

## **Prefatory Note**

The attached document represents the most complete and accurate version available based on original files from the FOMC Secretariat at the Board of Governors of the Federal Reserve System.

Please note that some material may have been redacted from this document if that material was received on a confidential basis. Redacted material is indicated by occasional gaps in the text or by gray boxes around non-text content. All redacted passages are exempt from disclosure under applicable provisions of the Freedom of Information Act.

# Report to the FOMC on Economic Conditions and Monetary Policy



## Book B

### Monetary Policy: Strategies and Alternatives

June 17, 2010

(This page is intentionally blank.)

## Monetary Policy Strategies

---

The staff's estimates of short-run  $r^*$ —defined as the real federal funds rate that, if maintained over time, would return output to potential in twelve quarters—have mostly decreased in this forecast. As shown in the exhibit “Equilibrium Real Federal Funds Rate,” the Tealbook-consistent estimates of short-run  $r^*$  generated by the FRB/US and EDO models have decreased by 40 basis points and 120 basis points, respectively. These decreases reflect a stronger foreign exchange value of the dollar, a higher equity premium, and adverse effects on aggregate demand arising from increased uncertainty related to financial conditions in Europe, which led the staff to widen its projection of the output gap for the fourth quarter of 2011 by 1 percentage point. For broadly similar reasons, most other model-derived estimates of short-run  $r^*$  are below those shown in April. However, forecasts from the EDO model and the single-equation model do not incorporate the recent changes in financial conditions, and estimates of short-run  $r^*$  from these models have changed little.<sup>1</sup>

The policy prescriptions produced by optimal control simulations of the FRB/US model—in which policymakers are assumed to place equal weight on keeping core PCE inflation close to a 2 percent inflation goal, on keeping unemployment close to the effective NAIRU, and on minimizing changes in the federal funds rate—are shown in the exhibit “Constrained vs. Unconstrained Monetary Policy.” These prescriptions continue to imply that monetary policy is strongly constrained by the effective lower bound. As a result, the nominal funds rate does not rise from the effective lower bound until late 2013, about two quarters later than in April. Under this policy, the unemployment rate would be projected to remain above the NAIRU until early 2013, while core PCE inflation would stay appreciably below 2 percent through 2014. The exhibit also displays the optimal-control results obtained if the nominal funds rate were not constrained by the effective lower bound. Absent the constraint, the nominal funds rate would move down to about negative 4¾ percent by the middle of next year; this more accommodative policy would bring the unemployment rate back to the NAIRU more quickly and move the inflation trajectory closer to the assumed 2 percent goal. Reflecting the deterioration in

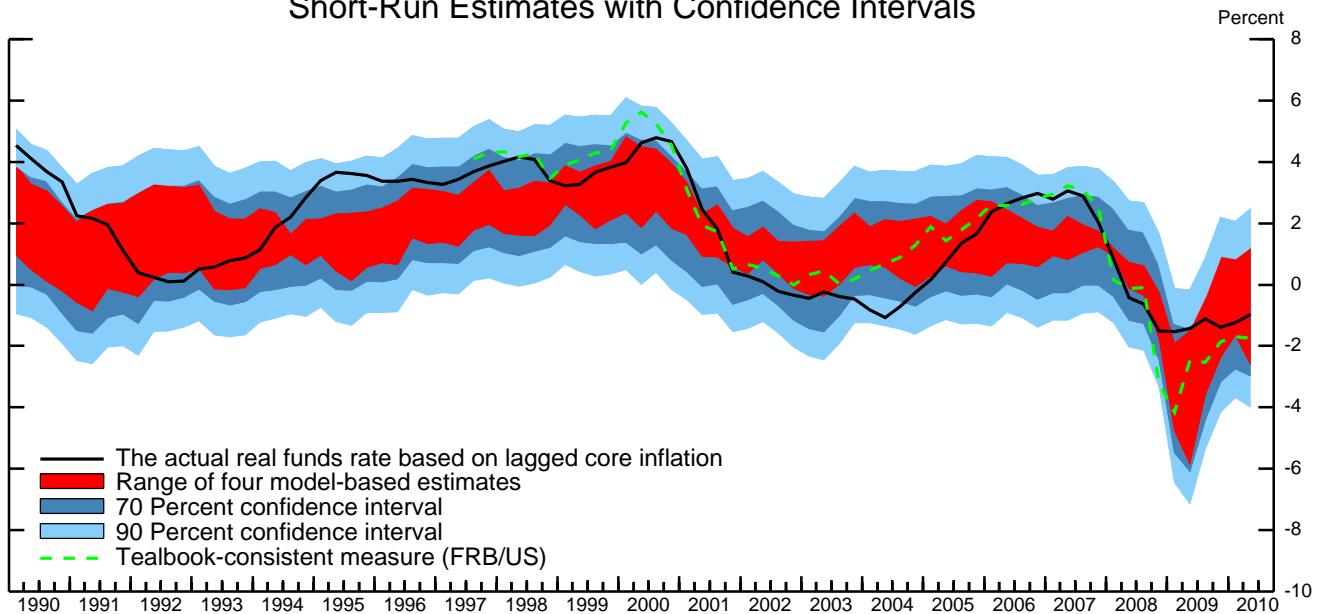
---

<sup>1</sup> While the EDO model's estimate of short-run  $r^*$  is the same as in April, the corresponding estimate from the single-equation model has edged upward by 10 basis points, reflecting a small increase in the staff's estimate of the level of output relative to potential in the first half of 2010.

## Equilibrium Real Federal Funds Rate

Strategies

### Short-Run Estimates with Confidence Intervals



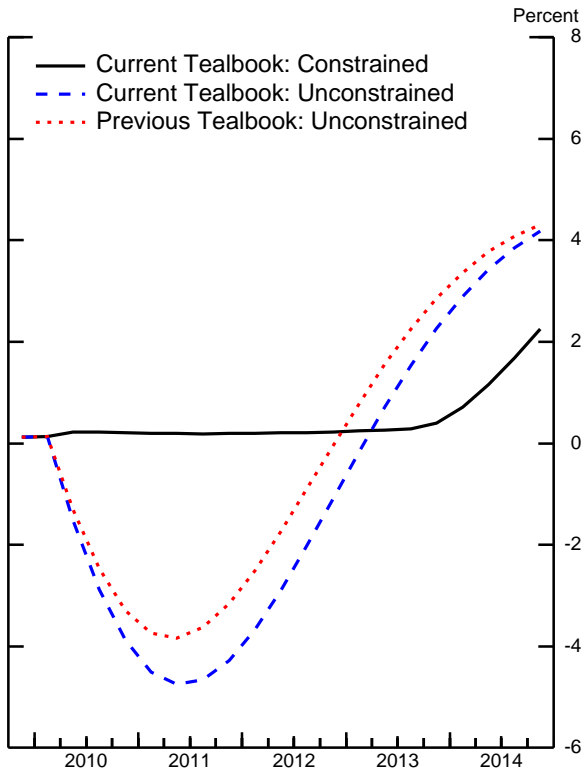
### Short-Run and Medium-Run Measures

	Current Estimate	Previous Estimate
<b>Short-Run Measures</b>		
Single-equation model	-1.4	-1.5
Small structural model	-0.9	-0.7
EDO model	1.2	1.2
FRB/US model	-2.6	-1.3
Confidence intervals for four model-based estimates		
70 percent confidence interval	-3.0 to 1.2	
90 percent confidence interval	-4.0 to 2.5	
Tealbook-consistent measures		
EDO model	-4.3	-3.1
FRB/US model	-1.8	-1.4
<b>Medium-Run Measures</b>		
Single-equation model	1.2	1.1
Small structural model	1.6	1.8
Confidence intervals for two model-based estimates		
70 percent confidence interval	0.4 to 2.3	
90 percent confidence interval	-0.3 to 2.8	
TIPS-based factor model	2.0	2.0
<b>Memo</b>		
Actual real federal funds rate	-1.0	-1.2

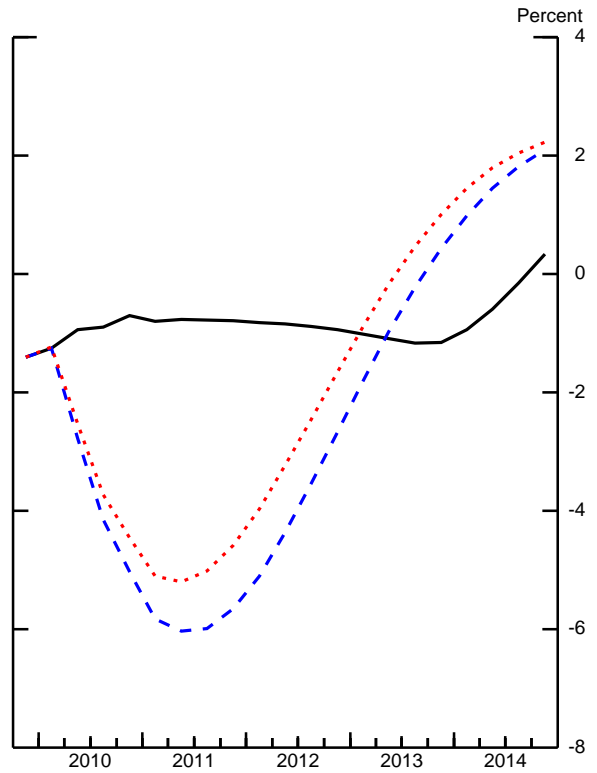
Note: Appendix A provides background information regarding the construction of these measures and confidence intervals. The actual real federal funds rate shown is based on lagged core inflation as a proxy for inflation expectation. For information regarding alternative measures, see Appendix A. Estimates of  $r^*$  may change at the beginning of a quarter even when there is no shift in the staff outlook because the twelve quarter horizon covered by the calculation has rolled forward one quarter. Therefore, whenever the Tealbook is published early in the quarter, this table includes a third column labeled "Current Quarter Estimate as of Previous Tealbook."

