

## **Exit Strategy**

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### **Introduction**

At its meeting one year ago, the Committee discussed strategies for exiting from the very accommodative stance of policy. The Committee reached agreement on a number of broad principles, but not on a specific strategy to be followed.

All participants expressed support for normalizing the size and composition of the balance sheet over time. Most participants saw such a normalization as being best accomplished by the sale of agency debt and agency mortgage-backed securities (MBS) over a period of about five years, although some participants thought that sales could be accomplished over a shorter period without causing market disruptions or a larger-than-desirable rise in longer-term interest rates. Participants agreed that sales should be implemented in accordance with a framework that would be communicated in advance and at a pace that could be adjusted in response to changes in economic and financial conditions. A majority of participants indicated a preference to begin asset sales only once the economic recovery was firmly established and after the Committee had begun increasing its short-term interest rate target. The balance sheet adjustment could also be supported by not reinvesting principal payments on agency debt and MBS. In addition, some participants suggested that holdings of Treasury securities might also be reduced by temporarily suspending the Committee's policy of rolling over maturing Treasury securities.

Participants envisioned that an increase in short-term market interest rates would be achieved by raising the interest rate that Reserve Banks pay on excess reserve balances (the IOER rate). They acknowledged that it might also be necessary to use temporary reserve draining tools, such as reverse repurchase agreements and term deposits to reduce the supply of reserve balances in order to tighten the link between the rate paid on excess reserves and short-term market rates.

However, given the evolution of the Federal Reserve's balance sheet and the economic environment during the past year, the Committee may want to revisit the assessment of the appropriate strategy for removing policy accommodation. Indeed, because of the Committee's decisions to reinvest principal payments from agency debt and agency MBS into longer-term Treasury securities and to purchase additional Treasury securities, SOMA securities holdings are about \$400 billion larger than they were a year ago and reserve balances are about \$440 billion higher.<sup>2</sup> Moreover, if the FOMC continues the asset purchase program through June, an additional \$200 billion will be added to both securities holdings and reserves.

This new starting point could have implications for the Committee's exit strategy. Most directly, the Committee will need to decide on the appropriate timing for ceasing reinvestments of the

<sup>1</sup> Helpful comments and suggestions were provided by Jim Clouse, Jane Ihrig, Jamie McAndrews, Steve Meyer, Dave Reifschneider, and Viktors Stebunovs.

<sup>2</sup> Reserve balances have risen by more than the increase in securities holdings in large part because the Treasury has reduced its deposits in the supplementary financing account.

principal payments from its agency debt and agency MBS as part of its sequencing of exit actions. More broadly, the Committee will need to decide if the larger balance sheet and higher level of reserve balances affect its preferred strategy for the timing and pace of the reduction in the balance sheet, the degree to which that balance sheet adjustment responds to economic conditions, and the reserve draining strategy that will be employed. This memo reviews these strategic issues and presents two specific options for the sequence of policy actions that may serve as useful benchmarks as the Committee considers how best to exit from its current accommodative policy stance.

Under the first option, which is intended to correspond to views expressed by a majority of participants a year ago, the Committee would adjust the balance sheet in a manner that is gradual and largely predetermined, leaving the federal funds rate as the active policy instrument for achieving the FOMC's economic objectives. Under this option, the Committee would remove policy accommodation by first redeeming securities, then increasing the federal funds rate target, and then selling agency debt and agency MBS over a five-year period.<sup>3</sup> This scenario corresponds to the policy assumptions made in the upcoming April Tealbook.

Under the second option, the Committee would instead implement a more rapid pace of asset sales and make that pace more responsive to economic conditions. In particular, this option would initially employ redemptions and then asset sales to tighten the stance of monetary policy, and would only then turn to raising the federal funds rate target. In this option, asset sales would be conducted at a pace that would be expected to eliminate the Federal Reserve's holdings of agency debt and agency MBS over a three-year period. The pace of sales would be adjusted more aggressively in response to economic conditions, however, so that the FOMC would be actively employing two policy tools to achieve its economic objectives during exit.

Regardless of the option chosen, the Committee would presumably need to retain considerable flexibility to address new developments. The effects on interest rates and the economy of some policies are hard to predict and could turn out to be either larger or smaller than anticipated, necessitating a change in approach. Moreover, assessments of the incoming economic data could cause the Committee to move up or combine steps relative to those assumed in this memo or, conversely, to slow the implementation of some steps in order to best foster its dual mandate.

## **Strategic Issues for the Exit Strategy**

The strategy to be employed by the FOMC involves decisions about a number of policy steps, including raising the federal funds rate target, raising the interest rate paid on excess reserves, draining excess reserves from the banking system using term deposits and reverse repurchase agreements, halting reinvestments of principal payments on securities held in the Federal

<sup>3</sup> Historically, the Federal Reserve has tended to invest the proceeds of maturing Treasury securities in new securities that are auctioned on the date of maturity. If the Federal Reserve does not reinvest the proceeds of a maturing security, the security is said to be redeemed. Like asset sales, redemptions reduce the size of the Federal Reserve's balance sheet and drain reserves from the banking system. In this memorandum, we use the term "redeeming securities" to also encompass ending the reinvestment of principal payments on agency debt and agency MBS.

Reserve's portfolio, and selling securities from the Federal Reserve's portfolio. In this section, we attempt to reduce this range of decisions into choices about a few key policy issues.

### ***Timing and Pace of Balance Sheet Reduction***

Broadly speaking, the exit strategy chosen by the FOMC involves two key policy levers—the level of short-term interest rates and the size and composition of the balance sheet. Financial conditions could potentially be tightened either by raising short-term interest rates or by reducing the Federal Reserve's holdings of longer-term securities.

Raising short-term interest rates would affect the economy in the same way that this policy instrument has traditionally operated. Higher short-term interest rates tend to raise borrowing costs for households and businesses, to strengthen the dollar, and to weigh on various asset prices. The magnitude of these effects will depend importantly on the public's expectation of the path of short-term interest rates. Accordingly, the Committee may also choose to use forward guidance in its post-meeting statement to influence financial conditions and the broader economy as it normalizes the stance and conduct of monetary policy.

Reducing the Federal Reserve's holdings of longer-term securities would also restrain economic activity. Recent experience suggests that reductions in Federal Reserve holdings of longer-term securities should, by increasing the public's current and expected future holdings of such securities, cause an increase in longer-term interest rates and a broader tightening of financial conditions.

This perspective suggests a degree of substitution between the two policy levers, as the FOMC could potentially achieve the same outcomes for economic activity and inflation by using the two policy tools in different combinations.<sup>4</sup> However, there are a number of considerations that the Committee might take into account in determining the appropriate sequencing and pace of the related policy steps.

