

Fiscal Implications of Additional Large-Scale Asset Purchases for the Federal Government and the Federal Reserve¹

March 11, 2013

1. Introduction and Summary

This memo discusses the staff's current evaluation of the implications of additional asset purchases for the Federal Reserve's remittances to the Treasury and the federal government's budget more broadly. Evaluating these fiscal implications raises a wide variety of issues regarding efficacy, costs and risks, and exit policy. This memo provides a summary and overview of these issues. Several topics touched on here are covered in greater depth in other memos.

Our analysis focuses on the marginal fiscal effects of an additional \$500 billion in asset purchases. Specifically, we start from the January Tealbook baseline, in which the current LSAP program is concluded in June, and consider the marginal effects of continuing that program through the end of 2013. The results are consistent with earlier results the staff has presented on this topic, and the purpose of this memo is both to provide additional detail regarding the sensitivity of our estimates to alternative assumptions about economic conditions and the efficacy of large-scale asset purchases (LSAP), and to discuss how different uses of the balance sheet tools could alter the fiscal effects.

The main results are these:

- If there are any substantial benefits of the marginal LSAPs in terms of employment and inflation, then the fiscal implications of these effects tend to dominate all other fiscal issues, and the additional purchases lead to substantial net fiscal benefits. In our baseline estimates, continuing the current LSAP program through the end of the year lowers the longer-run debt-to-GDP ratio by 1.4 percentage points.
- If we set aside all employment and inflation effects and only allow for the standard term premium effects of the LSAPs on Treasury and MBS yields, the net fiscal benefit to the Federal government (including the effects of remittances) remains positive in our baseline case, but only marginally so. We have not previously emphasized this result.
- We consider two alternative scenarios—one in which stronger real activity and rising inflation cause interest rates to be markedly higher than in our baseline and one in which the pace of the recovery remains sub-par, leading to persistently lower interest rates than in the baseline. Although additional asset purchases reduce remittances by more in the high-rate scenario than in the baseline case (and vice-versa in the low-rate scenario), the net fiscal benefit to the government remains roughly the same in all three cases because

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of offsetting effects on Treasury interest outlays.²

- A program with net fiscal benefits could still be associated with periods of zero Federal Reserve remittances to the Treasury and the appearance of a deferred asset on the Federal Reserve Balance sheet. While this possibility exists without any additional purchases, additional purchases would raise somewhat the likelihood that the Federal Reserve will show a deferred asset.
- The main costs of low remittances, as distinct from overall net fiscal benefits, operate through reputational or political consequences. Should the FOMC be concerned about these consequences, there are four natural responses: alter the exit principles, adopt a policy of retaining income against future losses in order to smooth remittances, curtail the program, or use communication tools to manage the risks. We discuss each of these approaches, and further information is provided in related memos.

In the final section, we discuss some broader governance and optimality issues regarding fiscal implications of monetary policy.

2. Fiscal Effects of Additional Asset Purchases—General Considerations

To begin, consider the effects of the Federal Reserve's purchases of Treasury securities. From the standpoint of the fiscal position of the consolidated federal government, our LSAP programs are analogous to the Treasury replacing some long-term debt with borrowing from banks at the IOER. If the Treasury had been following a strategy that minimized the fiscal costs of financing the debt, then *by definition*, a small (marginal) shift from one source of funding to another would yield no net fiscal saving or cost. Two factors drive us away from this starting point. First, LSAPs by design are large, not small—they change the prices on the underlying securities. Second, the Treasury's financing plan need not be cost minimizing at the outset.³ Under these circumstances, a shift from one source of funding to another may yield either net fiscal benefits or costs depending on whether it moves the overall mix of financing toward or away from the cost-minimizing mix.⁴

The combined effects of Treasury security and agency MBS purchases on the federal budget can be decomposed into several components:

Net proceeds on SOMA purchases of Treasury securities and agency MBS

² Even if the marginal program has net fiscal costs, previous staff analyses suggest that the collective effect of all the FOMC's balance sheet operations, past and present, are positive under a wide range of future outcomes for the economy.

³ While assuming that the Treasury is cost minimizing is a useful conceptual starting point, in practice, the Treasury balances has many competing interests in deciding how to finance the debt, as discussed in the final section. The Treasury's objective function is rather opaque. Further, this conceptual scheme assumes that the Treasury's short-term borrowing rate is close to the IOER, when historically yields on three-month Treasury bills have on average run somewhat below the federal funds rate.

⁴ This memo focuses on the fiscal effects of the marginal LSAP mainly in terms of the effect on the government debt. We briefly discuss the step from debt effects to welfare effects in the final section.

The SOMA will earn some holding period yield on any Treasury security purchased, whether held to maturity or re-sold. This yield ultimately represents savings to the Treasury, and it comes at the cost of the IOER paid on the reserves that finance the purchase. The net effect will be positive if the holding period yield exceeds the average IOER rate over the period.⁵ This profitability condition is close in expectation to the condition that the conventionally calculated term premium is positive. While longer-term Treasury term premiums have been negative of late, recent increases in Treasury rates have made them much less so. In the January Tealbook baseline, by the middle of this year (the time when our illustrative additional purchases begin), term premiums are turning from negative to positive on securities that would be purchased in the LSAP program.⁶ The additional LSAPs, by depressing term premiums, push back a bit the date at which premiums become uniformly positive. As a result, the term premiums on the marginal purchases of Treasury securities are close to zero on average for the assumed purchase program.