### Constrained vs. Unconstrained Monetary Policy (2 Percent Inflation Goal)

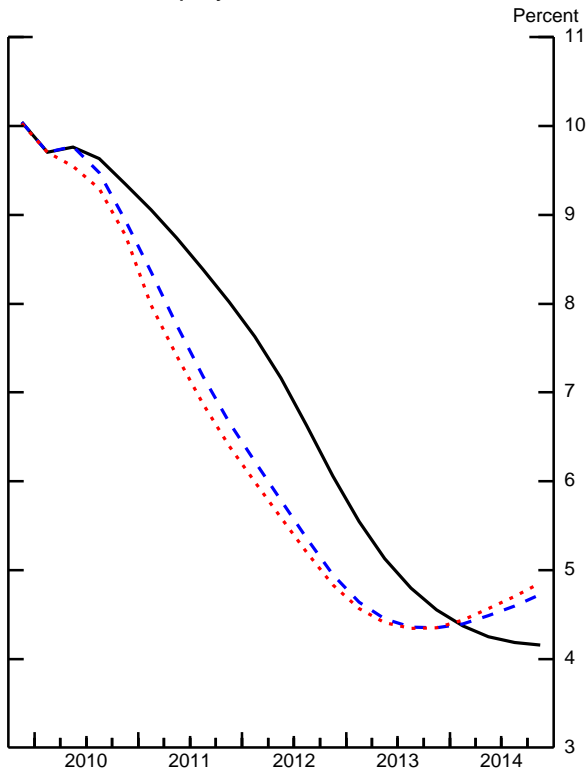
Nominal Federal Funds Rate



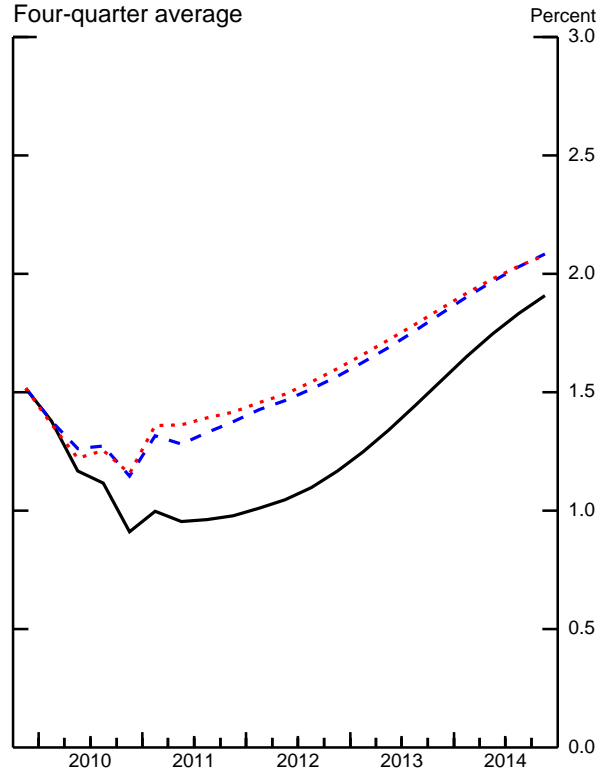
Real Federal Funds Rate



Civilian Unemployment Rate



Core PCE Inflation  
Four-quarter average



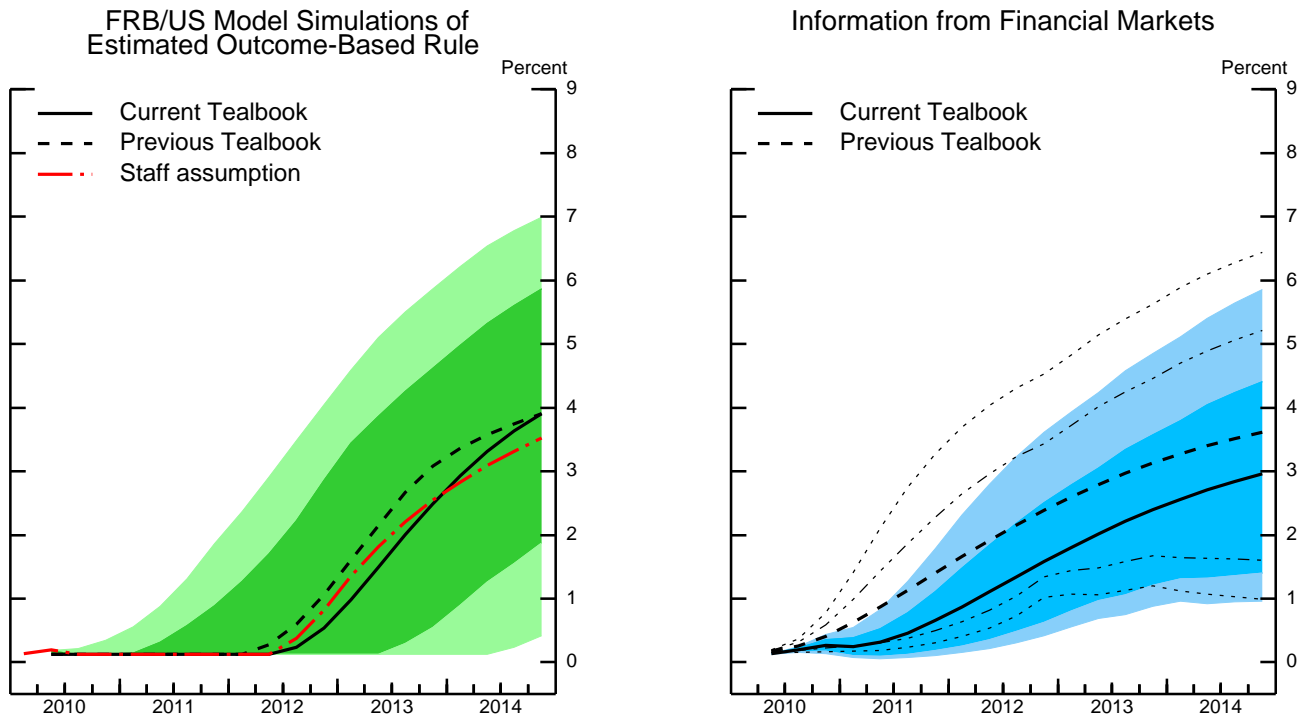
the economic outlook, the unconstrained path for the funds rate is as much as 1¼ percentage points lower than it was last round.

As shown in the exhibit, “The Policy Outlook in an Uncertain Environment,” the staff’s estimated outcome-based policy rule prescribes keeping the federal funds rate at its effective lower bound through the first half of 2012. Consistent with the widening in the staff estimates of the output gap, the rule calls for tightening to begin one quarter later than prescribed in April. Over the intermeeting period, financial market expectations for the funds rate at the end of 2010 appear to have shifted down by about 15 basis points, while the expected funds rate for 2011 through the end of 2014 has decreased on average by about 70 basis points. The lower panel of the exhibit provides near-term prescriptions from simple policy rules. As shown in the left-hand columns, all of the prescriptions are at the effective lower bound. The right-hand columns show the prescriptions that would be implied by these rules if the lower bound was not imposed. All these unconstrained rules generate prescriptions of negative funds rates. Reflecting the widening of the staff’s output gap projections, most rules prescribe interest rates that are markedly lower than in April.<sup>2</sup>

---

<sup>2</sup>For reasons related to the passage of time since the last FOMC meeting, the unconstrained prescriptions from the two estimated rules have increased somewhat since April, as both rules depend on the lagged value of the federal funds rate. For example, the current prescription of the estimated outcome-based rule for the third quarter puts significant weight on the actual second-quarter funds rate value of 20 basis points, whereas the previous simulation for the third quarter jumped off from the rule’s prescription for the second quarter of negative 47 basis points.

## The Policy Outlook in an Uncertain Environment



### Near-Term Prescriptions of Simple Policy Rules

	Constrained Policy		Unconstrained Policy	
	2010Q3	2010Q4	2010Q3	2010Q4
Taylor (1993) rule	<b>0.13</b>	<b>0.13</b>	<b>-0.80</b>	<b>-1.07</b>
<i>Previous Tealbook</i>	0.13	0.13	-0.71	-0.83
Taylor (1999) rule	<b>0.13</b>	<b>0.13</b>	<b>-4.16</b>	<b>-4.32</b>
<i>Previous Tealbook</i>	0.13	0.13	-4.01	-3.96
Estimated outcome-based rule	<b>0.13</b>	<b>0.13</b>	<b>-0.47</b>	<b>-1.28</b>
<i>Previous Tealbook</i>	0.13	0.13	-1.13	-1.66
Estimated forecast-based rule	<b>0.13</b>	<b>0.13</b>	<b>-0.46</b>	<b>-1.18</b>
<i>Previous Tealbook</i>	0.13	0.13	-1.04	-1.42
First-difference rule	<b>0.13</b>	<b>0.13</b>	<b>-0.02</b>	<b>-0.13</b>
<i>Previous Tealbook</i>	0.43	0.69	0.43	0.69
 <b>Memo</b>				
		<u>2010Q3</u>	<u>2010Q4</u>	
Staff assumption		0.13	0.13	
Fed funds futures		0.19	0.21	
Median expectation of primary dealers		0.13	0.13	
Blue Chip forecast (June 1, 2010)		0.20	0.30	

Note: In calculating the near-term prescriptions of these simple policy rules, policymakers' long-run inflation objective is assumed to be 2 percent. Appendix B provides further background information.



