue to be reluctant to add to payrolls. Housing starts remain at a depressed level. Measures of underlying inflation have trended lower in recent quarters, and longer-term inflation expectations have remained stable.
2. The FOMC seeks to foster maximum employment and price stability. The lowest unemployment rate that is sustainable over the longer run is determined by a variety of economic and demographic factors that evolve over time; in light of the available information, the Committee currently estimates this rate to be around [5 to 5¼ percent], but considerable uncertainty surrounds this range. The Committee judges that [2 percent] trend growth in the price index for personal consumption expenditures (the PCE price index) is most consistent with its objectives. This price index has risen at an average rate of [1½ percent per year since the fourth quarter of 2007, when the recent recession began], and it is currently about [1½ percent] below the Committee's preferred path, [which begins at the level of the index in the fourth quarter of 2007 and then rises at a rate of 2 percent per year].
3. The Committee anticipates a gradual return to higher levels of resource utilization but judges that, without further policy stimulus, the pace of economic recovery likely would be too slow to make acceptable progress in bringing unemployment toward its longer-run sustainable rate; moreover, the PCE price index likely would remain below the desired path for some time. Accordingly, the Committee will implement monetary policy to achieve a stronger economic recovery and to bring the PCE price index back up to the Committee's preferred path. Once the index has returned to that path, the Committee will seek to achieve maximum employment and inflation of [about 2 percent | 2 percent or a bit less] as measured by trend growth in the PCE price index.
4. To better meet its objectives, the Committee decided today to purchase an additional [\$500] billion of longer-term Treasury securities, bringing the total intended size of the SOMA portfolio to about [\$2.50] trillion. These purchases will be executed by the end of [May 2011]. The Committee also will maintain its existing policy of reinvesting principal payments from its securities holdings.
5. In addition, the Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period.

The Committee will continue to monitor the economic outlook and financial developments. In current circumstances, the Committee is prepared to expand its securities holdings as necessary to support progress toward maximum employment and price stability.

Figure 1: Alternative Policy Strategies Based on Simple Rules

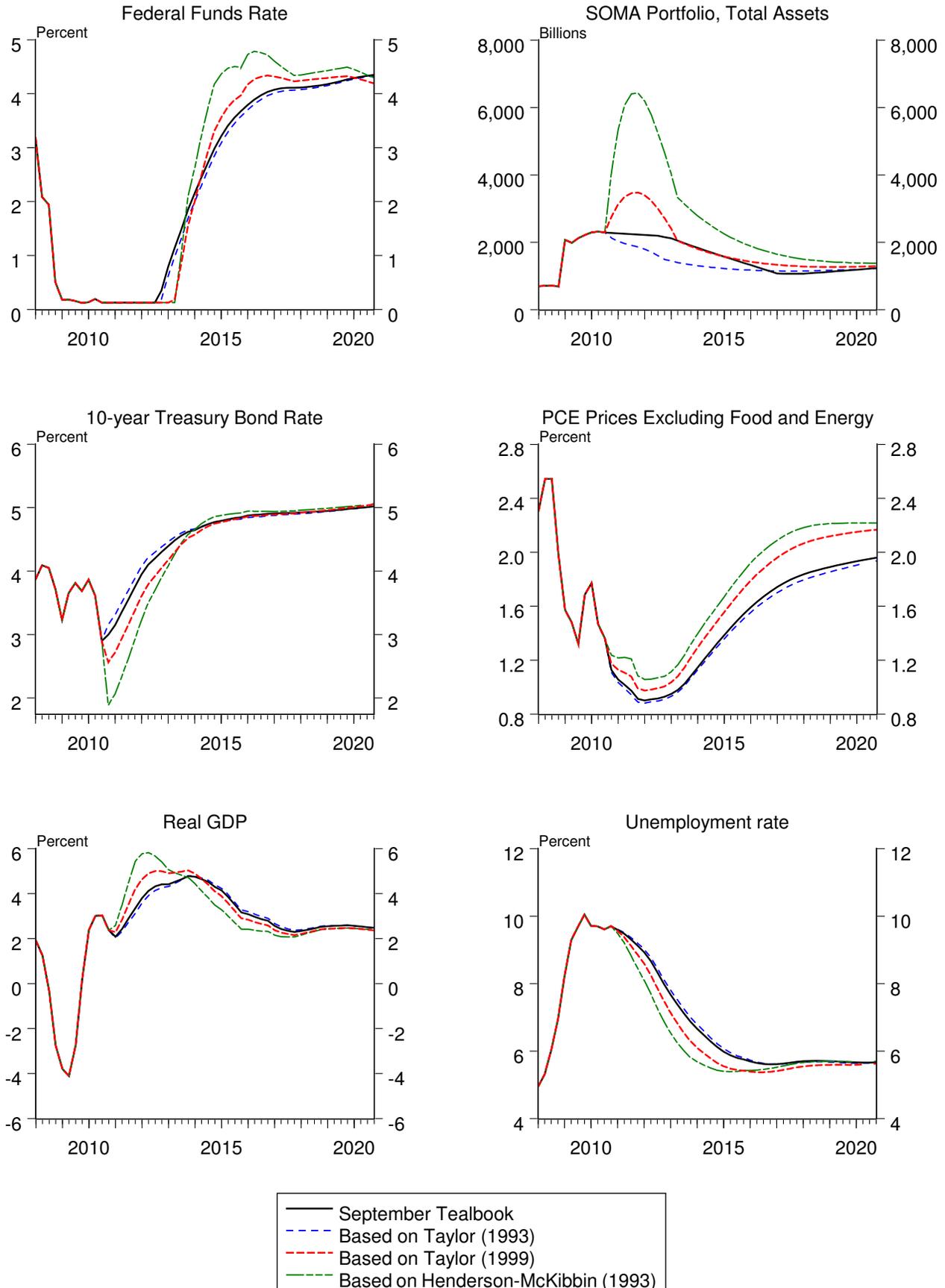


Figure 2: Comparing An Aggressive Simple Rule to Forward Guidance