Participants may see important advantages of an earlier and more rapid reduction of the balance sheet. This approach would more aggressively unwind the extraordinary asset purchases that were conducted during the financial crisis, returning the Federal Reserve more quickly to operating in a "normal" policy regime. More rapidly shedding agency securities (a term we will use to refer to both agency debt and agency MBS) may reduce concerns that FOMC members have about unduly influencing credit allocation to particular sectors of the economy. Moreover, a more rapid reduction in the balance sheet could limit upside risks to inflation expectations if it gave the public greater confidence in the Committee's ability to tighten policy at the appropriate time. The accompanying reduction in reserves would also limit the amount of reserve draining required through term deposits and reverse repurchase agreements, which might be seen as an advantage by policymakers concerned about the possibility that those reserve draining tools will not work as planned or will have undesirable side effects.

<sup>4</sup> Different choices regarding the relative intensity of the use of the tools could affect the composition of GDP because different components of spending are more or less sensitive to interest rates of different maturities. However, such effects are likely to be small, and we leave this issue aside in our analysis.

However, an earlier and more rapid reduction in the size of the balance sheet, particularly if achieved through asset sales, might also be seen as presenting some disadvantages. Such an approach might prove disruptive for financial markets or result in a larger-than-expected movement in longer-term rates by prompting either a large increase in the term premium or expectations of an earlier and more rapid increase in the federal funds rate target.<sup>5</sup> More broadly, the effects of balance sheet reduction on financial market conditions and, ultimately, on economic activity might be seen as harder to predict than those of a change in the Committee's target for short-term rates. As a result, policymakers may choose to adjust the balance sheet less rapidly in order to limit the risk of an outsized response. Finally, participants who believe that the low level of short-term rates and steep yield curve are increasing the risk of financial instability may have concerns about more aggressive asset sales, as the economic restraint resulting from those sales would necessitate a somewhat longer interval during which short rates would remain near the zero lower bound and would result in a steeper yield curve for a longer period.

Many of the concerns about an aggressive reduction in the balance sheet are tied to asset sales. Of course, the size of the balance sheet can also be reduced through the natural run-off of securities held in the SOMA by stopping the reinvestment of principal payments received on those assets. Redemptions would generate a significant reduction in the balance sheet under an approach that is operationally simple, transparent, easily communicated, and potentially less disruptive to the market than asset sales. Accordingly, the staff assumes that the FOMC, once it decides that the time has arrived to reduce the size of the balance sheet, will redeem its holdings of Treasury and agency securities. Treasury securities are assumed to be redeemed in addition to agency debt and agency MBS because the potential benefits of redeeming the securities would seem to apply across all three asset types. If the FOMC wanted to take a more incremental approach, it could instead decide to stop reinvesting principal payments on agency securities as a first step and then to begin redeeming maturing Treasury securities at a later date or not at all.<sup>6</sup>

Even though redemptions alone could achieve a sizable decline in the balance sheet, the two options discussed in this memo assume that the FOMC will decide to sell its agency securities at some point. If the FOMC were to rely only on redemptions of maturing (or prepaid) assets without asset sales, the SOMA portfolio would be projected to return to its trend size by late 2016. However, the SOMA portfolio would continue to include a sizable amount of agency MBS at that time, and some holdings of agency MBS would remain in the portfolio until 2039.<sup>7</sup> In order to avoid leaving agency MBS on the Federal Reserve's balance sheet for such a long period, the two policy strategies considered below include selling agency securities to bring SOMA holdings of those assets to zero over a period of several years.<sup>8</sup>

<sup>5</sup> If the Committee wished to reduce the size of its balance sheet rapidly but was concerned that high-volume sales of agency securities could disrupt financial markets, it could sell Treasury securities—the market for which is larger and more liquid—in addition to, or instead of, agency securities.

<sup>6</sup> Yet another alternative would be to redeem only a fraction of maturing Treasury securities.

<sup>7</sup> Specifically, without asset sales, the SOMA portfolio would return to its steady state growth path in October 2016, and about 45 percent of the portfolio would be in agency securities at that time.

<sup>8</sup> Sales of MBS are substantial under the two scenarios. Agency debt holdings can instead be eliminated over the next few years primarily through redemptions of maturing securities, although some minor agency debt sales are eventually needed to bring those holdings to zero in a timely manner.

### ***Responsiveness of the Balance Sheet to Economic Conditions***

In addition to determining the timing and pace of the reduction in the balance sheet that would generally occur if economic conditions were to turn out as expected, the FOMC will have to decide how responsive the balance sheet should be to changing economic circumstances. In its past discussions, the Committee has agreed that asset sales may need to be adjusted in light of incoming economic information, but participants have indicated a range of views about the extent to which such adjustments would be made.

Some policymakers may feel that the pace of asset sales should be quite responsive to economic conditions, with adjustments perhaps considered at each FOMC meeting. For example, the policy proposal circulated by President Plosser over the intermeeting period would adjust the pace of asset sales in lockstep with changes in the federal funds rate, and other types of state-contingent responses could also be considered.<sup>9</sup> Under a state-contingent approach for adjusting the balance sheet, the FOMC would be actively employing two policy instruments to achieve its economic objectives.

Alternatively, the balance sheet could be set on a path in which it declines gradually over time in a nearly deterministic manner. Changes to the sales program in this case would be made only if there was a significant shift in the economic outlook. Under this approach, the Committee would use its traditional policy instrument of short-term rates as the primary active tool for achieving its economic objectives, with the balance sheet adjustment generally taking place in the background in a gradual, predictable manner.

There are several considerations that may weigh on the decision between these alternatives. Some participants may favor making asset sales quite responsive to economic conditions on the view that the optimal use of all monetary policy instruments should be state contingent. An advantage of introducing a second policy instrument is that it could increase the scope and flexibility for adjusting financial conditions, particularly in response to substantial economic developments. Indeed, if the FOMC were reluctant to change the federal funds rate aggressively, supplementing those changes with balance sheet adjustments could result in a more powerful policy response.<sup>10</sup> That approach might be attractive if policymakers believe that they may need to tighten financial conditions at a very rapid pace, in which case the ability to accelerate asset sales may be desirable. Conversely, the state-contingent approach would allow sales to slow if the economy was to weaken, which might help to prevent reaching a situation in which short-term interest rates were again constrained by the zero bound.

<sup>9</sup> “A Systematic Approach to an Exit Strategy,” memorandum to the Federal Open Market Committee, President Charles Plosser, March 18, 2011.

<sup>10</sup> For example, the Committee might choose to limit the size of changes to the federal funds rate because the effects of those changes on the economy are subject to uncertainty, making a relatively cautious approach optimal (as argued in William Brainard’s paper, “Uncertainty and the Effectiveness of Policy,” *American Economic Review*, May 1967). In that event, policymakers might choose to also employ balance sheet adjustment so long as uncertainty about the effect of the balance sheet policy was not too large and was not correlated with the uncertainty about the interest rate effect.

