



DOMESTIC OPEN MARKET OPERATIONS DURING 2014

*A Report Prepared for the Federal Open
Market Committee by the Markets Group
of the Federal Reserve Bank of New York*

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Contents

This report, presented to the Federal Open Market Committee by Simon Potter, Executive Vice President, Federal Reserve Bank of New York, and Manager of the System Open Market Account, describes domestic open market operations of the Federal Reserve System for the calendar year 2014. Suraj Prasanna and Tal Shoer were primarily responsible for preparation of the report.

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Overview

The Federal Open Market Committee (FOMC) continued to provide monetary policy accommodation in 2014 to support a stronger economic recovery in a context of price stability. The Committee maintained the target for the federal funds rate in a range of 0 to ¼ percent, and provided forward guidance on the federal funds rate that evolved as the economic outlook improved through the year. Further, it continued to adjust the size and composition of the Federal Reserve's balance sheet by purchasing additional Treasury securities and agency mortgage-backed securities (MBS), although it slowed the pace of its purchases and eventually ended them in October. Lastly, it continued to reinvest principal payments from Treasury securities at auction and to reinvest principal payments from agency MBS and debt in agency MBS. These monetary policy actions were intended to put downward pressure on longer-term interest rates, support mortgage markets, and help foster more accommodative financial conditions in order to advance the FOMC's goals of maximum employment and stable prices.

The FOMC issued directives to the Open Market Desk (hereafter referred to as the "Desk") at the Federal Reserve Bank of New York to implement these policies.¹ The FOMC's directives to expand the balance sheet resulted in the Desk making cumulative additional purchases of \$450 billion in longer-term securities in 2014, including \$250 billion in Treasury securities and \$200 billion in agency MBS. These purchases brought the System Open Market Account's (SOMA) domestic portfolio to a level of nearly \$4.3 trillion.² Although the size of the portfolio grew substantially over the year, the overall composition of the portfolio did not change significantly, with approximately 60 percent of its holdings in Treasury securities and 40 percent in agency MBS. The Desk monitored market conditions closely while undertaking these actions, and available indicators suggested little adverse impact on market functioning from the Desk's activity.

Interest rates declined over the year, leading the SOMA domestic securities portfolio's unrealized loss position at the end of 2013 to shift to an unrealized gain by the end of 2014. These unrealized gains or losses have no effect on net income or Federal Reserve remittances to the U.S. Department of the Treasury unless assets are actually sold.

As in recent years, in 2014 the large size of the SOMA portfolio resulted in historically elevated levels of the Federal Reserve's income and remittances to the U.S. Treasury. A projection exercise using publicly available data suggests that the SOMA portfolio's net income will decline as the FOMC eventually normalizes the stance of monetary policy, but will remain above the average level seen prior to the financial crisis. The scenario's baseline projections further show that the portfolio will not reach its steady-state size until late 2020.

Bank reserves, which are liabilities on the Federal Reserve's balance sheet, also grew to historically elevated levels primarily as a result of large-scale asset purchases. Reserves are created in the process of conducting asset purchases. However, reserve balances did not increase to the same extent as SOMA assets in 2014 largely because of changes in the composition of liabilities attributable to the Federal Reserve's testing of tools that might be used when the FOMC elects to tighten monetary policy.

The federal funds rate remained within the FOMC's specified target range without the need for the Desk to conduct temporary open market operations to manage the supply of reserves. The federal funds rate remains well connected to other money market rates and is of ongoing importance for the transmission of monetary policy. The Federal Reserve began a data collection initiative in 2014 to facilitate monetary policy implementation by monitoring conditions in money markets more comprehensively. The data gathered,

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issued in the *Report of Selected Money Market Rates*, provide new and detailed insight into unsecured money markets. The New York Fed expects to use this data source to calculate the federal funds effective rate and to publish a new overnight bank funding rate in the coming year.

Lastly, the Federal Reserve devoted considerable attention to readying operational tools that could assist in the execution of monetary policy during normalization. These tools, including overnight and term reverse repurchase agreements (reverse repos, or RRP) and term deposits, may be used to supplement interest on excess reserves as a means of managing the federal funds rate and other money market rates at levels consistent with the FOMC's macroeconomic objectives. Tests of these tools saw significant participation from eligible counterparties, with the aggregate amount of accepted offers across the exercises peaking at \$568 billion in early December. Such exercises are a matter of prudent planning, and have no implications for the timing or pace of eventual policy normalization.

This report begins with a review of the permanent open market operations undertaken in 2014 to adjust the size and composition of the Federal Reserve's balance sheet as directed by the FOMC. It then describes the evolution of the SOMA portfolio since the start of the third large-scale asset purchase (LSAP3) program in 2012, identifies the factors affecting the Federal Reserve's consolidated balance sheet, and reports the current and projected income from the SOMA portfolio. Lastly, it reviews the state of the federal funds market and the Desk's testing of operational tools described above. Appendixes 1 through 4 provide the full text of the authorizations, directives, and resolutions guiding the Desk's activity. Appendix 5 provides background detail on Desk counterparties. Appendix 6 provides links to webpages where source material for Federal Reserve-related content and underlying data for the charts in this report can be found. Finally, Appendix 7 presents suggested readings on the financial and economic effects of large-scale asset purchases.

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Domestic Open Market Operations

The FOMC directed the Desk to purchase Treasury securities and agency MBS as part of the LSAP3 program. It also instructed the Desk to continue reinvesting maturing securities. The Desk's purchases of securities under the program were intended to put downward pressure on longer-term interest rates, support mortgage markets, and make broader financial conditions more accommodative. The ultimate goal was to promote a stronger economic recovery and to help ensure that unemployment and inflation, over time, would be consistent with the Federal Reserve's dual mandate (see **Box 1**).

The FOMC also directed the Desk to undertake open market operations as necessary to maintain conditions in reserve markets such that the federal funds rate traded in a range of 0 to ¼ percent, and authorized it to conduct reverse repurchase agreements for the purpose of operational readiness testing.

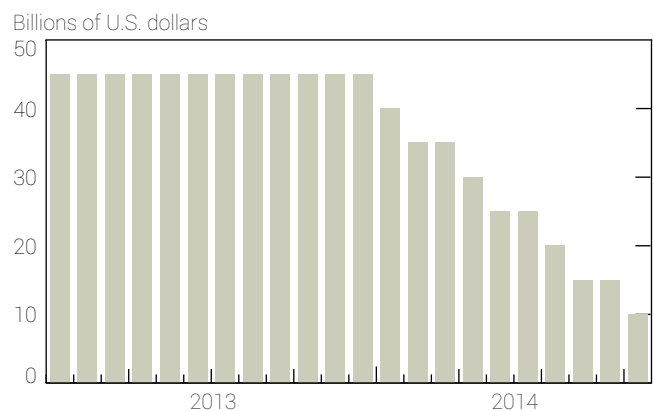
Permanent Operations

Permanent open market operations consist of outright purchases of Treasury securities and agency MBS, and were conducted by the Desk in 2014 as part of LSAP3. The monthly pace of purchases was adjusted at each meeting by the FOMC based on its review of incoming information on economic and financial developments, including the outlook for the labor market.

TREASURY SECURITIES OPERATIONS

Through October 2014, the FOMC directed the Desk to purchase Treasury assets at a monthly rate that decreased over time as a result of the Committee's ongoing review of the economic outlook at its regular meetings (**Chart 1**). For six consecutive meetings beginning in December 2013, the FOMC voted to reduce the pace of Treasury purchases in \$5 billion increments. In September, the Committee

Chart 1
SOMA Treasury Purchases under LSAP3



Source: Federal Reserve Bank of New York.

Note: Figures are monthly.

judged that sufficient progress in the labor market had been made to conclude the program at the end of October with a final \$10 billion reduction. Throughout 2014, the Committee also directed the Desk to roll over maturing Treasury securities into new issues at auction, such that the total amount of Treasuries on the balance sheet would not materially decline.

In total, the Desk purchased \$250 billion in additional Treasury securities during 2014. Adding this amount to the \$540 billion purchased in 2013 brought the total size of large-scale Treasury purchases under LSAP3 to \$790 billion. Purchases were distributed across pre-established maturity sectors for nominal Treasury securities and Treasury Inflation-Protected Securities (TIPS) (**Table 1**). The allocations resulted in a weighted average duration of 9.8 years for 2014 purchases. The Desk also rolled over \$464 million in maturing Treasury securities.

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Box 1

The Economic Rationale for Asset Purchases

Several theories have been advanced about the channels through which asset purchases can affect financial conditions. One prevalent theory centers on a portfolio balance channel. In this view, the Federal Reserve's sizable purchases of longer-term securities reduce the current and expected future stock of securities—and therefore the risk—that would otherwise be held in private investors' portfolios. As a result, the purchases compress risk premiums (that is, the compensation that investors demand for bearing risk), which puts downward pressure on long-term interest rates.

While Treasury securities, agency debt, and agency MBS are free of credit risk, they bear duration risk, the chance that interest rates may change over time, which in turn affects the value of those bonds. By purchasing large amounts of relatively long-duration securities, the Federal Reserve reduces the amount of this risk that must be borne by the market. Since Treasury rates serve as the basis for other borrowing costs, lower

term premiums on Treasury securities may also reduce broader private sector borrowing costs relative to the levels that otherwise would have prevailed.

In addition to removing duration risk from the market, the Federal Reserve's purchases of agency MBS remove prepayment risk associated with the uncertain timing of principal cash flows, given that mortgage holders may refinance (and thus prepay) their mortgages at any time. In particular, declining interest rates often result in greater prepayments, as homeowners respond to the economic incentive to refinance their mortgages at lower interest rates. Similarly, rising interest rates often result in decreasing prepayments, as homeowners are less likely to refinance. The Federal Reserve's absorption of prepayment risk from the market may also have a secondary effect of dampening risk related to interest rate volatility by reducing the need for agency MBS investors to hedge their positions, a behavior that can exacerbate large inter-

est rate moves. By removing such risks from the market, purchases of agency MBS contribute to downward pressure on longer-term interest rates, and all else equal, lower MBS rates, helping to reduce primary mortgage rates and encourage greater demand for housing.

LSAPs may also work through other channels. Some research suggests that asset purchases can provide a signal about the FOMC's overall stance of monetary policy and thus reinforce other FOMC communications that shape market participants' expectations about the future path of the federal funds rate. In addition, under certain circumstances, asset purchases can help improve market functioning and liquidity by boosting confidence that the central bank is willing to act aggressively through a consistent and significant market presence.

Additional analysis of the financial and economic effects of large-scale asset purchases can be found in the studies cited in Appendix 7.

Table 1

Maturity Distribution of Treasury Operations in 2014

	Par Amount Purchased (Billions of U.S. Dollars)	Percentage of Total Purchases
Nominal Coupon Securities by Maturity Range		
4–4¾ years	27	11
4¾–5¾ years	30	12
5¾–7 years	38	15
7–10 years	74	30
10–20 years	5	2
20–30 years	69	28
TIPS	7	3
Total	250	100

Source: Federal Reserve Bank of New York.

Note: Figures may not sum to totals because of rounding.

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The Desk did not sell any Treasury securities in 2014, and has not done so since the conclusion of the Maturity Extension Program (MEP) in December 2012.

Operation Results

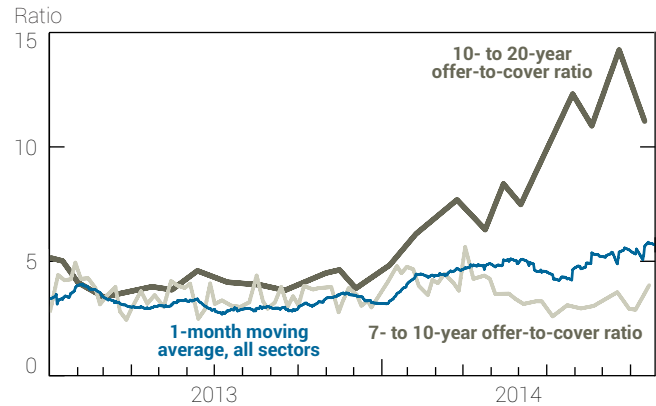
The Desk conducted 148 operations in the secondary market, with an average operation size of about \$1.7 billion. Consistent with the intent to focus on longer-maturity securities, more than half of new purchases were in the seven- to ten-year and twenty- to thirty-year maturity sectors.

The competitiveness of propositions in Treasury operations was robust over 2014. One proxy measure of competitiveness is the ratio of offers from participants to the amount of securities actually purchased by the Desk.³ This ratio averaged 4.8 in 2014, meaning that for every dollar of securities the Desk purchased, \$4.8 dollars of securities were offered for sale. For comparison, the ratio was a slightly less competitive 3.1 in 2013 (**Chart 2**). The offer-to-cover ratio rose over the course of the year, because counterparties did not materially reduce the dollar value of the offers they submitted as the pace of purchases declined. Instead, counterparties' bidding behavior in aggregate remained relatively static until very late in the program, when many adjusted offer amounts. The coverage ratio for purchases in the ten- to twenty-year maturity sector rose significantly over the year to become the highest for all sectors, although it was likely highly variable given the relatively small size of purchases in this sector. The offer-to-cover ratio was lowest in the seven- to ten-year sector, where operations were the largest.

Operational Approach

The Desk conducted all open market purchases according to operating policies that were released in December 2012, immediately following the FOMC's announcement that purchases of longer-term Treasury securities would continue following the conclusion of the MEP. These policies were periodically revised to provide updates to operational details, such as the number of operations each month by maturity sector. The FAQs accompanying the policies specified the maturity distribution, expected average duration, and other details of new purchases. Toward the end of each month, the Desk also released a tentative schedule of operations for the following month.

Chart 2
Coverage of SOMA Treasury Purchase Operations under LSAP3



Source: Federal Reserve Bank of New York.

Beginning in May, the Desk reduced the number of operations per month and the size of each operation at several points. This consolidation increased efficiency by combining multiple small operations within the same maturity sector. The sectors and proportion of securities purchased in each sector remained constant each month, thereby avoiding large swings in the weighted average maturity of new purchases.

Purchase operations were conducted through FedTrade, the New York Fed's proprietary trading system. Counterparties participating in an operation were allowed to submit multiple offers across the range of eligible securities in a multi-price auction. An announcement was posted prior to each operation noting the maturity bin, the securities eligible, and a range for the dollar amount of expected awards. Results, including the amount selected for each security, were generally posted well within three minutes of the close of the auction window on the New York Fed's public website; participating counterparties received their own award notifications simultaneously. At the end of each month, the Desk released the weighted average accepted price, the highest accepted price, and the percentage of propositions filled at the highest accepted price for each security at every operation during that month.⁴

The Desk judged the attractiveness of offers to determine which would be accepted based on their proximity to prevailing market

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Table 2

SOMA Purchase Limits for Individual Treasury Securities

SOMA Security Ownership prior to Operation as a Percentage of Outstanding Issuance	Maximum Purchase Amount per Security in Operation Is Lesser of:	
	(A)	(B)
0–30	N/A	35% of outstanding less SOMA holdings
30–47.5	5.0% of outstanding	50% of outstanding less SOMA holdings
47.5–59	2.5% of outstanding	60% of outstanding less SOMA holdings
59–70	1.0% of outstanding	70% of outstanding less SOMA holdings
More than 70	Not eligible for purchase	

Source: Federal Reserve Bank of New York.

prices near the close of the auction, as well as on the Desk's own evaluation of theoretical value using a yield curve model. The selection criteria had the effect of tilting purchases toward securities that the Desk perceived to be undervalued by market participants, such as certain off-the-run securities. Off-the-run securities—those issued prior to the most recent Treasury auction for a given maturity sector—often trade at a discount relative to the most recently issued, or on-the-run, securities because they are somewhat less liquid. These characteristics tend to render them more attractive from a relative value perspective.

To avoid disruptions in market liquidity and excessive concentration in its holdings, the Desk placed a number of constraints on the security selection process, as it had done in past programs. First, the Desk excluded certain securities if it judged that purchasing them might adversely affect market functioning. Specifically, it refrained from purchasing securities that traded with heightened scarcity value (that is, securities that “traded special”) in the repurchase agreement (repo) market, those that were the cheapest to deliver into Treasury futures contracts, Treasury STRIPS (Separate Trading of Registered Interest and Principal Securities), and securities in the when-issued market that had yet to be formally issued. At the start of each operation, the Desk announced specific issues to be excluded from the eligible basket of CUSIPs.⁵

Second, the Desk maintained limitations on the amount of any individual security that it could own. In accordance with this framework, aggregate holdings of any individual Treasury security

were capped at 70 percent of that security's outstanding supply, and restrictions were phased in once SOMA holdings reached 30 percent of total supply (Table 2). These limits became more binding as the proportion of aged securities the Desk purchased increased throughout the program. At the end of LSAP3, the SOMA portfolio held the maximum limit of 70 percent of outstanding supply in seventeen securities, up from thirteen at the maximum in 2013.⁶

Desk counterparties in Treasury operations were primary dealers and, through July 2014, Treasury Operations Counterparty (TOC) participants. The TOC program, announced in February 2013, was a one-year pilot project designed to explore ways of broadening access to open market operations and to determine the extent to which firms beyond the primary dealer community could augment the New York Fed's operational capacity and resiliency in its monetary policy operations. Under the program, four counterparties were selected to participate in Treasury outright operations. All four firms participated in at least one operation, and their offered amounts were consistent with their relative size.

Rollovers

The FOMC directed the Desk to reinvest the proceeds from Treasury securities that matured over the year at auction. However, for operational efficiency, proceeds were only reinvested on days in which the total amount of maturities exceeded \$2 million; when maturities fell short of this sum, the securities were allowed to mature without reinvestment. In line with existing practices, maturing Treasury securities were reinvested in new Treasury securities issued on the day the funds

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were received, and were allocated in proportion to the issue size of all qualifying new securities. Given that the Desk had sold most securities that would have matured in 2014 during the MEP, roll-overs were sporadic over the year. In aggregate, the Desk reinvested \$464 million of Treasury securities in 2014 across five separate issue dates, including the acquisition of nearly \$5 million in floating rate notes (see **Box 2**). In contrast, the Desk allowed \$10 million of securities to mature from the portfolio without reinvestment on dates when maturities did not exceed the minimum threshold.

Securities Lending

Securities lending operations provide a secondary and temporary source of securities to the financing market to promote the smooth clearing of Treasury and agency securities. Lending of SOMA's securities, especially those in which SOMA has a significant market share, may help to mitigate periods of scarcity or elevated fails. In 2014, securities held in the SOMA portfolio were lent to primary dealers based on competitive bidding in auctions conducted over FedTrade. Primary dealers bid on a fee that would be economically equivalent to a spread between the general collateral repo rate and the rate at which they are willing to borrow the security. The minimum bid was 5 basis points, all loans were for an overnight term, and the amount of each security that could be lent was limited. Dealers borrowing securities pledged other Treasury securities to the New York Fed, plus margin, as collateral for the securities loan. Primary dealers borrowed an average of \$12 billion in par value of securities per day in 2014, somewhat lower than the daily average of \$15 billion in 2013 (Chart 3). Despite bouts of heightened market fails on several occasions during the year, daily securities lending volumes exhibited less variability than in prior years.