Similar to the case of Treasuries, if the holding period yield on the MBS exceeds the average IOER rate, additional MBS purchases result in a fiscal gain to the Treasury; otherwise they result in a loss.⁷ Because term premiums on both Treasury securities and agency MBS are close to zero on average in the simulations, this net income component is projected to be roughly zero.

Treasury benefits from lowered borrowing cost

As shown in Figure 1, we estimate that additional asset purchases would persistently lower term premiums, and hence would reduce the yields on longer-term Treasury securities for some time to come. (These term premium effects are computed conditioning on the Treasury's projected issuance requirements for rolling over maturing debt and financing new deficits.) Thus, the Treasury benefits from lowered borrowing costs on all refinancing and new debt issuance during the period when yields are depressed by the LSAP.

Fiscal benefits of stronger real activity

Staff analysis suggests that additional asset purchases would modestly boost real activity, thereby increasing employment, household income, and corporate profits, which in turn would lead to higher federal tax receipts. In addition, some taxpayers would be pushed into higher marginal tax brackets, thereby increasing the average effective tax rate paid on income; capital gains realizations would also probably rise, resulting in additional taxable income and hence higher tax revenues. Finally, stronger real activity would lower (inflation-adjusted) unemployment benefits, Medicare outlays, and other transfer payments. These effects of

⁵ A minor modification of this statement is needed: Once the balance sheet is normalized in size, reserve balances are minimal and the Treasury securities that remain are backed by currency, which has no funding cost. The IOER expense only continues until this point.

⁶ This statement is based on the implicit term premiums embedded in current and projected bond yields as estimated using the January Tealbook's extended projection for the future path of the federal funds rate.

⁷ There is an additional feedback effect of the marginal LSAP program on MBS that is not present for Treasury securities. MBS are currently rolling off with the proceeds being reinvested, and additional asset purchases would lower the rate received on reinvestments. The same would be true of Treasuries being rolled over at auction, but following the conclusion of the maturity extension program very few Treasuries in the SOMA portfolio will mature until 2016.

stronger real activity make the largest contribution to net benefits in the simulations discussed below.

Fiscal benefits of higher inflation

Additional asset purchases would also likely boost inflation modestly for a time. This tends to raise nominal income, tax receipts, and other nominal payments. In our analysis, however, we assume that the tax code and various spending programs are sufficiently indexed that a general rise in the price level does not by itself alter the *inflation-adjusted* levels of tax receipts and non-interest outlays.⁸

However, there is another fiscal benefit of the higher inflation that arises from what we might call a “surprise inflation tax.” Suppose we assume that fully anticipated changes in inflation have no net fiscal effects, and we also set aside any attempt by the FOMC to use deliberate surprises in inflation as a tax tool. Nonetheless, economic shocks generate inflation surprises, which Federal Reserve policy can choose to offset or not, and this decision will have material fiscal implications. Negative inflation surprises raise the real burden of debt existing at the time of the surprise, positive ones lower that burden. Viewed in this light, the financial crisis and its surprisingly persistent aftermath constitute a collection of surprises that would, if not offset, result in a substantial cumulative shortfall of inflation over time relative to what was expected before the crisis.⁹ The decision to pursue or to forgo additional LSAPs will engender a surprise about the degree to which disinflationary forces will be offset. Any cumulative shortfall in inflation implied by that surprise will tend to raise the burden on existing debt.¹⁰

3. Fiscal Effects of Additional Asset Purchases—Simulation Results

Base-case estimates

To generate estimates of the fiscal effects of additional asset purchases, we start with the staff’s January Tealbook forecast, in which asset purchases end in June. We then use the FRB/US model to simulate the effects of an alternative strategy in which purchases continue at their present pace through December, pushing the overall size of the balance sheet \$500 billion above the baseline by the end of the year. An important assumption in such a simulation is whether the additional purchases come as a surprise or are already anticipated by financial market participants and others. For simplicity, we assume that agents originally expect purchases to end

⁸ Given the constraints imposed by the zero lower bound on nominal interest rates, higher inflation also contributes to stronger real activity by reducing real interest rates. In our simulation analysis, however, this effect is small.

⁹ If the Fed were a price level targeter, the inflation effects of these shocks would inevitably be offset, but as the FOMC does not follow this strategy, past shortfalls are not as a matter of course offset.

¹⁰ More specifically, any surprise shortfall in inflation that occurs before an existing fixed-income security matures would raise the real value of that debt. As a result, the reduction in the real value of the outstanding debt with significant remaining maturity could be considerable, even though the real value of, say, outstanding three-month Treasury bills would be unaffected. This result holds whether or not the additional asset purchases are anticipated by the public. If expected, forgoing the additional purchases would be a negative inflation surprise; if unexpected, the additional purchases would be a positive surprise. Either way, additional asset purchases involve a positive surprise relative to a policy that holds the size of the balance sheet unchanged.

in June, but that they become aware of the additional purchases in 2013Q1. As a result, shifts in term premiums and other effects begin at that time.

Our base-case results incorporate the same LSAP-to-term-premium effects used in other staff work; the time paths of the term premium at different maturities are shown in Figure 1. Similarly, these estimates are conditioned on the same spillover effects to other financial markets and to the broader macroeconomy discussed in the accompanying memo on the efficacy of asset purchases.¹¹ One advantage of using the FRB/US model for this analysis is that it contains a relatively detailed accounting of the response of federal government tax receipts and outlays to changes in macroeconomic conditions. To provide information on the Federal Reserve's balance sheet and income and additional detail on Treasury interest expense, we carry out a separate analysis using detailed information on the volume and maturity composition of projected Federal Reserve purchases and sales of securities as well as of projected Treasury gross borrowing through 2025. We consider a number of variations on the baseline case, as described more fully below.