However, policymakers may see several disadvantages to introducing asset sales as an active policy instrument. First, it is not clear that the FOMC needs to introduce a second state-contingent policy instrument to achieve its economic objectives in circumstances in which its use of the primary policy instrument is unconstrained. That is, if the FOMC is able to achieve its desired effect on financial conditions and the economy by increasing the federal funds rate, then there may be little to be gained by introducing variation in asset sales in response to economic conditions. It is worth noting that the FOMC has long relied on a single policy instrument, the federal funds rate, to achieve its economic objectives. Second, the effects of asset sales on the economy are relatively uncertain because the Federal Reserve has little experience with the use of this policy instrument. Policymakers may feel that relying on the traditional policy instrument will lead to better-calibrated policy steps and more predictable effects on the economy. Moreover, given the history of using short-term interest rates as the policy instrument, the public may be able to better understand and anticipate adjustments in rates than adjustments to the balance sheet, making the effects on markets and the economy more predictable. Third, the active use of asset sales as a policy instrument would involve communications challenges. Because the Federal Reserve has never used the balance sheet in this manner, market participants have no empirical evidence upon which to assess the balance sheet reaction function. Thus, switching to an active regime with this instrument would introduce uncertainty unless the FOMC effectively communicates the important features of this reaction function. Moreover, by introducing the balance sheet as a second instrument, the historical relationship between the federal funds rate and economic conditions would no longer be relevant for predicting changes in short-term interest rates going forward. In particular, the responsiveness of short-term interest rates to economic conditions would presumably have to be scaled down relative to its historical pattern depending on the extent to which the balance sheet was also reacting to those same variables. As a result, the market could also face greater uncertainty about how the traditional policy instrument—the federal funds rate target—would be adjusted.

It may be because of these considerations that the FOMC has not traditionally used its balance sheet in an active manner for the purpose of economic stabilization.<sup>11</sup> Indeed, the FOMC only turned to employing asset purchases once the federal funds rate had fallen to a very low level and the scope for achieving more accommodation with this instrument was limited. However, since the FOMC's ability to raise the federal funds rate is not impaired, there is no analogous constraint that necessitates active adjustments to the balance sheet during the removal of policy accommodation.<sup>12</sup>

### ***Strategy for Managing Short-term Interest Rates***

The third broad issue to consider in the strategy for removing policy accommodation is the approach for managing short-term interest rates. The staff assumes that the interest rate paid on excess reserves will be adjusted roughly in parallel with changes in the federal funds rate target.

<sup>11</sup> Of course, there are policy options that fall in-between placing the balance sheet on a largely deterministic path and adjusting it to economic conditions at a relatively high frequency. For example, an approach that generally increases the pace of assets sales as the economy strengthens could permit a more rapid normalization of the balance sheet than sticking with the pace of sales that was appropriate earlier in the recovery.

<sup>12</sup> President Kocherlakota makes a similar point in his memo to the Committee, "Reducing Accommodation," April 18, 2011.

While the IOER rate has not provided a hard floor on the federal funds rate, the staff believes that it does act as a magnet for the federal funds rate and for other overnight market interest rates. Indeed, the willingness of banks to borrow at these market rates and to hold reserves earning the IOER rate should help to keep market rates relatively close to the IOER rate. Accordingly, the staff sees increases in the IOER rate as a key factor allowing the Federal Reserve to adjust the federal funds rate higher.

The Committee will also need to decide whether and to what extent to drain reserves from the banking system using either term deposits or reverse repurchase agreements.<sup>13</sup> The potential need for draining reserves differs across the two options considered below, as they involve different paths for the size of the Federal Reserve's balance sheet. However, in each option the balance sheet will still be elevated at the time that the FOMC begins raising the federal funds rate. The scenarios below assume that a sizable amount of reserve draining will be conducted prior to the first anticipated increase in the federal funds rate target. Such an approach seems prudent given the uncertainties regarding the relationship between the IOER rate and other short-term interest rates when there are very high levels of reserve balances, and given that the draining tools have not been used on a large scale in the past. This approach will put the Federal Reserve in a better position to assess the effectiveness of the draining tools and to judge the size of draining operations that will be required to achieve the desired level of short-term rates. Moreover, it will better prepare both the Federal Reserve and market participants if it turns out that those tools have to be used in significant size. A strategy of utilizing the temporary reserve draining tools several months in advance of liftoff may present communication challenges, however, as market participants may expect an imminent increase in the federal funds rate target when the draining is announced.

## **Two Options for the Exit Strategy**

We now turn to a more detailed discussion of two possible exit scenarios. The specific steps taken under each of the two options and their assumed timing are shown in Table 1. The timing for the two options has been chosen so that they yield very similar macroeconomic outcomes in simulations with the FRB/US model.

### ***Option 1***

Option 1 is intended to correspond to the views that a majority of participants expressed during the discussion of exit strategies at the April 2010 FOMC meeting, adjusted to reflect the Committee's subsequent decisions to reinvest payments from agency securities and to purchase additional Treasury securities. This option maintains the federal funds rate as the primary policy instrument to be adjusted in response to changing economic circumstances, while putting the balance sheet on a path to normalization that takes place at a gradual and predictable pace.

<sup>13</sup> It is worth noting that draining reserves using these two tools is simply a transformation of the liabilities on the Federal Reserve's balance sheet across alternatives that are close substitutes for one another. Accordingly, these operations are likely to have little effect on financial conditions and economic activity beyond their effects on the Federal Reserve's control of overnight interest rates.

Under Option 1, the initial step in removing policy accommodation would involve the cessation of the reinvestment of the principal payments on all SOMA securities holdings, including the rollover of Treasury securities that occurs at auctions. This step would presumably take place as the Committee became increasingly confident that the recovery was self-sustaining. If the Committee felt that policy accommodation would likely be appropriate for a while longer to support the pace of recovery, it might retain the “extended period” language for a time. The Committee would subsequently modify or remove the forward guidance when it judged the recovery to be proceeding at an acceptable pace, and it would begin additional reserve draining using term deposits and reverse repurchase agreements at that time or shortly thereafter.<sup>14</sup> The Committee would then raise its target for the federal funds rate when it believed that this step was appropriate to guide the economy toward price stability and maximum employment. Once the increase in short-term rates was underway and the recovery remained on track, the Committee would begin selling agency securities in a gradual and transparent manner.

Sales of agency securities under this option would be calibrated to return the portfolio to an all-Treasury composition over five years, and the pace of sales would be adjusted only if economic conditions deviated substantially from what was expected when sales were initiated. Sales might continue, for instance, even if the Committee determined that economic conditions justified a pause in the tightening of the federal funds rate so long as the nominal rate was well above zero. However, sales might be suspended if an easing was warranted or the economy slowed when nominal rates were still near zero, risking a return to the zero bound.