Market Functioning

By the end of the year, SOMA held approximately 20 percent of all marketable Treasury securities, with those holdings concentrated in longer-maturity sectors. These purchases do not appear to have had an adverse impact on market functioning. While some isolated bursts of volatility occurred, they were not related to purchase operations, and most major indicators of market liquidity in cash Treasury markets, including bid-ask spreads, quote sizes, and trading volumes, generally remained within historical ranges.⁷ As the pace of SOMA purchases declined to zero, there were some signs of increased spreads between on-the-run and off-the-run

Box 2

Floating Rate Notes

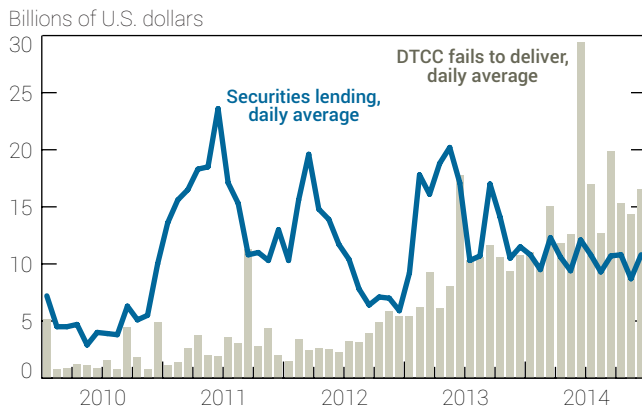
In January 2014, the Department of the Treasury began to issue floating rate notes (FRNs). The Treasury's stated goal in developing this product was to complement its existing suite of securities and to help achieve its objective of financing the government at the lowest cost over time. Interest on FRNs is accrued and paid quarterly, with the rate referencing the most recent thirteen-week Treasury bill auction rate. To date, the Treasury has only issued FRNs with a two-year maturity, and auctions for new FRNs occur quarterly.^a Bids for the security at auction are expressed in terms of a discount margin, which is the fixed spread to the underlying index rate paid by Treasury for the remaining life of the security.

On January 13, the Desk released a statement noting that it would treat FRNs in a similar manner to other Treasury securities in its rollover operations, securities lending program, and repo and reverse repo operations. Because of their short duration, FRNs were not included in outright LSAP3 purchases. On May 21, the Desk began to accept FRNs as collateral in its securities lending and repo operations, and noted that it expected its first reinvestments in FRNs to occur on July 31, 2014. Once such securities were held by the SOMA, FRNs would be available for borrowing in the daily securities lending program and could be pledged in reverse repo operations. In July, the Desk purchased nearly \$5 million in FRNs during its normal reinvestments of maturing Treasury principal. A portion of these FRN holdings were lent out in regular securities lending operations at several points through the year.

^aSee https://www.treasurydirect.gov/indiv/research/indepth/frns/res_frn.htm and <http://libertystreeteconomics.newyorkfed.org/2014/04/introduction-to-the-floating-rate-note-treasury-security.html>

securities, perhaps related in part to the declining volume of Fed purchases. Although market liquidity was normal, fails to deliver in certain on-the-run benchmark Treasury securities rose throughout 2014 as many market participants placed positions anticipating that interest rates would rise from very low levels (Chart 4).⁸ In June, the par value of fails to deliver in Treasury securities reached its highest level since the introduction in May 2009 of a punitive charge on counterparties failing to deliver securities; on-the-run securities accounted for a significant portion of these fails.⁹ As noted earlier, the Desk rarely purchased

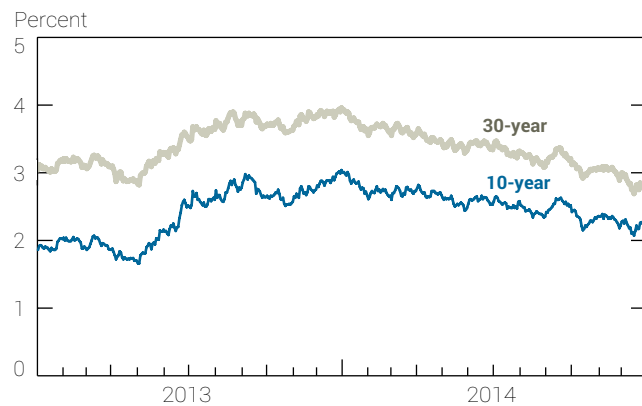
Chart 3
SOMA Securities Lending in Treasuries



Sources: Federal Reserve Bank of New York; The Depository Trust & Clearing Corporation.

Note: Figures are monthly.

Chart 4
U.S. Treasury Yields

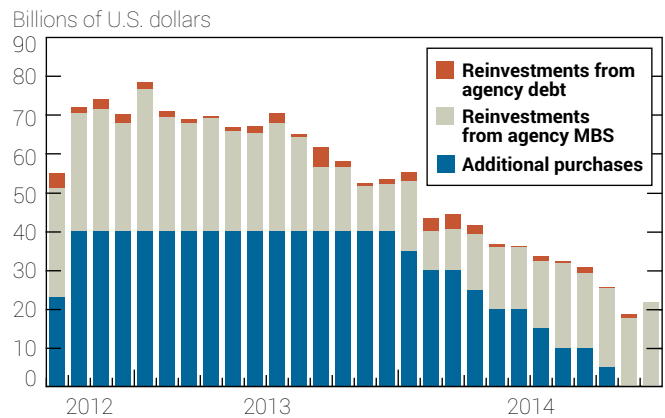


Source: Board of Governors of the Federal Reserve System.

Note: Figures are daily.

on-the-run securities in its purchase operations, and the limited amount of rollovers of maturing Treasury securities in the SOMA meant fewer new on-the-runs were acquired through reinvestments. Many market participants suggested that had the SOMA held such securities in its portfolio, it could have alleviated market stress by lending them out. Indeed, volumes in the securities lending program did not increase in tandem with the rise in fails to deliver in 2014.

Chart 5
SOMA Agency MBS Purchases under LSAP3



Source: Federal Reserve Bank of New York.

Note: Figures are monthly.

AGENCY MBS OPERATIONS

In addition to authorizing the Desk's Treasury security purchases, the FOMC directed the Desk to purchase MBS guaranteed by the three government-sponsored enterprises (GSEs): Fannie Mae, Freddie Mac, and Ginnie Mae. For six consecutive meetings beginning in December 2013, the FOMC voted to reduce the pace of agency MBS purchases in \$5 billion increments. In September, the Committee judged that sufficient progress in the labor market had been made to conclude the program at the end of October with a final \$5 billion reduction. Throughout the year, the Desk was also directed to continue to reinvest principal payments from agency debt and agency MBS in agency MBS (**Chart 5**).

In total, the Desk completed \$200 billion in additional purchases in 2014. Adding this amount to the \$623 billion purchased in 2012 and 2013 brings the total size of large-scale agency MBS purchases under the open-ended program to \$823 billion.

The Desk did not sell any agency MBS securities outright in 2014 for policy implementation, but did engage in temporary sales through dollar roll transactions, discussed further below.¹⁰

Operation Results

The Desk conducted agency MBS purchase operations on most trading days in 2014 for a total purchase amount of \$420 billion. This

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figure comprises \$200 billion in additional purchases and \$220 billion from reinvestments of principal payments. For comparison, in 2013, total purchases including reinvestments totaled \$783 billion.

Within the GSE-guaranteed MBS universe, purchases took place in the “to-be-announced” (TBA) market and were concentrated in thirty-year securities, because these make up the majority of coupon issuance.¹¹ The remainder consisted of fifteen-year Fannie Mae and Freddie Mac securities (Table 3). The fifteen-year securities, which are strongly related to refinancing activity, accounted for 10 percent of the Desk’s purchases—down 6 percentage points from their 2013 share. This decline mirrors the decrease in new issuance of fifteen-year securities in the market, which declined as a share of all issuance from 18 percent in 2013 to 12 percent in 2014.¹²

For each agency issuer and maturity term, agency MBS can be grouped by the coupon rate that they pay. Typically, issuers minimize costs and maximize expected returns by issuing coupons closest to the primary mortgage rate minus a spread (which incorporates

compensation for servicing the mortgage). Newly issued thirty-year securities were concentrated in 3.5 and 4.0 percent coupons in 2014, reflecting an average 100 basis points spread from the primary mortgage rate. Production coupon rates edged lower during 2014 alongside the steady decline in longer-term interest rates (Chart 6).

Consistent with the drop in refinancing activity noted above, pay-downs of SOMA agency MBS principal and the resultant purchases required to reinvest those proceeds declined from \$273 billion in 2013 to \$204 billion in 2014 (Chart 7).¹³ The decline in SOMA MBS principal pay-downs occurred despite the larger overall size of the MBS portfolio. An additional \$16 billion in purchases were executed in 2014 reinvestment cycles to reinvest maturing agency debt in agency MBS.

Operational Approach

The Desk conducted all open market purchases according to operating policies that were released in September 2012 and periodically updated thereafter. The operating policies specified how the Desk

Table 3

Distribution of Agency MBS Operations in 2014

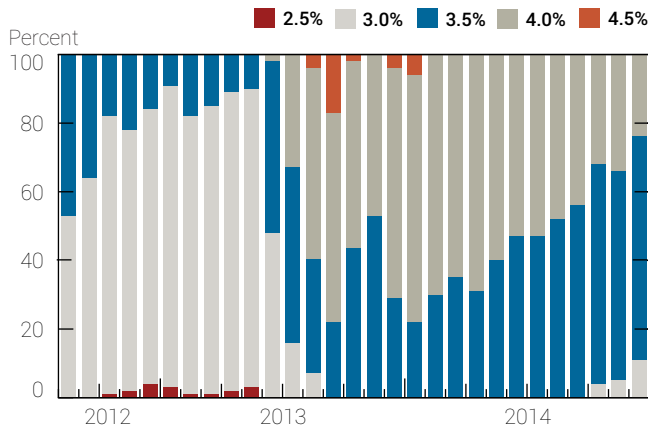
	SOMA Purchases (Billions of U.S. Dollars)	Issuance (Billions of U.S. Dollars)	SOMA Purchases as a Share of Issuance (Percent)
Term			
30-year	376	738	51
15-year	44	103	43
Agency			
Fannie Mae	194	336	58
Freddie Mac	125	225	56
Ginnie Mae	101	279	36
Coupon			
≤ 2.5%	5	14	36
3.0%	33	78	42
3.5%	169	286	59
4.0%	210	384	55
≥ 4.5%	3	79	4

Sources: Federal Reserve Bank of New York; eMBS.

Notes: Figures may be rounded. Issuance figures represent gross issuance of fixed-rate agency MBS in 2014.

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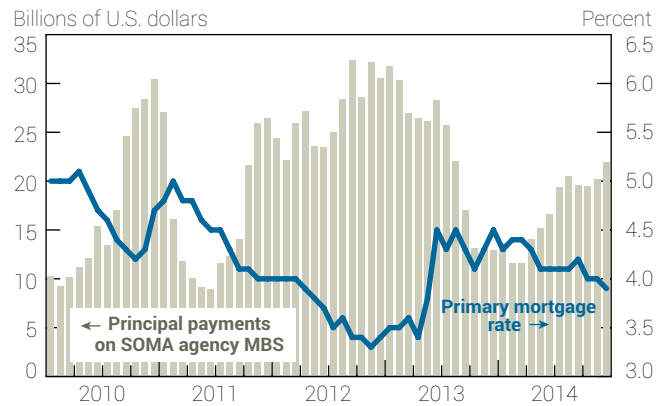
Chart 6
SOMA Purchases of Agency MBS by Coupon



Source: Federal Reserve Bank of New York.

Note: Figures are monthly and consist of thirty-year agency MBS purchases only.

Chart 7
SOMA Agency MBS Principal Payments and Primary Mortgage Rate



Sources: Federal Reserve Bank of New York; Federal Home Loan Mortgage Corporation.

Note: Figures are monthly.

would execute operations. Additionally, the Desk released statements following each FOMC meeting in 2014 noting the new pace at which it was directed to purchase. Each Friday afternoon, the Desk released a tentative weekly schedule of new purchase operations; on the eighth business day of each month, it announced a tentative amount for the following month's reinvestments.¹⁴ Further, the Desk released information on trades that took place in the prior month, including price, trade amount, agency, coupon, term, and settlement date.

The distribution of agency MBS purchases by coupon and issuing agency was intended to reflect origination patterns. Thus, purchases were targeted toward newly produced coupons in thirty- and fifteen-year securities issued by the three GSEs in the TBA market. These securities are closely linked to new primary issuance and accordingly tied to primary mortgage rates.

After April 2014, the Desk decreased the number of operations per month and increased the amount purchased per operation. While the reduction in monthly purchase amounts was one factor leading to fewer and larger operations over time, the notable change seen after April was due to the Desk's shift in trading platforms. In that month, the Desk began to execute an increasing share of its purchase operations on the FedTrade platform, phasing out its

use of the commercial TradeWeb platform for these transactions by June. This shift represented a major enhancement to the Desk's operational approach (see **Box 3**).

Since the Desk transacted in the TBA market, purchases were scheduled to settle—meaning a security was delivered to the Federal Reserve—up to three months following the trade date. In certain cases, agency MBS securities could become relatively scarce in the market, and the Desk had the option to conduct dollar roll transactions to facilitate settlement.¹⁵ A dollar roll sale is a transaction that involves the sale of agency MBS for delivery in one month with the simultaneous agreement to purchase substantially similar securities in the following month. Dollar roll sales helped the Desk ease market stress by allowing dealers more time to obtain securities in the TBA market that were required to settle transactions, in exchange for a market price that compensated the Federal Reserve. Dollar roll transactions represented only 2 percent of the Desk's expected agency MBS settlements in 2014, down from 5 percent in 2013—a decline that suggests minimal stress in agency MBS markets (**Chart 8**).¹⁶

The Desk required counterparties to post a margin on the unsettled trade amount, given that up to three months may have passed before a trade was settled. The margin was calculated on a daily

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Box 3

Executing Agency MBS Operations on FedTrade

Prior to April 2014, all agency MBS operations were conducted on the commercial TradeWeb platform. These operations were conducted with a rotating subset of four primary dealers—the maximum number of dealers Tradeweb allowed—to ensure adequate competition. The executed price of the trade was only transparent to the winning dealer whose offer to sell the agency MBS was accepted by the Desk. The Desk released both a weekly summary of the amount it purchased by product and a monthly summary of the amount it purchased by product and price.

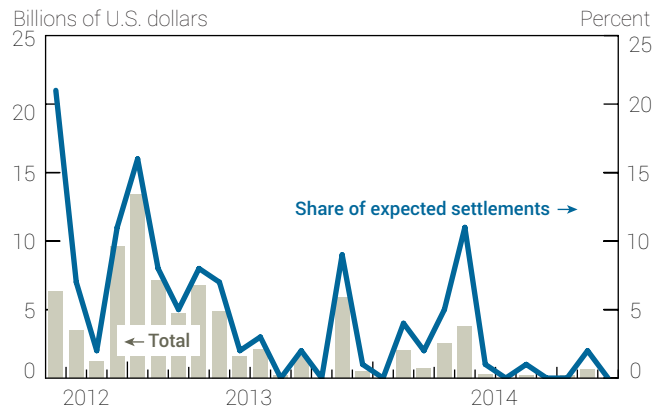
In early April, the Desk began executing outright purchases of agency MBS over its proprietary FedTrade platform—the same platform used in several other Desk operations. The switch to FedTrade, which was completed by early June, fulfilled three objectives: 1) it minimized operational risk by eliminating the reliance on a third-party software provider and by reducing manual processes, 2) it improved efficiency and competitiveness by permitting transactions with a larger number of counterparties—and all at the same time, and 3) it increased transparency around the Desk's mortgage operations through the advance announcement of operation details and the prompt release of results.

FedTrade operations were conducted using multiple-price auctions, meaning that each offer at or lower than the stop-out rate was transacted at the actual offer rate—a practice similar to that used in the Desk's Treasury operations. All primary dealers that transact in agency MBS were expected to participate meaningfully, and each dealer was allowed to submit up to ten offers on each security included in the operation. The competitiveness of each dealer's offers was assessed by their proximity to prevailing market prices at the auction close.

basis, and served to protect the New York Fed from counterparty credit risk exposure arising from unsettled MBS trades. There was no change in this policy from the prior year.

Agency MBS operations were conducted with primary dealers that transact in this market. Additionally, in August 2014, the Desk announced the Mortgage Operations Counterparty (MOC) pilot program, which was modeled after the recently concluded TOC

Chart 8
SOMA Dollar Roll Sales



Source: Federal Reserve Bank of New York.

Note: Figures are monthly by settlement month.

program. The FRBNY's intent in conducting this pilot program was to explore ways to broaden access to MBS open market operations and to determine the extent to which firms beyond the Primary Dealer community could augment the Desk's operational capacity and resiliency in its monetary policy operations. Three counterparties were announced in November, and they began participating in outright purchase operations in mid-December.¹⁷

Market Functioning

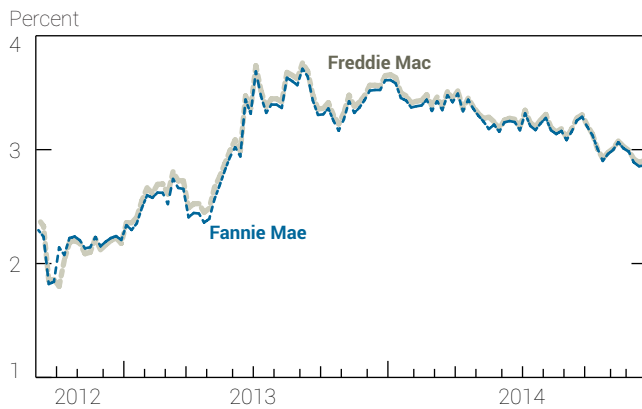
Having risen notably in 2013, yields on agency MBS securities declined modestly over the course of 2014. Further, spreads to Treasury securities of similar duration, adjusted for the value of the prepayment option, narrowed during the year—most sharply for the Fannie Mae 3.5 percent coupon. The price appreciation of agency MBS relative to Treasuries has been attributed to subdued origination trends, low interest rate volatility, and the substantial volume of Federal Reserve purchases during the year (**Chart 9**).

Against this backdrop of declining origination, Desk purchases accounted for 50 percent of gross issuance of eligible securities for the year as a whole (**Chart 10**). This ratio was higher in the first quarter of the year when gross issuance was relatively low and purchase amounts were relatively larger. It declined sharply in the second quarter when seasonal factors and lower interest rates boosted gross issuance and the pace of Desk purchases declined. At the end of the

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Chart 9
Thirty-Year Agency MBS Current Coupon Yields



Source: Bloomberg L.P.