The results from this exercise are summarized in Table 1, where we report the cumulative economic and budget implications of the alternative portfolio policies through 2025.¹² We choose this date for ending the evaluation of fiscal effects because, by then, the simulated effects of additional asset purchases on real activity, inflation, and interest rates have faded away and the economy and the SOMA portfolio have returned to normal.¹³ As can be seen in the first column, the additional asset purchases decrease outstanding federal debt about \$300 billion by 2025, a change equivalent to a 1.4 percentage point reduction in the federal debt-to-GDP ratio; the result is broadly consistent with staff estimates previously reported to the Committee. More than all of this reduction in nominal debt stems from a substantial cumulative increase in nominal federal tax revenues, reflecting both stronger real activity and a higher price level. The rise in prices over time also boosts cumulative nominal outlays appreciably, although in real terms outlays actually decline relative to baseline, because stronger real activity reduces real transfer payments and because lower interest rates and debt reduce interest expense. Moreover, the changes in these components of the federal budget dwarf the modest \$10 billion reduction in Federal Reserve remittances that occurs as a result of the additional \$500 billion in asset purchases. (We turn to Federal Reserve income and remittances below.)

Sensitivity analysis conditional on the Tealbook baseline outlook

Table 1 reports several simulations based on differing assumptions about the LSAP's effects. The first of these alternatives, reported in column 2 of the table, holds inflation at its baseline path but allows other endogenous changes in real activity and interest rates to influence federal

¹¹ See Durdu, and others (2013). In particular, we use the same version of the FRB/US model used to produce the benchmark results reported in Table 2 of the efficacy memo.

¹² In these simulations, the additional purchases initially cause the 10-year Treasury yield to fall about 20 basis points relative to the baseline. Thereafter, the LSAP effects gradually fade away; the average change in the 10-year Treasury yield from 2013 to 2025 is thus less than half as large as the impact effect.

¹³ Beyond 2025, the reduction in federal indebtedness relative to baseline gradually fades away in the FRB/US simulation. This long-run neutrality is, however, an implication of the assumption used in all of the simulations that personal income tax rates adjust endogenously after 2025 to gradually return the federal debt-to-GDP ratio to its baseline level.

tax receipts and outlays. As a result, the reduction in the debt-to-GDP ratio is only -0.9 percentage points, one-third smaller than in the base case. A substantial portion of the reduction in federal indebtedness in the base-case simulation thus reflects the reduction in the real value of current outstanding federal debt coming from keeping inflation closer to target.

To illustrate the role of macroeconomic stimulus on the fiscal results, we report a simulation in which we eliminate all inflation and real activity effects—that is, in computing fiscal effects, we only allow for the effects of changes in term premiums on interest rates, and so in turn on remittances and Treasury interest outlays. Under these assumptions, we still obtain a net reduction in the debt-GDP ratio, but it is quite small (column 3).¹⁴ We also present a case in which all the base-case macroeconomic channels operate, but the effects of additional asset purchases on long-term interest rates fade away twice as fast as in the base-case simulation (column 4).¹⁵ The net fiscal benefit as measured by the debt-GDP ratio drops by about one-third in this case relative to the base case.

Based on these results for the base-case outlook, it would seem fair to say that, in the absence of substantial employment and inflation effects (which are, of course, quite uncertain), the net fiscal benefit or cost of additional asset purchases is likely to be minimal. But if additional asset purchases were to impart even a modest amount of economic stimulus, then the net fiscal gains could be substantial.

Sensitivity of fiscal effects to changes in the outlook for interest rates

As the staff has emphasized in earlier memos, the overall fiscal implications of both past and possible future LSAPs will depend on how interest rates evolve. For the moment, let's set aside the question of additional LSAPs and consider the fiscal implications of alternative economic scenarios without any change to the baseline portfolio policy. If short-term interest rates were to rise more rapidly than anticipated in the January Tealbook projection, the result would be increased IOER expense and, hence, lower net income on SOMA holdings of longer-term fixed-income securities.¹⁶ Moreover, longer-term interest rates would also increase and so realized losses on sales of such securities would increase as well. However, the fact that net income from SOMA holdings would be lower in a higher-interest-rate environment, all else equal, does not tell us how the overall fiscal position of the government would actually evolve under such conditions. In one of the scenarios discussed below, for example, higher rates are partly driven by more rapid growth, and the overall fiscal position improves despite lower SOMA net income.

¹⁴ This result rests on a decline in Treasury interest outlays that more than offsets the estimated decline in Federal Reserve remittances in the FRB/US simulations. The reported value comes from the FRB/US model, which provides a relatively detailed accounting of the factors driving the average rate paid on outstanding Treasury debt. However, we also performed a consistency check using a security-by-security analysis of the likely path of the portfolio and rates. This analysis yields results that are quite close to the FRB/US estimate.

¹⁵ In this simulation, however, the initial effects of the additional asset purchases on financial conditions are the same as in the baseline simulation, as is the responsiveness of real activity and inflation to changes in interest rates, stock prices, and the real exchange rate.

