The Effects of MBS Paydowns and Potential Reinvestment Options

Joshua Frost, Jane Ihrig, Jaime Marquez, Jeffrey Moore, Angela O'Connor,
Julie Remache, Nathaniel Wuerffel[1]

I. Introduction

The Federal Open Market Committee (FOMC) conducted large scale purchases of longer-term securities between December 2008 and March 2010 as part of its efforts to stimulate economic activity. Through its large-scale asset purchase (LSAP) programs, the Federal Reserve purchased $300 billion of Treasury securities, roughly $175 billion of agency debt, and $1.25 trillion of agency mortgage-backed securities (MBS). Since purchases began, repayments of principal of maturing Treasury securities have been reinvested in new Treasury securities, while repayments of principal on agency debt and MBS have been redeemed without replacement.

Projected SOMA portfolio balances have been revised sharply lower in recent months against the backdrop of declining longer-term interest rates. These revisions are attributable to a sizable rise in realized and expected principal repayments ("paydowns") of agency MBS holdings, which are sensitive to the level of mortgage interest rates. The actual and anticipated reduction in Federal Reserve holdings would be expected to reverse a portion of the effect of the LSAPs on long-term interest rates by shifting duration and prepayment risk from the Federal Reserve portfolio back to private investors at a significantly faster pace than was expected earlier this year. If the Committee felt that the resulting effect on long-term rates was undesirable in current circumstances, then it could adopt a policy under which MBS paydowns are reinvested in Treasury securities or MBS.[2]

This memo estimates how rising paydowns may affect the size of the SOMA portfolio going forward and evaluates the effects of reinvesting repayments of principal on MBS on long-term interest rates. The calculations presented here are partial-equilibrium in nature, in that they do not consider the effects on the paths of economic activity and the federal funds rate arising from the changes in the SOMA portfolio. The memo concludes with a discussion of the possible costs and benefits of reinvesting repayments in new MBS or in longer-term Treasury securities. Some of the main points are as follows:

- Since April, longer-term interest rates have fallen and MBS prepayment speeds have increased as mortgage borrowers take advantage of lower mortgage interest rates to refinance their mortgages.

[1] Thanks to Seth Carpenter, Sophia Castelo, Bill English, Katy Femia, David Finkelstein, Frank Keane, Christian Miller, David Reifschneider, Brian Sack, and Tom Tallarini for helpful comments.

[2] Additional purchases of agency debt are not contemplated in this note. However, the maturity of such holdings would also serve to reduce the portfolio balance effect. Accordingly, the Committee might also wish to reinvest the proceeds of maturing agency debt, and so maintain the level of Federal Reserve holdings of longer-term securities. A rough calculation of the effects of such a policy change suggests that it would result in a decline in long-term interest rates of 3-5 basis points.

At current interest rate levels, cumulative MBS paydowns within the SOMA portfolio are projected to be about $340 billion from August 2010 to December 2011, in addition to the $130 billion of paydowns realized to date. If mortgage interest rates decline by an additional 50 basis points, estimated prepayments from August 2010 to December 2011 are projected to increase to approximately $540 billion.

- Because the Federal Reserve does not currently offset MBS prepayments, paydowns result in a transfer of duration and prepayment risk from the Federal Reserve to the marketplace, thereby unwinding the stimulative effects associated with the LSAPs. To the degree that rates drop faster than baseline expectations, triggering a higher level of refinancing, this unwinding effect would increase.

- Staff estimates suggest that longer-term interest rates could move down by as much as 20 basis points in the near-term if the FOMC were to adopt a policy of fully reinvesting repayments of principal in longer-term instruments. This effect would occur because the new asset purchases would keep the market from having to absorb the duration associated with the reduction in the size of the SOMA portfolio, thereby keeping term premiums lower than they otherwise would be. However, as the staff has emphasized in the past, there is considerable uncertainty associated with estimates of these effects.