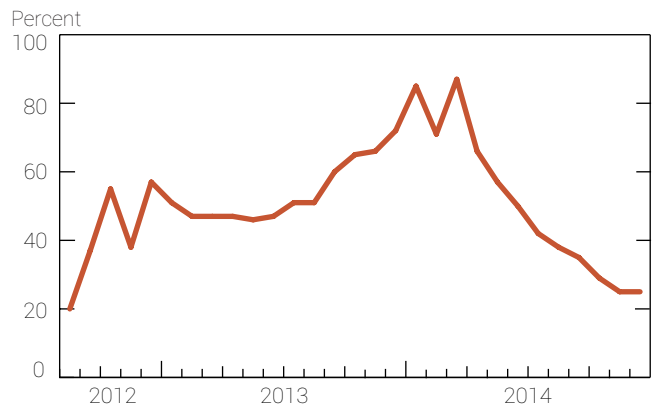
Note: Figures are weekly.

year, when only reinvestment activity was occurring, Desk purchases accounted for approximately 20 percent of gross issuance.

Major indicators of liquidity in agency MBS markets, including trading volumes and average trade sizes, increased modestly over the course of the year; however, they remained at the lower end of the range seen over the past several years. Purchase operations were affected by the bout of market volatility and liquidity impairment that took place on October 15, when interest rates declined sharply without an apparent catalyst. On that day, the operation was extended by ten minutes, from 9:45 a.m. to 9:55 a.m., because of low levels of participation up to that point. After allowing counterparties additional time to enter offers, the operation closed with adequate offers to cover the purchase amount fully.

Settlements of agency MBS purchases generally went smoothly throughout the year, as evidenced by the limited amount of dollar rolls undertaken by the Desk. The implied financing rate on dollar roll transactions for production coupon securities, which is a measure of the availability of a particular cohort of TBA securities relative to demand for those securities, was near zero for much of the year—a sign of limited scarcity. In private markets, fails to deliver in agency MBS securities were near multiyear lows as well.

Chart 10
SOMA Agency MBS Purchases as a Share of Gross Fixed-Rate Issuance



Sources: Federal Reserve Bank of New York; eMBS.

Note: Figures are monthly.

AGENCY DEBT OPERATIONS

In 2014, the Desk did not purchase or sell any direct obligations of the housing-related GSEs. About \$19 billion of agency debt holdings matured in 2014, and proceeds were reinvested in agency MBS throughout the year.

Agency debt securities in the SOMA portfolio are offered for loan in the SOMA securities lending program. As in the case of Treasury securities, an auction is held each day to determine the fee for lending specific securities. The minimum bid rate is 5 basis points. On average, primary dealers borrowed less than \$1 billion of agency debt securities per day in 2014—a level consistent with the low levels seen in prior years. Loans of agency debt are collateralized with Treasury securities.

Temporary Operations

Temporary open market operations, including repo (RP) and reverse repo (RRP) operations, are typically used to manage the supply of reserves, and thus influence the federal funds market. Since December 2008, the FOMC has directed the Desk to maintain conditions in the market for reserve balances such that the federal funds rate trades in a range of 0 to ¼ percent. The Desk has not

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needed to conduct any temporary open market operations since that time to fulfill its monetary policy directives.

Prior to the financial crisis of 2008-09, the Federal Reserve maintained a modest structural deficit in the level of reserve balances supplied to the federal funds market, such that small changes in the supply of reserves significantly changed the market-clearing price. The Desk would undertake temporary open market operations to make such adjustments to the supply of reserves, and thus maintain the federal funds effective rate (FFER) at its target.¹⁸ Since the financial crisis, the monetary policy framework has changed in several ways. Instead of adopting a single-point target, the FOMC has employed a target range of between 0 and ¼ percent for the federal funds rate. Actions undertaken since the crisis have elevated the level of reserve balances and eliminated the structural deficit,

with the excess supply of reserves putting downward pressure on rates. The payment of interest on excess reserves (IOER), set at ¼ percent, has provided a countervailing upward pull on rates. In tandem, these factors maintained the FFER within the target range without the need for any temporary open market operations.

The Desk still maintains its operational capacity to conduct RP operations, and has periodically tested this capability in recent years. In 2014, more extensive testing was conducted in overnight and term RRP operations as part of the Desk's operational readiness exercises. Peak usage occurred over year-end, with a combined amount of \$397 billion awarded on December 31, but for most of the year, usage was below \$200 billion. A more detailed review of these exercises is provided in this report's discussion of planning for normalization.



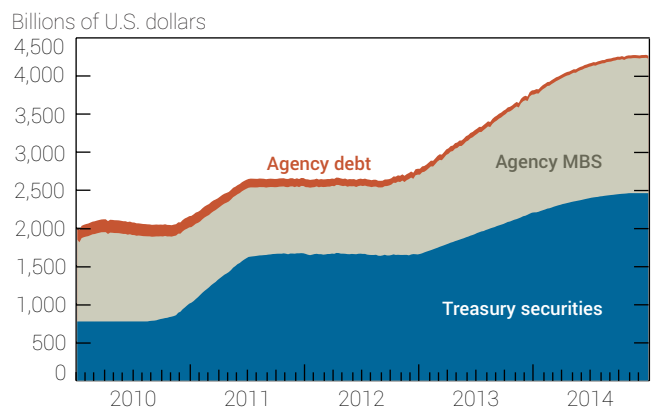
Balance Sheet Effects of Federal Reserve Operations

The asset purchase program completed in 2014 was one of several portfolio-oriented programs that the Federal Reserve has undertaken since 2008 to provide additional monetary policy accommodation once U.S. short-term interest rates reached the zero lower bound (**Box 4**). Together, these programs have had a profound effect on the Federal Reserve's balance sheet, including shifts in the size and composition of the SOMA's domestic securities portfolio and in the composition of Federal Reserve liabilities associated with those assets. As a result of these changes, the portfolio has contributed to outsized increases in the Federal Reserve's income and remittances to the Treasury. A projection exercise, summarized below, illustrates how the size of the portfolio and the net income associated with it are expected to decline from their currently elevated levels as the FOMC eventually normalizes the stance and conduct of monetary policy.

SOMA Domestic Securities Holdings

Since 2008, the composition of the SOMA's domestic securities holdings has shifted significantly from an all-Treasury portfolio with a relatively short average maturity. By the end of 2014, the portfolio had become much larger, with a longer maturity profile and a sizable allocation to agency MBS securities. The portfolio roughly quadrupled in size from its pre-crisis level to \$4.26 trillion at the end of 2014, and it continued to serve as a source of monetary policy accommodation. The following discussion reviews changes in the portfolio that took place in 2014, as well as changes that began with the start of LSAP3 in September 2012.

Chart 11
Composition of SOMA Domestic Securities Holdings



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly averages of daily figures and include unsettled holdings.

PORTFOLIO SIZE AND COMPOSITION

Domestic securities holdings of the System Open Market Account (SOMA) grew by \$450 billion in 2014 through additional asset purchases under LSAP3. Over the entire course of LSAP3, the SOMA's domestic securities holdings grew by \$1.61 trillion, a 38 percent increase (**Chart 11**).¹⁹ During the same period, the size of the SOMA relative to U.S. nominal GDP increased to about 24 percent from approximately 16 percent.

Although the size of the portfolio grew substantially during LSAP3, the overall composition of the portfolio did not change

Box 4

Timeline of Asset Purchase Programs

Since late 2008, the FOMC has undertaken three large-scale asset purchase (LSAP) programs and a Treasury security maturity extension program (MEP), and has used reinvestment policies to preserve or augment the accommodative effects of its large securities portfolio.

The first LSAP program, announced in November 2008, focused on purchases of direct obligations of housing-related GSEs and GSE-backed MBS in order to support housing markets and foster improved conditions in financial markets more generally. In March 2009, the FOMC substantially expanded the size of the program and added Treasury securities to it. A total of \$1,250 billion of agency MBS, \$172 billion of agency debt, and \$300 billion of longer-term Treasury securities were purchased under LSAP1 before the program's completion in March 2010.

To promote a faster pace of economic recovery and to help ensure that inflation, over time, would be at levels consistent with the FOMC's mandate, a second LSAP program ran from November 2010 to June 2011. During this time, the Federal Reserve purchased \$600 billion of longer-term Treasury securities.

In September 2011, the FOMC announced a maturity extension pro-

gram, which ultimately ran from October 2011 through December 2012. The MEP raised the average maturity of the SOMA's portfolio of Treasury securities without increasing its total size. It did so through sales and redemptions of \$667 billion in shorter-term securities and purchases of an equivalent par amount of longer-term securities.

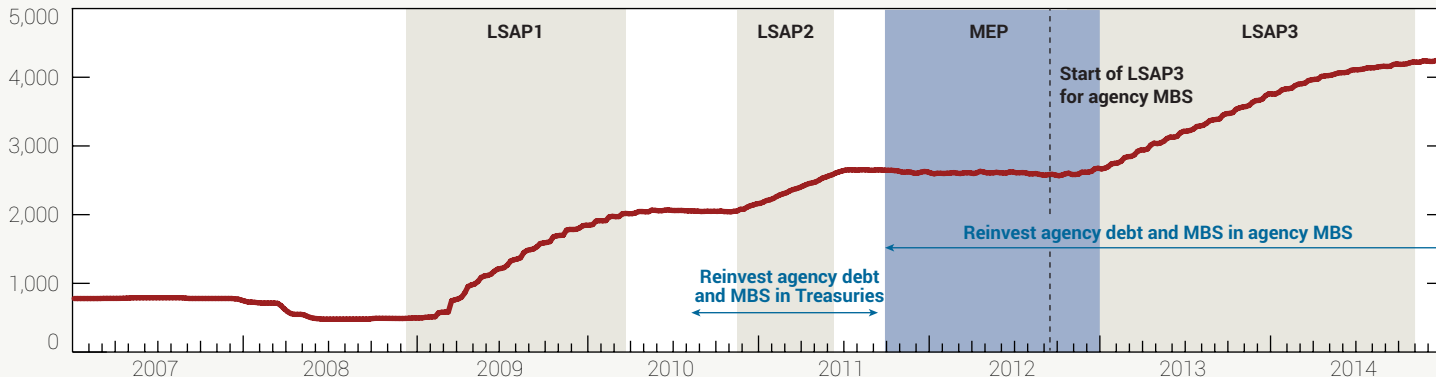
In September 2012, the FOMC initiated a third LSAP program, which ran concurrently with the MEP through the end of the year. At the start of LSAP3, the Federal Reserve purchased agency MBS, then added outright Treasury securities purchases in January 2013 after the MEP concluded. Unlike the parameters of prior purchase programs, the length and total purchase amount under LSAP3 were open-ended, with the FOMC announcing at each meeting a monthly pace of purchases based on progress toward a substantial improvement in the labor market outlook in a context of price stability, and an assessment of the likely efficacy and costs of the purchases. Through December 2013, the FOMC purchased agency MBS at a pace of \$40 billion per month and longer-term Treasury securities at a pace of \$45 billion per month. Over 2014, the monthly purchase pace was reduced in measured steps. At the

completion of LSAP3 in October 2014, a total of \$823 billion in agency MBS and \$790 billion in Treasury securities had been purchased under the program (see chart below).

The FOMC has also used reinvestment policies as a portfolio-related tool for monetary policy implementation. Agency MBS and agency debt holdings acquired during LSAP1 were initially allowed to run off through maturities or prepayments, thus reducing the size of the SOMA portfolio. In August 2010, however, to maintain its level of monetary accommodation, the FOMC announced it would keep constant its holdings of securities at existing levels by reinvesting principal payments from agency debt and agency MBS in longer-term Treasury securities. Another shift occurred in October 2011, at the start of the MEP, when the FOMC specified that agency MBS and agency debt reinvestments should instead be directed to agency MBS—reinvestment activity that continues today. Aside from a period of redemptions during the last six months of the MEP, the FOMC has also continued its long-standing practice of rolling over its holdings of Treasury securities as they mature.

SOMA Domestic Securities Holdings

Billions of U.S. dollars

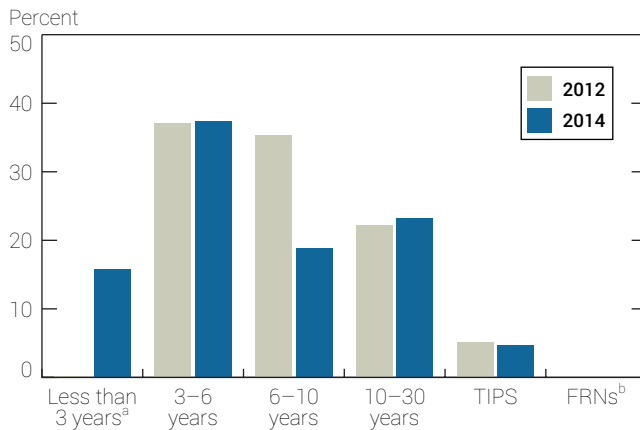


Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly averages of daily figures and include unsettled holdings.

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Chart 12
Maturity Distribution of SOMA Treasury Holdings



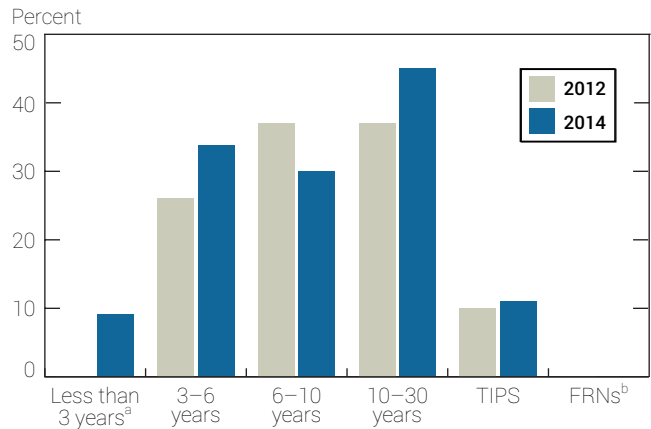
Source: Federal Reserve Bank of New York.

Note: Figures are as of year-end.

^a Less than 1 percent of holdings in 2012 are securities with less than three years remaining to maturity.

^b Less than 1 percent of holdings in 2014 are floating rate notes (FRNs).

Chart 13
SOMA Treasury Holdings as a Share of Outstanding Treasury Supply



Sources: Federal Reserve Bank of New York; U.S. Treasury Department.

Note: Figures are as of year-end.

^aIn 2012, SOMA held less than 1 percent of the outstanding supply of Treasury securities with less than three years remaining to maturity.

^bIn 2014, SOMA held less than 1 percent of the outstanding supply of floating rate notes (FRNs).

significantly—as it had during previous asset purchase programs. As a share of the total SOMA portfolio, agency MBS holdings constituted just under 41 percent, Treasury holdings 58 percent, and agency debt just under 1 percent. These proportions are similar to those at the end of 2013, and reflect a small increase in the share of agency MBS since the start of LSAP3.

COMPOSITION OF TREASURY HOLDINGS

Over the course of LSAP3, the Treasury portion of the SOMA portfolio increased by \$790 billion to \$2.46 trillion, primarily because of additional asset purchases. In late 2012, just prior to the start of Treasury purchases, the portfolio was near its peak duration of 8.0 years, reflecting the impact of the MEP. The duration of the Treasury portfolio then slowly declined to 7.6 at end-2013 and 7.4 at end-2014 as the aging of extant portfolio holdings outweighed the addition of new LSAP3 purchases. For example, although the majority of additional purchases were of securities with six or more years to maturity, the percentage of securities in the SOMA with fewer than six years remaining to maturity increased to 54 percent from 38 percent over the program (**Chart 12**). Although the

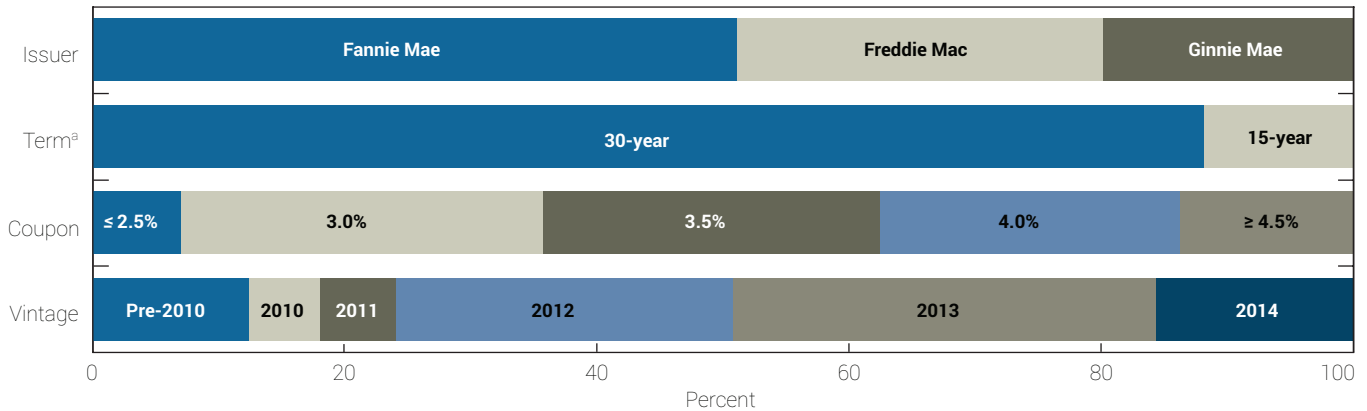
portfolio continues to age, there will not be a significant amount of Treasury holdings maturing from it until early 2016.

As of the end of 2014, the SOMA portfolio held about 20 percent of the outstanding supply of marketable Treasury securities.²⁰ It owned a larger proportion of the longer-term securities outstanding. For example, it held 45 percent of Treasuries with ten to thirty years remaining until maturity—a share essentially unchanged since the end of 2013 and 8 percentage points higher than just prior to the start of LSAP3 (**Chart 13**).

COMPOSITION OF AGENCY MBS HOLDINGS

During LSAP3, the agency MBS portion of the SOMA portfolio increased by \$863 billion to \$1.76 trillion. At the end of 2014, 51 percent of the settled agency MBS portfolio was held in MBS guaranteed by Fannie Mae, 29 percent in MBS guaranteed by Freddie Mac, and 20 percent in MBS guaranteed by Ginnie Mae. Eighty-eight percent of the portfolio was held in thirty-year MBS and the remaining 12 percent in fifteen-year MBS. The shares of Ginnie Mae and fifteen-year MBS in SOMA increased during

Chart 14

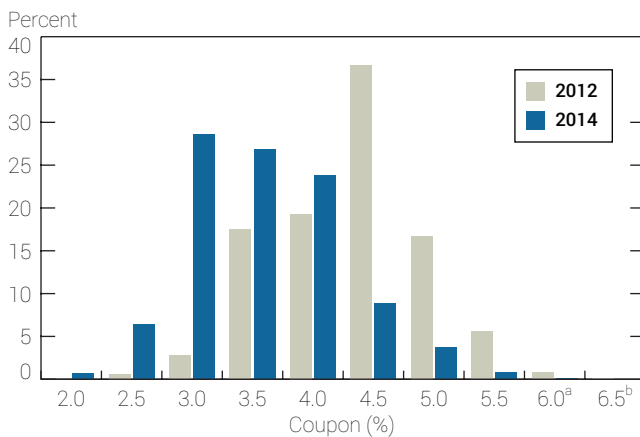
Distribution of SOMA Agency MBS Holdings

Source: Federal Reserve Bank of New York.