¹⁶ For MBS there is an added effect: as rates rise, prepayments of MBS will fall, and the effective duration of the MBS portfolio will increase, exacerbating the costs.

The fact that higher interest rates would reduce net SOMA income on the existing portfolio also does not reveal the effect of higher rates on the *incremental* fiscal effects of *additional* purchases. To judge that issue, we must instead simulate the model under alternative economic conditions with and without the additional purchases, and then consider the difference between the simulation outcomes.¹⁷ To do that, we generate two alternatives to the Tealbook outlook for the evolution of overall economic conditions over the next decade, in both cases evaluating outcomes under two different policy assumptions—the baseline in which purchases end in June, and our alternative in which purchases continue at their present pace through the end of the year. Summary information on macroeconomic and budget conditions in these alternative scenarios is plotted in Figure 2; solid lines indicate outcomes under the baseline policy and dashed lines denote results with an additional \$500 billion in purchases. The scenarios are as follows:

- High rates: The pace of the recovery picks up markedly over the next few years, causing the unemployment rate to fall below 5½ percent by late 2015 (blue lines). In addition, inflation gradually rises to more than 3 percent later in the decade, in part reflecting an unmooring of long-run inflation expectations. Reflecting these developments, the funds rate begins to climb rapidly starting in early 2015 and averages about 5 percent over the second half of the decade, while the yield on 10-year Treasury notes rises above 6 percent for a time. On average, interest rates over the second half of the decade are about 150 to 175 basis points higher than in the baseline.
- Low rates: The pace of the recovery remains sub-par and the unemployment rate remains above 7 percent until late 2016 (green lines). In response to lower commodity prices, more persistent slack, and some modest slippage in long-run inflation expectations, inflation moves down to 1 percent for several years before slowly rising back towards 2 percent later in the decade. In response, the funds rate does not begin to rise until late 2017 and is still below 2 percent in 2020, while the yield on 10-year Treasury notes averages only 3 percent over the second half of the decade. On average, interest rates over the second half of the decade are about 100 to 200 basis points lower than in the baseline.

The different economic assumptions in the scenarios lead to very different economic outcomes, but the marginal effects of additional purchases are very similar in each scenario. This can be seen in Figure 2, where for each scenario the shift between the solid and dashed line is about the same, even though the overall paths of the pair of lines for each scenario are quite different. This conclusion is also clear in the results reported in the two rightmost columns of Table 1. The alternative interest rate scenarios have the expected effect on remittances—lowering them relative to baseline in the high rate scenario and raising them in the low rate scenario.¹⁸ These changes in remittances notwithstanding, the marginal effect of additional asset purchases on overall federal indebtedness is about the same in the three different economic environments as measured by the effect on the debt-GDP ratio. This top-line similarity primarily reflects offsetting effects stemming from the macroeconomic benefits of the LSAP. In all scenarios, by stimulating the economy, the additional LSAP leads to a reduction in the path of the debt. The higher are interest rates, however, the greater are the interest savings attributable to each \$1

¹⁷ To be clear, we allow the marginal LSAP program to have different effects in each scenario.

¹⁸ Indeed, in the low-rate scenario, the additional purchases lead to an absolute increase in remittances.

dollar reduction in the debt.¹⁹ Thus, the additional LSAP leads to larger reductions in the interest outlays of the Treasury in the higher-rate scenario, tending to offset the effect of lower remittances; the opposite holds true in the low-rate environment.²⁰

Additional comments on interest rate risk

An important caveat to the “fiscal neutrality” result just described is our assumption that the macroeconomic consequences of additional LSAPs operate in the same way in each scenario. For example, while the high rate scenario involves some unanchoring of inflation expectations, we do not assume that the LSAP precipitates or exacerbates this effect. One could also imagine that the economic stimulus provided by additional asset purchases would be greater in the low-rate environment than in the other scenarios, perhaps because a further expansion of the portfolio would have more favorable effects on household and business confidence under such circumstances. It is important to note that if we allow for these different channels through which LSAPs might work, the evaluation of policy should start with the macroeconomic effects, which are likely to dominate the purely fiscal effects.

Two related risk scenarios may illustrate this point—an unanchoring of inflation expectations upward or downward. A shift of expectations in the disinflationary direction that was not stemmed could clearly have profound negative fiscal implications (as the Japanese case illustrates), but the fiscal costs are probably not the main reason to avoid disinflation. Similarly, the rising inflation scenario could also be a very bad outcome, but not for strictly fiscal reasons—at noted earlier, surprise inflation can have fiscal benefits. It is difficult to assess the likelihood of either of these scenarios, but if additional LSAPs have any effect on the probability of these scenarios coming to pass, they presumably shift probability away from disinflation toward inflation. If this is so, the macroeconomic implications of any shift in these risks would almost surely deserve primary consideration over more narrow fiscal implications.

4. Federal Reserve’s balance sheet, income, and remittances

As noted above, some of the fiscal benefits of the LSAPs flow directly to the Treasury, while the costs in terms of IOER and capital losses enter through the Fed’s remittances to the Treasury. Thus, a program with net fiscal benefits may nonetheless involve periods of low or negative net income for the Federal Reserve. If net income is insufficient to cover required additions to

¹⁹ Two factors account for the larger interest savings in the high interest rate environment. First, the nominal level of federal debt is considerably higher than it is under the Tealbook baseline, and so the LSAP-induced reduction in interest rates (which is about the same across all three environments) results in greater interest savings because of the higher level of nominal borrowing. Second, because the Treasury’s average borrowing rate is much higher in the high rate environment than in the Tealbook environment, each dollar in reduced Treasury borrowing from the marginal improvement in real activity generates greater interest savings.