If the economy were to follow the staff’s baseline outlook, under Option 1 the Committee could begin redeeming securities in December 2011, drop the extended period language and commence reserve draining using term deposits and reverse repurchase agreements in March 2012, raise its target for the federal funds rate in September 2012, and begin sales of agency securities in March 2013.

The resulting path for the size of the balance sheet is plotted in Figure 1. Redemptions alone impart a noticeable downward tilt to the balance sheet, reducing it by about \$30 billion per month in 2012. Once sales of agency securities begin in March 2013, they proceed at an average pace of about \$10 billion per month. However, the projected pace at which the portfolio is shrinking does not pick up meaningfully over this period because the pace of redemptions is falling off. The portfolio reaches its steady state growth path by late 2015 under this approach.<sup>15</sup> Sales of agency securities continue through early 2018 in order to reduce those holdings to zero, requiring the Desk to actively purchase Treasury securities to offset the decline in agency securities held and to achieve the expansion of the portfolio required by the assumed growth of currency and other factors.

<sup>14</sup> The appendix provides draft statement language the Committee could choose to announce or foreshadow this sequence of policy changes.

<sup>15</sup> At that time, reserve balances would be \$25 billion. If the Committee were to decide on a longer-term policy implementation framework that included a higher level of reserve balances, the portfolio would reach its desired size somewhat sooner.

Conditioning on the staff outlook, under Option 1 the FOMC would first increase short-term interest rates in September 2012. Given the path of the balance sheet, there would still be nearly \$1.2 trillion in excess reserves in the banking system at that time in the absence of temporary reserve draining. Staff estimates suggest that a significantly lower level of reserve balances might be required to keep short-term rates near the IOER rate. Accordingly, we would expect the Federal Reserve to ramp up reverse repurchase agreements and term deposits by several hundred billion dollars in advance of September 2012 in order to tighten the relationship between the federal funds rate and the IOER rate.

Participants might see several advantages to Option 1 related to the strategic issues raised above. Given the uncertainty associated with the estimated effects of securities sales, the Committee might feel that using the traditional policy lever of short-term rates as the primary active tool would lead to better economic outcomes. Moreover, postponing the sale of assets until after the Committee raised the federal funds rate and the recovery was well established would reduce the risk of an unexpectedly sharp market reaction to the announcement of sales that could weaken or even derail the recovery. Announcing a framework for sales that was relatively independent of economic developments might reassure market participants that sales are not likely to be accelerated, helping to reduce further the risk of an unexpectedly sharp market reaction. Lastly, by raising short-term interest rates first and only later commencing asset sales, the Committee would ensure that short-term rates were further above the effective zero bound than would be the case under Option 2, thereby reducing the risk of rates falling back to the zero bound in the event of adverse shocks to economic activity.

On the other hand, participants might also see some disadvantages to Option 1. Sales would begin relatively late in the tightening process and would proceed fairly slowly. If participants were concerned that owning agency securities inappropriately allocates credit to one sector of the economy, they might be reluctant to wait until 2018 to return the portfolio to an all-Treasury composition. Participants might also be concerned that reducing the size of the balance sheet at such a gradual pace risks boosting inflation expectations and hence actual inflation above desired levels. Indeed, some participants might worry that the sustained high level of reserve balances under Option 1 could, if the expansion began to strengthen significantly, allow for a rapid and potentially destabilizing expansion in money and credit that the Committee might find difficult to counter quickly.

### *Option 2*

Option 2 is constructed to address the desire by some participants to normalize the balance sheet sooner and to use asset sales as an active policy instrument for achieving the FOMC's economic objectives. As under Option 1, the Committee would start by redeeming securities, but under Option 2 the Committee would next begin sales of agency securities while leaving the federal funds rate target unchanged. The Committee could retain the "extended period" language as those steps took place, if it intended to keep the funds rate near its lower bound to support the economic recovery. Once it became more confident that the economic recovery was continuing and that increases in short-term interest rates would soon be appropriate, it would modify or remove the forward guidance for the funds rate and would begin using reverse repurchase agreements and term deposits to drain additional reserves. It would then begin increasing its

target for the federal funds rate when that action was judged to be appropriate for guiding the economy toward price stability and maximum employment.

Sales of agency securities under this option would be calibrated to return the portfolio to an all-Treasury composition over three years given the projected economic outlook, compared to the five-year period assumed under Option 1. Moreover, sales would not take a backseat to the federal funds rate target as a policy tool as was the case in Option 1. Instead, the pace of sales would be quickened or slowed in reaction to changes in the economic outlook.

As under Option 1, the timing of each step in the exit strategy would depend on economic developments. Under the baseline economic assumptions, asset redemptions are assumed to begin in December 2011 and sales to begin in June 2012. With sales happening sooner and proceeding more briskly than under Option 1, and hence providing more restraint on economic activity, liftoff of the federal funds rate would be somewhat later. Under the baseline economic outlook, the federal funds rate would not be increased until December 2012, three months later than in Option 1. With that timing, the “extended period” language would be modified or dropped soon after the June 2012 decision to begin selling assets, for example in September 2012, at which point the Committee would also commence reserve draining using term deposits and reverse repurchase agreements.

As shown in Figure 1, this option would normalize the size and composition of the balance sheet more quickly. Because of the earlier start and more rapid pace of sales, under the baseline economic assumptions the balance sheet would return to its steady state growth path in early 2015, about one year earlier than in Option 1. In addition, the last agency security would be sold by August 2015, nearly two and a half years sooner than under Option 1.

Because the size of the balance sheet is declining more quickly and the liftoff of the federal funds rate is delayed under this option relative to Option 1, fewer reserves would be in the banking system when the federal funds rate target is increased in December 2012. Under the baseline assumptions, there would be \$1 trillion in reserves at that time, or about \$200 billion less than at liftoff under Option 1. As a result, the Federal Reserve would likely have to drain somewhat fewer reserves using reverse repurchase agreements and term deposits to ensure trading in the federal funds market near the IOER rate.

The approach suggested by President Plosser is broadly similar to that taken in Option 2, as it involves the use of both the federal funds rate and state-contingent asset sales. However, under his approach, redemptions, sales, and the tightening of the federal funds rate target begin at the same time. Moreover, a portion of the sales of securities would be non-state-contingent, although the larger portion would be state-contingent. In addition, the state-contingent sales would operate in tandem with changes in the federal funds rate rather than responding to the data in a potentially independent manner. In the numerical example provided in his memo, the economic outcome is such that the sales occur quite rapidly – over a period of just over a year. However, the approach he proposes could result in a more gradual, or a more rapid, pace of sales, depending on economic developments.

