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## Incremental Balance Sheet Policies

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### Introduction

To date, the Committee's announcements regarding changes to the size and composition of the Federal Reserve's balance sheet have generally concerned programs to purchase large, discrete quantities of securities over relatively long periods.<sup>2</sup> But if the Committee decided that a further expansion of the SOMA portfolio was merited, it could consider a more incremental approach. Such an approach might involve more frequent announcements of purchases, but in smaller quantities to be completed within shorter periods. In addition, the Committee could use such a strategy to make balance-sheet expansion more open-ended by announcing its intention to buy a given amount of securities per month, with the understanding that this program would be revisited at subsequent meetings and purchases potentially adjusted up or down, or suspended altogether.

This memo considers issues related to an incremental approach to any future expansion of the balance sheet. We first compare the relative benefits of policy strategies that involve large but infrequent adjustments to the level of Federal Reserve securities holdings with those of strategies that involve smaller but more frequent adjustments. We then consider two illustrative examples of simple policy rules for adjusting the securities holdings of the System Open Market Account (SOMA) in response to changes in macroeconomic conditions, and use model simulations to gauge the implications of these rules for the flow of purchases (and hence Committee guidance) under different scenarios for the evolution of real activity and inflation.

In our analysis, we assume that asset purchases influence financial markets and the broader economy through their effect on the current and expected *stock of assets* held by the System rather than directly through the *flow of purchases*. This assumption is consistent with theories in which asset prices are influenced by portfolio-balance effects; it is also consistent with empirical work by System staff and others, as well as with the lack of any significant response of term premiums or yields to the winding down of either of the large-scale purchase programs that have been completed thus far.<sup>3</sup>

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<sup>2</sup> This general characterization also applies to the current program to extend the average maturity of the portfolio by swapping \$400 billion in shorter-term Treasury securities for longer-term assets.

<sup>3</sup> For evidence on this point, see Gagnon et (2011), Hamilton and Wu (2011), and Krishnamurthy and Vissing-Jorgensen (2011); also see the memo to Bill English from Canlin Li and Min Wei, "Term Structure Modeling with Supply Factors and an Application to Maturity Extension Evaluation" that was distributed to the Committee on September 15, 2011. Although here we emphasize the influence of the stock of SOMA holdings of longer-term securities on term premiums, Bauer and Rudebusch (2011) provide evidence that the Desk's asset purchases also may have influenced long-term interest rates by altering expectations for the future of short-term interest rates. In addition, Hancock and Passmore (2011) find that the flow of purchases of agency debt and MBS has influenced mortgage rates independent of accompanying stock effects.

## **Relative merits of discrete versus incremental balance-sheet adjustment**

To date, the FOMC's asset-purchase actions have been discrete in nature—an announcement to buy \$X billion of longer-term securities in total over the next Y months, where X is a large number and the purchases are spread out over many months. Moreover, the communication around the LSAP programs executed thus far (as well as internal Committee deliberations) suggested that the Committee intended to avoid fine-tuning the amount of asset purchases, but instead established a relatively high threshold for adjustments to the total volume of purchases. Such an approach has several potential advantages. First, large, discrete adjustments may have helped to reset expectations and diminish fears of bad tail events by reassuring the public that the FOMC was taking significant actions to keep the economy from falling into a deflationary state. Second, such an approach in December 2008, March 2009, and November 2010 may have served to ease markedly an overall stance of policy that, by some assessments, may have fallen behind the curve. Finally, discrete actions, combined with guidance about the eventual exit strategy, likely have helped to clarify for the public what this unfamiliar policy action implies for the size of the balance sheet over time. Based on analysis by the staff and others, these discrete portfolio actions appear to have been successful in putting downward pressure on longer-term interest rates and in helping to improve financial conditions more generally, thereby stimulating real activity and checking disinflationary pressures relative to what otherwise would have been the case.

Despite the merits of the discrete approach, the FOMC may want to consider adopting a more incremental strategy for asset purchases should it decide that a further expansion of the portfolio is warranted. For example, rather than announcing that it intends to buy an additional \$1 trillion in longer-term Treasury securities and agency MBS over the coming twelve months, the Committee could instead announce that it will purchase a smaller amount of securities over a shorter period—say, \$125 billion during the inter-meeting period, or \$250 billion over the next three months. Alternatively, the Committee could announce its intention to begin purchasing a certain quantity of longer-term securities per month, with the end-date of the purchase program left open.

These sorts of incremental strategies could have several advantages. First, relative to the discrete approach, they would likely lower the bar for adjustments to the size of the portfolio. As a result, the FOMC may be able to better calibrate the overall stance of policy to changes in the outlook for real activity and inflation. In addition, an incremental approach—particularly if accompanied by guidance that the Committee envisions buying securities until economic conditions improve—could diminish investors' fears of tail risks by increasing public confidence that the FOMC will act as necessary to sustain the recovery and prevent deflation. Finally, more-frequent adjustments would permit greater opportunities for the public to learn about the Committee's underlying portfolio "policy rule" and its relationship to the overall policy strategy, thereby facilitating forecasts of future policy actions and helping expectations to adjust in a stabilizing manner to incoming economic data.