²⁰ This offsetting response of Treasury interest outlays does not necessarily hold under all conditions, however. For example, if interest rates rose solely because of stronger real activity, and there were no changes in actual and expected inflation or inflation-risk premiums, then the marginal reduction in interest outlays would probably be larger in the low-rate scenario than it would be in the high-rate scenario.

surplus, Federal Reserve remittances to the Treasury go to zero and a deferred asset is recorded on the Federal Reserve's balance sheet.²¹

The time path of remittances under our baseline and under the high and low interest rate scenarios is shown in Figure 3. The solid lines represent remittances without the additional LSAP; the dashed lines denote remittances with the additional expansion of the portfolio. These results are all conditioned on the staff's interpretation of the exit principles and on current Federal Reserve accounting conventions. We consider alterations to these assumptions below.

In our baseline projection *without* the additional purchases, there are no years of zero remittances and only four years in which remittances are slightly below the 10-year, pre-crisis average of about \$25 billion. The marginal effect of the additional purchases is to lower cumulative remittances by \$10 billion through 2025, but these reductions are sufficiently spread out that there are still no years of zero remittances and the same four years of remittances below the pre-crisis average. Under the high interest rate scenario without the additional LSAP, there are also four years of zero remittances. The marginal effect of additional purchases on cumulative remittances in this case is a reduction of \$70 billion and an increase in the number of years of zero remittances to five. In the low interest rate scenario, remittances always remain well above zero, with or without the additional purchases.

The possible negative implications of low remittances and of booking a deferred asset seem to flow mainly from political or reputational channels. Setting these aside, we have not identified any clear and significant consequences of the time path of remittances as distinct from effects on the consolidated position of the government.²² Nonetheless, the topic of capital and remittances is surely an important one from the standpoint of communication, with losses or periods of zero remittances raising potentially important political or reputational problems, say, because they could be seen as calling into question the Federal Reserve's competence in managing taxpayer resources or as undermining its financial strength.

The staff sees four possibilities for dealing with the possible consequences of low remittances: alter the exit principles, adopt a policy of retaining income against future losses in order to smooth remittances, curtail the purchase program, or use communication tools to reduce risks implied by a period of low remittances. We consider these in turn.

Remittances and the exit principles

The likelihood and duration of any period of zero remittances might be reduced by changing the exit strategy. This possibility is discussed in greater detail in the accompanying memo by Femia and others (2013) on exit strategy. For example, a policy of no sales of MBS could reduce the likelihood of zero remittances and of realized capital losses, and combining this change with sales of short-term Treasury securities would further reduce the likelihood of booking a deferred

²¹ The January Tealbook Book B provides the assumptions and conventions underlying the balance sheet projections. Carpenter et al. "The Federal Reserve's Balance Sheet and Earnings: A primer and projections," FEDS 2013-1, provides an overview of the assumptions behind the income projections.

²² Only in very extreme cases would balance sheet losses formally constrain FOMC behavior.

asset. Moreover, such a change to the current exit strategy would limit the risk that sales might undermine market functioning and so financial stability.

When the Committee issued its exit strategy principles in June 2011, it emphasized that the pace of sales could be adjusted up or down in response to material changes in either the economic outlook or financial conditions. Since material changes have subsequently transpired, a change would arguably be justified. Further, a number of Federal Reserve officials and others have publicly raised the possibility of changing the principles, without generating adverse reactions in financial markets or unfavorable comments by other observers. Thus, it seems likely that a clearly communicated and carefully justified adjustment of the exit principles could be adopted with low risk of market disruption or risk to the reputation of the Federal Reserve.

Altered Remittance Policy

As shown in Figure 3, additional asset purchases result in higher remittances in the near term when the IOER is low, but low or zero remittances later as interest rates rise. It is clear, at least in principle, that the Federal Reserve could follow private sector entities in retaining income in high income periods in order to smooth remittances. As discussed in the accompanying memo on foreign practices (Chaboud and Leahy, 2013), some version of this idea is pursued by many central banks around the world.

There is no doubt that a variety of smoothing rules could substantially reduce the risk of booking a deferred asset in the medium run even if the Committee maintains the current exit strategy. The memo on “Alternatives for Federal Reserve Remittance Policy” (Allison and others, 2013) considers two alternative remittance policies that would involve substantial additions to surplus over the next few years and then drawdowns in surplus over the period in which Federal Reserve income is depressed by assets sales.

While smoothing remittances may help reduce the political or reputational risks associated with Federal Reserve losses, such changes should have few direct implications for economic performance or overall fiscal conditions.

Curtail the LSAP program

Clearly, if the FOMC decides that a further expansion of the portfolio is not warranted on other grounds, we need not spend much time discussing whether the uncertain future path of remittances provides a good additional argument for curtailing purchases. But if the FOMC instead judges that, remittances aside, the policy is warranted on other grounds—because, say, additional asset purchases would probably provide at least modest benefits in terms of the dual mandate and positive net fiscal gains to the government—then the decision is more difficult.

Curtailing an otherwise warranted program based mainly on a problematic time path of one component of the net fiscal effect—remittances—would require an evaluation of issues and risks that fall outside the expertise of the economics staff. We note only that surely there are risks not only with low remittances, but also with curtailing a program that is otherwise warranted in order to avoid reputational problems.