Participants may see the speedier normalization of the balance sheet as the key advantage of Option 2. Compared to Option 1, agency securities would be shed more quickly, easing the associated concerns about credit allocation. Moreover, the more rapid reduction in reserve balances could limit upside risks to inflation expectations that some associate with an outsized balance sheet. And the reduction in the amount of reserve draining required to keep the federal funds rate close to the IOER rate under this option might be seen as an advantage by policymakers who are concerned that the short-term reserve draining tools might not work as planned or might have undesirable side effects.

Participants may also see disadvantages for Option 2. As noted earlier, making asset sales responsive to economic conditions might make it more difficult for the public to anticipate the timing and extent of policy adjustments and so could increase the uncertainty facing both policymakers and market participants. Moreover, this option would keep short-term interest rates near zero for longer and would leave the yield curve steeper, conditions that some participants have associated with greater vulnerability to financial instability. Lastly, asset sales under this option would proceed at about twice the monthly pace assumed under Option 1, which might prove disruptive for markets.

In addition, participants may see significant upside risks to longer-term interest rates under Option 2. In the simulations, longer-term interest rates follow nearly the same path as under Option 1. However, this outcome reflects two specific features of the simulation. First, the staff projects that the announcement of sales would have only a small effect on the term premium, as can be seen in Figure 1. Second, the staff assumes that, at the time that the sales regime becomes clear to investors, market participants respond by pushing back the expected timing of the liftoff of the federal funds rate from its current level, providing an immediate and roughly offsetting effect on longer-term rates.<sup>16</sup> Policymakers may feel that both of these aspects of the projection may be questionable in practice. First, the announcement of more aggressive sales that will be responsive to the economy may introduce a greater amount of uncertainty about longer-term interest rates, leading to a larger response of the term premium. Second, market participants might read the more aggressive approach to asset sales as implying an earlier and more rapid increase in the federal funds rate target as well. For these reasons, the Committee may see a risk that longer-term rates would increase considerably more than projected by the staff, potentially weakening the recovery at a time when short-term rates were still constrained by the lower bound.

## **SOMA Income**

While maximizing Federal Reserve income is not an objective of the Committee, participants might nonetheless want to be informed about the implications of the different exit strategies for income and the corresponding remittances to the Treasury.

As shown in Figure 2, the two options produce different patterns for Federal Reserve income and remittances to the Treasury. The cumulative amounts of remittances to Treasury under the two

<sup>16</sup> Indeed, the two scenarios were constructed so that the macroeconomic outcomes are roughly the same, and businesses and households were assumed to understand the policy that the Federal Reserve was pursuing.

approaches are similar, in part because the projected paths for longer-term interest rates in the two options are little different. Remittances to the Treasury remain positive under both options. However, remittances are somewhat lower in the middle of the decade under Option 2 because the relatively rapid pace of securities sales at that time boosts realized capital losses. Remittances under Option 2 subsequently move above those in Option 1 because the earlier completion of sales means that realized losses end sooner. The Federal Reserve would report larger and more long-lived unrealized capital losses under Option 1 because of the later start and slower pace of asset sales.

The risks to Federal Reserve income also differ across the two options. If the economy simply recovered more strongly than expected, causing a more rapid rise in both short-term and longer-term rates, income would fall under both options. Unrealized losses under Option 1 would increase by more since the SOMA portfolio would be larger under that option. But the probability of remittances falling to zero would be larger under Option 2 because the high rate of sales over the next few years would generate bigger realized capital losses.<sup>17</sup> If the more rapid and state-dependent sales under Option 2 generated a larger-than-projected increase in longer-term interest rates, as discussed above, the result could be a significantly lower level of Federal Reserve income under this approach. On the other hand, interest rates could also be higher than projected under Option 1 if the longer period with an elevated balance sheet contributed to an increase in inflation expectations and hence nominal interest rates, in which case the Federal Reserve could realize significantly higher losses from asset sales and a notable reduction in income.

## Conclusions

This memo has presented two specific options that the FOMC could adopt for a sequence of policy steps that would remove the extraordinary degree of policy accommodation in place today. These options were calibrated to produce largely similar paths for economic activity and inflation, but they differ importantly in terms of some of the strategic issues surrounding the use of the policy instruments available and the associated risks to the economy.

In the staff's view, the Committee's choice of exit strategy should be based on an assessment of the approach that appears most likely to yield the best economic outcomes over the next several years, regardless of the longer-term policy framework that the Committee may ultimately choose. In particular, the two policy strategies considered could transition smoothly into any of the longer-term policy frameworks that the Committee has discussed.<sup>18</sup> Each strategy will involve an elevated balance sheet for several years and, unless temporary draining tools are used very aggressively, will involve considerable amounts of excess reserves in the banking system over the next few years. Thus, it seems likely that the federal funds rate target will have to remain near the IOER rate over that period, as in floor-type systems. If the FOMC desired to eventually move to a corridor-type system for the federal funds rate, it could do so by continuing to drain reserves until they reached a level that would be associated with the federal funds rate trading above the IOER rate. Alternatively, the FOMC could maintain a floor-type system for

<sup>17</sup> See the staff memo to the FOMC, "Risks to the SOMA Portfolio and Federal Reserve Income," January 20, 2011.

<sup>18</sup> See the staff memo to the FOMC, "Long-Run Policy Implementation Frameworks," April 19, 2011.

the federal funds rate by halting the decline of the balance sheet at higher levels of reserves in the banking system. Thus, the Committee's choices regarding exit strategy over the next few years are unlikely to constrain policymakers from choosing any particular longer-term framework. Moreover, the lessons learned from the exit period may help the Committee choose among the alternative longer-term policy frameworks.

## **Appendix: Illustrative Examples of How the Statement Might Evolve during Exit<sup>19</sup>**

This appendix illustrate how the policy paragraphs (currently paragraphs three and four) of the Committee's statement might evolve, under Option 1 or Option 2, as the Committee implements the successive steps in either exit strategy. These examples envision five steps in each strategy, beginning with a signal that the Committee will halt reinvestment of principal in the near future. The speed with which the Committee would move from one step to the next would depend on how economic conditions, the outlook, and the risks to the outlook evolve over time. The Committee could choose to combine steps (and thus language) as needed.

Of course, in addition to the post-meeting statement, the Committee will be able to increase the public's understanding of its exit strategy through speeches, testimony, and the Chairman's remarks at the post-meeting press conferences.

### ***Starting Point: LSAPs are complete; reinvestment is continuing***

3. The Committee judges that the current level of its securities holdings will support monetary conditions that promote appropriate progress toward maximum employment and price stability. Accordingly, the Committee will maintain its existing policy of reinvesting principal payments from its securities holdings. The Committee will regularly review its securities holdings in light of incoming information and is prepared to make adjustments as needed to best foster maximum employment and price stability.
4. 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 for the federal funds rate for an extended period.

<sup>19</sup> This appendix was prepared by Steve Meyer.