(This page is intentionally blank.)

## Monetary Policy Alternatives

---

This Tealbook presents three policy alternatives—labeled A, B, and C—for the Committee’s consideration. Under Alternative A, the statement would indicate that the Committee would maintain agency mortgage-backed securities (MBS) in the System Open Market Account (SOMA) at approximately their current level rather than continuing to allow them to run off; in addition, the statement would suggest that the federal funds rate was likely to remain near zero for a longer period than anticipated in April. Apart from updating the characterization of the incoming data, the statement under Alternative B would be unchanged from the one released at the conclusion of the April meeting. Under Alternative C, the Committee would indicate that it anticipated that economic conditions would warrant a “low,” rather than “exceptionally low,” target range for the federal funds rate for “some time” rather than “an extended period;” the Committee would also begin to allow Treasury securities to roll off as they mature. Under all three alternatives, the Committee would maintain the 0 to ¼ percent target range for the federal funds rate. Table 1 provides an overview of the key elements of the alternatives. Draft statements are provided on subsequent pages, followed by the case for each alternative.

Under all of the alternatives, the statement would indicate that the economy has continued to strengthen, with household spending increasing and investment in equipment and software rising at a robust pace, and that conditions in the labor market are improving. The statements would also note that underlying inflation has trended lower and that longer-term inflation expectations have been stable; Alternatives A and B would mention the recent decline in energy and other commodity prices. All of the statements observe that financial conditions have become somewhat less supportive of economic growth. In addition, each of the statements indicates an outlook for a gradual return to higher levels of resource utilization with subdued inflation. Under Alternative A, the statement characterizes the recent strengthening of the economy as gradual and the improvement in the labor market as slow. In addition, Alternative A indicates that the near-term outlook for activity has weakened and that the outlook is for “quite” subdued inflation – below levels consistent with the dual mandate. By contrast, Alternative C states that a sustainable recovery is under way.

**Table 1: Overview of Alternatives for the June 23 FOMC Statement**

<b>April Statement</b>		<b>June Alternatives</b>		
		<b>A</b>	<b>B</b>	<b>C</b>
<b><i>Economic Activity</i></b>				
<i>Recent Developments</i>	has continued to strengthen	has continued to strengthen gradually	has continued to strengthen	
<i>Labor Market</i>	is beginning to improve; high unemployment; employers remain reluctant to add to payrolls	is improving slowly; high unemployment; employers remain reluctant to add to payrolls	is improving gradually; high unemployment; employers remain reluctant to add to payrolls	has continued to improve
<i>Outlook</i>	gradual return to higher levels of resource utilization; recovery likely to be moderate for a time	gradual return to higher levels of resource utilization; near-term outlook has weakened somewhat	gradual return to higher levels of resource utilization; recovery likely to be moderate for a time	sustainable recovery under way; gradual return to higher levels of resource utilization
<b><i>Financial Conditions</i></b>				
<i>Recent Developments</i>	bank lending continues to contract, financial market conditions remain supportive of economic growth	financial conditions have become less supportive of economic growth on balance; bank lending continues to contract	financial conditions have become less supportive of economic growth on balance; bank lending has continued to contract in recent months	financial market conditions have become somewhat less supportive of growth on balance
<b><i>Inflation</i></b>				
<i>Recent Developments</i>	substantial slack is restraining cost pressures; stable inflation expectations	Prices of energy and other commodities have declined somewhat in recent months; underlying inflation has trended lower; substantial slack is restraining cost pressures; stable inflation expectations		underlying inflation has trended lower; stable inflation expectations
<i>Outlook</i>	likely to be subdued for some time	likely to be quite subdued for some time, remaining below rates consistent with dual mandate	likely to be subdued for some time	subdued rates of inflation anticipated
<b><i>Federal Funds Rate Target</i></b>				
<i>Intermeeting Period</i>	0 to ¼ percent	0 to ¼ percent		
<i>Forward Guidance</i>	economic conditions are likely to warrant exceptionally low levels for an extended period	economic conditions will warrant exceptionally low levels for an extended period, until resource utilization and inflation clearly moving toward mandate-consistent levels	economic conditions are likely to warrant exceptionally low levels for an extended period	economic conditions are likely to warrant low levels for some time
<b><i>Reinvestment of SOMA Assets</i></b>				
<i>Approach</i>	allow agency debt and MBS to roll off but roll over maturing Treasuries (nothing in statement)	roll over agency MBS as well as Treasuries; allow agency debt to roll off (not in statement)	allow agency debt and MBS to roll off but roll over maturing Treasuries (nothing in statement)	allow Treasuries as well as agency debt and MBS to roll off

---

## APRIL FOMC STATEMENT

1. Information received since the Federal Open Market Committee met in March suggests that economic activity has continued to strengthen and that the labor market is beginning to improve. Growth in household spending has picked up recently but remains constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software has risen significantly; however, investment in nonresidential structures is declining and employers remain reluctant to add to payrolls. Housing starts have edged up but remain at a depressed level. While bank lending continues to contract, financial market conditions remain supportive of economic growth. Although the pace of economic recovery is likely to be moderate for a time, the Committee anticipates a gradual return to higher levels of resource utilization in a context of price stability.
2. With substantial resource slack continuing to restrain cost pressures and longer-term inflation expectations stable, inflation is likely to be subdued for some time.
3. The Committee will maintain the target range for the federal funds rate at 0 to 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 of the federal funds rate for an extended period. The Committee will continue to monitor the economic outlook and financial developments and will employ its policy tools as necessary to promote economic recovery and price stability.
4. In light of improved functioning of financial markets, the Federal Reserve has closed all but one of the special liquidity facilities that it created to support markets during the crisis. The only remaining such program, the Term Asset-Backed Securities Loan Facility, is scheduled to close on June 30 for loans backed by new-issue commercial mortgage-backed securities; it closed on March 31 for loans backed by all other types of collateral.

**JUNE FOMC STATEMENT—ALTERNATIVE A**

1. Information received since the Federal Open Market Committee met in **April** suggests that economic activity has continued to strengthen **gradually** and that the labor market is **improving slowly**. Household spending **is increasing** but remains constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software **appears to be rising at a robust pace**; however, investment in nonresidential structures **continues to be weak** and employers remain reluctant to add to payrolls. Housing starts remain at a depressed level. Financial conditions **have become less** supportive of economic growth **on balance, largely reflecting developments abroad, and** bank lending continues to contract. **Although** the Committee **still** anticipates a gradual return to higher levels of resource utilization in a context of price stability, **the near-term outlook for economic activity has weakened somewhat**.
2. **Prices of energy and other commodities have declined somewhat in recent months, and underlying inflation has trended lower**. With substantial resource slack continuing to restrain cost pressures and longer-term inflation expectations stable, inflation is likely to be **quite** subdued for some time, **remaining below rates that would be consistent over the longer run with the Federal Reserve's dual mandate to promote maximum employment and stable prices**.
3. 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, **will** warrant exceptionally low levels of the federal funds rate for an extended period. **The Committee expects to maintain the current range for the federal funds rate until resource utilization and underlying inflation are clearly moving toward rates consistent with the dual mandate. In addition, to provide continued support to mortgage lending and housing markets and to aid overall conditions in private credit markets, the Committee will maintain holdings of agency mortgage-backed securities in the System Open Market Account at approximately their current level rather than allowing them to run off. The Committee will also continue to roll over maturing Treasury securities**.
4. The Committee will continue to **evaluate its holdings of securities in light of the evolving** economic outlook and **conditions in** financial **markets** and will employ its policy tools as necessary to promote economic recovery and price stability.

**JUNE FOMC STATEMENT—ALTERNATIVE B**

1. Information received since the Federal Open Market Committee met in **April** suggests that economic activity has continued to strengthen and that the labor market is **improving gradually**. Household spending **is increasing** but remains constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software **appears to be rising at a robust pace**; however, investment in nonresidential structures **continues to be weak** and employers remain reluctant to add to payrolls. Housing starts remain at a depressed level. Financial conditions **have become less** supportive of economic growth **on balance, largely reflecting developments abroad**. Bank lending has continued to contract **in recent months**. **Nonetheless**, the Committee anticipates a gradual return to higher levels of resource utilization in a context of price stability, although the pace of economic recovery is likely to be moderate for a time.
2. **Prices of energy and other commodities have declined somewhat in recent months, and underlying inflation has trended lower**. With substantial resource slack continuing to restrain cost pressures and longer-term inflation expectations stable, inflation is likely to be subdued for some time.
3. The Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period.
4. The Committee will continue to monitor the economic outlook and financial developments and will employ its policy tools as necessary to promote economic recovery and price stability.