Communication tools

If the FOMC chooses to pursue a policy that carries risks of balance sheet losses, zero remittances, and a deferred asset; a public communication program to make clear the overall merits is probably warranted. Some other central banks around the world have taken the risk of—and in some cases have experienced—large losses and retained public support in cases where there was a clearly understood public rationale for the program (Chaboud and Leahy, 2013).

5. Additional Considerations Regarding Fiscal Costs and Risks

Monetary policy is at all times inextricably linked with fiscal policy through, for example, seigniorage and effects on Treasury borrowing costs. In normal times and under conventional policy, we generally believe that these effects are small relative to the macroeconomic effects and so we neglect them. Fiscal costs and risks may be larger in relative terms at present, however, and because these elements are not typically a part of the discussion of the appropriate stance of monetary policy, we provide some additional discussion of some of the issues raised by these fiscal implications.

Governance issues

Some economists have argued that it is inappropriate for an independent central bank to take actions that have prominent fiscal implications.²³ Some argue, more specifically, that the Federal Reserve is inappropriately overriding the Treasury's choices regarding the mix of financing. As an empirical matter, while central bank actions generally do not have major fiscal implications—except through conventional macroeconomic feedbacks—in normal times, in more extreme circumstances the fiscal-monetary linkages become more important. The LSAP programs of the Bank of England and Federal Reserve and the recent Swiss interventions provide three current examples. Other examples are provided in the accompanying memo on foreign practices (Chaboud and Leahy, 2013). It is fairly common for central banks, independent or otherwise, to take actions with direct fiscal implications in certain, typically difficult, circumstances.

In assessing whether these intertwined activities of the fiscal authorities and independent monetary authorities are appropriate, it is important to take explicit account of the factors that warrant making the central bank independent in a democracy. In the most general terms, the purpose of making the central bank independent under a specific mandate is to allow the central bank to pursue appropriate policies on behalf of the public—policies that the political authority might at times find difficult to implement, say, due to short-term political considerations.

In this light, it may be useful to note that the Treasury could, if it chose, largely undo the effects of the Federal Reserve's asset purchases; alternatively, the Treasury could object to the FOMC's actions, either in private or in public. On the contrary, however, the Treasury has publicly stated

²³ For example, John Taylor (2013).

that it intends to follow a policy of gradually lengthening the maturity of outstanding securities consistent with its long-term objectives and that the Federal Reserve's purchases in pursuit of its independent mandate would not impact Treasury's debt management.²⁴ If the Treasury accepts the general LSAP efficacy arguments, this approach is arguably consistent with Treasury's self-described mission.²⁵

This discussion suggests that any analysis of appropriate monetary policy should take as its starting point that the tools of fiscal policy will, at times, not be set at the optimal values. Of course, given the current fiscal issues in play in the federal government, it is not a stretch to imagine that tax and spending policies may not be optimal at present

Fiscal effects, welfare effects, and optimal policy

Up to this point in the memo, we have focused on the fiscal price tag of the marginal LSAP in dollar terms. However, \$1 in fiscal cost attributable to the LSAP should not be compared directly to, say, a \$1 increase in GDP due to the LSAP – this is not an apples-to-apples comparison. Ideally, we would convert both the fiscal cost and GDP gain into equivalent welfare terms. Roughly speaking, the welfare cost of a \$1 increase in debt mainly flows through the distorting effect of raising taxes by \$1. Evaluating the welfare benefit of a \$1 increase in GDP stemming, say, from re-employing idle labor resources requires netting out the value of the forgone leisure on the part of the workers. The proper valuation of these welfare effects is quite contentious.²⁶

Bringing in the full dynamic problem, including uncertainty, raises further issues. Standard intuitions suggest that it will matter for welfare whether a given bad fiscal outcome tends to arise in good or in bad economic times. Ideally we would perform optimal LSAP policy calculations, including fiscal effects, in the context of a dynamic stochastic model analogous to the optimal federal funds rate policy exercises regularly reported in Tealbook B. Optimal unconventional monetary policy, allowing for fiscal effects and distorting taxes, is, however, an unsolved problem in the economics profession. Public finance economists have only just begun to scratch the surface on the sort of dynamic problems that arise in the face of multiple distortions, such as those that the current situation presents to policymakers.²⁷

²⁴ Kim (2012), Wessel (2012), and Sparshott (2013).

²⁵ In its Strategic Plan, fiscal years 2012-2015, the Treasury Dept. clearly recognizes potentially competing goals of supporting the recovery and minimizing financing costs. The document (p.6) emphasizes the Treasury's "efforts to strengthen the economic recovery as we emerge from the worst financial crisis since the Great Depression." Regarding debt management, the plan states (p.7) that the goal is to "optimize the cash and debt portfolio to manage the Government's borrowing costs effectively."

²⁶ The marginal distortion cost of raising \$1 in taxation is variously estimated between \$0.17 and \$1.65 (see, for example, Ballard and others 1985; Feldstein, 1997). Similarly, while some would argue that the going wage should be taken as the marginal value of forgone leisure to the unemployed, others might argue that the marginal value of leisure to the *involuntarily* unemployed is much smaller. Open economy issues add another dimension. For example, with foreigners holding approximately half of Treasury debt, any surprise shortfall in inflation involves both a rise in the real tax burden on domestic agents and an additional direct wealth transfer to foreigners holding the debt.