Notes: Figures are as of December 31, 2014. Holdings total \$1,737 billion and consist of settled holdings only.

^a Less than 1 percent of holdings are ten- and twenty-year agency MBS, which may be delivered into fifteen- and thirty-year TBA contracts, respectively.

Chart 15

Coupon Distribution of SOMA Agency MBS Holdings

Source: Federal Reserve Bank of New York.

Note: Figures are as of August 31, 2012, and December 31, 2014.

^a Less than 1 percent of holdings in 2014 are 6.0 percent coupons.

^b Less than 1 percent of holdings in 2012 and 2014 are 6.5 percent coupons.

LSAP3, as allocations were adjusted in line with the relative availability of securities for settlement (**Chart 14**).

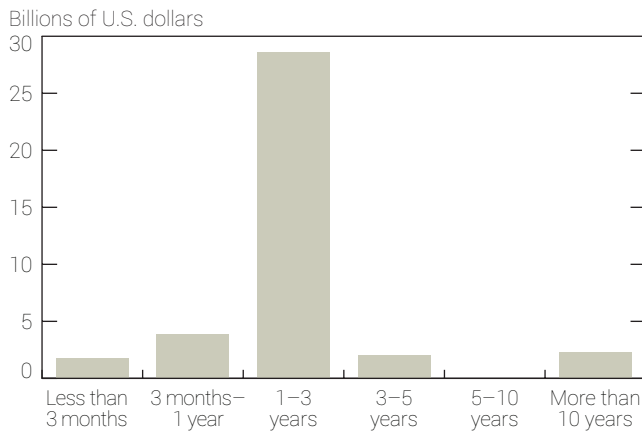
At the end of 2014, just over half of the portfolio was in 3.0 and 3.5 percent coupons—similar to the proportion of the portfolio in 4.0 and 4.5 percent coupons at the start of LSAP3 (**Chart 15**). The older, higher coupon securities held at the start of LSAP3 were acquired in past asset purchase programs, when longer-term interest rates were significantly higher. Accordingly, the weighted average coupon of the agency MBS in the portfolio decreased over the LSAP3 period to 3.6 percent at the end of 2014, from 4.2 percent in September 2012.

The Federal Reserve's ownership of the outstanding stock of fixed-rate agency MBS available in the market rose to 34 percent from 30 percent at the end of 2013, and from 19 percent at the start of LSAP3. Ownership was more concentrated in certain sectors that have been the focus of more recent purchases. For example, at the end of 2014, the SOMA held 51 percent of outstanding thirty-year, 2013- and 2014-vintage, 3.0 and 4.0 percent coupon agency MBS. The SOMA portfolio also held lower coupons and newer loans, on average, than the broader market. For example, the weighted-average coupon of securities held in the SOMA was 3.6 percent, compared with the 3.9 percent average coupon in the broader market. The weighted average loan age of SOMA securities was twenty-seven months, compared with thirty-eight months for the broader market.²¹

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Chart 16
Maturity Distribution of SOMA Agency Debt Holdings



Source: Federal Reserve Bank of New York.
 Note: Figures are as of December 31, 2014.

COMPOSITION OF AGENCY DEBT HOLDINGS

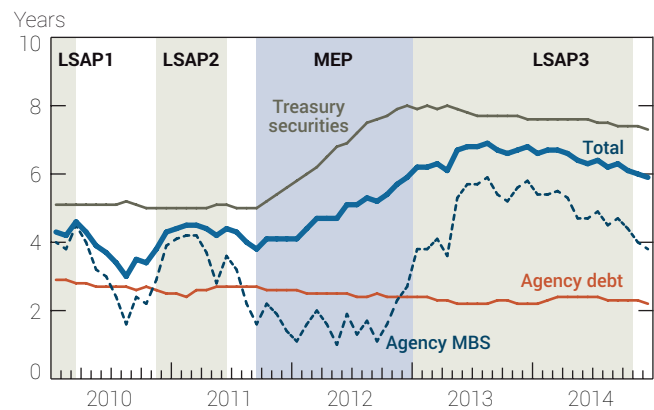
At the end of 2014, the SOMA held a total face value of \$39 billion of agency debt securities, acquired during the Federal Reserve's first asset purchase program from 2008 to 2010. About 89 percent of agency debt securities held in SOMA will mature within three years (Chart 16).

PORTFOLIO RISK MEASURES

The Federal Reserve's purchases of longer-term securities meant that the interest rate risk and other market risks associated with those assets were assumed by the Federal Reserve rather than by private investors (see **Box 1**). Duration measures the sensitivity of a security's price to changes in interest rates, and may be thought of as the weighted-average term to maturity of cash flows from the portfolio. The longer the duration of a security, the more sensitive it will be to changes in interest rates. Duration is generally greater for longer-maturity and lower-coupon securities.²² The SOMA portfolio's weighted average duration was 5.9 years at the end of 2014, reflecting a decline from 6.8 years at the end of 2013, and 5.3 years at the start of LSAP3 (Chart 17).²³

These fluctuations were driven primarily by trends in prevailing market yields on agency MBS securities. In the first half of 2013, the duration of the agency MBS portfolio holdings was driven higher

Chart 17
Average Duration of SOMA Domestic Securities Holdings



Source: Federal Reserve Bank of New York.

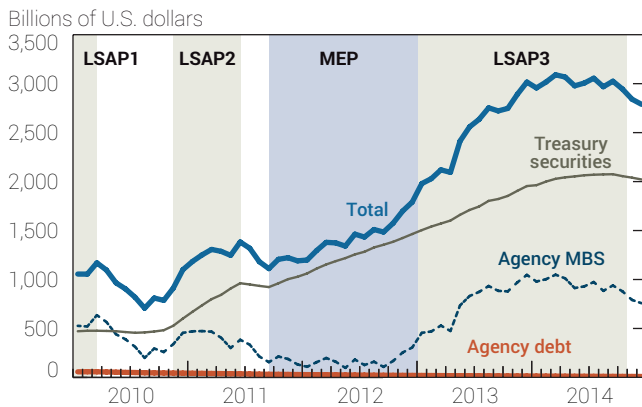
Notes: Figures are monthly. LSAP3 purchases of agency MBS began in September 2012.

by both the purchase of new, longer-duration securities and the sharp rise in interest rates beginning in May of that year. When mortgage rates rise, the incentive for borrowers to refinance (and thus prepay their current mortgage) falls, resulting in a lengthening of the duration of MBS. After late 2013, interest rates stabilized and then declined, developments that had the opposite effect of incentivizing refinancing, resulting in a reduction in the weighted-average duration of the overall portfolio through the end of 2014. The downward drift in the duration of the Treasury portfolio arising from the aging of the extant portfolio further contributed to the decline in the total portfolio's duration.

Although the weighted-average duration of the portfolio fell over the course of LSAP3, the dollar value of duration held in the portfolio increased as the Federal Reserve continued to purchase additional securities. One measure of dollar duration is the ten-year equivalent, which tracks the amount of ten-year Treasury securities that would be needed to match the duration risk of the portfolio. The SOMA portfolio's ten-year equivalent measure rose from about \$1.5 trillion prior to the start of LSAP3 to a peak of \$3.1 trillion in March 2014, before declining slightly to a year-end level of \$2.8 trillion (Chart 18).

In addition, the SOMA purchases have absorbed a substantial amount of prepayment risk—the risk arising from the prepayment

Chart 18
SOMA Domestic Securities Holdings in Ten-Year Equivalents



Source: Federal Reserve Bank of New York.

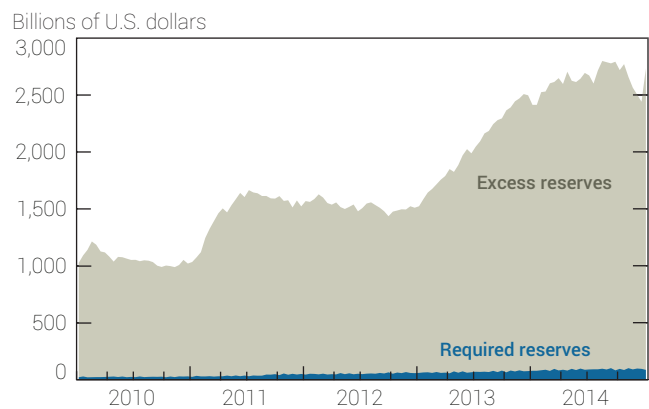
Notes: Figures are monthly. LSAP3 purchases of agency MBS began in September 2012.

option embedded in agency MBS—from the market. This option is held by homeowners, who have the right to prepay their mortgage at any time, adding uncertainty to the agency MBS holder's expected cash flows. The primary factor driving prepayments is the level of interest rates, with lower rates encouraging more homeowners to refinance their loans and shortening the duration of MBS securitizing these loans.²⁴

Factors Affecting the Supply of Reserves

Reserve balances, which are deposits held by depository institutions at the Federal Reserve, grew to historically elevated levels during 2014, and were the largest liability of the Federal Reserve.²⁵ As in prior years, purchases of longer-term securities for the purpose of monetary accommodation have been the largest driver of the growth of reserves in 2014. When such assets are purchased, new reserves are created in the process. Changes in other Federal Reserve liabilities can also influence the aggregate amount of reserves held. Indeed, reserve balances did not increase to the same extent as SOMA assets in 2014 because of offsetting changes in the Federal Reserve's consolidated balance sheet.

Chart 19
Reserve Balances



Source: Board of Governors of the Federal Reserve System.

Notes: Figures are biweekly. Data prior to June 27, 2013, are reserve balance requirements and excess balances. Data beginning June 27, 2013, are balances maintained to satisfy reserve balance requirements and balances that exceed the upper bound of the penalty-free band.

RESERVE BALANCES

Reserve balances grew a net \$174 billion in 2014 to a year-end level of \$2.59 trillion on a biweekly average basis (**Chart 19**).²⁶ The change, which was modest relative to the substantial increase in assets over 2014, reflected the net effect of changes in several other balance sheet items. Reserve balances rose throughout the year to a peak level of \$2.81 trillion in early September, driven by the ongoing expansion of the SOMA's securities holdings. Settlement of the Federal Reserve's final additional asset purchases in the fourth quarter did have further reserve-adding effects (albeit at a slower pace owing to the tapering of purchases). However, the testing of new operational tools, which shifted the composition of the Federal Reserve's liabilities away from reserves into reverse repos and term deposits, had a countervailing reserve-draining impact. Autonomous factors, which are outside the direct control of the Federal Reserve, also had a net reserve-draining effect.

As has been the case since the financial crisis, the level of total reserve balances remains well in excess of required levels.²⁷ Reserve balance requirements grew to \$85 billion in 2014, up \$13 billion from their 2013 level. The increase was in line with the growth in depository institutions' transaction deposits, against which the institutions are required to hold reserves. It represented an

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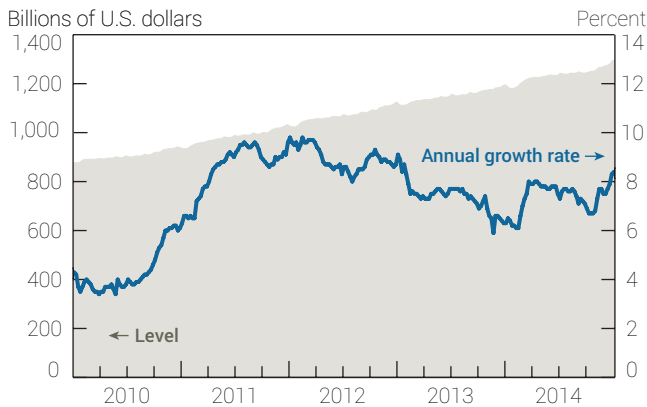
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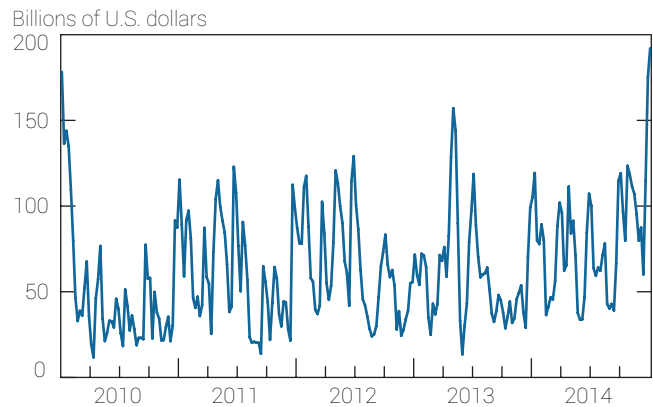
Chart 20
Federal Reserve Notes Outstanding



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly, net of holdings of Federal Reserve Banks.

Chart 21
Treasury General Account Balances



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly averages.

11 percent rate of growth year over year, slightly stronger than in 2013 but considerably below growth rates seen immediately following the financial crisis. Required reserves remain a very small share of total reserve balances. Throughout 2014, the Federal Reserve paid depository institutions an interest rate of $\frac{1}{4}$ percent on both required and excess reserves.

AUTONOMOUS FACTORS

The largest autonomous factors affect the level of reserves in the system by changing the composition of the liability side of the Federal Reserve's balance sheet, or by resulting in the creation of new assets. These factors are considered autonomous because they are not directly influenced by Federal Reserve domestic open market operations.

Federal Reserve Notes

The largest autonomous factor is the quantity of Federal Reserve notes outstanding, which are more commonly known as U.S. dollar paper currency.²⁸ All else equal, the growth of currency reduces the level of reserve balances. The Federal Reserve pays no interest on Federal Reserve notes.²⁹ Federal Reserve notes increased by \$101 billion in 2014 to a year-end level of \$1.34 trillion (Chart 20). This represented an annual growth rate of a little more than 8 percent, somewhat higher than the 2013 growth rate owing to an increase in foreign demand.

Treasury General Account

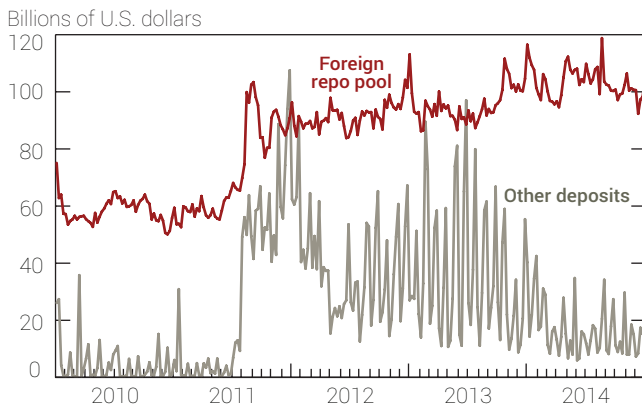
The U.S. Department of the Treasury holds its cash balances at the Federal Reserve in its General Account (TGA), which is the Treasury's primary account for managing its cash flows. All else equal, an increase in the TGA balance reduces the level of reserve balances. Balances in the TGA have been highly volatile, typically swelling when auctions of Treasury securities settle and on tax receipt dates, and shrinking when large payments are made (Chart 21).³⁰ TGA balances in 2014 continued the variability exhibited in previous years, with the weekly average balance ranging from approximately \$34 billion to \$192 billion.³¹ The TGA balance was higher than average at the end of the third quarter, and rose further in the fourth quarter as the Treasury increased its bill issuance sizes. Overall, the weekly average balance during 2014 was \$81 billion, \$20 billion higher than the 2013 average.

Foreign Repo Pool

An overnight reverse repo facility (the "foreign repo pool") has long existed as an investment vehicle for foreign central banks and international accounts that choose to hold a portion of their dollar assets at the New York Fed. This facility is unrelated to the overnight and term reverse repo operations that have been conducted with private sector market participants for operational readiness testing. All else equal, an increase in investment in the foreign repo pool results in a corresponding decrease in reserves. Investments in this

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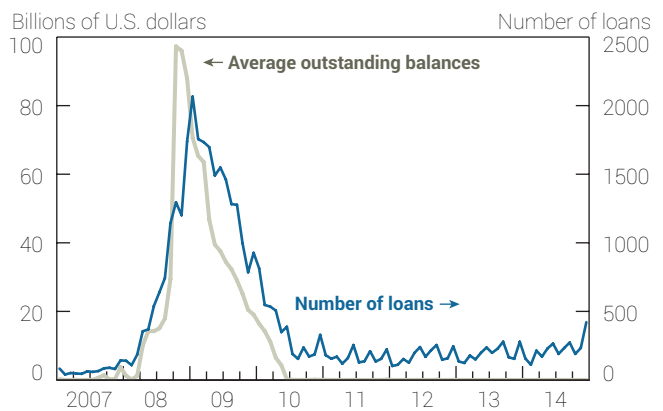
Chart 22

Foreign Repo Pool and Other Deposits

Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly averages.

Chart 23

Primary Credit Facility Loan Balances and Number of Loans

Source: Federal Reserve System.

Note: Figures are monthly.

facility give each participant an undivided interest, proportional to its investment, in an identified pool of domestic securities held in the SOMA portfolio. The daily rate offered on investments in the pool is derived from comparable market-based rates. The foreign repo pool increased to a weekly average of \$103 billion in 2014 from an average of \$96 billion in 2013 (**Chart 22**).

Official Sector and Other Deposits

Separately, official institutions may hold deposits directly at Federal Reserve Banks. Foreign official deposits averaged \$6 billion, while other deposits, including balances held by GSEs, averaged \$17 billion. The Federal Reserve pays no interest on balances in accounts held by non-depository institutions.

OTHER FEDERAL RESERVE OPERATIONS AND STANDING FACILITIES

In addition to open market operations, other operations and standing facilities made available by the Federal Reserve affect the level of reserves.

Term Deposit Facility

During several periods in 2014, the Federal Reserve tested term deposits with depository institutions for the purpose of advance planning

for eventual monetary policy normalization. Term deposits result in a corresponding decrease in reserves. As with RRP exercises, the size and the scope of these operations were not intended to have any impact or signaling effect regarding policy, although the testing at times did result in a significant drain of reserves. One-week term deposits saw the highest take-up of \$402 billion at the seven-day term operation conducted on December 1. For a more detailed discussion of these exercises and their policy context, see pages 36-7 of this report.