**JUNE FOMC STATEMENT—ALTERNATIVE C**

1. Information received since the Federal Open Market Committee met in **April** suggests that economic activity has continued to strengthen and that the labor market **has continued** to improve. Household spending is **increasing, and** business spending on equipment and software **is rising at a robust pace**. **Underlying inflation has trended lower, but longer-term inflation expectations have remained stable. Although financial market conditions have become somewhat less supportive of growth on balance in recent weeks, the Committee believes that a sustainable economic recovery is under way and anticipates a gradual return to higher levels of resource utilization with subdued rates of inflation.**
2. The Committee **decided to** maintain the target range for the federal funds rate at 0 to ¼ percent and anticipates that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant low levels of the federal funds rate for **some time**. **As a step toward normalizing the size of the Federal Reserve's balance sheet and the level of reserves in the banking system, on August 3 the Committee will stop reinvesting the proceeds of maturing Treasury securities; the Committee will maintain its approach of not reinvesting the proceeds of maturing agency debt and payments on mortgage-backed securities held by the System Open Market Account.** The Committee will continue to monitor the economic outlook and financial developments and will employ its policy tools as necessary to promote economic recovery and price stability.

## THE CASE FOR ALTERNATIVE B

Committee members may see the current policy stance as consistent with a gradual return to full employment and with subdued inflation, and they may judge the anticipated trajectory for the economy as the best that can be achieved under current circumstances. If so, they might wish to maintain the existing target range for the federal funds rate, reiterate that economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period, and continue essentially its current practices with respect to outright purchases, sales, and redemptions of securities in the System Open Market Account, as in Alternative B.<sup>1</sup> Although financial conditions became less supportive of economic growth over the intermeeting period, the incoming data, while mixed, continued to suggest moderate growth in economic activity. In these circumstances, the Committee may prefer to refrain from adjusting policy until the implications of recent financial developments for activity become clearer, and may think that an essentially unchanged policy statement would be most reassuring to financial markets.

Even if Committee members, like the staff, marked down their outlook in response to the decline in equity prices and appreciation of the dollar, they may judge it appropriate to leave the Committee's forward guidance for the federal funds rate unchanged. The statement is explicit that expectations for continued exceptionally low levels of the federal funds rate are conditional on economic developments, and members may take the substantial drop in money market futures rates over the intermeeting period as indicating that market participants recognize that the extended period is likely to be longer than before. Moreover, participants may be concerned that modifying the language in the statement to indicate more explicitly that the "extended period" would likely be longer than had been thought, as in Alternative A, would lead market participants to conclude incorrectly that the Committee was making a less conditional commitment to leave rates unchanged. If so, participants may also be concerned that markets could overreact when any expanded forward guidance was unwound, potentially leading the Committee to adjust policy more slowly than would otherwise be optimal when the time comes to remove policy accommodation. In addition, participants may be reluctant to revise the current policy of allowing agency mortgage-backed securities to

---

<sup>1</sup> See the memo from Brian Sack, "Conducting Coupon Swaps to Facilitate Settlement of Agency MBS Purchases," June 17, 2010.



roll off because they wish to make progress toward normalizing the size and composition of the balance sheet and reducing the level of reserves in the banking system.

Alternatively, participants may be skeptical that the adverse effects of recent financial developments will be as pronounced as anticipated by the staff and read the incoming data as suggesting that the economic expansion has appreciable momentum. At the same time, they may judge it to be premature to revise the statement to suggest that the Committee is moving toward a reduction in policy accommodation. Even though economic activity has continued to expand, both unemployment and core inflation are far from the levels that most participants view as consistent with the dual mandate, and thus the Committee may still judge that a near-zero federal funds rate is likely to be appropriate for an extended period. Partly for the same reasons, the Committee may be reluctant to allow Treasury securities to run off, as under Alternative C, because doing so could put upward pressure on longer-term interest rates. In addition, redeeming Treasuries would have the disadvantage of tilting the Committee's securities holdings further away from the desired long-run composition. Moreover, the concerns of policymakers who had been worried that the large size of the Federal Reserve's balance sheet would contribute to increased inflation expectations may have been allayed somewhat by the very low readings on inflation over the intermeeting period and by the decline in TIPS-based estimates of longer-term inflation compensation.

The statement proposed under Alternative B would probably result in little change in bond yields, equity prices, or the foreign exchange value of the dollar. The Desk's recent survey of primary dealers suggests that market participants expect the statement to be similar to the one released in April apart from revisions to the characterization of the economic situation, and that they place low odds on any changes to the Committee's SOMA strategy at this meeting.

*Variant of Alternative B.* The Committee's portfolio management policies can, of course, be adjusted independently of its policies toward short-term interest rates. Policymakers might believe that economic conditions are likely to warrant exceptionally low short-term rates for an extended period but also believe that it would be appropriate soon to begin to allow the SOMA portfolio to shrink through redemptions of Treasury securities. If so, they may prefer to combine the language about the economic situation and guidance about the target federal funds rate of Alternative B with an announcement—as in Alternative C—that the Committee would begin to redeem

maturing Treasury securities. Redeeming Treasury securities would reduce the Federal Reserve's balance sheet and reserve balances by about \$200 billion over the next two years. That reduction could facilitate an eventual increase in the target federal funds rate. Participants also may wish to commence steps toward normalizing the size of the balance sheet in order to reduce the risk that inflation expectations might become unmoored. A possible disadvantage of this approach, however, is that redeeming all maturing Treasury securities in addition to allowing agency debt and MBS to run off is that the Committee would not make progress toward its long-run objective of normalizing the composition of the balance sheet.

Although the staff estimates that a policy of redeeming all Treasury securities would increase longer-term interest rates about 15 basis points, that estimate is very uncertain and is based on the market reactions to FOMC announcements about asset purchases made during a period when financial market functioning was considerably impaired.<sup>2</sup> Given the improved condition of financial markets, participants may judge the likely reaction to be much smaller now. The market reaction could also be muted by the retention of the "extended period" language in the statement, which might limit the extent to which market participants took the change in redemption policy as an indication that the target federal funds rate was likely to be increased sooner than had been anticipated.

Nevertheless, an announcement at this time that the FOMC was going to begin redeeming Treasury securities would come as a considerable surprise to market participants. The Desk's current survey of primary dealers found that dealers place near-zero odds on the Committee adopting a policy of redeeming all Treasury securities at the current meeting. Even if coupled with the unchanged language about the interest rate outlook of Alternative B, interest rates would probably rise, at least initially, in large part because market participants seem likely to misinterpret the change in redemption policy as indicating an earlier start to interest rate hikes. Most of any initial increase in market interest rates would likely be reversed subsequently as investors came to understand, in light of policy communications such as the minutes, that the changed redemption policy had no implication for the Committee's intentions with respect to the federal funds rate. However, the direct upward pressure on rates resulting from redemptions would persist.

---

<sup>2</sup> See "SOMA Treasury Redemption and Reinvestment Policy," Michelle Ezer, Joshua Frost, Frank M. Keane, Julie A. Remache, and Brian P. Sack, June 16, 2010.

## THE CASE FOR ALTERNATIVE A

If Committee members, like the staff, have marked down their outlook in response to intermeeting developments, then they may see unemployment remaining above, and inflation below, levels consistent with the dual mandate by greater amounts and for even longer than at the time of the April meeting. In such circumstances, the Committee might wish, as under Alternative A, to adjust the language in the statement to suggest that the period of near-zero interest rates will be even longer than previously anticipated and may also decide to keep the SOMA holdings of MBS at around their current levels rather than allowing them to roll off. These actions would provide additional monetary stimulus but would stop short of resuming an expansion of the portfolio, a step that might be viewed as too costly in current circumstances relative to the likely benefit.

The additional monetary stimulus provided under Alternative A would come in large part through a reduction in short- and intermediate-term interest rates as market participants marked down their outlook for the federal funds rate path. Judging by the results of the primary dealer survey and by interest rate futures, market participants appear to be expecting the Committee to begin raising short-term interest rates in the first half of 2011. By contrast, the staff assumption is for policy to be on hold until the summer of 2012, and the optimal policy prescriptions discussed in the Monetary Policy Strategies section of this Tealbook are for the federal funds rate to remain at about zero until late 2013. If members also anticipate that the funds rate will remain at the effective lower bound for longer than market participants currently expect, and they wanted to provide additional monetary stimulus, then they might wish to bring market expectations for the federal funds rate into closer alignment with their own by modifying the statement. In the draft statement under Alternative A, for instance, the Committee would indicate that it anticipates economic conditions “will” rather than “are likely to” warrant exceptionally low levels of the federal funds rate for an extended period. In addition, the statement indicates that the Committee “expects to maintain the current range for the federal funds rate until resource utilization and underlying inflation are clearly moving toward rates consistent with the dual mandate.” This stronger and more expansive language, especially if coupled with a decision to keep MBS holdings constant, seems likely to persuade market participants that the federal funds rate will probably be exceptionally low for longer than currently anticipated.