***Option 1, Step 1: Signal that reinvestment will end soon***

3. The Committee **continues to judge** that the current level of its securities holdings will support monetary conditions that promote appropriate progress toward maximum employment and price stability. Accordingly, Committee is maintaining its existing policy of reinvesting principal payments from its securities holdings **for the time being**. The Committee will regularly review its reinvestment policy and the level of its securities holdings in light of incoming information and is prepared to make adjustments as needed to best foster maximum employment and price stability.
4. The Committee will maintain the target range for the federal funds rate at 0 to  $\frac{1}{4}$  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 for the federal funds rate for an extended period.

***Option 1, Step 2: End reinvestment***

3. **The Committee decided today to suspend its policy of reinvesting principal payments from its holdings of Treasury securities, agency debt, and agency mortgage-backed securities. This step will result in a gradual, ongoing reduction in the Committee's securities holdings.** The Committee will regularly review its securities holdings in light of incoming information and is prepared to make **additional** adjustments as needed to best foster maximum employment and price stability.
4. The Committee will maintain the target range for the federal funds rate at 0 to  $\frac{1}{4}$  percent. The Committee 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 for the federal funds rate for an extended period.

***Option 1, Step 3: Drop “extended period” language and begin using term deposits and Reverse RPs to drain reserves***

3. The Committee will continue reducing its holdings of securities over time by not reinvesting the principal payments it receives. The Committee will regularly review its securities holdings in light of incoming information and is prepared to make additional adjustments as needed to best foster maximum employment and price stability.
4. The Committee decided to maintain the target range for the federal funds rate at 0 to ¼ percent. The Committee **now** anticipates that economic conditions, including **improved but still-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 some time. To begin preparing for an eventual increase in the federal funds rate, the Committee will execute reverse repurchase agreements of up to \$[100] billion by the next FOMC meeting.**

***At the end of the statement***

**In a related action, the Board of Governors authorized offerings of term deposits that will result in a level of up to \$[100] billion of term deposits by the next FOMC meeting.**

***Option 1, Step 4: Increase federal funds rate target***

3. The Committee will continue reducing its holdings of securities over time by not reinvesting the principal payments it receives. The Committee will regularly review its securities holdings in light of incoming information and is prepared to make additional adjustments as needed to best foster maximum employment and price stability.
4. **The Committee decided today to increase its [target range for the federal funds rate to ¼ to ½ percent | target for the federal funds rate to ½ percent]. The Committee will continue to review its target for the federal funds rate in light of the economic outlook and is prepared to make additional adjustments as needed to best foster maximum employment and price stability.**

***At the end of the statement***

**In a related action, the Board of Governors raised the interest rates that the Federal Reserve pays on required and excess reserve balances from ¼ to ½ percent [and approved recommendations from the Federal Reserve Banks of . . . to increase the primary credit rate from ¾ to 1 percent].**

*Option 1, Step 5: Initiate gradual asset sales (with no change in the funds rate)*

3. **In light of continuing improvement in economic and financial conditions, the Committee decided today to reduce its securities holdings somewhat more quickly by initiating a program of gradual sales of its holdings of agency debt and agency mortgage-backed securities** and by continuing to not reinvest the principal payments it receives on its securities holdings. **Specifically the Committee will sell its agency debt and agency mortgage-backed securities at a pace sufficient to reduce its holdings by approximately \$[15] billion per month. The Committee may adjust the pace at which it reduces its holdings if there is a material change in financial market conditions or the economic outlook.**
4. In addition, to promote a continuing and sustainable return to higher levels of resource utilization in a context of price stability, the Committee decided to maintain its target [range] for the federal funds rate at [?] [to [?]] percent.

*Option 2, Step 1: Signal that reinvestment will end soon*

3. The Committee **continues to judge** that the current level of its securities holdings will support monetary conditions that foster appropriate progress toward maximum employment and price stability. Accordingly, the Committee is maintaining its existing policy of reinvesting principal payments from its securities holdings **for the time being**. The Committee will regularly review its reinvestment policy and the level of its securities holdings in light of incoming information and is prepared to make adjustments as needed to best foster maximum employment and price stability.
4. 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 for the federal funds rate for an extended period.

*Option 2, Step 2: End reinvestment*

3. **The Committee decided to suspend its policy of reinvesting principal payments from its holdings of Treasury securities, agency debt, and agency mortgage-backed securities. This step will result in a gradual, ongoing reduction in the Committee's securities holdings.** The Committee will regularly review its securities holdings in light of incoming information and is prepared to make **additional** adjustments as needed to best foster maximum employment and price stability.
4. 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 for the federal funds rate for an extended period.

*Option 2, Step 3: Initiate asset sales (with no change in the funds rate)*

3. **In light of continuing improvement in economic and financial conditions, the Committee decided today to reduce its securities holdings more quickly by initiating a program of gradual sales of its holdings of agency debt and agency mortgage-backed securities and by continuing to not reinvest the principal payments it receives. Specifically, by not reinvesting the principal payments on its holdings and by selling securities, the Committee intends to reduce its holdings of agency debt and agency mortgage-backed securities by \$[38] billion by the next FOMC meeting. The Committee will adjust the pace of sales in light of incoming information on market functioning and the economic outlook.**
4. 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 for the federal funds rate for an extended period.

*Option 2, Step 4: Drop “extended period” and begin using term deposits and reverse RPs to drain reserves*

3. The Committee will gradually reduce its securities holdings by continuing to not reinvest principal payments it receives and by continuing gradual sales of its holdings of agency debt and agency MBS. Through these steps, the Committee intends to reduce its holdings of agency debt and agency mortgage-backed securities by \$[38] billion by the next FOMC meeting. The Committee will regularly review the pace of its securities sales in light of incoming information and is prepared to make adjustments as needed to best foster maximum employment and price stability.
4. The Committee decided to maintain the target range for the federal funds rate at 0 to ¼ percent. The Committee **now** anticipates that economic conditions, including **improved but still-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 some time. To begin preparing for an eventual increase in the federal funds rate, the Committee will execute reverse repurchase agreements of up to \$[100] billion by the next FOMC meeting.**

*At the end of the statement*

**In a related action, the Board of Governors authorized offerings of term deposits that will result in a level of up to \$[100] billion of term deposits by the next FOMC meeting.**

*Option 2, Step 5: Increase federal funds rate target*

3. **The Committee decided today to increase its [target range for the federal funds rate to  $\frac{1}{4}$  to  $\frac{1}{2}$  percent | target for the federal funds rate to  $\frac{1}{2}$  percent]. The Committee will continue to review its target for the federal funds rate in light of the economic outlook and is prepared to make additional adjustments as needed to best foster maximum employment and price stability.**
4. The Committee will gradually reduce its securities holdings by continuing to not reinvest principal payments it receives and by continuing gradual sales of its holdings of agency debt and agency MBS. The Committee intends to reduce its holdings of agency debt and agency mortgage-backed securities by \$[38] billion by the next FOMC meeting. The Committee will regularly review the pace of its securities sales in light of incoming information and is prepared to make adjustments as needed to best foster maximum employment and price stability.