Primary Credit Facility

The Primary Credit Facility, the discount window's main lending facility, serves as a backup source of liquidity for depository institutions in generally sound financial condition that have appropriate collateral pledged to a Reserve Bank. All else equal, an increase in discount window borrowing creates new assets and corresponding reserves on the Federal Reserve's balance sheet. Loans are generally limited to overnight maturities and are initiated by depository institutions and approved by Reserve Banks. In addition to its lender of last resort role, the facility is intended to limit upward pressure on overnight interest rates, including the federal funds rate, if a net reserve shortage or a disruption to payment flows should occur. The interest rate on primary credit loans remained at 75 basis points throughout 2014, 50 basis points above the upper limit of the target range for the federal funds rate.

Primary credit borrowings remained subdued in 2014 amid high levels of excess reserves and benign market funding conditions. Average and peak daily loan balances stayed close to levels seen in the prior year, and well below pre-crisis levels (**Chart 23**). Although loan balances were consistent with prior years, the number of loans originated was elevated, largely because of ongoing testing. Banks conducted such test loans to ensure that access to the facility was functioning smoothly.

Central Bank Liquidity Swaps

Central bank liquidity swaps are a temporary exchange of currencies between two central banks. By providing foreign central banks with the capacity to deliver U.S. dollar funding to institutions in their jurisdictions, the Federal Reserve can improve liquidity conditions in U.S. dollar funding markets and minimize the risk that strains abroad could spread to U.S. markets. All else equal, U.S. dollar liquidity swaps create reserves corresponding to the dollar amount of the swap. In 2014, the Federal Reserve maintained standing dollar liquidity swap lines with the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank. The use of dollar liquidity swap lines declined from nearly \$300 million in early 2014 to near zero late in the year due to ongoing improvement in dollar funding conditions.³² Apart from draws on the swap lines for liquidity purposes, the Federal Reserve executed small-value swaps with the Bank of England and Swiss National Bank in December solely for operational readiness purposes.³³

Financial Results

The FOMC's directives in recent years to alter the size and composition of the SOMA portfolio were designed to promote its dual mandate of fostering maximum employment and price stability. Accordingly, portfolio changes were motivated by monetary policy objectives rather than profit. Nonetheless, net SOMA income and remittances to the U.S. Treasury have been significantly above average in recent years.

SOMA INCOME

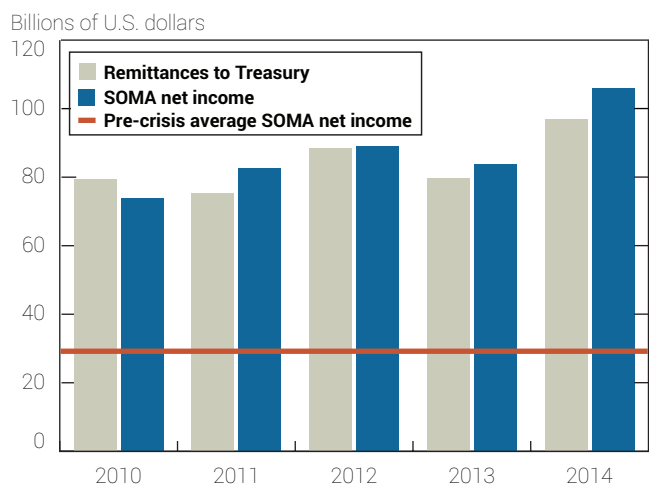
In 2014, total SOMA income was \$113 billion, primarily derived from interest income on its domestic security holdings. SOMA net

income, which takes into account the costs of funding the portfolio, was \$106 billion for 2014.³⁴ This sum exceeds SOMA net income of \$84 billion in 2013 and \$89 billion in 2012. The 2012 figure includes realized gains from sales of shorter-term Treasury securities under the Maturity Extension Program, which boosted income by \$13 billion that year. The large size of the portfolio, its concentration in longer-term securities, and the low interest rates paid on the Federal Reserve's liabilities generated portfolio income well in excess of pre-crisis levels (**Chart 24**).

FEDERAL RESERVE REMITTANCES

The Federal Reserve remits residual net income to the Department of the Treasury.³⁵ Owing largely to net income from the domestic SOMA portfolio, Federal Reserve remittances to the Treasury were \$97 billion in 2014, high by historical standards and up from roughly \$80 billion in 2013. This year's figure far exceeds average yearly remittances of about \$25 billion per year prior to the financial crisis.³⁶

Chart 24
SOMA Net Income and Federal Reserve Remittances to the U.S. Treasury



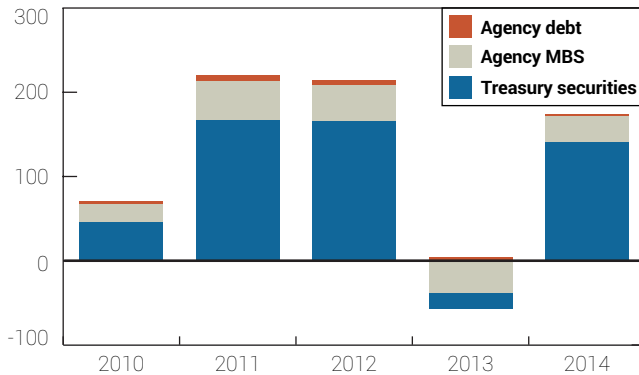
Source: Federal Reserve Bank of New York.

Note: Pre-crisis SOMA net income is calculated as the average annual value from 1997 to 2007.

Chart 25

SOMA Portfolio Unrealized Gains and Losses

Billions of U.S. dollars



Source: Federal Reserve Bank of New York.

Note: Figures are as of year-end.

SOMA UNREALIZED GAINS AND LOSSES

The market value of the SOMA portfolio fluctuates with changes in the prevailing level of interest rates. In 2014, the decline in longer-term interest rates led to a rise in the market value of the portfolio. Unrealized gains on the portfolio, computed as the difference between the market value of the portfolio and its accounting or book value (which reflects amortized cost), were \$174 billion at the end of 2014. The change represented a notable gain relative to the end of 2013, when the portfolio was valued with an unrealized loss of \$53 billion (**Chart 25**).

The unrealized gain or loss position has no effect on net income or Federal Reserve remittances to the Treasury Department unless assets are actually sold and those gains or losses are realized. Further, the entirety of SOMA holdings could not be sold, since a central bank needs assets to balance liabilities demanded by the private sector. For example, currency and required reserves alone amounted to \$1.43 trillion at the end of 2014. These considerations suggest that the figures above are far in excess of any potential gains or losses that would actually be realized if the Federal Reserve were to liquidate its portfolio. Unrealized portfolio gains or losses also have no effect on the conduct of monetary policy. Indeed, the SOMA portfolio's sensitivity to interest rate movements is to a large extent a predictable result of the FOMC's large-scale asset purchases, which

as noted earlier are intended to ease financial conditions by absorbing interest rate risk from the market.

Projections for the SOMA Portfolio and Net Income

A baseline projection for the path of SOMA net income over the next decade is illustrated below. Additionally, the exercise shows the sensitivity of the composition of the SOMA portfolio and SOMA net income to changes in various factors. Some of these factors are within the control of the Federal Reserve while others are not.³⁷ Assumptions underlying these projections are based on publicly available, survey-based financial forecasts and expectations for policy, as well as the FOMC's communications about its principles and plans for policy normalization.

BASELINE AND ALTERNATIVE PROJECTIONS

In the baseline projection scenario, the assumed paths of the target federal funds rate and longer-term interest rates were taken from the Survey of Primary Dealers (SPD) conducted by the Desk before the December 2014 FOMC meeting. According to the survey, the median expectation for the federal funds target rate begins to rise from the current range in the second quarter of 2015 and settles at a level of 3.5 percent in the long run. Median expectations are for the ten-year Treasury yield and the thirty-year fixed primary mortgage rate to rise gradually to 4 percent and approximately 5.5 percent, respectively, by the end of 2018.

The projection exercise for the SOMA portfolio starts with actual holdings as of December 31, 2014. The portfolio is then assumed to evolve in a manner consistent with the framework presented in the Policy Normalization Principles and Plans released by the FOMC following its September 2014 meeting, with details on the framework's application drawn from dealers' median expectations in the December SPD. Specifically, the FOMC is assumed to use the payment of IOER as its primary tool for controlling interest rates, with an overnight reverse repo facility (ON RRP) facility providing supplementary support through the normalization period. These administered rates are set at either end of a 25 basis point range, with the dealers' projected federal funds target rate falling in the center

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of the range.³⁸ Survey results indicate that dealers expect the reinvestment of principal payments from SOMA holdings to cease two quarters following the first federal funds rate hike (or “liftoff”). The exercise assumes that the size of the SOMA portfolio has reached a steady state when reserve balances decline to a level of \$100 billion.³⁹ At that point, the Federal Reserve resumes purchases of Treasury securities in order to offset the ongoing runoff of agency debt and MBS holdings and to support normal balance sheet growth.

Under these assumptions, the size of the SOMA portfolio is projected to remain at its 2014 peak of \$4.3 trillion while reinvestments continue. Dealers project the reinvestments to end two quarters after liftoff, after which securities holdings decline through the redemption of maturing Treasury and agency debt securities and MBS principal payments. The portfolio reaches a normalized size in late 2020. At that time, the portfolio’s composition is estimated to be approximately 45 percent agency MBS and 55 percent Treasury securities (Chart 26).

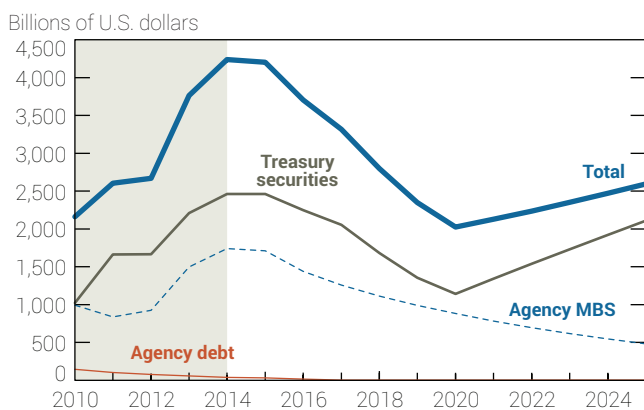
SOMA net income is projected to decline sharply following liftoff as interest payments on reserve balances increase with rising interest rates and, once reinvestments end, as interest income declines with the shrinking of the SOMA securities portfolio. SOMA net income is projected to fall to a trough of roughly \$35 billion in

2018, compared with a historical average of about \$30 billion in the years prior to the crisis. Portfolio net income is projected to rise after 2018 as the level of reserve balances declines; eventually the size of the portfolio normalizes and purchases of Treasury securities resume at higher yields, supporting net income (Chart 27).

These baseline projection results for portfolio balances and net income are largely similar to the projection results in the 2013 SOMA Annual Report, although there are two noteworthy differences. First, in the current baseline projection, the portfolio reaches its steady-state level in late 2020, roughly one year earlier than was projected last year. The earlier normalization date is primarily attributable to a faster pace of principal pay-downs on the agency MBS portfolio, owing to the lower path of longer-term interest rates projected in the current Survey of Primary Dealers compared with the 2013 survey.

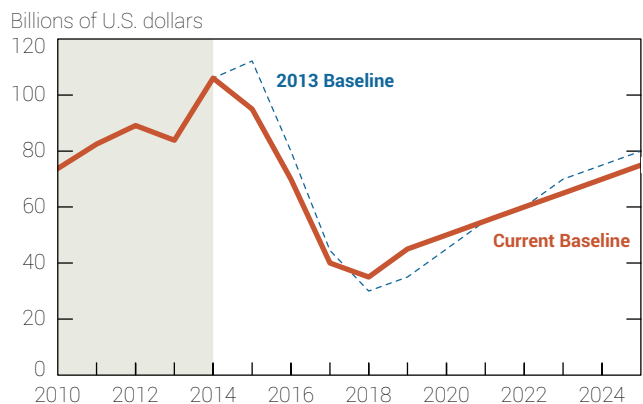
Second, the projected level of net income for the current baseline is lower than projected a year ago across most of the forecast horizon, largely because of primary dealers’ expectations for a slightly earlier liftoff than they anticipated in the SPD a year ago. This result leads to higher projected short-term interest rates in 2015 and 2016 for the current baseline scenario, hastening the onset of higher interest expense. Under the current baseline assumptions,

Chart 26
Projected SOMA Domestic Securities Holdings: Baseline



Source: Federal Reserve Bank of New York.
Notes: Figures for 2010-14 (shaded area) are historical settled holdings. Projected figures are rounded.

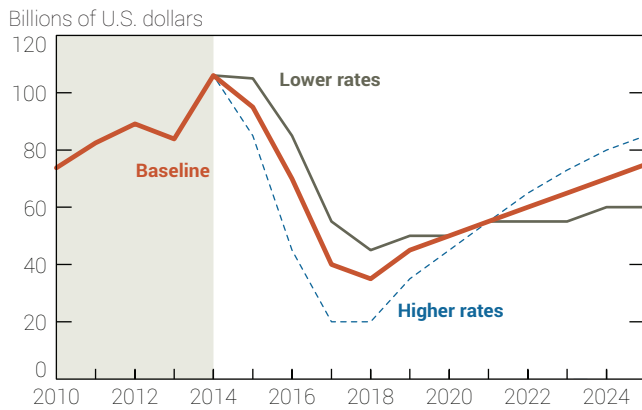
Chart 27
Projected SOMA Net Income: Baseline



Source: Federal Reserve Bank of New York.
Notes: Figures for 2010-14 (shaded area) are realized returns. Projected figures are rounded.

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Chart 28

Projected SOMA Net Income: Alternative Interest Rate Paths

Source: Federal Reserve Bank of New York.

Notes: Figures for 2010-14 (shaded area) are realized returns. Projected figures are rounded. Higher- and lower-rate scenarios use baseline interest rates plus or minus 100 basis points.

cumulative portfolio net income from 2015 to 2025 is projected to be approximately \$660 billion, roughly \$25 billion lower than in last year's baseline projection.

To demonstrate the sensitivity of the projections to changes in interest rates, the path of SOMA net income was projected under alternative interest rate scenarios.⁴⁰ In these scenarios, SOMA net income follows the same general contours as in the baseline analysis, but with significant differences in magnitude (Chart 28). Under the higher rate scenario, a sharper reduction in SOMA net income is seen through the normalization period, driven by higher interest expense relative to the baseline. Net income falls to a trough of roughly \$20 billion in both 2017 and 2018. In the later years of the projection horizon, after the size of the portfolio has normalized, net income is projected to rise above that of the baseline scenario as Treasury securities are purchased at higher yields in a future steady state. In contrast, the lower interest rate scenario sees a more muted decline in SOMA net income during the normalization period, but income grows at a slower pace in the steady state.

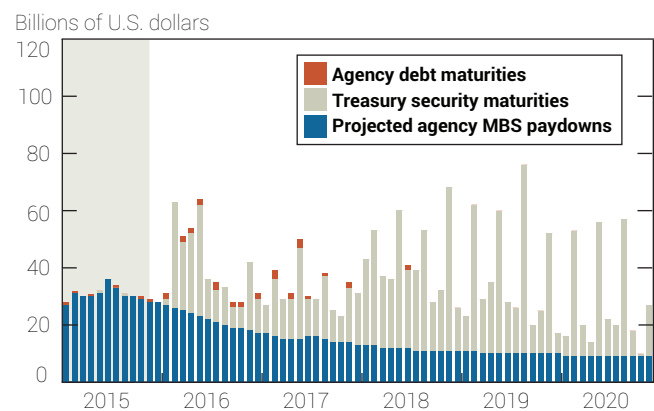
Since the SOMA portfolio has a large influence on the Federal Reserve's net income, declines in the portfolio's net income during the normalization process are likely to feed through to declines in the Federal Reserve's remittances to the U.S. Treasury.⁴¹ In general,

lower levels of SOMA net income suggest a greater likelihood of near-zero or even zero remittances to the Treasury for a time. Even so, remittances associated with the projections shown here remain positive, and on a cumulative basis, net income generated by the SOMA portfolio is very likely to remain quite high over the projection period, even under several alternative scenarios. It is also higher than it would have been had large-scale asset purchases not been conducted.⁴² Moreover, a reduction in net income or a temporary halt in remittances to the Treasury would not affect the Desk's capacity to conduct open market operations or the FOMC's ability to manage short-term interest rates. It is important to bear in mind that the Federal Reserve's policy decisions are undertaken to promote its statutory dual mandate of maximum employment and price stability, and the implications of such decisions for government finances extend well beyond the direct influence of the Federal Reserve's earnings.⁴³

PROJECTION UNCERTAINTY

Once the FOMC ends reinvestments, the pace of the reduction in the size of the SOMA portfolio will largely be driven by the pace of principal receipts from SOMA securities holdings (Chart 29). The timing of principal payments from maturing U.S. Treasury securities and agency debt securities is a known function of current

Chart 29

Projected Receipts of Principal on SOMA Securities: Baseline

Source: Federal Reserve Bank of New York.

Notes: Principal receipts for January through November 2015 (shaded area) are assumed to be reinvested. Agency MBS paydown projections are derived using BlackRock Solutions' prepayment model. Figures are monthly and are rounded.

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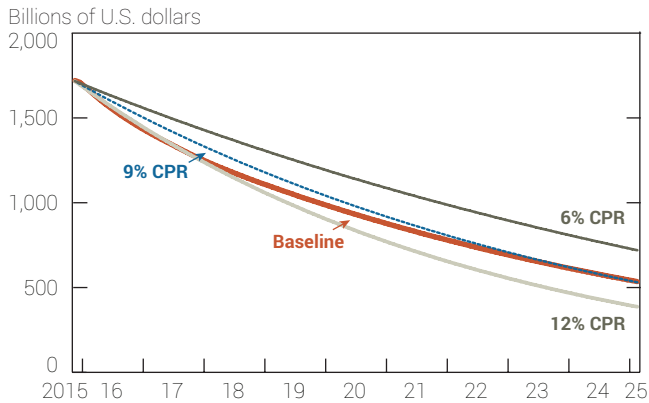
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Chart 30

Projected SOMA Agency MBS Holdings: Alternative Prepayment Assumptions



Source: Federal Reserve Bank of New York.

Notes: CPR is the conditional prepayment rate. Figures are monthly and are rounded.

SOMA holdings. In contrast, principal pay-downs associated with agency MBS are model-based estimates that are subject to considerable uncertainty resulting from the embedded prepayment option. Whether that option gets exercised depends on a variety of factors, including the level of interest rates, changes in housing prices, and government policy initiatives. Predicting the future pace of agency MBS prepayments is therefore a highly complex exercise subject to substantial forecast errors.