Monetary stimulus would also be applied under this alternative by halting the upward pressure on longer-term interest rates caused by the gradual decline of MBS in the SOMA as payments on the securities are received. The statement under Alternative A would note that the change was intended “to provide continued support to mortgage lending and housing markets and to aid overall conditions in private credit markets.” Although the statement does not specify the period of time over which the current holdings of MBS would be maintained, the final sentence indicates that the Committee would “...evaluate its holdings of securities in light of the evolving economic outlook and conditions in financial markets...” The staff projects that payments on MBS will reduce holdings by about \$230 billion over the next two years. If, instead, the Committee announced that MBS holdings in the SOMA would be maintained at their current level, and market participants expected that policy to be followed for two years, we estimate that longer-term rates would fall about 10 basis points. As another option, if policymakers wished to mitigate the upward pressure on longer-term interest rates but were reluctant to slow the transition toward an all-Treasury portfolio, the Committee could instead purchase longer-term Treasury securities using the proceeds from payments on MBS. A possible advantage of such an approach is that Treasury purchases would be less likely to be seen as allocating credit to a particular sector of the economy. However, purchasing longer-term Treasury securities could have the disadvantage of potentially being portrayed as monetizing currently very high federal deficits.

Participants may favor the combination of language and policy actions in Alternative A as a way to put downward pressure on interest rates to counter the tightening in financial conditions that occurred over the intermeeting period. As discussed in the Monetary Policy Strategies section, the decline in equity prices and the appreciation of the dollar contributed to significant reductions in a range of staff estimates of the equilibrium federal funds rate. Policymakers might be unwilling to accept this tightening in financial conditions if they not only view the outlook as having deteriorated but also see increased downside risks to that outlook. For example, the sovereign debt crisis in Europe could intensify, perhaps even to the point of pushing the United States back into recession, as described in the box “Consequences of a Severe European Sovereign Debt Crisis” in the Risks and Uncertainty section of Tealbook A. Moreover, with inflation evidently trending down and resource utilization rates very low, participants may see an increased risk of a pernicious disinflation, as in the “Greater Disinflation” alternative scenario. Participants may be particularly worried that, because of investors’ intense concerns about fiscal sustainability, there is little scope for increased

fiscal stimulus in the United States, and with the federal funds rate at its effective lower bound, both the federal government and the Federal Reserve would be hampered in their ability to counter a deflationary spiral should one develop.

As noted above, market participants appear to expect little change to the characterization of the policy outlook in the statement and no change in the Committee's SOMA strategy. Consequently, interest rates would likely fall across the yield curve in response to a statement like that proposed under Alternative A. The decline in longer-term yields might be offset to some extent by an increase in inflation compensation, if investors concluded that sustained monetary stimulus was likely to lead eventually to higher inflation. Equity prices would probably rise, while the foreign exchange value of the dollar would likely fall.

## **THE CASE FOR ALTERNATIVE C**

If policymakers see a sustainable economic recovery as now under way or are concerned that the prolonged period of near-zero interest rates could contribute to financial imbalances, they might choose to modify the statement to imply an approaching increase in interest rates and to indicate a start to redemptions of Treasury securities, as under Alternative C. Participants might take a more positive signal for the outlook than the staff has from incoming economic data, perhaps on the view that the recent financial turmoil is likely to prove transitory and the European situation will improve relatively soon, as in the "Normalization in Europe" and "Stronger Recovery" alternative scenarios in the Risks and Uncertainty section of Tealbook A. Even if policymakers have not changed their outlook, with the passage of time they may now consider it appropriate to modify the statement to reflect an approaching exit from highly accommodative policies. Moreover, they may view redeeming Treasury securities, and the associated reduction in reserve balances, as supportive of an eventual increase in interest rates.

If participants judge that the near-zero federal funds rate is contributing to financial imbalances but still anticipate the need for continued policy accommodation in coming months, they may wish to move the federal funds rate up a bit but then hold at an only moderately higher level while gathering additional information on the outlook. Such a strategy might be viewed as the best means to support the economic expansion while avoiding financial instability. The statement under Alternative C would suggest an approaching increase in rates by changing "will maintain" to "decided to maintain," thus indicating that the Committee's commitment to the current target range did not extend to

future meetings, and by changing “extended period” to “some time.” The statement leaves open the possibility that the FOMC might choose to set its target range only a bit higher than its current range by changing “exceptionally low” to “low.”

Even though energy prices and other commodity prices have declined over the intermeeting period and core inflation has trended down, participants may be confident that solidly anchored inflation expectations will prevent a prolonged, unwelcome disinflation. Nevertheless, neither recent inflation developments nor the near-term inflation outlook would appear to be a reason to tighten policy. Consequently, in the statement under Alternative C, the pertinent inflation developments are listed in the first paragraph along with the other information about economic developments. That paragraph then concludes with a characterization of the outlook for both economic activity and inflation.<sup>3</sup>

An announcement along the lines of the statement under Alternative C would surprise investors. The changes to the statement language would lead market participants to conclude that the Committee was going to increase its target for the federal funds rate sooner than had been anticipated. Moreover, as noted above, announcing that the Committee would begin redeeming all maturing Treasury securities would directly increase longer-term Treasury yields to some extent. Consequently, interest rates would likely rise across the yield curve. Forward measures of inflation compensation might move down, lessening the rise in nominal longer-term rates, if the statement led investors to reduce their assessment of the longer-term inflation outlook. Equity prices likely would fall, and the dollar appreciate.

---

<sup>3</sup> Another feature of the structure proposed for paragraph C-1 is that it treats output and inflation in a parallel way in that there is no discussion of the causal factors behind the outlook for either variable.

## LONG-RUN PROJECTIONS OF THE BALANCE SHEET AND MONETARY BASE

In this section, scenarios for the Federal Reserve's balance sheet are presented that correspond to the alternatives discussed in the "Monetary Policy Alternatives" section of the Tealbook. The baseline scenario corresponds to Alternative B in this Tealbook. In the baseline scenario, the FOMC continues to allow agency MBS and debt securities to roll off as they mature or are prepaid. Additionally, we assume that the FOMC begins asset sales in the first quarter of 2013, six months after the assumed rise in the target federal funds rate. Specifically, beginning at that time, agency MBS and debt securities are sold at a constant rate for five years until holdings of these assets reach zero in December 2017.<sup>4</sup> All Treasury securities are rolled over as they mature, continuing the current practice. Under Alternative A, holdings of agency debt securities are redeemed, while we assume that holdings of agency MBS remain constant until the target fed funds rate increases in the third quarter of 2012. At this point, MBS holdings are also allowed to decline as these assets mature or prepay. As in the baseline scenario, sales of agency MBS and debt securities commence in the first quarter of 2013, and these securities are sold at a constant rate for five years until the holdings fall to zero. All Treasury securities are rolled over as they mature. In Alternative C, agency MBS and debt securities are treated as in the baseline. Treasury securities, however, are allowed to run off beginning in August of 2010. Projections for the scenarios are based on assumptions about each component of the balance sheet. Details of these assumptions are described in Appendix C. Substantive revisions that result from these assumptions, relative to material presented during the last FOMC cycle, are noted below.

Under the baseline, total assets are lower from now through 2016 and higher thereafter than in the balance sheet projections presented in April. The most significant change relative to the previous projection is a downward revision in the projected holdings of agency MBS and debt securities. In the near term, the downward revision is to the path for agency MBS, reflecting higher forecasted prepayments based on a lower projected level of mortgage rates. In the medium term, the downward revision stems from the new assumption that agency MBS and debt are sold beginning in 2013, rather than rolled off the balance sheet only as they mature or prepay. Another change to assets reflects the reestablishment of central bank liquidity swaps over the intermeeting period.

---

<sup>4</sup> The Tealbook projection assumes that the federal funds rate lifts off in the third quarter of 2012. The baseline balance sheet projection assumes that the tools to drain reserve balances are not used.

The forecast now anticipates that \$15 billion in swaps will be on the balance sheet from July 2010 to year-end; however, the level of swaps returns to zero by the end of 2011.<sup>5</sup>

Beginning in 2015, the balance sheet begins to expand again in line with growth in total Federal Reserve notes in circulation and capital, as Treasury securities are purchased to prevent the aggregate level of reserve balances from falling below \$25 billion.<sup>6</sup> Because under Alternative A agency MBS are held at the current level until the third quarter of 2012, the path of total assets associated with this scenario is higher over that time period relative to the baseline. After sales commence, the paths for total assets under both Alternative A and the baseline converge in June 2015, after which point they follow the same slight upward trajectory in line with growth in Federal Reserve notes in circulation and capital. Alternative C assumes that Treasury securities are not rolled over when they mature, resulting in a lower path of assets than under the baseline. Because of these redemptions, purchases of Treasury securities undertaken to maintain the level of reserve balances at \$25 billion begin sooner than under the baseline. The total assets path corresponding to Alternative C eventually converges with the baseline path in February 2015.

On the liability side of the baseline balance sheet, reserve balances are lower initially than in the previous projection because of the downward revision to the agency MBS forecast path. The path for reserve balances is revised downward in the medium term in response to agency debt and MBS sales. In response to the more rapid decline in reserve balances in the medium term, under the baseline, the U.S. Treasury's supplementary financing account falls to zero in February 2015, two and a half years earlier than the last cycle.

---

<sup>5</sup> Given the low demand so far for the renewed liquidity swaps, the assumed use in these projections may be an upper bound on their likely use.