- Reinvestments could be directed towards purchases of either MBS or Treasury securities. Reinvesting in MBS might be easier to communicate as an adjustment to the current policy. However, reinvesting in Treasuries may be preferable, partly in view of the interest in returning to a Treasury-only portfolio over time and the greater available supply of those securities relative to MBS.

II. MBS paydown estimates and effects

About $130 billion of the MBS portfolio has already paid down, leaving current SOMA holdings at $1.12 trillion. Moreover, the pace of actual and expected future paydowns has increased notably in recent months as mortgage interest rates have declined sharply and more homeowners have refinanced mortgages at lower rates. Current estimates of MBS paydowns in the SOMA portfolio between August 2010 and December 2011 are about $340 billion. In December 2009, this estimate stood at about $115 billion.

To illustrate the sensitivity of SOMA's MBS holdings to declining rates, staff estimated cumulative MBS paydowns of SOMA holdings in various interest rate scenarios.[3] (See Figures 1-3.) According to these estimates, if interest rates decline an additional 50 basis points from current levels, cumulative paydowns through December 2011 would rise from about $340 billion to about $540 billion. Paydowns would increase even more sharply in lower rate scenarios.[4]

Changes in the Federal Reserve's MBS portfolio holdings tend to affect the equilibrium between supply and demand in long-term fixed income markets more broadly. In general, most prepayments of MBS reflect refinancing activity that creates newly originated MBS securities. The Federal Reserve's current policy of allowing paydowns to occur without reinvestment implies that private investors must absorb the newly issued MBS, leaving them holding the duration and negative convexity of those securities. This dynamic will affect the portfolio balance effects associated with the LSAPs. In particular, SOMA paydowns serve as a form of an "interest rate dampener." Intuitively, in a falling rate environment, the marketplace must absorb the added supply of the Federal Reserve's refinanced MBS, which puts upward pressure on the term premium and hence leans against the initial decline in rates. Consequently, long-term interest rates do not adjust down as quickly or as far as they otherwise might.

III. Effects associated with reinvesting MBS paydowns

As discussed above, when paydowns are not reinvested, the infusion of duration or risk into the market serves to reverse some of the portfolio balance effects associated with Federal Reserve asset holdings. Should the FOMC change the existing policy to reinvest MBS paydowns in new long-term instruments, the term premium associated with interest rate risk would presumably fall, leading to a decline in longer-term interest rates.

Using a stylized valuation model, Board staff estimated the approximate size of the term premium effects under various reinvestment scenarios.[5] The calculations presented here are partial-equilibrium in nature, in that the paths of economic activity and the federal funds rate are conditioned on a preliminary version of the August Tealbook forecast and do not respond to the changes in the SOMA portfolio considered. The analysis considers a baseline forecast that is consistent with the current redemption

[3] These estimates are formulated using a BlackRock agency MBS prepayment model and take into account the current set of Tealbook interest rate forecasts.

[4] One reason for this notable jump in prepayments as rates fall is that SOMA MBS holdings are largely composed of 4.5 and 5.0 percent coupon bonds originated in 2009. Refinancing rates within this cohort are estimated to be particularly high given that borrowers who took out new mortgages in 2009 have relatively better credit profiles and are considered to be more aware of the economic incentives associated with refinancing. As a result, prepayments on these mortgages are expected to be quite sensitive to the level of mortgage rates.