This uncertainty in the future path of the SOMA's MBS portfolio holdings has implications for the time required for the size of the portfolio to normalize. To demonstrate how changes in the pace of prepayments may affect normalization, three alternative prepayment scenarios can be calculated (**Chart 30**). For simplicity, these scenarios use an illustrative range of constant conditional prepayment rates (CPRs) rather than the model-based projection used in the baseline scenario. The portfolio path under the 9 percent CPR assumption converges to the modeled baseline path in the later years of the projection horizon. Raising or lowering the CPR assumption would result in a faster or slower decline of MBS portfolio holdings, respectively, and therefore a faster or slower attainment of the portfolio's normalized size. For example, constant CPRs of 12 percent or 6 percent would shift the date SOMA reaches its steady state by roughly half a year earlier or later, respectively. In actuality, the pace of prepayments is unlikely to be constant, and realized prepayments of SOMA agency MBS holdings will show significantly more variability over time than the smooth profile of estimated pay-downs illustrated in the baseline scenario.

These projections are illustrative. The actual portfolio path and future income will be influenced by a number of factors, including the decisions that the FOMC makes about its securities portfolio, as well as interest rate, economic, and autonomous balance sheet developments.



Money Market Analysis and Policy Implementation Tools

Although the Desk did not actively transact in markets to influence the federal funds rate in 2014, the federal funds market remains key to transmitting monetary policy and communicating its stance. The Desk undertook an initiative to capture and analyze money market transactions and rates by means of a report known as the FR 2420 *Report of Selected Money Market Rates*. The Federal Reserve also devoted considerable effort to readying operational tools that might be used in the execution of monetary policy during normalization. These tools, including overnight and term reverse repo agreements and term deposits, will be used as needed to supplement IOER to help control the federal funds rate.

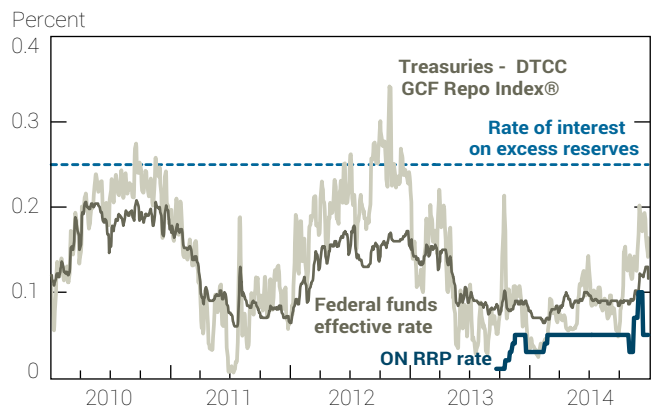
Money Market Developments

THE FEDERAL FUNDS MARKET

To support continued progress toward maximum employment and price stability, the FOMC maintained its target for the federal funds rate in a range of 0 to ¼ percent throughout 2014. Accordingly, the FOMC directed the Desk to undertake open market operations as necessary to maintain conditions in reserve markets consistent with federal funds trading in this range. Given the elevated level of excess reserves and the payment of IOER, no temporary open market operations were required to maintain the federal funds effective rate (FFER) in the FOMC's target range.

The FFER averaged 9 basis points over 2014, slightly below its average of 11 basis points in 2013. From January through March 2014, the FFER fluctuated in a range of 6 to 8 basis points, then

Chart 31
Overnight Money Market Rates



Sources: Federal Reserve Bank of New York; The Depository Trust & Clearing Corporation.

Notes: Overnight reverse repo figures are daily. Other figures are daily one-week moving averages.

increased to a range of 8 to 10 basis points from April through November, and finally moved up between 11 and 13 basis points in December, excluding quarter-end dates (Chart 31).

The federal funds market consists of unsecured loans of U.S. dollars among depository institutions and certain other eligible entities, such as government-sponsored enterprises. Until recently, there were no systematic estimates of the size of the federal funds market, although trading volumes could be estimated from the public filings of market participants. The available data suggest

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Box 5

Recent Dynamics in the Federal Funds Market

The decline in federal funds volume, which largely took place near the end of 2008, primarily reflected two factors. First, Federal Reserve asset purchases elevated the level of excess reserves in the banking system, reducing the need for many institutions to borrow to meet reserve requirements or to settle financial transactions. Second, beginning in October 2008, the Federal Reserve began to pay interest on required and excess reserves to depository institutions, establishing a rate of $\frac{1}{4}$ percent for both types of reserves in mid-December 2008. This step removed depository institutions' incentive to lend federal funds at rates lower than what they would receive from the Federal Reserve, reducing the volume of transactions in the market.

Thus, in recent years, the primary lenders of federal funds have been

government-sponsored enterprises, particularly Federal Home Loan Banks (FHLBs), which are not eligible to receive interest on excess reserves. These institutions have an incentive to lend at rates below the IOER rate but above zero, the rate at which they could leave deposits in unremunerated Federal Reserve accounts. While some depository institutions borrow to fulfill liquidity needs, borrowing activity is dominated by depository institutions that deposit the cash borrowed as excess reserves at the Federal Reserve. The Federal Reserve remunerates those funds at the IOER rate, allowing depository institutions to earn a profit on the spread.^a

In a frictionless market, this arbitrage trade would occur until the FFER rose to the IOER rate. However, while these trades are riskless to the bank borrower,

the lender bears a small amount of counterparty risk. If federal funds lenders manage their exposure to individual counterparties, competition in the market may be reduced. Further, banks face uncertain or rising balance sheet costs, related in part to regulatory constraints. Such costs include those related to capital requirements, leverage and liquidity requirements, and FDIC deposit insurance assessments, which together limit the amount of borrowing activity the depository institutions choose to engage in.^b This additional cost for domestic banks' balance sheets prevents perfect arbitrage, and means that the FFER is generally lower than the IOER rate. Although the IOER rate does not currently serve as a hard floor for the federal funds rate, it is expected to continue to act as a magnet, pulling the federal funds rate higher.^c

^aFor further detail on participants in the federal funds market, see: <http://libertystreeteconomics.newyorkfed.org/2013/12/whos-lending-in-the-fed-funds-market.html> and <http://libertystreeteconomics.newyorkfed.org/2013/12/whos-borrowing-in-the-fed-funds-market.html>.

^bThe FDIC fee is assessed on all insured depository institutions. Most foreign institutions do not offer insured deposits, and so they are not subject to the assessment. This means that the arbitrage trade is more cost effective for many foreign banking organizations, and such institutions are now the primary borrowers of federal funds.

^cSee <http://www.newyorkfed.org/newsevents/speeches/2014/pot141007.html> for a discussion of the federal funds market in the context of policy normalization.

that the volume of funds sold per day declined from more than \$200 billion before the crisis to about \$60 billion at the end of 2012, a dollar amount that has remained relatively stable in recent years. Despite the decline in trading volumes, the federal funds market has remained linked to other money market rates and important for the transmission of monetary policy (see **Box 5**).

FR 2420 REPORT OF SELECTED MONEY MARKET RATES

In order to support the implementation of monetary policy and the analysis of money market conditions, the Federal Reserve launched a new data collection initiative on April 1, 2014. The *Report of Selected Money Market Rates*, or FR 2420, is a transaction-based report that collects liability data on unsecured borrowing—including federal funds, Eurodollars, and certificates of deposit—from certain

depository institutions on a daily basis.⁴⁴ These institutions include domestically chartered commercial banks and thrifts with total assets of \$26 billion or more and U.S. branches and agencies of foreign banks with total assets of \$900 million or more (**Table 4**). This new dataset provides policymakers with a richer picture of money market activity.

Further, the Federal Reserve announced on February 2, 2015, two important developments related to the publication of money market rates based on FR 2420 data. First, in light of the recent international focus on best practices for financial benchmarks, the New York Fed announced its intention to enhance its process for calculating the FFER. It will begin utilizing FR 2420 transaction-level data in place of data previously supplied by federal funds brokers. The FR 2420 data capture a greater share of federal funds activity

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Table 4

FR 2420 Transaction Types, Reporting Entities, and Submission Frequency

Transaction Type	Reporting Entities	Submission Frequency
Federal funds	U.S. banks with more than \$26 billion in assets and FBO branches with more than \$900 million in third-party assets	Daily, previous day's transactions
Eurodollars	U.S. banks with more than \$26 billion in assets	Daily, previous day's transactions
Certificates of deposit	U.S. banks with more than \$26 billion in assets and FBO branches with more than \$900 million in third-party assets	Daily, activity from two days prior

Source: Federal Reserve Bank of New York.

Note: FBO branches are branches of foreign banking organizations.

and allow for more insight into the transactions underlying the rate's calculation, supporting a robust calculation process. Second, the New York Fed announced plans to begin publishing an overnight bank funding rate based on transactions in both federal funds and Eurodollar markets, which collectively represent a substantial proportion of banks' overnight borrowings.

Planning for Monetary Policy Normalization

The Federal Reserve in 2014 continued to prepare for the eventual normalization of the stance and conduct of monetary policy. It advised the public on the steps the FOMC anticipated it would take to remove monetary accommodation when the time was appropriate. In addition, it expanded operational readiness exercises for new tools that would allow it to control the federal funds rate and other short-term interest rates in an environment of elevated reserves. These actions were taken as a matter of prudent advance planning, and as such, had no implications for the timing or pace of eventual policy normalization.

POLICY NORMALIZATION PRINCIPLES AND PLANS

Over several meetings in 2014, the FOMC planned the actions it would take to normalize the stance of monetary policy and the Federal Reserve's securities holdings when warranted by economic conditions. While the FOMC judged that many of the normalization principles it had adopted in June 2011 remained applicable, it acknowledged that since then, there had been significant changes in the SOMA portfolio as well as enhancements to potential tools that the Committee might utilize. These developments suggested

that some aspects of the normalization process would likely differ from those previously specified. As a result, in September 2014, the FOMC released a statement of Policy Normalization Principles and Plans outlining key elements of the approach it would implement when the normalization of monetary policy became appropriate.

The statement highlighted several core objectives. First, as was the case before the crisis (and as articulated in the June 2011 principles), the Committee indicated that it would adjust the policy stance primarily through actions influencing the level of the federal funds rate and other short-term interest rates. Specifically, when economic conditions and the economic outlook warranted a less accommodative policy, the Committee would raise its target range for the federal funds rate. The Federal Reserve would raise the federal funds rate into the target range set by the FOMC primarily by adjusting the IOER rate, and it would use the ON RRP facility and other supplementary tools as needed to help control the federal funds rate. The Committee indicated its intention to use supplemental tools only to the extent necessary, and to phase out the ON RRP facility when no longer needed to help control the federal funds rate.

Second, the Committee noted its expectation that it would reduce the Federal Reserve's securities holdings in a gradual and predictable manner, primarily by ceasing to reinvest repayments of principal on securities held in SOMA after it begins increasing the federal funds rate. The timing of the end of reinvestment will depend on how economic and financial conditions evolve. The Committee further did not anticipate selling agency MBS as part of the normalization process, although limited sales might be warranted in the longer run to

reduce or eliminate residual holdings. The Committee noted that, in the longer run, it intended to hold no more securities than necessary to implement monetary policy efficiently and effectively, and that it would hold primarily Treasury securities.

Finally, the Committee noted that it was prepared to adjust the details of its approach to policy normalization in light of economic and financial developments.

READYING TOOLS FOR INTEREST RATE CONTROL DURING NORMALIZATION

The normalization framework described by the FOMC would both utilize new tools and adapt existing tools to help control interest rates in an environment of elevated reserve balances. Throughout 2014, the Federal Reserve continued to test the ON RRP and term RRP and a Term Deposit Facility (TDF) to support its longer-run planning for improvements in the technical execution of monetary policy.

Overnight Reverse Repurchase Agreements

Reverse repos are transactions in which eligible counterparties invest cash temporarily at the Federal Reserve in exchange for securities from the SOMA portfolio. The transaction is economically similar to a collateralized deposit, and the Federal Reserve maintains beneficial ownership of the securities it pledges. Treasury securities are margined at 100 percent, meaning that the market value of the securities the Federal Reserve pledges as collateral is exactly equal to the amount of cash borrowed from the counterparty.

Reverse repos provide a risk-free asset, at a rate managed by the Federal Reserve and subject to certain limitations, to a broad range of market participants. Making such assets available widens the universe of counterparties that are unwilling to lend at rates below those available from the Federal Reserve, thereby strengthening the bargaining position of nonbank lenders and enhancing competition in money markets. Moreover, by reducing the amount of reserves held by banks, reverse repos may directly reduce the level of bank assets and thus bank balance sheet costs, alleviating a friction to the federal funds arbitrage trade. In this way, as the FOMC raises its target range for the federal funds rate, RRP should help to form a floor under short-term interest rates to complement the magnetic upward pull of IOER.

Throughout 2014, the Federal Reserve conducted a technical exercise of daily ON RRP operations to explore how such operations might improve interest rate control. The exercise, which began on September 23, 2013, was initially authorized to run through January 29, 2014, but the FOMC twice approved resolutions extending the exercise. The first resolution was approved at the January 2014 FOMC meeting to run through January 30, 2015, and the second was approved at the December 2014 FOMC meeting to run through January 29, 2016. Several additional resolutions were approved by the FOMC throughout the year, and provided revised guidelines for the terms of the operations, including the allowable range for offered rates, the maximum bid amounts for individual counterparties, and an aggregate cap on the amount of ON RRP outstanding.

Operational Approach

ON RRP operations were conducted according to terms announced in operating statements and FAQs published on the New York Fed's website, and operation results were published shortly following the conclusion of each operation. Starting in December, the New York Fed began to publish on a quarterly basis the amounts awarded in RRP operations by counterparty type with a one-quarter lag.

During the first operations in late 2013, individual counterparty bids were limited to amounts that increased from \$500 million to \$3 billion. In January of 2014, this cap was increased to \$5 billion per counterparty per day, and then to \$7 billion in March, \$10 billion in April, and finally to \$30 billion in September. Operating statements also specified changes to other key parameters throughout the year, such as the maximum offering rate, and were announced with at least one business day's prior notice. By adjusting these parameters over the course of 2014, the FOMC sought to better understand how the operations affected short-term money market rates (**Table 5**).

On September 17, 2014, the FOMC instructed the Desk to further alter the design of the RRP operations. Starting with the September 22 operation, each eligible counterparty was limited to one bid of up to \$30 billion per day. In addition, each operation would be subjected to an overall size limit of \$300 billion. Each submitted bid would subsequently include a rate of interest that would apply only in the event that the total amount of bids received by the Desk rose above the overall size limit of the operation. If the sum of bids submitted did exceed \$300 billion, then awards were

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Table 5

Terms of Overnight Reverse Repo Exercise Operations

	Offering Rate (Basis Points)	Maximum Award per Counterparty (Billions of U.S. Dollars)	Aggregate Cap (Billions of U.S. Dollars)
2013			
Sept 23 - Sept 26	1	0.5	N/A
Sept 27 - Oct 20	1	1.0	N/A
Oct 21 - Nov 03	2	1.0	N/A
Nov 04 - Nov 11	3	1.0	N/A
Nov 12 - Nov 18	4	1.0	N/A
Nov 19 - Dec 22	5	1.0	N/A
Dec 23 - Jan 29, 2014	3	3.0	N/A
2014			
Jan 30 - Feb 17	3	5.0	N/A
Feb 18 - Feb 25	4	5.0	N/A
Feb 26 - Mar 04	5	5.0	N/A
Mar 05 - Apr 06	5	7.0	N/A
Apr 07 - Sept 21	5	10.0	N/A
Sept 22 - Nov 02	5	30.0	300
Nov 3 - Nov 16	3	30.0	300
Nov 17 - Nov 30	7	30.0	300
Dec 01 - Dec 14	10	30.0	300
Dec 15 - Dec 31	5	30.0	300

Source: Federal Reserve Bank of New York.

made using a single-price auction format. Awards would be made at the rate at which the overall size limit was achieved (that is, the stop-out rate), with all bids below this rate awarded in full and all bids at this rate awarded on a pro rata basis. There was no restriction on the minimum (more competitive) rate a counterparty was allowed to bid, with negative rates allowable; however, bid rates could not be higher than the announced maximum operation rate. The aggregate cap was intended to prevent a disruptive surge in ON RRP usage in times of severe market stress, thus limiting the financial stability risks potentially posed by the facility.⁴⁵

ON RRP operations were conducted using FedTrade. Participants in the operations included primary dealers and an expanded set of counterparties including money market mutual funds (MMFs),

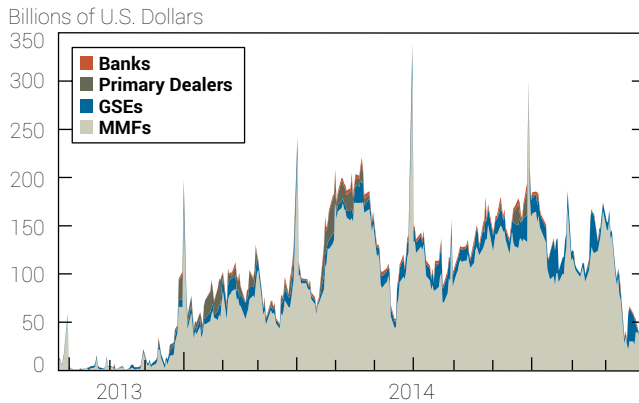
GSEs, and banks. At the end of 2014, there were 139 reverse repo counterparties, consisting of 22 primary dealers, 94 money market mutual funds, 17 depository institutions, and 6 government-sponsored enterprises. On November 12, the Federal Reserve announced that it would accept applications from additional firms interested in becoming reverse repo counterparties, with the criteria for eligibility remaining the same. New counterparties were announced in the first quarter of 2015; the New York Fed does not currently anticipate further expansion beyond this wave.

Operations were conducted from 12:45 p.m. to 1:15 p.m. New York time each day, with the exception of September 30 and December 31.⁴⁶ On those quarter-end dates, the operation was moved to earlier in the day in anticipation of significantly higher-than-average

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Chart 32

Daily Allotment in Overnight Reverse Repo Operations by Counterparty Type



Source: Federal Reserve Bank of New York.

Note: Figures are daily.

levels of participation. The change was made to provide cash lenders with greater clarity early in the day on their residual transaction needs in private markets.

Operation Results and Market Dynamics

Over the course of the year, a total of 250 ON RRP operations were conducted, with \$124 billion in accepted offers per operation on average. The amount of accepted offers in operations rose after the increase in the per-counterparty cap to \$10 billion on April 7. From the start of the year until that date, the daily awarded amount averaged \$87 billion; for the remainder of the year, it averaged \$136 billion. Most of the 139 eligible counterparties have participated in the operations, with about 48 bidders participating each day, on average. MMFs accounted for most of the daily investment (**Chart 32**).

The average amount of accepted offers in operations was sensitive to the spread between the ON RRP operation's rate and money market rates. The higher the offering rate relative to rates that were available privately, all else equal, the more investment was redirected to the ON RRP exercise (**Chart 33**). This dynamic has effectively set a soft floor under money market rates thus far, in part by influencing the bargaining power of eligible counterparties. Additionally, when the offering rate has been increased or decreased,

broader money market rates have generally moved along with it. For example, as the offering rate was increased from 3 to 10 basis points in November and December, the FFER, Eurodollar rates, and commercial paper yields all rose with it. One exception to this trend occurred during the latter half of December: when the offering rate was decreased to 5 basis points from 10, money market interest rates did not materially decline.