<sup>6</sup> Reserve balances are computed as a residual of assets and liabilities in this exercise. Reserve balances fall as securities obtained through large-scale asset purchases mature, are prepaid, or are sold, and as credit facilities continue to unwind. An assumption of this forecast is that the aggregate level of reserve balances does not fall below \$25 billion. When reserve balances first hit this level, the U.S. Treasury's supplementary financing account (SFA) is assumed to fall from \$200 billion to zero. Once the balances in the SFA have run off, the Federal Reserve begins to purchase Treasury bills until bills comprise one-third of the Federal Reserve's total Treasury securities holdings. At this point, the Federal Reserve begins to purchase notes and bonds in addition to bills so that bills continue to constitute about one-third of total Treasury security holdings.



**Balance Sheet Projections Summary**

	Alternative A	Baseline	Alternative C
<b>MBS Securities</b>			
Total held June 2010	\$1,117 billion	\$1,117 billion	\$1,117 billion
Total held Dec. 2012	\$1,076 billion	\$853 billion	\$853 billion
<b>Agency Debt Securities</b>			
Total held June 2010	\$165 billion	\$165 billion	\$165 billion
Total held Dec. 2012	\$77 billion	\$77 billion	\$77 billion
<b>Treasury Securities</b>			
Total held June 2010	\$777 billion	\$777 billion	\$777 billion
Total held Dec. 2012	\$777 billion	\$777 billion	\$513 billion
<b>Total Assets</b>			
Peak month	June 2010	June 2010	June 2010
Peak amount	\$2.34 trillion	\$2.34 trillion	\$2.34 trillion
December 2020	\$1.86 trillion	\$1.86 trillion	\$1.86 trillion
<b>Reserve Balances</b>			
Peak month	February 2010	February 2010	February 2010
Peak amount	\$1.23 trillion	\$1.23 trillion	\$1.23 trillion

Under the baseline scenario, the balance sheet peaks at \$2.34 trillion in June 2010. The balance sheet then contracts as securities obtained through large-scale asset purchases mature, prepay, or are sold, and credit extensions are repaid. From March 2015 onwards, after reserve balances hit the assumed \$25 billion floor and the supplementary financing account has been drained, the balance sheet begins to expand again in line with growth in Federal Reserve notes in circulation and capital, as purchases of Treasury securities match the growth in these two items. In Alternatives A and C, the size of the balance sheet peaks in June 2010 at \$2.34 trillion, as well. By the end of 2020, the size of the balance sheet under all scenarios is roughly \$1.86 trillion.<sup>7</sup>

Reflecting the declines in the level of reserve balances, the monetary base is projected to contract from 2010 through 2013 on an annual basis. Because the monetary base is derived from the balance sheet projections of Federal Reserve notes in circulation

<sup>7</sup> The composition of Federal Reserve assets in these projections differs notably at times from historical patterns. Prior to August 2007, U.S. Treasury securities were about 90 percent of assets, and the Federal Reserve did not hold any agency debt or MBS. By contrast, under the baseline scenario, Treasury securities are projected to account for only around 35 percent of total assets at the end of 2010. However, by the end of 2020, Treasury securities in the SOMA portfolio account for 96 percent of total assets.

and reserve balances, and because notes in circulation are projected to follow a fairly gradual upward trajectory, the path of the monetary base in each scenario largely mirrors the path of reserve balances. In each scenario, the monetary base peaks at essentially the same time as reserve balances in February 2010. As reserve balances subsequently decline, the monetary base contracts. When reserve balances are assumed to have stabilized at \$25 billion, the level of the monetary base moves more in line with changes in Federal Reserve notes in circulation.

<b>Federal Reserve Balance Sheet</b>							
<b>End-of-Year Projections -- Baseline Scenario</b>							
	May 31, 2010	End-of-Year					
		2010	2012	2014	2016	2018	2020
\$ Billions							
<b>Total assets</b>	2,340	2,202	1,846	1,386	1,497	1,661	1,856
Selected assets:							
Liquidity programs for financial firms	7	15	0	0	0	0	0
Primary, secondary, and seasonal credit	0	0	0	0	0	0	0
Central bank liquidity swaps	7	15	0	0	0	0	0
Lending through other credit facilities	44	44	12	1	0	0	0
Term Asset-Backed Securities Loan Facility (TALF)	44	44	12	1	0	0	0
Support for specific institutions	119	81	40	14	4	0	0
Credit extended to AIG	52	28	9	0	0	0	0
Net portfolio holdings of Maiden Lane LLC, Maiden Lane II LLC, and Maiden Lane III LLC	68	53	31	14	4	0	0
Securities held outright	2,057	1,960	1,707	1,294	1,422	1,593	1,791
U.S. Treasury securities	777	777	777	777	1,254	1,593	1,791
Agency debt securities	167	147	77	34	10	0	0
Agency mortgage-backed securities	1,114	1,035	853	484	158	0	0
Special drawing rights certificate account	5	5	7	7	7	7	7
Net portfolio holdings of TALF LLC	0	1	1	1	0	0	0
Total other assets	112	102	86	76	72	69	66
<b>Total liabilities</b>	2,284	2,143	1,768	1,283	1,361	1,481	1,617
Selected liabilities:							
Federal Reserve notes in circulation	902	918	1,008	1,137	1,252	1,373	1,509
Reverse repurchase agreements	59	59	59	59	59	59	59
Deposits with Federal Reserve Banks	1,305	1,147	686	73	35	35	35
Reserve balances of depository institutions	1,083	939	476	25	25	25	25
U.S. Treasury, general account	20	5	5	5	5	5	5
U.S. Treasury, supplementary financing account	200	200	200	38	0	0	0
<b>Total capital</b>	56	59	78	103	136	180	239

Source: Federal Reserve H.4.1 statistical release and staff calculations.

---

 Growth Rates for the Monetary Base
 

---

Date	Baseline	Alternative A	Alternative C
Percent, annual rate			
Monthly			
Jan-10	-17.8	-17.8	-17.8
Feb-10	72.2	72.2	72.2
Mar-10	-19.7	-19.7	-19.7
Apr-10	-37.7	-37.7	-37.7
May-10	-2.1	-2.1	-2.1
Jun-10	-18.0	-18.0	-17.8
Jul-10	-10.0	-7.2	-9.8
Aug-10	4.2	10.6	-4.6
Sep-10	-20.9	-12.5	-31.0
Oct-10	-16.2	-6.2	-18.7
Nov-10	1.4	11.2	-1.4
Dec-10	-8.8	0.3	-12.5
Quarterly			
Q1 2010	14.0	14.0	14.0
Q2 2010	-11.8	-11.8	-11.8
Q3 2010	-8.9	-5.7	-11.8
Q4 2010	-10.2	-1.2	-15.2
Annual - Q4 to Q4			
2009	41.5	41.5	41.5
2010	-4.3	-1.3	-6.2
2011	-10.8	-4.5	-14.7
2012	-10.1	-6.7	-19.7
2013	-20.0	-18.3	-13.0

Note. Not seasonally adjusted.

## DEBT, BANK CREDIT, AND MONEY FORECASTS

Growth in domestic nonfinancial sector debt is projected to pick up to a 5¾ percent annual rate in the current quarter, with government borrowing continuing at a brisk pace and private-sector debt about unchanged. For both 2010 and 2011, domestic nonfinancial sector debt is expected to grow around 5¼ percent. Household debt edges up over the projection period as consumer credit begins to expand in the near term and residential mortgage debt increases starting next year. Lending standards for households are expected to ease slowly. The outlook for borrowing by nonfinancial businesses is similarly tepid: The rates of corporate bond and commercial paper issuance are projected to be moderate, and tight terms and standards for bank loans that loosen only gradually hold down increases in business loans. State and local government debt grows moderately, with fiscal pressures limiting spending, and federal government debt continues to expand at a double-digit pace, although not as rapidly as this year.

Commercial bank credit is expected to fall at an annual rate of about 5¾ percent in the second quarter of 2010, reflecting a broad-based contraction across all loan categories and a slight drop in securities holdings as well. Bank credit is projected to begin expanding later this year, trimming the decline for 2010 as a whole to 2 percent, and to rise 4¼ percent in 2011. Supported by modest but steady growth in economic output, the persistent decline in commercial and industrial loans is expected to abate next quarter; that said, business loan growth remains subdued through 2011. Consumer loans also begin to edge up late this year and then increase modestly through 2011 as spending on durables rises. However, real estate lending is expected to recover more slowly over the forecast period. Despite low interest rates on home mortgages, sluggish housing demand is expected to weigh on residential loan growth, and continued poor fundamentals should result in continued weakness in banks' commercial real estate loans. Securities are projected to expand at a moderate pace over the forecast period as tight lending conditions that ease only gradually and weak loan demand cause further substitution of securities for loans.

After expanding modestly in the first half of this year, M2 is expected to grow somewhat faster than nominal GDP in the third quarter. As the current bout of financial market volatility abates, growth of M2 is projected to fall back below that of nominal GDP for several quarters, reflecting the unwinding of safe haven flows. Turning to the components, growth of liquid deposits is expected to slow somewhat further from its

Growth Rates for M2  
(Percent, seasonally adjusted annual rate)

Monthly Growth Rates	Tealbook Forecast *
Jan-10	-8.2
Feb-10	7.8
Mar-10	-4.1
Apr-10	-4.5
May-10	11.3
Jun-10	5.7
Jul-10	3.0
Aug-10	2.2
Sep-10	2.1
Oct-10	1.8
Nov-10	1.9
Dec-10	2.1
Quarterly Growth Rates	
2010 Q1	-0.2
2010 Q2	1.6
2010 Q3	4.2
2010 Q4	2.0
Annual Growth Rates	
2009	5.1
2010	1.9
2011	3.4

\* This forecast is consistent with nominal GDP and interest rates in the Tealbook forecast. Actual data through May 2010; projections thereafter.

robust 2009 advance but remain solid over the forecast period. Currency growth, similarly, is predicted to move down from its brisk 2009 pace as precautionary demand for U.S. dollars from abroad fades. Small time deposits and retail money market mutual funds are projected to continue to decline through 2011, in part reflecting the very low interest rates offered on these instruments.