These potential advantages notwithstanding, the discrete approach and the incremental strategy have some important similarities: Both involve statements about quantities of assets to be purchased in the near term, and both also provide information about the expansion of the balance

sheet over a longer period if the incremental strategy is accompanied by some form of forward guidance. Indeed, market participants would probably respond similarly to an announcement that the Committee intends to buy \$480 billion in longer-term securities over the next 12 months, and one saying that it will begin buying such assets at a rate of \$40 billion per month and expects to continue doing so for 12 months given the current outlook. From this prospective, the main difference between the two approaches is the choice of “step size” for adjusting the overall stance of monetary policy. Staff analysis suggests that a \$1 trillion expansion of SOMA longer-term security holdings provides roughly as much economic stimulus as a cut in the federal funds rate of 100 basis points. Thus, a strategy that operates by expanding the balance sheet in \$250 billion increments effectively eases monetary policy by roughly 25 basis points at a time, whereas the discrete approach shifts the stance of policy by a significantly larger amount.<sup>4</sup>

Still, by lowering the bar for adjusting the flow of purchases, the incremental approach may in practice lead to changes in Committee decision-making, and hence to revisions to the expectations of financial market participants and others. In particular, the incremental approach may be more conducive to a reconsideration of the desired level of security holdings at each meeting—much as, prior to late 2008, the level of the federal funds rate was reconsidered at each meeting. For this reason, the strategy could lead to better macroeconomic performance because it would allow the Committee to better tune the overall stance of policy to changing economic conditions. Of course, such tuning would be most effective at stabilizing the economy if it were accompanied by appropriate revisions to investors’ expectations for future portfolio actions—something that would require financial market participants to have a reasonably good understanding of how asset purchases are likely to evolve, both given the current outlook and in response to changes in projected conditions. Although (as noted above) investors could acquire this knowledge over time by observing the FOMC’s actions, they would be unlikely to obtain it quickly unless the Committee provided some information about the overall policy strategy. For this reason, the initial effectiveness of an incremental strategy would likely depend importantly on the provision of forward guidance about the likely path of the portfolio; also beneficial would be information on the economic factors likely to influence future portfolio actions as well as the setting of the federal funds rate over the longer run.

In contrast, the discrete approach provides highly specific information about the expansion of the portfolio over the next year or so. That said, its implementation to date has arguably focused on near-term conditions and not on longer-term economic developments and strategy. Accordingly, the Committee might be able to enhance the effectiveness of the discrete approach by providing information about the potential evolution of the portfolio in response to unexpected economic developments, and how these actions might be coordinated with adjustments to the federal funds rate. Indeed, the simulation results we report below implicitly indicate the value of establishing a medium-term strategy for the balance sheet, given that our illustrative portfolio policy rules call for active expansion of the balance sheet for two to three years given the baseline economic outlook, and considerably longer if real activity were to weaken markedly.

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<sup>4</sup> For small increments to the balance sheet that could be completed within a few weeks, the Committee might not need to indicate the specific period over which purchases would be completed, but could instead treat that information as an operational detail that could be left out of the statement.

## Illustrative balance-sheet adjustment rules

Because the incremental approach eschews large, discontinuous shifts in the stance of monetary policy, it may conform more closely to the spirit of simple funds-rate policy rules, which call for continuous adjustments in response to changing economic conditions. Thus, if the Committee were to begin to reconsider its balance-sheet decisions more frequently, participants might want to consult similar policy rules for asset purchases to help inform their decisions. To this end, we consider illustrative rules for setting the announced monthly rate of purchases while the federal funds rate is constrained by the zero lower bound. In doing so, we should emphasize that the use of such rules has, strictly speaking, no bearing on whether the Committee communicates its portfolio decisions in terms of a monthly flow of purchases or as a discrete change in the stock of assets. Indeed, in the simulations reported below, the FOMC implicitly provides perfect forward guidance about both the flow and the stock because we assume that financial market participants understand completely the portfolio and interest rate policy rules, and thus the Committee's plans for adjusting SOMA security holdings and the federal funds rate in response to changing economic conditions.

In previous memos to the Committee, the staff has explored “optimal” strategies for asset purchases and sales as well as the comparative effectiveness of various simple portfolio rules for stabilizing real activity and inflation.<sup>5</sup> Here, our primary goal is instead to examine how the prescriptions of illustrative rules would respond to changing macroeconomic conditions, in order to explore the potential implications of an incremental approach to asset purchases for Committee decision-making and communications. To do this, we employ two rules that operate in qualitatively different ways.

The first is a change rule that calls for the FOMC to keep expanding the size of the portfolio until some economic condition is satisfied; such a rule might be attractive given the uncertain magnitude of the stimulus provided by large-scale asset purchases. Specifically, the rule prescribes buying longer-term assets as long as the Taylor (1999) rule is constrained by the zero lower bound, as follows:

$$(1) \quad \Delta(B_t - \delta) = \lambda \theta \left[ R_t - R^* - \pi_t - 0.5(\pi_t - \pi^*) - 1.0Y_t \right].$$

In this equation,  $B$  is the level of SOMA holdings of longer-term securities expressed as a ratio to nominal GDP, and  $\delta$  is the historical trend ratio. The term in square brackets on the right-hand side of the equation measures the extent to which the prescriptions of the standard Taylor (1999) rule cannot be satisfied because of the effective lower bound on the nominal federal funds rate (assumed to be 12½ basis points). In particular,  $R$  is the actual nominal funds rate,  $R^*$  is the equilibrium real rate (assumed to equal 2 percent),  $\pi$  is the four-quarter percent change in core PCE prices,  $\pi^*$  is the inflation target (assumed to equal 2 percent), and  $Y$  is the staff estimate of the output gap. The translation factor,  $\theta$ , converts prescribed changes in the federal funds rate