On quarter- and year-end reporting dates, there are often significant and transitory shifts in money market activity, which can result in higher-than-average volatility in rates. Anecdotal information suggests that the ON RRP exercise has supported market functioning on quarter- and year-end financial reporting dates. On these dates, participation in the ON RRP exercise increased notably as RRP counterparties sought to offset temporary but pronounced reductions in short-term borrowing, primarily by foreign banks.

The amount of accepted offers in operations on the three quarter-end dates and the year-end date was significantly higher than the non-quarter-end average. The largest operation of 2014 occurred at the end of the second quarter, with \$339 billion awarded at a fixed rate of 5 basis points. The operation on September 30, the end of the third quarter, when the new aggregate operation limit became binding, awarded the full \$300 billion available out of \$407 billion in bids. Because the aggregate cap was binding on that day, the offering rate was determined through auction pricing, and "stopped out" at zero basis points. Rates submitted by bidders ranged from -20 basis points to 5 basis points. At year-end 2014, \$171 billion was awarded, although this figure likely understates true demand as investments in term RRP that were also conducted by the Desk over year-end likely displaced some overnight demand (**Chart 33**).

Term Reverse Repurchase Agreements

At the October 2014 FOMC meeting, the FOMC approved a resolution authorizing the Desk to conduct a series of term RRP operations over year-end. The goal was to examine how term RRP operations might work as a supplementary tool to help control the federal funds rate, particularly at times of significant and transitory shifts in money market activity, and to reduce potential volatility in money market rates.

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Operational Approach

A total of \$300 billion was offered across four term RRP operations. This amount was in addition to the \$300 billion daily limit on overnight reverse repos. Term operations were conducted over four consecutive Mondays, December 8, 15, 22, and 29, with each maturing on January 5, 2015 (Table 6). Operations were open to all eligible RRP counterparties and used general collateral Treasury securities.

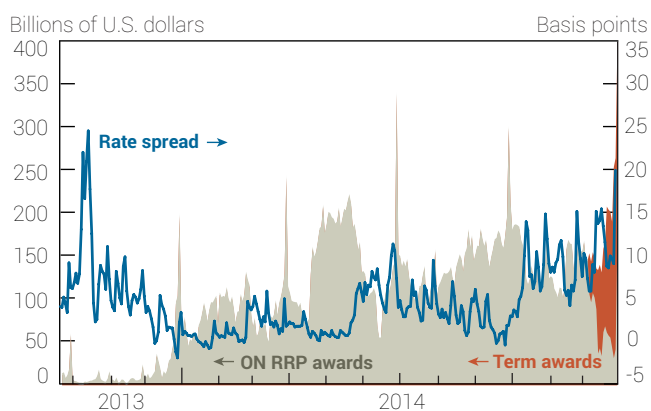
The term RRP operations were conducted from 9:30 a.m. to 10:00 a.m. New York time, with each bidder allowed two bids per operation. Each bid could be up to the total amount offered in a given operation, and the maximum bid rate was 10 basis points. Similar to the overnight operations, if the sum of the bids received was greater than the overall size limit, awards were allocated using a single-price auction format utilizing each counterparty's bid rates. If the operation was undersubscribed, amounts would be awarded at the highest rate submitted by any bidder. Further, any unawarded amount at the first three operations would roll over into the next operation. Other operational features, including announcements and trading practices, were similar to those of the ON RRPs.

Operation Results and Market Dynamics

The first two term operations of \$50 billion each were fully subscribed, with most of this amount awarded to money market mutual funds. Demand in the two subsequent operations was lower than the offered amount, with \$50 billion awarded of the \$100 billion offered in the third and \$76 billion awarded of the \$151 billion offered in the fourth operation. With each operation, some investments that

Chart 33

Reverse Repo Award Amounts and Rate Spread



Sources: Federal Reserve Bank of New York; The Depository Trust & Clearing Corporation.

Notes: Figures are daily. Rate spread is calculated as the Treasuries - DTCC GCF Repo Index[®] less the ON RRP offering rate.

would otherwise have been placed in the ON RRP were invested in the term RRP operations. As a result, concerns over the availability of investment opportunities over year-end were mitigated. Indeed, only \$226 billion of the \$300 billion available through the term RRP exercise was awarded; the amount awarded in the ON RRP operations was also well below the available cap at year-end. The overall level of secured money market rates was somewhat higher than at the end of the third quarter. This suggests that term RRPs, which provided an alternative and predictable investment, likely prevented notable downward pressure on secured funding rates over the year-end.

Table 6

Term Reverse Repo Operation Results

Billions of U.S. dollars

Operation Date	Tentative Amount Offered	Actual Amount Offered	Amount Submitted	Amount Accepted
Dec 8, 2014	50.0	50.0	101.9	50.0
Dec 15, 2014	50.0	50.0	75.1	50.0
Dec 22, 2014	100.0	100.0	49.5	49.5
Dec 29, 2014	100.0	150.5	76.1	76.1

Source: Federal Reserve Bank of New York.

Notes: All operations matured on January 5, 2015. The Desk adjusted the actual amount offered to be equal to the tentative amount plus any amount offered at the prior operation that had gone unawarded.

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

Term Deposit Facility

Since 2010, the Federal Reserve has periodically tested a Term Deposit Facility, through which it offers interest-bearing term deposits to depository institutions. TDF transactions are not open market operations, but are nonetheless an additional tool that could be used to supplement IOER to control the federal funds rate during policy normalization.⁴⁷

Operation Results and Market Dynamics

To ensure operational readiness and to provide eligible institutions with an opportunity to gain familiarity with TDF procedures, the Federal Reserve has conducted several rounds of TDF test operations. Through early 2014, these test operations consisted primarily of small-value twenty-eight-day term deposit offerings.

The Federal Reserve enhanced its TDF testing starting in March 2014 with the goal of increasing participation as well as improving operational readiness. Prior to that time, term deposits were offered twice a month for twenty-eight-day terms six times a year. In March, the TDF began to offer a series of four consecutive seven-day operations. Three had a fixed rate, and one was a floating-rate operation in which the rate offered was set equal to the sum of IOER plus a fixed spread of 1 basis point, resulting in an effective rate of

Table 7

Terms of Expanded Term Deposit Facility Operations in 2014

Week	Fixed Rate	Maximum Award Amount (Billions of U.S. Dollars)	
		May 19–Jul 7	Oct 14–Dec 1 (Early Withdrawal)
1	26 bps	3	5
2	26 bps	5	10
3	26 bps	7	15
4	26 bps	10	20
5	27 bps	10	20
6	28 bps	10	20
7	29 bps	10	20
8	30 bps	10	20

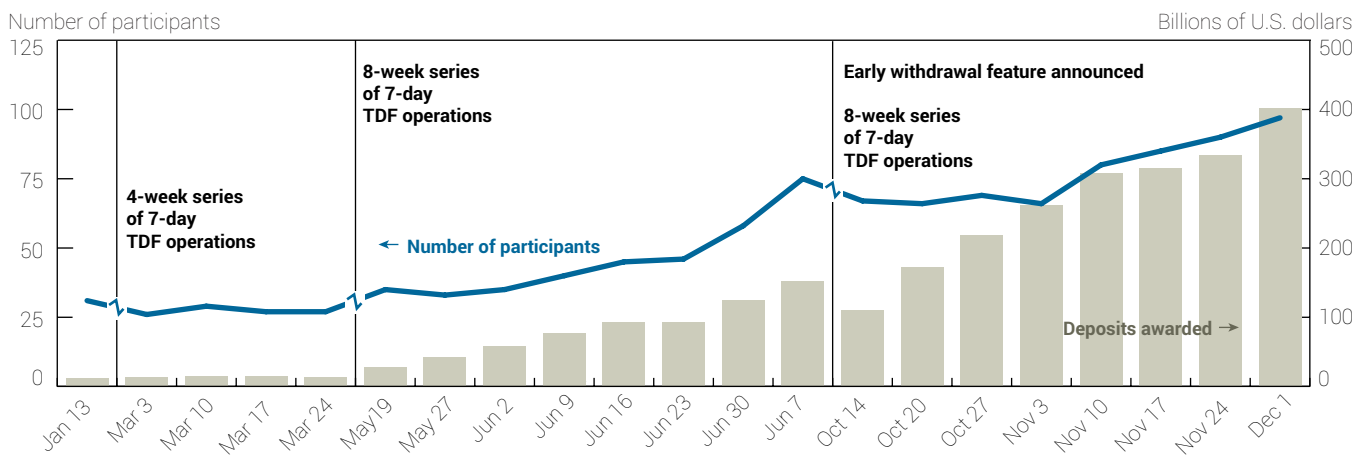
Source: Board of Governors of the Federal Reserve System.

Note: Tests consist of a series of eight consecutive seven-day TDF operations.

26 basis points. In May and October, the Federal Reserve conducted two series of eight consecutive seven-day operations that gradually raised the maximum award per counterparty and the

Chart 34

Term Deposit Facility Operation Results in 2014



Source: Board of Governors of the Federal Reserve System.

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

interest rate offered (**Table 7**). Higher deposit rates and maximum counterparty amounts were associated with greater participation and larger aggregate amounts deposited.

Beginning with the October round of operations, the TDF also began to offer an early withdrawal (or “breakability”) feature. This innovation allowed institutions to obtain a return of funds deposited prior to the maturity date, subject to a penalty fee. The added

liquidity of breakable term deposits, and the fact that this increased liquidity is recognized by the Basel III liquidity coverage ratio, made the facility more attractive to banks.⁴⁸ Before the introduction of breakability, the average amount deposited in the facility from January to September was \$57 billion among thirty-nine participants. In the last three months of the year following the introduction of early withdrawal, the average amount deposited was \$265 billion among seventy-eight counterparties (**Chart 34**).



Conclusion

In addition to providing forward guidance regarding the future path of the federal funds rate, the FOMC instructed the Desk to purchase longer-term Treasury securities and agency MBS for much of the year, and to continue reinvesting principal payments from its securities holdings. The pace of Desk purchases slowed and eventually ceased with the recognition that both a substantial improvement in the labor market outlook and progress toward maximum employment in a context of price stability had been achieved. Over the course of the third large-scale asset purchase program, which began in 2012 and ended in October 2014, SOMA's domestic securities holdings grew by \$1.6 trillion to a total size of \$4.3 trillion, a 38 percent increase. This expansion generated a further increase in the level of reserve balances and continued to contribute to elevated portfolio income. These policy actions were designed to put downward pressure on longer-term interest rates, support mortgage markets, and help make broader financial conditions more accommodative. The Desk closely monitored market conditions throughout the program, and its activities did not appear to affect market functioning adversely. No temporary

operations were required to maintain the federal funds rate within the FOMC's target range of 0 to ¼ percent, amid the elevated level of reserves that has resulted from policy actions taken in recent years and the payment of interest on excess reserves.

The Desk also undertook an array of initiatives to improve its understanding of money market reference rates and to enhance its technical tools for the eventual normalization of policy. Using the FR 2420 data collection, it is calculating a more robust set of reference rates. And although the Desk did not actively manage the supply of reserves in 2014, it maintained and expanded its readiness to conduct a range of operations in short-term money markets to meet the FOMC's current and future policy objectives. To this end, the Desk and Federal Reserve executed overnight reverse repos, term reverse repos, and term deposits to gain operational experience and explore the potential impact of such operations in helping to manage short-term interest rates. These actions position the Desk well to implement future directives of the FOMC.



Appendix 1: Authorization for Domestic Open Market Operations

On January 28, 2014, by unanimous vote, the FOMC approved the Authorization for Domestic Open Market Operations.

AUTHORIZATION FOR DOMESTIC OPEN MARKET OPERATIONS

As amended effective January 28, 2014

1. The Federal Open Market Committee authorizes and directs the Federal Reserve Bank of New York, to the extent necessary to carry out the most recent domestic policy directive adopted at a meeting of the Committee:
 - A. To buy or sell in the open market U.S. government securities, including securities of the Federal Financing Bank, and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, from or to securities dealers and foreign and international accounts maintained at the Federal Reserve Bank of New York, on a cash, regular, or deferred delivery basis, for the System Open Market Account at market prices, and, for such Account, to exchange maturing U.S. government and federal agency securities with the Treasury or the individual agencies or to allow them to mature without replacement; and
 - B. To buy or sell in the open market U.S. government securities, and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, for the System Open Market Account under agreements to resell or repurchase such securities or obligations (including such transactions as are commonly referred to as repo and reverse repo transactions) in 65 business days or less, at rates that, unless otherwise expressly authorized by the Committee, shall be determined by competitive bidding, after applying reasonable limitations on the volume of agreements with individual counterparties.
2. The Federal Open Market Committee authorizes the Federal Reserve Bank of New York to undertake transactions of the type described in paragraphs 1.A and 1.B from time to time for the purpose of testing operational readiness. The aggregate par value of such transactions of the type described in paragraph 1.A shall not exceed \$5 billion per calendar year. The outstanding amount of such transactions of the type described in paragraph 1.B shall not exceed \$5 billion at any given time. These transactions shall be conducted with prior notice to the Committee.
3. In order to ensure the effective conduct of open market operations, the Federal Open Market Committee authorizes the Federal Reserve Bank of New York to use agents in agency MBS-related transactions.
4. In order to ensure the effective conduct of open market operations, the Federal Open Market Committee authorizes the Federal Reserve Bank of New York to lend on an overnight basis U.S. government securities and securities that are direct obligations of any agency of the United States, held in the System Open Market Account, to dealers at rates that shall be determined by competitive bidding. The Federal Reserve Bank of New York shall set a minimum lending fee consistent with the objectives of the program and apply reasonable limitations on the total amount of a specific issue that may be auctioned and on the amount of securities that each dealer may borrow. The Federal Reserve Bank of New York may reject bids that could facilitate a dealer's ability to control a single issue as determined solely by the Federal Reserve Bank of New York. The Federal Reserve Bank of New York may lend securities on longer than an overnight basis to accommodate weekend, holiday, and similar trading conventions.
5. In order to ensure the effective conduct of open market operations, while assisting in the provision of short-term investments or other authorized services for foreign and international accounts maintained at the Federal Reserve Bank of New York and accounts maintained at the Federal Reserve Bank of New York as fiscal agent of the United States pursuant to section 15 of the Federal Reserve Act, the Federal Open Market Committee authorizes and directs the Federal Reserve Bank of New York:

DOMESTIC OPEN MARKET OPERATIONS DURING 2014

- A. For the System Open Market Account, to sell U.S. government securities and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States to such accounts on the bases set forth in paragraph 1.A under agreements providing for the resale by such accounts of those securities in 65 business days or less on terms comparable to those available on such transactions in the market;
- B. For the New York Bank account, when appropriate, to undertake with dealers, subject to the conditions imposed on purchases and sales of securities in paragraph 1.B, repurchase agreements in U.S. government securities and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, and to arrange corresponding sale and repurchase agreements between its own account and such foreign, international, and fiscal agency accounts maintained at the Federal Reserve Bank; and
- C. For the New York Bank account, when appropriate, to buy U.S. government securities and obligations that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States from such foreign and international accounts maintained at the Federal Reserve Bank under agreements providing for the repurchase by such accounts of those securities on the same business day.

Transactions undertaken with such accounts under the provisions of this paragraph may provide for a service fee when appropriate.

6. In the execution of the Committee's decision regarding policy during any intermeeting period, the Committee authorizes and directs the Federal Reserve Bank of New York, upon the instruction of the Chairman of the Committee, to (i) adjust somewhat in exceptional circumstances the degree of pressure on reserve positions and hence the intended federal funds rate and to take actions that result in material changes in the composition and size of the assets in the System Open Market Account other than those anticipated by the Committee at its most recent meeting or (ii) undertake transactions of the type described in paragraphs 1.A and 1.B in order to appropriately address temporary disruptions of an operational or highly unusual nature in U.S. dollar funding markets. Any such adjustment as described in clause (i) shall be made in the context of the Committee's discussion and decision at its most recent meeting and the Committee's long-run objectives to foster maximum employment and price stability, and shall be based on economic, financial, and monetary developments during the intermeeting period. Consistent with Committee practice, the Chairman, if feasible, will consult with the Committee before making any instruction under this paragraph.

Appendix 2: Guidelines for the Conduct of System Open Market Operations in Federal Agency Issues

The Guidelines for the Conduct of System Open Market Operations in Federal Agency Issues, which were temporarily suspended on January 27, 2009, remained suspended throughout 2014.

Appendix 3:

Domestic Policy Directives Issued to the Federal Reserve Bank of New York

In 2014, the FOMC directed the New York Fed to execute transactions in SOMA in accordance with the domestic policy directives below.

Directive Issued January 28, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, 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 undertake open market operations as necessary to maintain such conditions. Beginning in February, the Desk is directed to purchase longer-term Treasury securities at a pace of about \$35 billion per month and to purchase agency mortgage-backed securities at a pace of about \$30 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued March 19, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, 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 undertake open market operations as necessary to maintain such conditions. Beginning in April, the Desk is directed to purchase longer-term Treasury securities at a pace of about \$30 billion per month and to purchase agency mortgage-backed securities at a pace of about \$25 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued April 30, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, 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 undertake open market operations as necessary to maintain such conditions. Beginning in May, the Desk is directed to purchase longer-term Treasury securities at a pace of about \$25 billion per month and to purchase agency mortgage-backed securities at a pace of about \$20 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee

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directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued June 18, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to $\frac{1}{4}$ percent. The Committee directs the Desk to undertake open market operations as necessary to maintain such conditions. Beginning in July, the Desk is directed to purchase longer-term Treasury securities at a pace of about \$20 billion per month and to purchase agency mortgage-backed securities at a pace of about \$15 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued July 30, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to $\frac{1}{4}$ percent. The Committee directs the Desk to undertake open market operations as necessary to maintain such conditions. Beginning in August, the Desk is directed to purchase longer-term Treasury securities at a

pace of about \$15 billion per month and to purchase agency mortgage-backed securities at a pace of about \$10 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued September 17, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to $\frac{1}{4}$ percent. The Committee directs the Desk to undertake open market operations as necessary to maintain such conditions. Beginning in October, the Desk is directed to purchase longer-term Treasury securities at a pace of about \$10 billion per month and to purchase agency mortgage-backed securities at a pace of about \$5 billion per month. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.

Directive Issued October 29, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, 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 undertake open market operations as necessary to maintain such conditions. The Desk is directed to conclude the current program of purchases of longer-term Treasury securities and agency mortgage-backed securities by the end of October. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities 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.

Directive Issued December 17, 2014

Consistent with its statutory mandate, the Federal Open Market Committee seeks monetary and financial conditions that will foster maximum employment and price stability. In particular, 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 undertake open market operations as necessary to maintain such conditions. The Committee directs the Desk to maintain its policy of rolling over maturing Treasury securities into new issues and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities 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.