---

**DIRECTIVE**

Draft language for a June directive corresponding to each of the alternatives follows the April directive shown on the next page. Consistent with a recommendation in a memorandum to the Committee from the Desk, all of the directives include language that would direct the Desk to use coupon swaps, as well as dollar roll transactions, to facilitate the settlement of the Federal Reserve's purchases of agency mortgage-backed securities. The directive for Alternative A would instruct the Desk to purchase mortgage-backed securities to hold the level of the SOMA's holdings of such issues approximately constant. The directive for Alternative C would instruct the Desk to stop reinvesting the proceeds of maturing Treasury securities, effective on August 3, 2010.

**April 2010 FOMC Directive**

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to engage in dollar roll transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.



## June 2010 FOMC Directive — Alternative A

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. **The Committee directs the Desk to purchase agency mortgage-backed securities during the intermeeting period to maintain the total face value of the System Open Market Account's holdings of such securities at approximately its current level, with the aim of providing support to private credit markets and economic activity.** The Committee directs the Desk to engage in dollar roll **and coupon swap** transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions. **The Committee directs the Desk to maintain its practice of allowing all maturing agency debt to be redeemed without replacement.** The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

---

## June 2010 FOMC Directive — Alternative B

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to engage in dollar roll **and coupon swap** transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

## June 2010 FOMC Directive — Alternative C

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions. To gradually reduce the size of the Federal Reserve's balance sheet over time, the Committee directs the Desk to not reinvest the proceeds of maturing Treasury securities held by the System Open Market Account, effective August 3, 2010, and to maintain its practice of not reinvesting the proceeds of maturing agency debt and payments on agency mortgage-backed securities held by the System Open Market Account. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

## A. Measures of the Equilibrium Real Rate

The equilibrium real rate is the real federal funds rate that, if maintained, would be projected to return output to its potential level over time. The short-run equilibrium rate is defined as the rate that would close the output gap in twelve quarters given the corresponding model's projection of the economy. The medium-run concept is the value of the real federal funds rate projected to keep output at potential in seven years, under the assumption that monetary policy acts to bring actual and potential output into line in the short run and then keeps them equal thereafter. The TIPS-based factor model measure provides an estimate of market expectations for the real federal funds rate seven years ahead.

Measure	Description
<b>Single-equation Model</b>	The measure of the equilibrium real rate in the single-equation model is based on an estimated aggregate-demand relationship between the current value of the output gap and its lagged values as well as the lagged values of the real federal funds rate.
<b>Small Structural Model</b>	The small-scale model of the economy consists of equations for six variables: the output gap, the equity premium, the federal budget surplus, the trend growth rate of output, the real bond yield, and the real federal funds rate.
<b>EDO Model</b>	Estimates of the equilibrium real rate using EDO—an estimated dynamic-stochastic-general-equilibrium (DSGE) model of the U.S. economy—depend on data for major spending categories, price and wages, and the federal funds rate as well as the model's structure and estimate of the output gap.
<b>FRB/US Model</b>	Estimates of the equilibrium real rate using FRB/US—the staff's large-scale econometric model of the U.S. economy—depend on a very broad array of economic factors, some of which take the form of projected values of the model's exogenous variables.
<b>Tealbook-consistent</b>	Two measures are presented—based on the FRB/US and the EDO models. Both models are matched to the extended Tealbook forecast. Model simulations determine the value of the real federal funds rate that closes the output gap conditional on the extended baseline.

Measure	Description
<b>TIPS-based Factor Model</b>	Yields on TIPS (Treasury Inflation-Protected Securities) reflect investors' expectations of the future path of real interest rates. The TIPS-based measure of the equilibrium real rate is constructed using the seven-year-ahead instantaneous real forward rate derived from TIPS yields as of the Tealbook publication date. This forward rate is adjusted to remove estimates of the term and liquidity premiums based on a three-factor arbitrage-free term-structure model applied to TIPS yields, nominal yields, and inflation.

The actual real federal funds rate is constructed as the difference between the nominal rate and realized inflation, where the nominal rate is measured as the quarterly average of the observed federal funds rate, and realized inflation is given by the log difference between the core PCE price index and its lagged value four quarters earlier. If the upcoming FOMC meeting falls early in the quarter, the lagged inflation measure ends in the last quarter. For the current quarter, the nominal rate is specified as the target federal funds rate on the Tealbook publication date.

Estimates of the real federal funds rate depend on the proxies for expected inflation used. The table below shows estimated real federal funds rates based on lagged core PCE inflation, the definition used in the Equilibrium Real Federal Funds Rate chart; lagged four-quarter headline PCE inflation; and projected four-quarter headline PCE inflation beginning with the next quarter. For each estimate of the real rate, the table also provides the Tealbook-consistent FRB/US-based measure of the short-run equilibrium real rate and the average actual real federal funds rate over the next twelve quarters.

Proxy used for expected inflation	Actual real federal funds rate (current value)	Tealbook-consistent FRB/US-based measure of the equilibrium real funds rate (current value)	Average actual real funds rate (twelve-quarter average)
<b>Lagged core inflation</b>	-1.0	-1.8	-0.5
<b>Lagged headline inflation</b>	-1.5	-1.9	-0.6
<b>Projected headline inflation</b>	-1.0	-1.9	-0.7

## B. Analysis of Policy Paths and Confidence Intervals

### RULE SPECIFICATIONS

For the following rules,  $i_t$  denotes the federal funds rate for quarter  $t$ , while the explanatory variables include the staff's projection of trailing four-quarter core PCE inflation ( $\pi_t$ ), inflation two and three quarters ahead ( $\pi_{t+2|t}$  and  $\pi_{t+3|t}$ ), the output gap in the current period and one quarter ahead ( $y_t - y_t^*$  and  $y_{t+1|t} - y_{t+1|t}^*$ ), and the three-quarter-ahead forecast of annual average GDP growth relative to potential ( $\Delta^4 y_{t+3|t} - \Delta^4 y_{t+3|t}^*$ ), and denotes an assumed value of policymakers' long-run inflation objective. The outcome-based and forecast-based rules were estimated using real-time data over the sample 1988:1-2006:4; each specification was chosen using the Bayesian information criterion. Each rule incorporates a 75 basis point shift in the intercept, specified as a sequence of 25 basis point increments during the first three quarters of 1998. The first two simple rules were proposed by Taylor (1993, 1999). The prescriptions of the first-difference rule do not depend on assumptions regarding  $r^*$  or the level of the output gap; see Orphanides (2003).

<b>Outcome-based rule</b>	$i_t = 1.20i_{t-1} - 0.39i_{t-2} + 0.19[1.17 + 1.73\pi_t + 3.66(y_t - y_t^*) - 2.72(y_{t-1} - y_{t-1}^*)]$
<b>Forecast-based rule</b>	$i_t = 1.18i_{t-1} - 0.38i_{t-2} + 0.20[0.98 + 1.72\pi_{t+2 t} + 2.29(y_{t+1 t} - y_{t+1 t}^*) - 1.37(y_{t-1} - y_{t-1}^*)]$
<b>Taylor (1993) rule</b>	$i_t = 2 + \pi_t + 0.5(\pi_t - \pi^*) + 0.5(y_t - y_t^*)$
<b>Taylor (1999) rule</b>	$i_t = 2 + \pi_t + 0.5(\pi_t - \pi^*) + (y_t - y_t^*)$
<b>First-difference rule</b>	$i_t = i_{t-1} + 0.5(\pi_{t+3 t} - \pi^*) + 0.5(\Delta^4 y_{t+3 t} - \Delta^4 y_{t+3 t}^*)$

### FRB/US MODEL SIMULATIONS

Prescriptions from the two empirical rules are computed using dynamic simulations of the FRB/US model, implemented as though the rule were followed starting at this FOMC meeting. The dotted line labeled "Previous Tealbook" is based on the current specification of the policy rule, applied to the previous Tealbook projection. Confidence intervals are based on stochastic simulations of the FRB/US model with shocks drawn from the estimated residuals over 1969-2008.

---

## INFORMATION FROM FINANCIAL MARKETS

The expected funds rate path is based on Eurodollar quotes and implied three-month forward rates from swaps, and the confidence intervals for this path are constructed using prices of interest rate caps.

## NEAR-TERM PRESCRIPTIONS OF SIMPLE POLICY RULES

These prescriptions are calculated using Tealbook projections for inflation and the output gap. Because the first-difference rule involves the lagged funds rate, the value labeled “Previous Tealbook” for the current quarter is computed using the actual value of the lagged funds rate, and the one-quarter-ahead prescriptions are based on this rule’s prescription for the current quarter.

## REFERENCES

Taylor, John B. (1993). “Discretion versus policy rules in practice,” *Carnegie-Rochester Conference Series on Public Policy*, vol. 39 (December), pp. 195-214.