[5] The technical details of the calculations reported here are documented in the April 2010 FOMC memo from Board staff, "Quantitative Analysis of the Macroeconomic Effects of Alternative Strategies for Managing the Federal Reserve's Securities Holdings." That memo includes a discussion of the calculation of the term premium effects.

policy and an alternative scenario that considers full reinvestment of MBS paydowns. The "Baseline" forecast is consistent with a preliminary version of the August Tealbook assumptions that has been updated from the June forecast to reflect the staff's current interest rate and portfolio projections. This scenario assumes Treasury securities are reinvested and that both agency debt and MBS are redeemed, leading to a gradual decline in the size of the portfolio for more than two years. At that point, sales of agency debt and MBS begin and are completed over a five year horizon. Under this approach, the SOMA portfolio is projected to return to its "normal" size (associated with reserve balances of $25 billion) by year-end 2014, after which Treasury purchases are conducted to meet the steady growth of Federal Reserve notes and capital. The "Alternative" forecast makes the same assumption as in the baseline except that all MBS paydowns are reinvested in new MBS or Treasury securities for roughly the next two years. Once asset sales begin, the portfolio shrinks in the same manner as in the baseline forecast, only starting from a higher level of asset holdings. The gap in size of the portfolio under the two scenarios reaches a maximum of about $400 billion in late 2012. (See Figure 4.)

A comparison of the two scenarios suggests that the contemporaneous term premium would be pushed down by approximately 20 basis points if future MBS paydowns were reinvested. (See Figure 5.) The result should be a decline in long-term interest rates of a broadly similar size.[6] Of course, the additional term premium effect of reinvestments rather than redemptions declines over time because the two scenarios converge as sales proceed. Experience and theory would suggest that most of the effect of a change in reinvestment policy would take place upon the announcement of a policy change, as the policy shift provides new information to the marketplace about how Federal Reserve holdings are expected to affect the stock of long-term assets held by investors. The actual adjustment of rates upon announcement may be somewhat less than the model estimates if market participants have priced in some likelihood of this policy shift in advance of the announcement. Our recent primary dealer survey indicates that respondents saw approximately a one-third chance of such an action by year end.[7]

To be sure, calibrating these portfolio balance effects is subject to considerable uncertainty. Indeed, the calculations rely on the market response to the initial round of LSAPs to estimate the potential market effect of the new strategy, but the effects might not be proportional. Markets are currently functioning more efficiently than when LSAPs were initially introduced, which might affect their response to such a policy.[8] Moreover, based on FOMC communications about using asset sales to return

[6] In both cases, the impact of changes in SOMA holdings on term premiums evolves over time as the economy continues to grow and the value of the Federal Reserve's asset holdings relative to the overall economy declines.
[7] The perceived likelihood of conducting such reinvestments may have been boosted further by a recent *Wall Street Journal* story on this topic that came out after the survey.
[8] Importantly, note that we are not including the effect of LSAPs arising through improved market functioning in our calibration of the effects of the LSAPs. That component of the effect likely pushed down MBS rates by another 50 to 75 basis points on top of the portfolio balance effects considered here.

to a more normal portfolio at some point, market participants may now believe that any purchases will not be held to maturity, which could reduce the effects of the LSAPs. Nevertheless, while the size of the effect is subject to considerable uncertainty, reinvestment of repayments on MBS should cause a reduction in longer-term market interest rates.

In addition to the direct effect estimated here, this policy could have an indirect effect on longer-term interest rates if it is interpreted as a signal about the future path of policy rates. However, the outcome of the indirect effects is ambiguous. On the one hand, market participants may conjecture that asset purchases will result in policy rates remaining low for longer, interpreting purchases as a sign that the Committee is more concerned than had been thought about the economic outlook. This interpretation could amplify a decline in rates associated with the lower term premium. On the other hand, market participants could postulate that short-term rates will rise sooner and faster because the reinvestment policy will help to support the economic recovery. Under this interpretation, the effect of revised interest rate expectations would serve to partially offset the effect of a decline in term premiums. Our partial equilibrium calculations presented here do not attempt to account for such feedback.

IV. Considerations related to purchasing MBS or Treasury securities

MBS paydowns could be offset by purchasing either MBS securities or Treasury securities. There are some advantages and disadvantages to each.

Offsetting MBS paydowns with MBS purchases has the benefit of being a straightforward adjustment to the current policy that would be relatively easy to communicate. In addition, buying MBS may help to compress the spread of MBS to Treasuries. However, Federal Reserve holdings of MBS are already large, and further purchases could add to strains in that market.