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<sup>5</sup> See the memos to the Federal Open Market Committee by Eileen Mauskopf and Jae Sim, “Optimal Paths for Large-Scale Asset Purchases” (April 20, 2009) and Michael Kiley, Andrew Levin, Stephen Meyer and Edward Nelson, “Issues Related to Specifying a Policy Framework in the Current Environment” (October 13, 2010).

into their  $\Delta B$  equivalents, while the speed-of-adjustment factor,  $\lambda$ , is set to ensure that the speed of portfolio adjustment is gradual and the dynamics of the FRB/US model are reasonable.<sup>6</sup>

Once the Committee decides to start actively tightening the overall stance of policy, it can do so either by shrinking the size of the portfolio, raising the federal funds rate, or some combination of the two. As an activist tool for responding to changes in economic conditions, however, adjusting the funds rate may be preferable to balance-sheet actions because of the greater familiarity that both policymakers and the public have with the effects of the former. For this reason, we assume that when tightening begins policymakers place the renormalization of the portfolio on a simple trajectory and do not adjust that trajectory over time—an approach broadly consistent with the guidance on exit strategy provided by the Committee in June. Specifically, once the Taylor rule prescribes liftoff of the nominal funds rate, we assume that the FOMC begins shrinking its excess holdings of longer-term securities at a fixed rate of 10 percent per quarter—a rate sufficient to return the overall size of the portfolio to normal in about five years under baseline conditions.<sup>7</sup> At the same time, we assume that the Committee switches to using the funds rate as its active policy tool and follows the prescriptions of the Taylor (1999) rule.

Our second illustrative rule for adjusting the portfolio is also closely related to the Taylor (1999) rule but differs by being a level, not a change, rule. Specifically, we define an LSAP-adjusted version of the Taylor rule that attempts to integrate decisions about both the size of the balance sheet and the setting of the funds rate by specifying a reaction function for the *overall* stance of monetary policy, as follows:

$$(2) \quad \tilde{R}_t = R^* + \pi_t + 0.5(\pi_t - \pi^*) + 1.0Y_t.$$

In this equation,  $\tilde{R}$  denotes the overall stance of policy. The overall stance, in turn, has two components—one defined by the FOMC’s conventional policy tool (the federal funds rate,  $R$ ), and the other by its unconventional portfolio tool:

$$(3) \quad \tilde{R}_t = R_t + 4\phi_t.$$

Here,  $\phi_t$  denotes the estimated effect on term premiums of the Federal Reserve’s excess holdings of longer-term securities, multiplied by 4 to convert them into approximate funds rate equivalents. For computational convenience,  $\phi$  is assumed to be proportional to the present discounted value of current and future excess holdings of longer-term assets—an assumption consistent with much of the previous analysis of LSAP effects provided to the Committee.<sup>8</sup>

<sup>6</sup> Because the stimulative value of \$1 trillion in asset purchases is approximately equal to that provided by a 100 basis point cut in the funds rate, and given that nominal GDP is about \$15 trillion,  $\theta$  is set to 0.067. In contrast, the appropriate calibration of  $\lambda$  is less obvious, depending as it does on the dynamic properties of the overall model. Based on a series of exploratory simulations, we found that setting  $\lambda$  equal to 0.01 yielded satisfactory results.

<sup>7</sup> In contrast, the staff assumes a linear decline when preparing the portfolio projections reported in the Tealbook. Assuming a geometric rate of decline is much more tractable in the simulation analysis, however, and has only small implications for predicted macroeconomic effects.

<sup>8</sup> For further details on the simple present-value model, see Ihrig et al, “Quantitative Analysis of the Macroeconomic Effects of Alternative Strategies for Managing the Federal Reserve’s Securities Holdings,” memo to the Federal Open Market Committee (April 22, 2010). According to this model, buying \$1 trillion in assets, holding them for

When the nominal federal funds rate is at its effective lower bound and the rule calls for more stimulus than is provided by the Federal Reserve's existing asset holdings, we assume that the Desk purchases longer-term securities at a rate sufficient to bring the overall stance of policy back in line the rule's prescriptions within a few quarters. However, when the rule calls for the overall stance of policy to begin tightening, we assume that the FOMC stops using its asset holdings as an activist tool and instead starts reducing its excess holdings of longer-term securities at a fixed rate of 10 percent per quarter, for the reasons discussed above. In addition, we assume that the FOMC, from that point on, sets the federal funds rate equal to the prescriptions of the LSAP-adjusted Taylor rule. This procedure contrasts with the approach taken with the change rule, which set the funds rate after liftoff using the Taylor rule without any explicit adjustment for any stimulus still provided by the Federal Reserve's (shrinking) portfolio.

### Simulation Results

We now simulate the effects of the two illustrative portfolio rules under three different sets of economic conditions—specifically, the underlying conditions of the September Tealbook baseline projection, a scenario in which the economy falls back into recession, and a scenario in which inflation moves up markedly for a time.