²⁷ Recent advances in dynamic public finance are summarized in Golosov and others (2006) and Kocherlakota (2006). From the standpoint of the issues discussed in this memo, most models of optimal fiscal financing do not contemplate political distortions causing expenditure to be set at a sub-optimal level, do not have realistic term or

Thus, in lieu of the formal unifying framework that remains to be constructed, we can mainly provide some general observations. If there are any substantial benefits to the LSAP in terms of employment or inflation, net fiscal benefits are also likely to follow. This is true even under plausible higher and lower interest rate scenarios. This main conclusion neglects any direct effects, positive or negative, of LSAPs on confidence, sentiment, and inflation expectations. While these additional effects may be important, in practice, the macroeconomic consequences of these additional effects will likely dominate the purely fiscal implications.

liquidity premiums, and do not contemplate a government that optimizes over such premiums. Papers that tentatively explore some of these issues make clear that optimal policy results may depend on all these factors. For example, Greenwood, Hanson, and Stein (2010) consider implications of liquidity premiums for optimal debt structure, and Berck and Lipow (2013) consider a fiscal authority optimizing over endogenous premiums.

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Table 1. Marginal Economic and Fiscal Effects of Purchasing an Additional \$500 Billion in Assets, Based on Simulations of the FRB/US Model Under Different Assumptions for Overall Economic Conditions, Responsiveness of Real Activity and Inflation, and Term Premium Effects

	Baseline Economic Conditions (January Tealbook)				High Interest Rate Conditions	Low Interest Rate Conditions
	All Economic Feedback Effects	No Inflation Feedback Effects	No Real Activity or Inflation Feedback Effects	All Economic Feedback Effects and Faster TPE Decay	All Economic Feedback Effects	All Economic Feedback Effects
Cumulative economic effects, 2013 to 2025						
Nominal GDP ¹	1793	400	0	1080	1903	1425
Real GDP ²	501	408	0	335	534	412
Unemployment rate ³	-83	-80	0	-56	-85	-75
PCE inflation ³	41	0	0	24	37	36
Average interest rate effects, 2013 to 2025						
Federal funds rate ³	0	2	0	-1	0	1
10-year Treasury yield ³	-7	-6	-7	-5	-8	-7
Federal government debt, end-2025						
Nominal outstanding ¹	-299	-273	-66	-210	-302	-288
Ratio to GDP ⁴	-1.4	-0.9	-0.2	-0.9	-1.4	-1.5
Cumulative fed. tax receipts, 2013 to 2025						
Nominal ¹	449	180	3	275	472	366
Real ²	197	172	4	130	202	172
Cumulative FR remittances, 2013 to 2025¹	-10	-10	-10	1	-69	50
Cumulative fed. outlays, 2013 to 2025						
Nominal ¹	140	-103	-73	66	101	128
Interest expense ¹	-151	-120	-77	-106	-207	-100
Real ²	-130	-82	-65	-88	-170	-88