There are several reasons why policymakers might prefer to reinvest in Treasury securities. First, buying Treasuries is consistent with the objective of returning to a Treasury-only SOMA portfolio over time. Second, compared to MBS, the Federal Reserve currently holds a smaller percentage of the aggregate outstanding supply of Treasury securities. This lower share, along with the larger size of the Treasury market, would suggest that there is greater scope for Federal Reserve purchases of additional Treasury securities without an adverse effect on market functioning. Third, buying Treasuries rather than MBS could reduce realized losses associated with future asset sales if the FOMC were less inclined to sell Treasuries than MBS given its intention to move to a Treasury-only portfolio. However, offsetting MBS paydowns with Treasury securities would raise communication concerns since the Committee might need to explain the reasons for the change in investment strategy. In addition, some observers have expressed the concern that additional Treasury purchases could lead market participants to believe that the Federal

Reserve is monetizing the federal debt, potentially leading to an increase in long-term inflation expectations.

Figure 1

Cumulative Estimated MBS Principal Paydowns Under Alternative Interest Rate Scenarios

$billions, data as of July 31, 2010.

Each scenario represents a parallel yield curve shift from the current term structure of interest rates.

	-50 bps	-25bps	Current	+25bps
Dec-2010	$179	$144	$116	$96
Dec-2011	$542	$433	$342	$271
Dec-2012	$683	$564	$462	$376
Dec-2013	$742	$630	$529	$443