Figure 1 presents results under baseline economic conditions for the change rule (red lines) and the LSAP-adjusted Taylor rule (blue lines), together with the September Tealbook baseline (black lines). Both portfolio rules call for a moderate expansion of the SOMA portfolio over the next two or three years, to peak levels of about \$3.3 trillion. Under the change rule, purchases stay quite close to \$20 billion per month until mid-2014; under the adjusted Taylor rule, the monthly pace of purchases rises to about \$50 billion by the middle of next year, and then gradually falls back to zero by the end of 2013.<sup>9</sup> Relative to baseline, the change rule yields somewhat lower unemployment and somewhat higher inflation, largely reflecting the effects of additional asset purchases. In contrast, despite the additional assets acquired under the adjusted Taylor rule, real activity is little changed and inflation is actually slightly lower than in the

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two years, and then running them off over the following five years reduces the term premium on a ten-year Treasury bond by about 25 basis points. Of course, the average maturity of the additional security purchases could influence the term premium effects of such a strategy, and in the last Tealbook, the staff introduced a new model that takes better account of the influence of the maturity structure of SOMA asset holdings. However, the newer, more complicated model would have been difficult to incorporate into our simulation analysis, and so we continue to employ the older approach. Because we calibrate the older model's predictions for term premium effects to be broadly consistent with those generated by the newer approach, our simulation results should not be appreciably affected.

<sup>9</sup> The initial rise in the pace of purchases under the LSAP-adjusted rule reflects several factors. First, as noted earlier, our implementation of this rule assumes that policymakers adjust purchases to bring the actual stance of monetary policy into alignment with the prescriptions of the rule after several quarters, not instantaneously. Second, the baseline trajectory of the term premium effect declines substantially over the next two years, implying that the actual stance of monetary policy is tightening even as the federal funds rate remains near zero and the overall size of the SOMA portfolio remains unchanged. As a result, the rule calls for purchases to increase over time to compensate for this baseline tightening. Finally, inflation under this LSAP-adjusted rule falls below baseline over time, further augmenting the upward pressure on purchases in the first few quarters.

baseline, because this rule prescribes a persistently tighter real federal funds rate later in the decade than in the baseline.<sup>10</sup>

Figure 2 presents comparable results for the recession scenario. In this case, as output weakens relative to baseline, the change rule gradually increases the monthly pace of asset purchases to almost \$40 billion by mid-2013. Thereafter, monthly purchases slowly decline to about \$20 billion by early 2016, causing the overall size of the portfolio to peak at a little over \$4 trillion.<sup>11</sup> This marked expansion of the portfolio helps to limit the rise in unemployment and to keep inflation on average close to baseline. In contrast, the LSAP-adjusted rule calls for an even more aggressive increase in the Federal Reserve's holdings of longer-term securities: Monthly asset purchases jump to more than \$100 billion initially, and although they slowly moderate thereafter, they remain positive until late 2015 and cause the overall size of the SOMA portfolio to peak at about \$5½ trillion.<sup>12</sup> Nevertheless, the adjusted rule performs much worse at stabilizing real activity and inflation because it substantially offsets the stimulative effect of higher asset purchases by raising the expected longer-run path of real short-term interest rates higher than it would be in the absence of the LSAP adjustment.

Finally, figure 3 presents results for the inflation-surge scenario. Despite the marked pickup in inflation, the change rule calls for the Federal Reserve to continue buying assets through mid-2013, albeit at a very slow pace of about \$10 billion per month; nevertheless, the overall stance of policy does gradually tighten relative to baseline because the funds rate liftoffs from its effective lower bound a year earlier. In contrast, the adjusted Taylor rule calls for the immediate removal of monetary accommodation and so starts the “automated” run-off of the portfolio early next year. Interestingly, the overall tightening achieved through this unconventional policy tool is large enough that the adjusted Taylor rule does not call for raising the federal funds rate substantially until mid-2013. Both rules cause real activity to be somewhat weaker than in the baseline, thereby modestly checking the surge in inflation.

What might these simulation results imply for Committee decision-making and communications, should it decide to pursue an incremental approach to asset purchases? Three points stand out. First, such an approach would imply actively adjusting the size of the SOMA portfolio in response to changes in economic conditions, assuming that one of the Committee's goals in adopting this strategy was to make policy setting more rule-like. Second, if the FOMC were to adopt a policy establishing a more open-ended monthly flow of purchases, it would not necessarily have to adjust the volume of the flow frequently to achieve satisfactory results, based

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<sup>10</sup> In the extended Tealbook baseline, the path of the federal funds rate follows the prescriptions of the outcome-based rule. Because this rule does not adjust for the direct effects of asset purchases on term premiums, it calls for a somewhat lower level of real short-term interest rates later in the decade relative to the LSAP-adjusted Taylor rule.

<sup>11</sup> With such an elevated peak level of holdings, renormalization of the portfolio within five years or so would likely require sales of Treasury securities, creating the potential for significant capital losses. To avoid this outcome, in this scenario both portfolio rules assume that excess holdings of longer-term securities are run off at a slower rate of 7 percent per quarter, leaving the overall size of the portfolio still somewhat elevated at the end of the decade.

<sup>12</sup> Two observations about these results seem in order. First, the relative aggressiveness of the adjusted Taylor rule is sensitive to the calibration of the speed-of-adjustment factor in the change rule; other calibrations we considered caused the portfolio to expand more rapidly under the change rule. Second, portfolio expansion at such a rapid rate, and to such a high level, as that considered in these simulations could potentially disrupt market functioning. This issue is discussed in the appendix.

on simulations of the change rule. And third, the limited stimulus provided by asset purchases under the LSAP-adjusted rule illustrates that the effectiveness of such programs depends importantly on assumptions made about other policy actions, such as the rate of increase in the real federal funds rate once the funds rate becomes the active tool of policy.