*At the end of the statement*

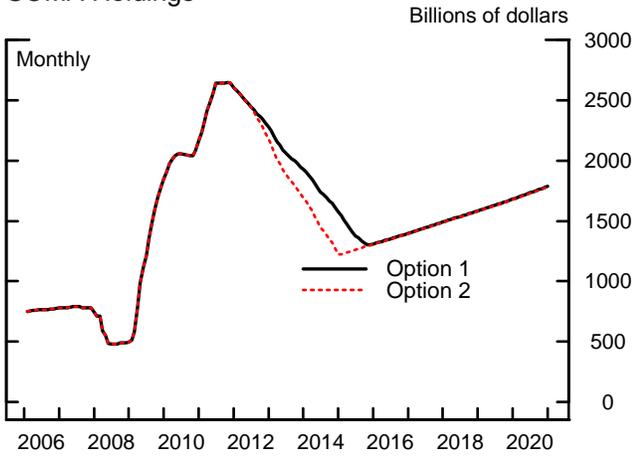
**In a related action, the Board of Governors raised the interest rates that the Federal Reserve pays on required and excess reserve balances from  $\frac{1}{4}$  to  $\frac{1}{2}$  percent [and approved recommendations from the Federal Reserve Banks of . . . to increase the primary credit rate from  $\frac{3}{4}$  to 1 percent].**

Table 1	
Exit Sequence under the Baseline*	
Option 1	Option 2
Redemptions of securities (December 2011)	Redemptions of securities (December 2011)
Removal of "extended period" language (March 2012)	Sales of agency securities (June 2012)
Temporary reserve draining tools (March 2012)	Removal of "extended period" language (September 2012)
Increase in the federal funds rate target (September 2012)	Temporary reserve draining tools (September 2012)
Sales of agency securities (March 2013)	Increase in the federal funds rate target (December 2012)

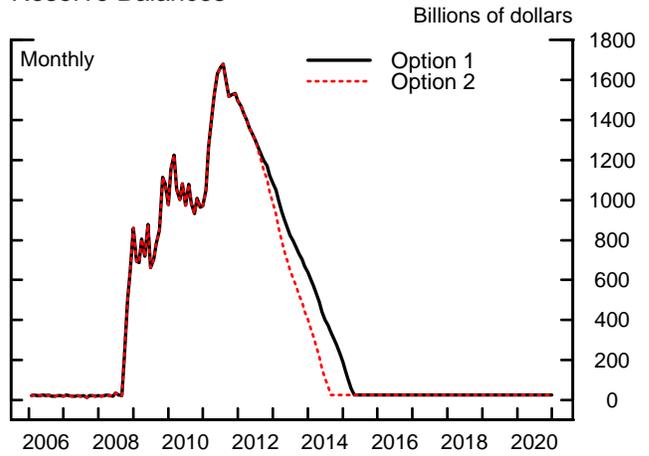
\* Dates shown are when the policy steps are assumed to begin.

**Figure 1**  
**Balance Sheet and Interest Rate Projections**

SOMA Holdings

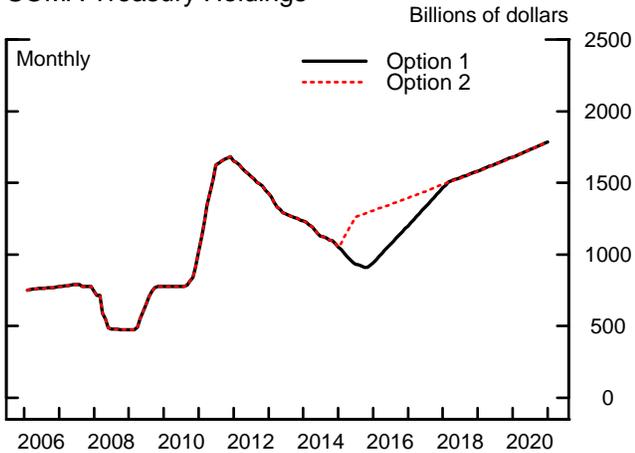


Reserve Balances\*

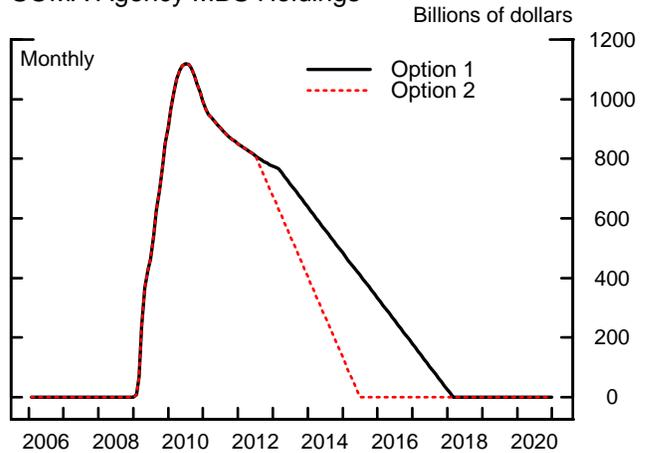


\* Projections assume no use of temporary reserve draining tools.