Figure 2

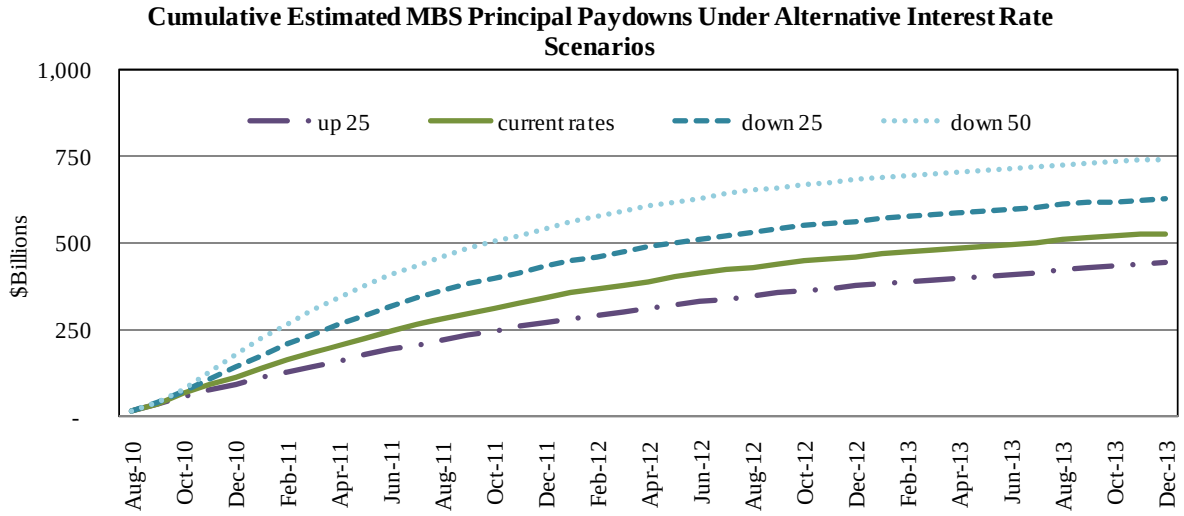


Figure 3

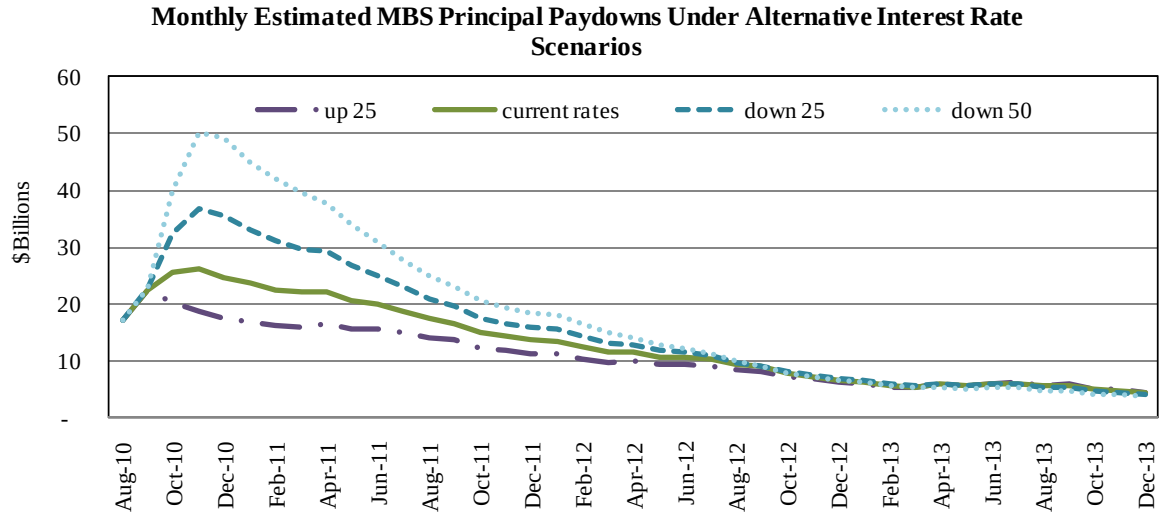
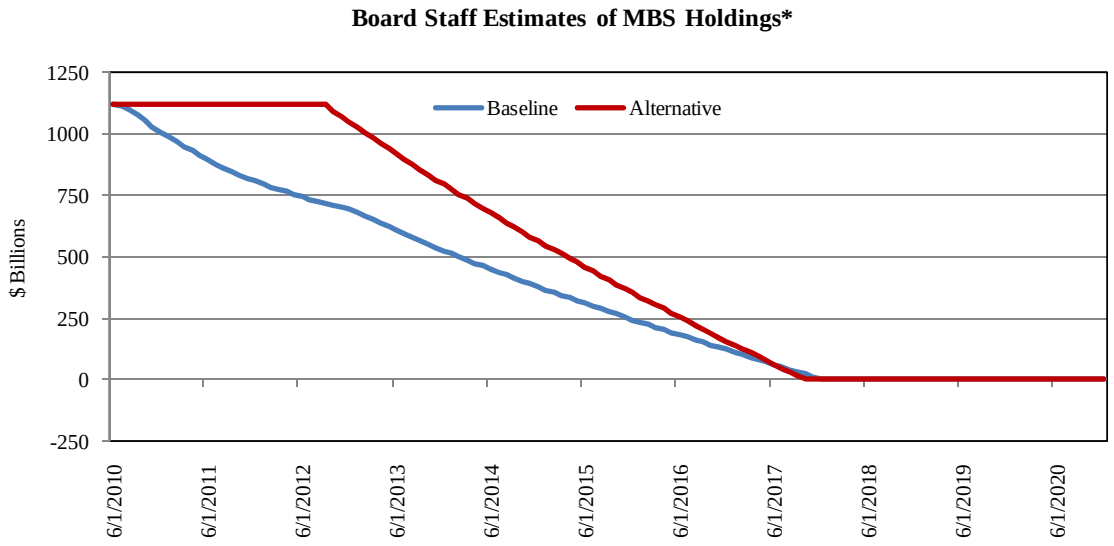


Figure 4



*These estimates assume that reinvestments are made in MBS.

Figure 5