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## Appendix: Potential constraints on balance-sheet adjustment

As discussed in the main text, the simulated pace of asset purchases and the overall size of the balance sheet becomes quite large under some macroeconomic scenarios and portfolio policy assumptions. However, the Federal Reserve may not actually be able to use this tool to the degree envisioned in these simulations because of practical limits on both the maximum flow of purchases or sales and on the cumulative amount of securities that the System could realistically acquire. For example, discussions with staff at FRBNY suggest that market functioning could be disrupted if the volume of the Desk's transactions and SOMA holdings became very large—the subject of this appendix. Still, this risk should be kept in perspective: The Committee would need to balance the costs associated with market disruption against the benefits of providing further economic stimulus, and what might be deemed an unacceptable market risk at 9 percent unemployment could be acceptable at 12 percent unemployment. Moreover, any assessment of the disruptive effects of large-scale asset transactions is inherently quite uncertain.

With these caveats in mind, System staff estimate that up to \$100 billion of longer-term Treasury securities could probably be transacted by the Desk each month without having significant adverse effects on market functioning. This upper limit presumes that purchases would be spread across a wide range of maturities, as was done with the first two LSAP programs; if purchases were instead concentrated in the long end of the yield curve, as the maturity extension program now does, the “safe” upper limit might be closer to \$50 billion.<sup>13</sup> In large part, these ceilings reflect the risk of lasting effects on the Treasury market if a persistently elevated volume of Federal Reserve transactions in these securities were to force many traditional Treasury investors to increase permanently their reliance on alternative investments.

As regards agency debt and MBS, the staff estimates that the Desk could increase the volume of new purchases to \$65 billion per month without severely hurting market functioning. This limit includes the current Desk operation of reinvesting agency debt and agency MBS principal payments, which the Desk projects to be about \$25 billion per month for the next few months. Thus, the Desk could increase net additional purchases of agency MBS to as much as \$40 billion per month. That limit, however, depends importantly on the overall volume of new issuance of current coupon securities, as the Desk estimates that the Federal Reserve can purchase roughly 75 percent of the flow of those MBS without significantly disrupting the market. The staff expects that, given the weak state of the housing market, overall issuance will be driven by the pace of refinancing activity, which is projected to be muted relative to 2009 in the absence of another major decline in mortgage rates.

Although the preceding might seem to suggest a combined ceiling of \$140 billion on the monthly increase in total SOMA holdings of longer-term securities, other considerations suggest that the actual limit may be appreciably lower. In particular, many investors likely view longer-term Treasury securities and agency MBS as (admittedly imperfect) substitutes by virtue of their

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<sup>13</sup> The current maturity extension program already entails \$45 billion in monthly Treasury securities purchases and an equal amount of sales, implying about \$90 billion in total transactions per month through June 2012. If cancellation of sales planned under the MEP were considered part of a new purchase plan, Treasury securities purchases could in principle be increased to \$100 billion per month, as long as the additional \$55 billion of new purchases were weighted toward securities with maturities of 3 to 8 years.

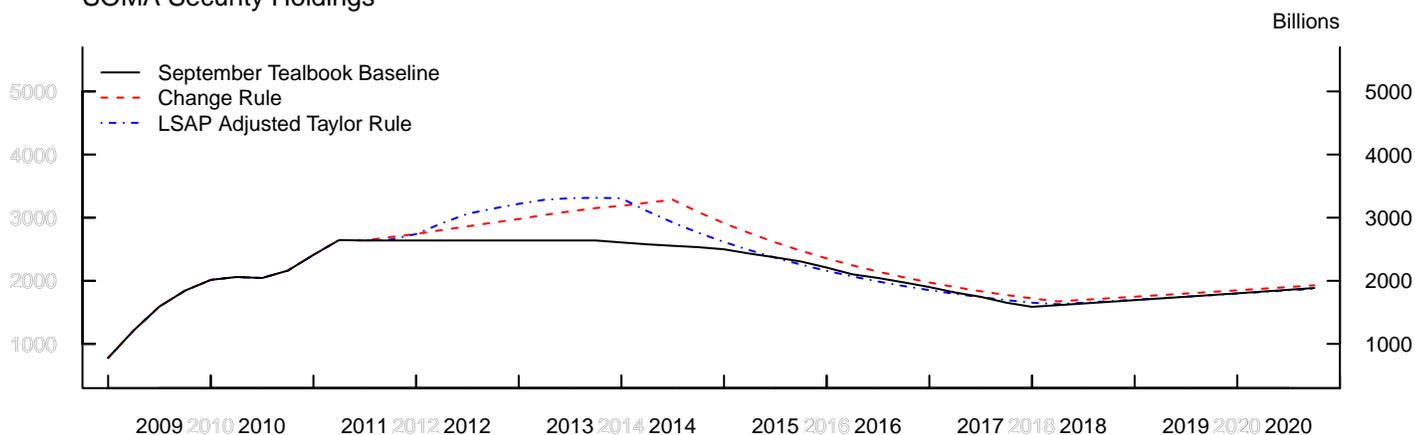
credit-risk-free status, implying that heavily intervening in one market could have implications for the functioning of the other. For these and other reasons, the effective ceiling may be closer to \$100 billion per month. And if the Committee wished to restrict any additional Treasury purchases to the long-end of the yield curve, the ceiling would need to be lower yet, perhaps on the order of \$50 billion.