1. Billions of dollars. 2. Billions of constant 2015 dollars. 3. Basis points. 4. Percentage points.

Figure 1: Term premium effect of marginal \$500B LSAP at various tenors

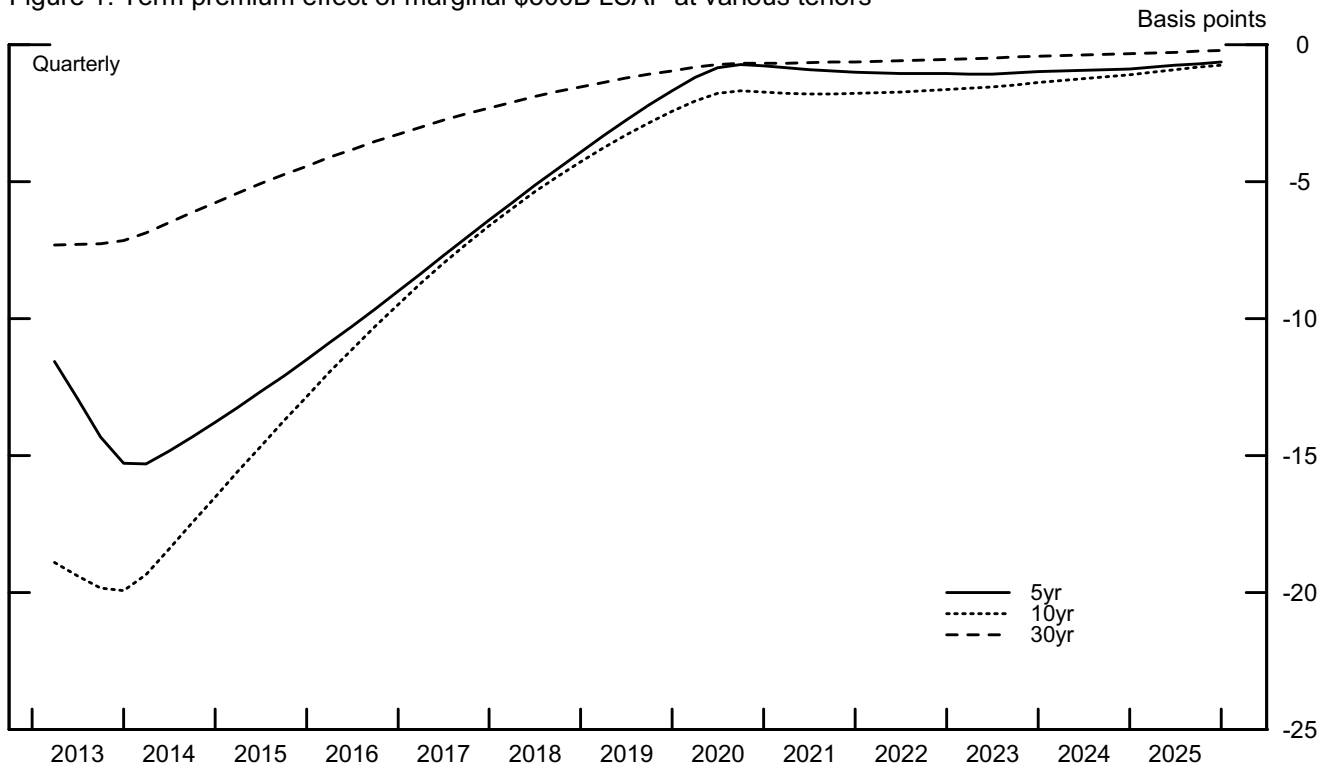


Figure 2
 Alternative Scenarios for the Evolution of the Economy and the Federal Budget,
 With and Without an Additional \$500 Billion in Asset Purchases

Tealbook conditions High rate conditions Low rate conditions
 Tealbook conditions with additional asset purchases High rate conditions with additional asset purchases Low rate conditions with additional asset purchases

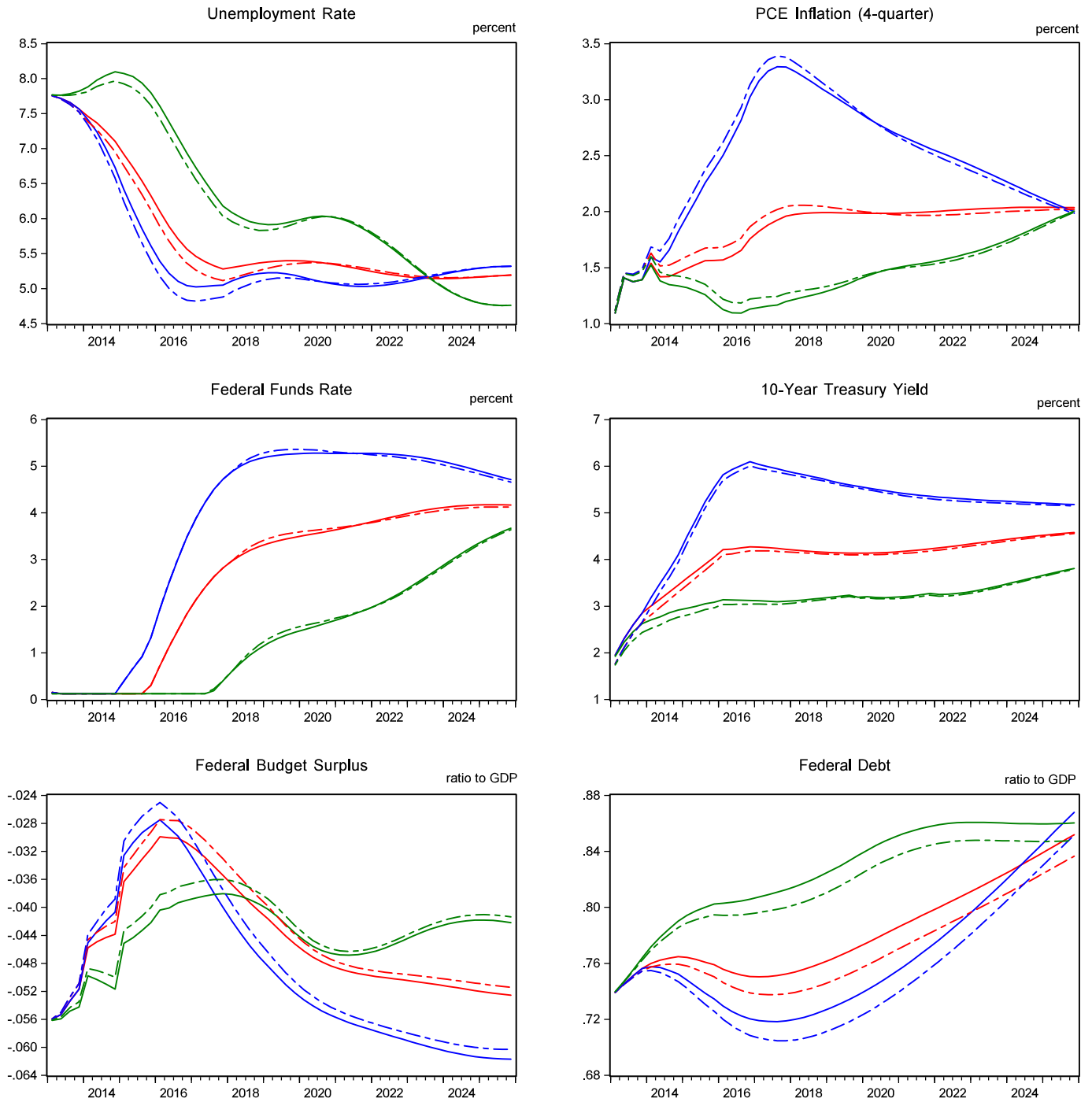


Figure 3: Remittances to the Treasury