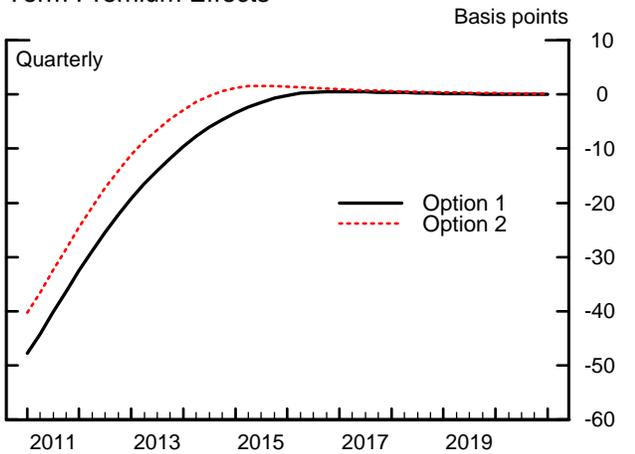
SOMA Treasury Holdings



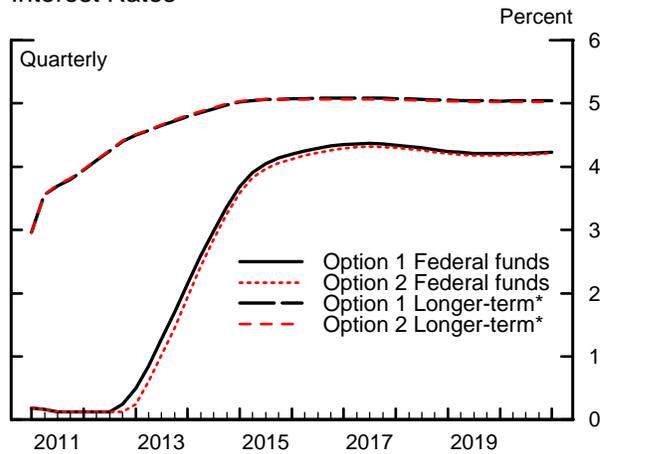
SOMA Agency MBS Holdings



Term Premium Effects



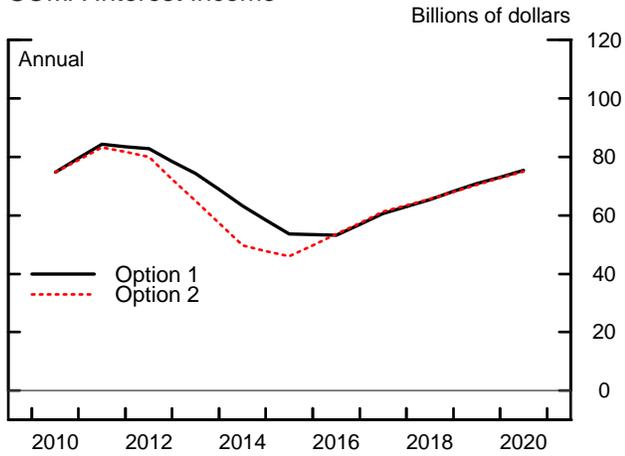
Interest Rates



\* 10-year Treasury rate.

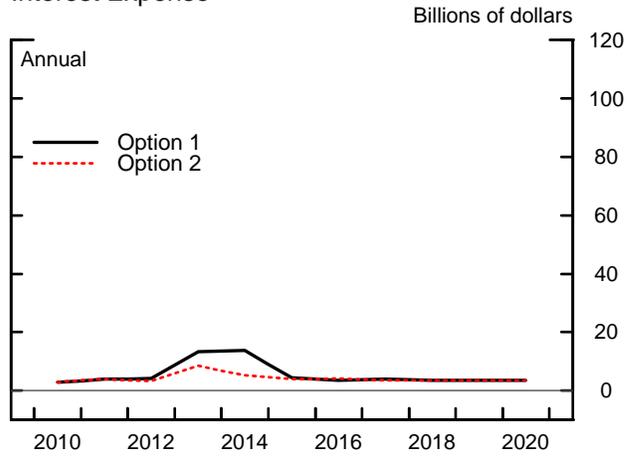
**Figure 2**  
**Income Projections under Different Exit Strategies\***

**SOMA Interest Income\*\***

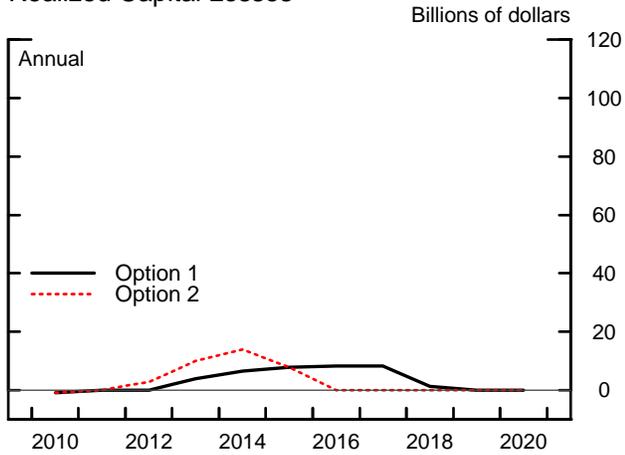


\*\* SOMA coupon income less amortization of net premiums.

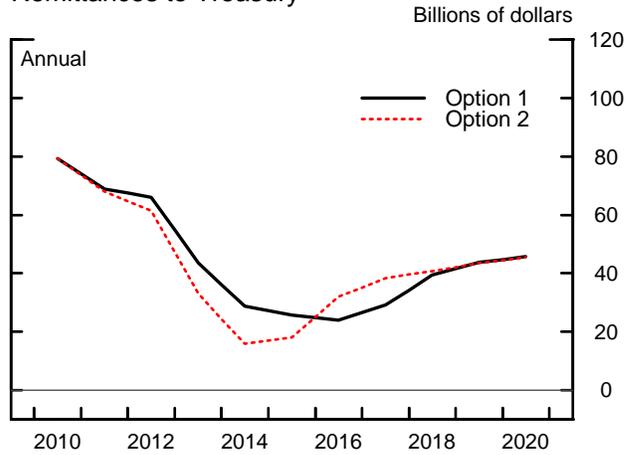
**Interest Expense**



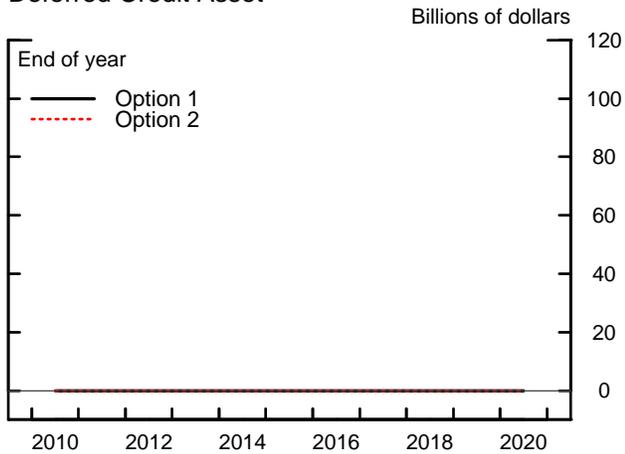
**Realized Capital Losses**



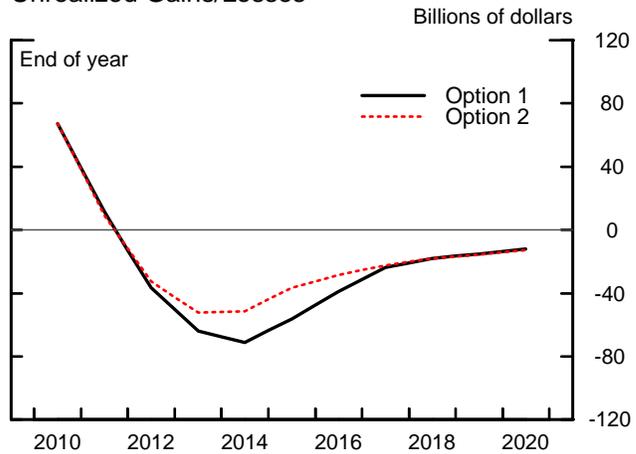
**Remittances to Treasury**



**Deferred Credit Asset**



**Unrealized Gains/Losses**



\* Consensus projections by Board and FRBNY.