Similarly, there may be limits on the cumulative amount of securities that the FOMC would be willing to purchase. Currently, the Desk restricts holdings of any given Treasury security to 70 percent of the total outstanding. This constraint, however, may not be directly instructive as to limits on the Federal Reserve's overall share of publically held debt. At present, this share is only 17 percent, similar to its share prior to the recession and well below a peak of 23 percent recorded in the early 1970s. A key consideration in determining the limits on Treasury holdings is the central role Treasuries play in the pricing of other securities and in the repo market; for these reasons, it is important to ensure that sufficient Treasuries remain in private hands to allow a thick market. In the recession scenario discussed in the main text, SOMA holdings of longer-term securities climb to \$5½ trillion under one of the portfolio rules, potentially violating this criterion. In particular, if all the expansion of the balance sheet occurred through purchases of Treasury securities with a maturity of 3 years or greater, then the Federal Reserve's share of longer-term federal debt outstanding would peak somewhat above 70 percent—a very high share. Accordingly, should the Committee decide that it want to expand the size of the balance sheet markedly, it might want to mitigate the potential risk of disruption to the Treasury market by devoting a significant share of its asset purchases to agency MBS.

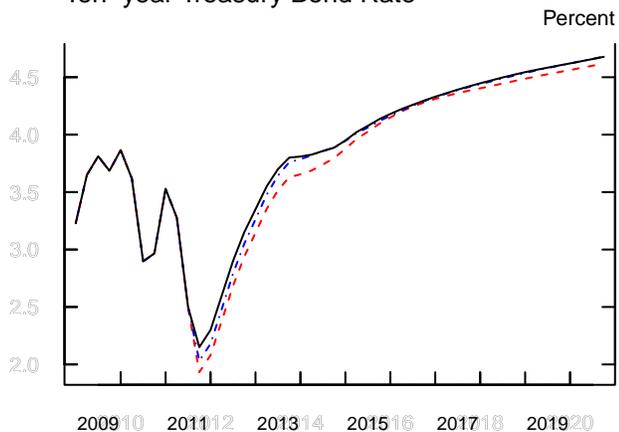
Figure 1

### Implications of Different Portfolio Policy Rules in the Baseline Scenario

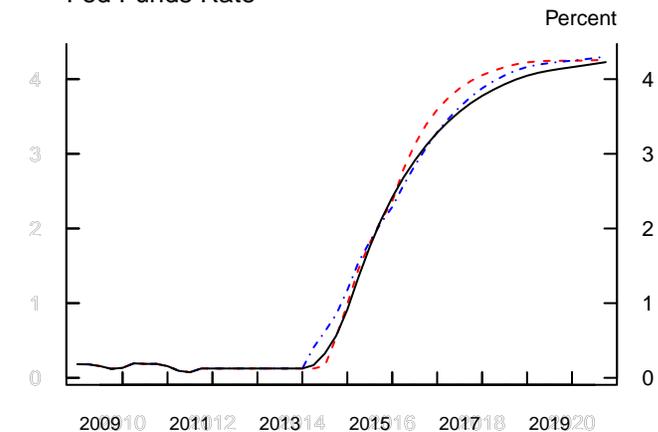
SOMA Security Holdings



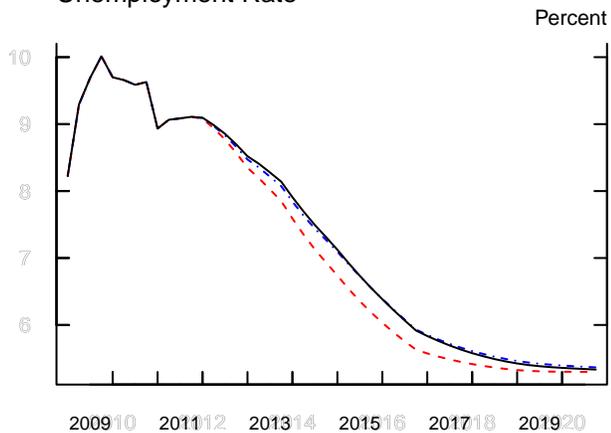
Ten-year Treasury Bond Rate



Fed Funds Rate



Unemployment Rate



Core PCE Inflation

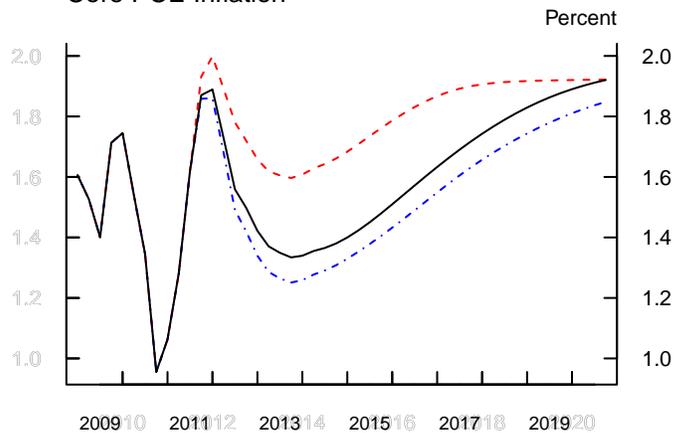
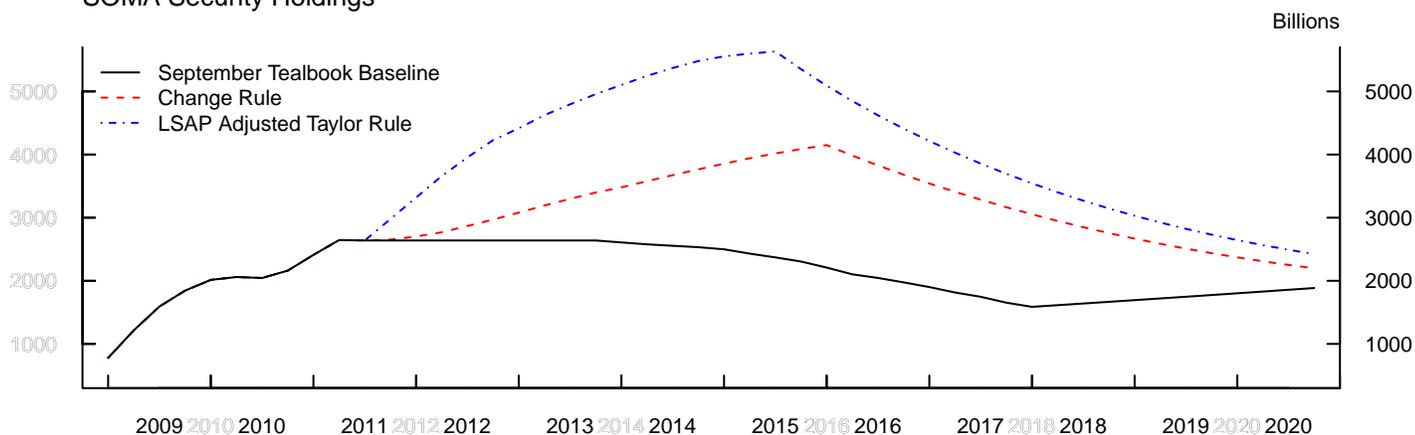