————— (1999). “A Historical Analysis of Monetary Policy Rules,” in John B. Taylor, ed., *Monetary Policy Rules*. The University of Chicago Press, pp. 319-341.

Orphanides, Athanasios (2003). “Historical Monetary Policy Analysis and the Taylor Rule,” *Journal of Monetary Economics*, vol. 50 (July), pp. 983-1022.

---

## C. Long-run Projections of the Balance Sheet and Monetary Base

---

This appendix presents the assumptions underlying the projections provided in the section entitled “Long-Run Projections of the Balance Sheet and Monetary Base.”

### GENERAL ASSUMPTIONS

The balance sheet projections are constructed on a monthly frequency from June 2010 to December 2020. The few balance sheet items that are not discussed below are assumed to be constant over the projection period at the level observed on May 31, 2010. The projections for all major asset and liability categories are summarized in the table that follows the bullet points.

The Tealbook projection assumes that the federal funds rate begins to increase in the third quarter of 2012. The balance sheet projections assume that no use of short-term draining tools is necessary to achieve the projected path for the federal funds rate.

### ASSETS

#### *Treasury securities, agency MBS, and agency debt*

- The baseline scenario, corresponding to Alternative B.
  - The Federal Reserve will begin to sell agency MBS and agency debt securities six months after the FOMC begins to increase the federal funds rate. Commencing in the first quarter of 2013, the sales of these securities will be executed over a five-year period at a constant rate until the Federal Reserve’s agency MBS and agency debt holdings fall to zero.
  - Prepayments of MBS and maturing agency debt are not reinvested.<sup>1</sup>
  - Due to expected settlement lags and prepayments, agency MBS holdings peak at \$1.1 trillion in June 2010, a somewhat lower level than the amount purchased. For agency MBS, the rate of prepayment is based on estimates from one of the program’s investment managers. The historically low coupon on these securities implies a relatively slow prepayment rate.
  - Holdings of agency debt securities peaked at \$169 billion in March 2010 and decline slowly thereafter as holdings continue to mature.
  - The maturity distribution of the Treasury securities is calculated based on the actual holdings of Treasury securities. The current weighted average maturity is

---

<sup>1</sup> Prepayments include regular payments of principal and repayments of mortgages.



about seven years. Treasury securities held in the SOMA portfolio are reinvested as they mature.

- Under Alternative A, the Committee reinvests the proceeds of maturing and prepaying Treasury securities and agency MBS to maintain the current level of these securities until the target federal funds rate increases in the third quarter of 2012. At this point, MBS holdings are allowed to decline as these assets mature or prepay. As in the baseline scenario, sales of agency MBS and debt commence in the first quarter of 2013, and these securities are sold at a constant rate for five years until the holdings fall to zero. Holdings of agency debt securities are redeemed.
- Under Alternative C, the Committee allows Treasury securities, agency debt securities, and agency MBS to prepay or to redeem as they mature. As in the baseline scenario, sales of agency MBS and debt commence in the first quarter of 2013, and these securities are sold at a constant rate for five years until the holdings fall to zero.
- In all three alternatives, a minimum level of \$25 billion is set for reserve balances. To ensure that reserve balances do not fall below this minimum level, first the U.S. Treasury's supplementary financing account (SFA) is reduced. After the SFA declines to zero, Treasury bills are purchased. Purchases of bills continue until these securities comprise one-third of the Federal Reserve's total Treasury holdings. Once this threshold is met, the Federal Reserve buys notes and bonds in addition to bills in order to keep bills at one-third of total Treasury holdings.
- By the end of the projection period in all three alternatives, the expansion of Federal Reserve notes in circulation and capital, combined with a runoff of assets, necessitates the reduction of the SFA to zero and results in a level of reserve balances of \$25 billion. After the SFA reaches zero, purchases of Treasury securities are resumed to maintain reserve balances at a level of \$25 billion.

### **Liquidity Programs and Credit Facilities**

- Loans through the Term Asset-Backed Securities Loan Facility (TALF) peaked at \$48 billion in December 2009. Credit extended through this facility declines to zero in the first quarter of 2015, reflecting loan maturities and prepayments.
- The assets held by TALF LLC increase to \$1 billion by June 2010 and remain at that level through June 2015, before dropping down to zero thereafter. Assets held by TALF LLC consist of investments of commitment fees collected by the LLC and the U.S. Treasury's initial funding. In this projection, the LLC does not purchase any asset-backed securities received by the Federal Reserve Bank of New York in connection with a decision of a borrower not to repay a TALF loan.
- Central bank liquidity swap lines, which were re-established on May 9, 2010, are projected to rise to \$15 billion by July 2010. Swap lines return to zero by the end of 2011.

- Credit extended to AIG, the sum of the Federal Reserve Bank of New York's extension of revolving credit and its preferred interests in AIA Aurora LLC and ALICO Holdings LLC, drops to \$28 billion by December 2010 and then declines to zero by the end of 2013.
- The assets held by Maiden Lane LLC, Maiden Lane II LLC, and Maiden Lane III LLC are sold over time and reach either zero or a nominal level by the end of 2016.

## LIABILITIES AND CAPITAL

- Federal Reserve notes in circulation grow in line with the staff forecast for money stock currency through the end of 2011. From 2011 to the end of the projection period, Federal Reserve notes in circulation grow at the same rate as nominal GDP, as projected in the extended Tealbook forecast.
- The U.S. Treasury's general account (TGA) follows the staff forecast for end-of-month U.S. Treasury operating cash balances through September 2010.<sup>2</sup> Thereafter, the TGA drops back to its historical target level of \$5 billion by the end of 2010 as it is assumed that the Treasury will have implemented a new cash management system that allows it to invest funds in excess of \$5 billion. The TGA remains constant at \$5 billion over the remainder of the forecast period.
- Balances in the SFA remain at their current level until the SFA is reduced to ensure reserve balance levels do not fall below \$25 billion.
- Federal Reserve capital grows 15 percent per year, in line with the average rate of the past ten years.
- In general, increases in the level of assets of the Federal Reserve generate higher levels of reserve balances. Increases in the levels of other liability items, such as Federal Reserve notes in circulation or the Treasury's general account, like increases in the level of Reserve Bank capital, drain reserve balances. When increases in these liability or capital items would otherwise cause reserve balances to fall below \$25 billion, purchases of Treasury securities are assumed in order to maintain that level of reserve balances.

---

<sup>2</sup> The staff forecast for end-of-month U.S. Treasury operating cash balances includes forecasts of both the TGA and balances associated with the U.S. Treasury's Tax and Loan program. Because balances associated with the Tax and Loan program are \$2 billion, for the time being, this forecast is a good proxy for the level of TGA balances.

**Federal Reserve Balance Sheet**  
**End-of-Year Projections -- Baseline Scenario**

	May 31, 2010	End-of-Year					
		2010	2012	2014	2016	2018	2020
		\$ Billions					
<b>Total assets</b>	2,340	2,202	1,846	1,386	1,497	1,661	1,856
Selected assets:							
Liquidity programs for financial firms	7	15	0	0	0	0	0
Primary, secondary, and seasonal credit	0	0	0	0	0	0	0
Term auction credit (TAF)	0	0	0	0	0	0	0
Central bank liquidity swaps	7	15	0	0	0	0	0
Primary Dealer Credit Facility (PDCF)	0	0	0	0	0	0	0
Asset-Backed Commercial Paper Money Market							
Mutual Fund Liquidity Facility (AMLF)	0	0	0	0	0	0	0
Lending through other credit facilities	44	44	12	1	0	0	0
Net portfolio holdings of Commercial Paper							
Funding Facility LLC (CPFF)	0	0	0	0	0	0	0
Term Asset-Backed Securities Loan Facility (TALF)	44	44	12	1	0	0	0
Support for specific institutions	119	81	40	14	4	0	0
Credit extended to AIG	52	28	9	0	0	0	0
Net portfolio holdings of Maiden Lane LLC,							
Maiden Lane II LLC, and Maiden Lane III LLC	68	53	31	14	4	0	0
Securities held outright	2,057	1,960	1,707	1,294	1,422	1,593	1,791
U.S. Treasury securities	777	777	777	777	1,254	1,593	1,791
Agency debt securities	167	147	77	34	10	0	0
Agency mortgage-backed securities	1,114	1,035	853	484	158	0	0
Memo: TSLF	0	0	0	0	0	0	0
Repurchase agreements	0	0	0	0	0	0	0
Special drawing rights certificate account	5	5	7	7	7	7	7
Net portfolio holdings of TALF LLC	0	1	1	1	0	0	0
Total other assets	112	102	86	76	72	69	66
<b>Total liabilities</b>	2,284	2,143	1,768	1,283	1,361	1,481	1,617
Selected liabilities:							
Federal Reserve notes in circulation	902	918	1,008	1,137	1,252	1,373	1,509
Reverse repurchase agreements	59	59	59	59	59	59	59
Deposits with Federal Reserve Banks	1,305	1,147	686	73	35	35	35
Reserve balances of depository institutions	1,083	939	476	25	25	25	25
U.S. Treasury, general account	20	5	5	5	5	5	5
U.S. Treasury, supplementary financing account	200	200	200	38	0	0	0
<b>Total capital</b>	56	59	78	103	136	180	239

Source: Federal Reserve H.4.1 statistical release and staff calculations.