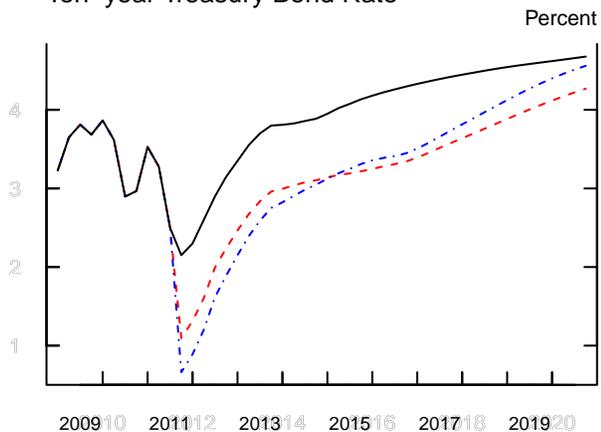
Figure 2

### Implications of Different Portfolio Policy Rules in the Recession Scenario

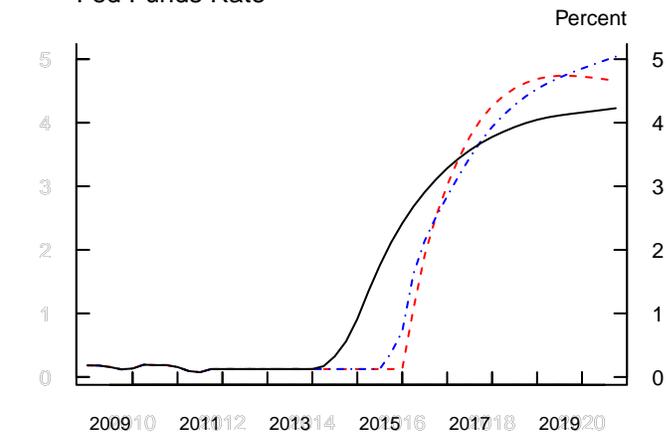
SOMA Security Holdings



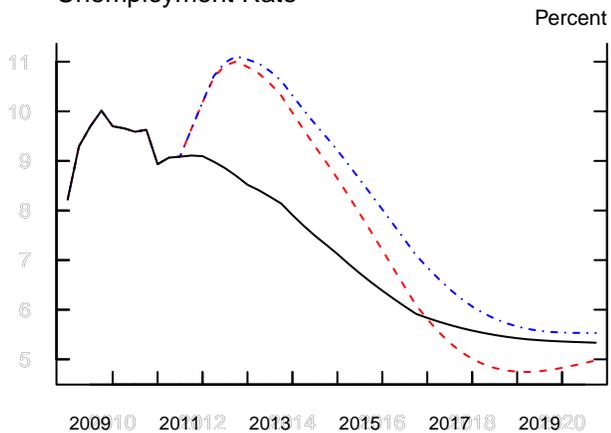
Ten-year Treasury Bond Rate



Fed Funds Rate



Unemployment Rate



Core PCE Inflation

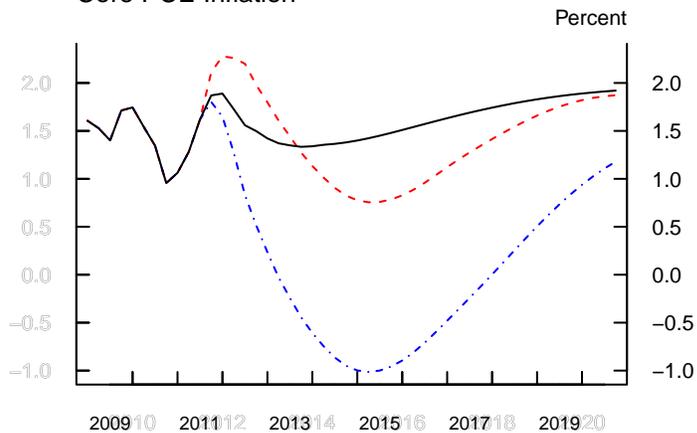
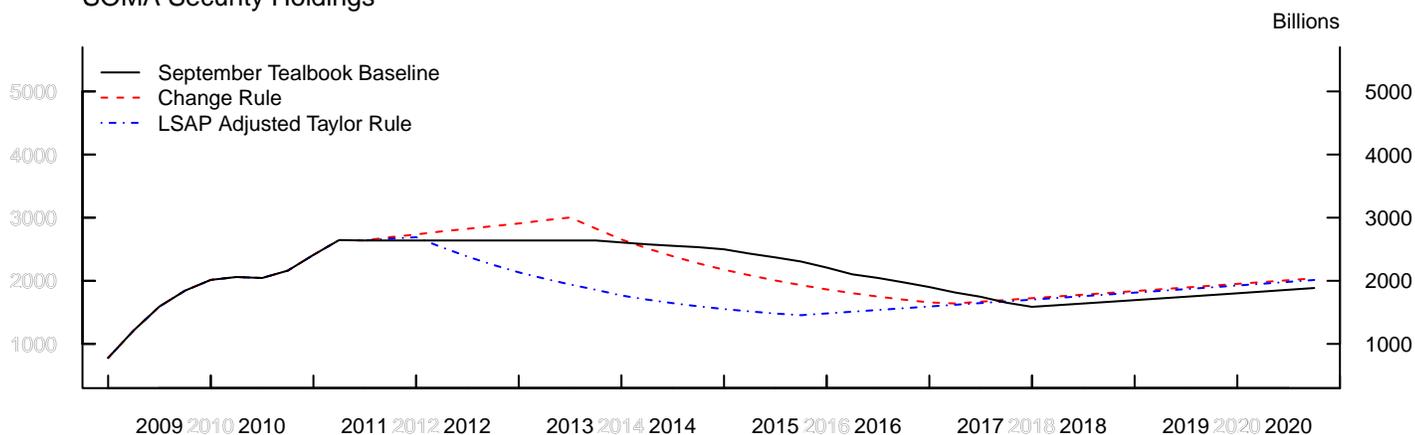


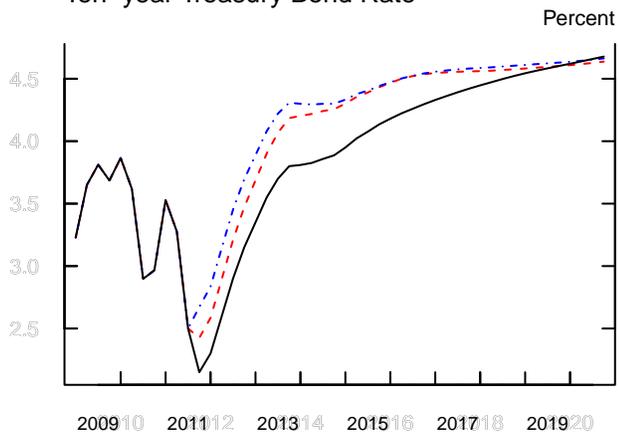
Figure 3

### Implications of Different Portfolio Policy Rules in the Inflation Surge Scenario

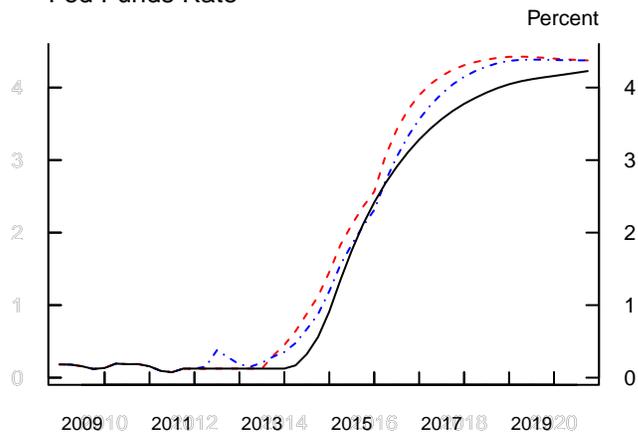
SOMA Security Holdings



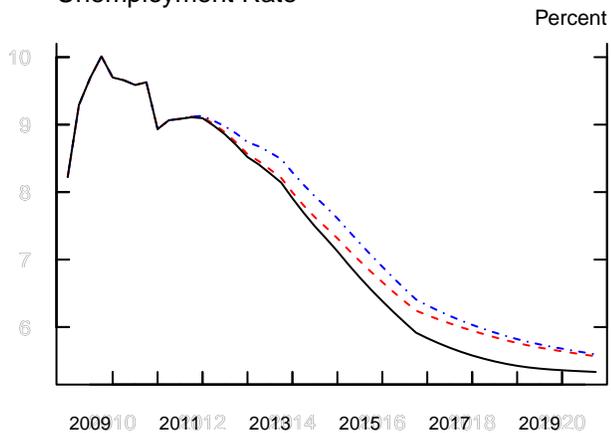
Ten-year Treasury Bond Rate



Fed Funds Rate



Unemployment Rate



Core PCE Inflation