Appendix 4: Resolutions Authorizing Overnight and Term Reverse Repo Operations

In 2014, the FOMC authorized the New York Fed to conduct overnight and term reverse repo operations according to the resolutions below.

Resolution Approved January 28, 2014

The Federal Open Market Committee (FOMC) authorizes the Federal Reserve Bank of New York to conduct a series of fixed-rate, overnight reverse repurchase operations involving U.S. Government securities, and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, for the purpose of further assessing the potential role for such operations in supporting the implementation of monetary policy. The reverse repurchase operations authorized by this resolution shall be offered at a fixed rate that may vary from zero to five basis points, and for an overnight term, or such longer term as is warranted to accommodate weekend, holiday, and similar trading conventions. Any change to the offered rate within the range specified above or the per-counterparty bid limits will require approval of the Chairman. The System Open Market Account manager will notify the FOMC in advance about any changes to the terms of operations. These operations shall be authorized through January 30, 2015.

Resolution Approved September 17, 2014

The Federal Open Market Committee (FOMC) authorizes the Federal Reserve Bank of New York to conduct a series of overnight reverse repurchase operations involving U.S. government securities for the purpose of further assessing the appropriate structure of such operations in supporting the implementation of monetary policy during normalization. The reverse repurchase operations authorized by this resolution shall be (i) conducted at an offering rate that may vary from zero to five basis points, (ii) for an overnight term,

or such longer term as is warranted to accommodate weekend, holiday, and similar trading conventions, (iii) subject to a per-counterparty limit of up to \$30 billion per day, (iv) subject to an overall size limit of up to \$300 billion per day, (v) awarded to all submitters (A) at the specified offering rate if the sum of the bids received is less than or equal to the overall size limit, or (B) at the stopout rate, determined by evaluating bids in ascending order by submitted rate up to the point at which the total quantity of bids equals the overall size limit, with all bids below this rate awarded in full at the stopout rate and all bids at the stopout rate awarded on a pro rata basis, if the sum of the counterparty offers received is greater than the overall size limit, and (vi) offered beginning with the operation conducted on September 22, 2014, with the resolution adopted at the January 28-29, 2014, FOMC meeting remaining in place until the conclusion of the operation conducted on September 19, 2014. The Chair must approve any change in the offering rate within the range specified in (i) and any changes to the per-counterparty and overall size limits subject to the limits specified in (iii) and (iv). The System Open Market Account manager will notify the FOMC in advance about any changes to the offering rate, per-counterparty limit, or overall size limit applied to operations. These operations shall be authorized through January 30, 2015.

Resolutions Approved October 29, 2014

The Federal Open Market Committee (FOMC) modifies the authorization concerning overnight reverse repurchase operations adopted at the September 17, 2014, FOMC meeting as follows:

- (i) The offering rate of the operations may vary from zero to ten basis points.

This modification shall be effective beginning with the operation

conducted on November 3, 2014, and conclude with the operation conducted on December 12, 2014.

During the period of December 1, 2014, to December 30, 2014, the Federal Open Market Committee (FOMC) authorizes the Federal Reserve Bank of New York to conduct a series of term reverse repurchase operations involving U.S. Government securities. Such operations shall: (i) mature no later than January 5, 2015; (ii) be subject to an overall size limit of \$300 billion outstanding at any one time; (iii) be subject to a maximum bid rate of ten basis points; (iv) be awarded to all submitters: (A) at the highest submitted rate if the sum of the bids received is less than or equal to the preannounced size of the operation, or (B) at the stopout rate, determined by evaluating bids in ascending order by submitted rate up to the point at which the total quantity of bids equals the preannounced size of the operation, with all bids below this rate awarded in full at the stopout rate and all bids at the stopout rate awarded on a pro rata basis, if the sum of the counterparty offers received is greater than the preannounced size of the operation. Such operations may be for forward settlement. The System Open Market Account manager will inform the FOMC in advance of the terms of the planned operations. The Chair must approve the terms of, timing of the announcement of, and timing of the operations. These operations shall be conducted in addition to the authorized overnight reverse repurchase agreements, which remain subject to a separate overall size limit of \$300 billion per day.

Resolution Approved December 17, 2014

The Federal Open Market Committee (FOMC) authorizes the Federal Reserve Bank of New York to conduct a series of overnight reverse repurchase operations involving U.S. government securities for the purpose of further assessing the appropriate structure of such operations in supporting the implementation of monetary policy during normalization. The reverse repurchase operations authorized by this resolution shall be (i) conducted at an offering rate that may vary from zero to five basis points; (ii) for an overnight term or such longer term as is warranted to accommodate weekend, holiday, and similar trading conventions; (iii) subject to a per-counterparty limit of up to \$30 billion per day; (iv) subject to an overall size limit of up to \$300 billion per day; and (v) awarded to all submitters (A) at the specified offering rate if the sum of the bids received is less than or equal to the overall size limit, or (B) at the stop-out rate, determined by evaluating bids in ascending order by submitted rate up to the point at which the total quantity of bids equals the overall size limit, with all bids below this rate awarded in full at the stop-out rate and all bids at the stop-out rate awarded on a pro rata basis, if the sum of the counterparty offers received is greater than the overall size limit. The Chair must approve any change in the offering rate within the range specified in (i) and any changes to the per-counterparty and overall size limits subject to the limits specified in (iii) and (iv). The System Open Market Account manager will notify the FOMC in advance about any changes to the offering rate, per-counterparty limit, or overall size limit applied to operations. These operations shall be authorized for one additional year beyond the previously authorized end date—that is, through January 29, 2016.

Appendix 5: Federal Reserve Bank of New York Counterparties for Domestic Open Market Operations

The Open Market Trading Desk requires a robust network of trading counterparties in order to provide the necessary operational capacity for the implementation of monetary policy. In 2014, primary dealers and reverse repo counterparties participated in domestic open market operations. In addition, a few small firms participated in outright purchases or sales of Treasury or agency MBS under two pilot programs.

Primary Dealers

The New York Fed trades U.S. government and other securities with designated primary dealers, which include banks and securities broker-dealers. The role of the primary dealer includes the obligations to: (i) participate consistently as a counterparty to the New York Fed in its execution of open market operations to carry out U.S. monetary policy pursuant to the direction of the FOMC; (ii) provide the Desk with market information and analysis helpful in the formulation and implementation of monetary policy; (iii) participate in all auctions of U.S. government debt; and (iv) make reasonable markets for the New York Fed when it transacts on behalf of its foreign official account holders.

Primary dealer relationships are administered through an operating policy that sets standards that must be met initially and on an ongoing basis. Primary dealers are expected to adhere to certain business standards in carrying out their responsibility as counterparties, including minimum participation requirements in U.S. government debt auctions, and to act as responsible market participants in their overall conduct and support of market efficiency and liquidity. Primary dealers are also expected to meet certain minimum capital requirements and to maintain a robust compliance program under the standards.

On February 11, one firm was added to the primary dealer list. As of December 31, there were 22 primary dealers.

Reverse Repo Counterparties

The New York Fed has been developing arrangements with an expanded set of counterparties with whom it can conduct reverse repurchase transactions to be ready to support the monetary policy objectives of the Federal Open Market Committee. These reverse repo expanded counterparties augment the existing set of primary dealer counterparties with whom the Federal Reserve can already conduct RRP.

On November 24, one bank was removed from the reverse repo expanded counterparty list. As of December 31, there were 117 reverse repo expanded counterparties—17 banks, 6 government-sponsored enterprises, and 94 money funds (representing 21 fund families)—and 22 primary dealers, bringing the total number of reverse repo counterparties to 139.

On November 12, the New York Fed announced that it would accept applications from firms interested in becoming counterparties eligible to participate in reverse repo transactions with the New York Fed. The entity types and counterparty eligibility criteria remained substantially the same as those announced during the last counterparty expansion wave on August 16, 2012. At the same time, the New York Fed announced that it was unlikely to further modify the eligibility criteria and that it anticipated this would be the last wave of applications accepted. It also noted that the overnight reverse repo operations would be phased out when no longer needed to help control the federal funds rate. On January 16, 2015, 25 additional reverse repo expanded counterparties were accepted as part

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of this wave—7 banks, 6 government-sponsored enterprises, and 12 money funds (representing 9 fund families)—bringing the total number of reverse repo counterparties to 164.

Treasury Operations Counterparty Pilot Program

To explore ways to broaden access to open market operations and determine whether firms beyond the primary dealer community could augment operational capacity and resilience in its monetary policy operations, the New York Fed initiated the Treasury Operations Counterparty (TOC) pilot program in 2013. The program ran from July 2013 to July 2014.

Four pilot program participants took part in Desk operations to conduct secondary market outright purchases or sales of U.S. Treasury securities, along with primary dealers. They were subject to size limitations on aggregate daily bids and unsettled awards—limitations imposed by the New York Fed on the basis of the firms' capital position. Participation in the pilot program did not mean that a firm had been designated as a primary dealer, and did not guarantee participation in any permanent program the New York Fed might establish in the future.

Mortgage Operations Counterparty Pilot Program

The Mortgage Operations Counterparty (MOC) pilot program, announced on August 5, 2014, was similar to the TOC program in both its aims and its conduct, except that the MOC participants were eligible to take part in the New York Fed's outright purchases or sales of agency MBS.

Applications were due in September, and evaluated on the basis of the firms' business capabilities and potential to meet the New York Fed's stated expectations of counterparties for agency MBS operations throughout the duration of the pilot program. In order to maximize the information gained from this pilot, the New York Fed intended to select a small subset of eligible firms that were diverse with respect to characteristics such as size and geographic reach. On November 17, the New York Fed announced that three firms would participate in the MOC pilot program. These firms began participating in the Desk's agency MBS outright operations in December 2014. The program is expected to run for about one year.

Appendix 6: Federal Reserve Reference Webpages

Policies, communications, and data discussed in this document can be found online at the websites for the Board of Governors of the Federal Reserve System and the Federal Reserve Bank of New York. Below, we provide the primary webpages where this source material may be found.

Federal Reserve Board

FOMC statements, minutes, and the Normalization Principles and Plans:

<http://www.federalreserve.gov/monetarypolicy/fomc.htm>

<http://www.federalreserve.gov/monetarypolicy/policy-normalization.htm>

Operational results, announcements, and other detail regarding the Term Deposit Facility:

<http://www.federalreserve.gov/monetarypolicy/tdf.htm>

Background on reserve requirements, interest on reserves, and IOER:

<http://www.federalreserve.gov/monetarypolicy/reservereq.htm>

<http://www.federalreserve.gov/monetarypolicy/reqresbalances.htm>

Federal Reserve Bank of New York

Primary webpage for Markets and Policy Implementation:

<http://www.newyorkfed.org/markets/>

Electronic version of this report and the underlying data for the charts and tables:

http://www.newyorkfed.org/markets/annual_reports.html

List of primary dealer counterparties and related policies:

http://www.newyorkfed.org/markets/pridealers_current.html

Operational policies, FAQs, operation results, and other detail regarding Treasury open market and securities lending operations:

<http://www.newyorkfed.org/markets/pomo/operations/index.html>

<http://www.newyorkfed.org/markets/securitieslending.html>

http://www.newyorkfed.org/markets/toc_pilot.html

Operational policies, FAQs, operation results, counterparties, and other detail regarding agency MBS open market operations:

<http://www.newyorkfed.org/markets/ambs/>

<http://www.newyorkfed.org/markets/moc-pilot.html>

Operational policies, FAQs, operation results, counterparties, and other detail regarding reverse repo operations:

<http://www.newyorkfed.org/markets/omo/dmm/temp.cfm>

http://www.newyorkfed.org/markets/rrp_counterparties.html

http://www.newyorkfed.org/markets/rrp_op_policies.html

http://www.newyorkfed.org/markets/rrp_faq.html

Foreign exchange quarterly reports and information on central bank liquidity swaps:

<http://www.newyorkfed.org/markets/foreignex.html>

http://www.newyorkfed.org/markets/liquidity_swap.html

System Open Market Account holdings:

http://www.newyorkfed.org/markets/soma/sysopen_accholdings.html

Consolidated list of statements and operating policies across all Desk open market operations:

http://www.newyorkfed.org/markets/op_policies.html

Desk Survey of Primary Dealers and Survey of Market Participants

http://www.newyorkfed.org/markets/primarydealer_survey_questions.html

http://www.newyorkfed.org/markets/survey_market_participants.html

Appendix 7: Selected Research on LSAPs

- D'Amico, Stefania, and Thomas B. King. 2013. "Flow and Stock Effects of Large-Scale Treasury Purchases: Evidence on the Importance of Local Supply." *Journal of Financial Economics* 108, no. 2: 425-48.
- Engen, Eric, Thomas Laubach, and Dave Reifschneider. 2015. "The Macroeconomic Effects of the Federal Reserve's Unconventional Monetary Policies." Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2015-005.
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- Hamilton, James D., and Jing Cynthia Wu. 2012. "The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment." *Journal of Money, Credit, and Banking* 44, suppl. s1: 3-46.
- Hancock, Diana, and S. Wayne Passmore. 2014. "How the Federal Reserve's Large-Scale Asset Purchases (LSAPs) Influence Mortgage-Backed Securities (MBS) Yields and U.S. Mortgage Rates." Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2014-12.
- Ihrig, Jane, Elizabeth Klee, Canlin Li, Brett Schulte, and Min Wei. 2012. "Expectations about the Federal Reserve's Balance Sheet and the Term Structure of Interest Rates." Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2012-57.
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- Krishnamurthy, Arvind, and Annette Vissing-Jorgensen. 2011. *The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy*. National Bureau of Economic Research, Working Paper no. w17555.
- Li, Canlin, and Min Wei. 2012. "Term Structure Modelling with Supply Factors and the Federal Reserve's Large Scale Asset Purchase Programs." Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2012-37. Also available at SSRN 2082112 (2012).
- Woodford, Michael. 2012. "Methods of Policy Accommodation at the Interest-Rate Lower Bound." *The Changing Policy Landscape: 2012 Jackson Hole Symposium*. Federal Reserve Bank of Kansas City.

Endnotes

¹The FOMC has selected the Federal Reserve Bank of New York to execute transactions for the System Open Market Account, the account through which open market operations are conducted. As explained in last year's annual report, for resiliency purposes, the New York Fed now maintains and staffs alternative sites for trading and settlement of open market operations in other Reserve Bank locations throughout the System. These arrangements ensure that the Desk would have the resources necessary to carry out its critical operational and analytical activities should a contingency scenario affect the greater New York area.

²The SOMA comprises the Federal Reserve's domestic and foreign portfolios, along with reciprocal currency arrangements made with foreign official institutions. The SOMA domestic portfolio consists of U.S. Treasury and federal agency securities held on both an outright and a temporary basis. The SOMA foreign currency portfolio is made up of investments denominated in euros and yen, and is not discussed in this report.

Unless otherwise stated, all dollar values of securities held in the domestic SOMA portfolio refer to par (face) values and include both settled and unsettled amounts. Values of agency MBS refer to the current face value of the securities (that is, the remaining principal balance of the underlying mortgages). The Federal Reserve reports SOMA securities holdings at par (face) value and any unamortized premiums or discounts separately in its weekly statistical release on the balance sheet. For purposes of financial accounting, SOMA securities holdings are reported at amortized cost, and gains and losses resulting from sales of securities are determined by specific issue based on average cost.

³Other measures of competitiveness include the price on counterparties' offers relative to the observed market price prior to the close of the operation and, for accepted offers, the aggregate premium or discount relative to the market price. Therefore, the offer-to-cover ratio by itself provides only a partial picture of competitiveness.

⁴In addition to the monthly release of information on prices paid, in accordance with Section 1103 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, complete details of individual open market transactions—including transactions in Treasury securities, agency MBS, repo and reverse repo agreements, and securities lending—as well as discount window advances, are published quarterly, approximately two years after the transactions were conducted. Details include the date and

amount of the transaction, the counterparty to the transaction, the price or interest rate at which the transaction was conducted, and other relevant terms. See http://www.federalreserve.gov/newsevents/reform_quarterly_transaction.htm.

⁵CUSIPs are codes that identify financial securities, allowing for efficient clearing and settlement in capital markets. See <http://www.cusip.com/>.

⁶Securities bound by the maximum limit fell largely in the twenty- to thirty-year maturity sector.

⁷The notable volatility and liquidity impairment seen in U.S. Treasury markets on October 15 did not require the Treasury purchase operation on that day to be adjusted, and the operation closed with adequate offers to fully cover the purchase amount.

⁸Fails-to-deliver generally occur when market participants that sell specific issues short are unable to borrow those securities to deliver into the trade. Typically, market participants use the "specific issue" repo market to source these securities. Over the year, there was heightened demand to establish such short positions in anticipation of higher rates, given the decline in longer-term Treasury rates—unexpected by many market participants—throughout 2014. Additionally, structurally heightened demand for safe collateral or decreased securities lending activity in the market may have also added to periodic shortages of certain securities.

⁹However, settlement fails remained significantly below their levels during the financial crisis. See <http://libertystreeteconomics.newyorkfed.org/2014/09/measuring-settlement-fails.html> and <http://libertystreeteconomics.newyorkfed.org/2014/09/what-explains-the-june-spike-in-treasury-settlement-fails.html> for additional information on delivery fails in Treasuries.

¹⁰The Desk did conduct one small-value sale of \$29 million in agency MBS on January 14 for the purpose of operational testing. The sale had no significance for the contemporaneous execution of monetary policy.

¹¹The to-be-announced market is a forward market that is built on a trading convention that allows market participants to

trade thousands of different agency MBS backed by millions of individual mortgages. The market uses only a few standardized contracts, which are grouped by key characteristics such as the agency, term, coupon, and settlement date of the security that will be delivered. The standardized nature of TBA contracts helps make a large segment of the agency MBS market effectively homogeneous and thus highly liquid—an important characteristic for implementing large-scale purchases of agency MBS. Under a TBA contract, the buyer is notified by the seller of the specific securities which will be delivered (that is, the securities are “announced”) two days prior to settlement.

¹²Many borrowers who opt to refinance have partially paid down their loan balances and are able to afford the relatively higher monthly payment associated with the shorter fifteen-year debt obligation, making it a popular choice for refinancing homeowners. Therefore, fifteen-year issuance is correlated with refinancing activity.

¹³When mortgage borrowers choose to refinance their mortgages at lower rates, the outstanding amount of their original mortgage is prepaid and a new mortgage is initiated. Thus, the holder of an agency MBS security will receive a prepayment of principal on the portion of the security attributable to that mortgage. Refinanced mortgages are generally the largest source of prepayments of agency MBS principal in SOMA.

¹⁴The Friday release of the weekly schedule was initiated in April 2014, when a significant portion of purchases were transitioned to FedTrade operations (see below). Prior to April, the Desk only announced the amount expected to be purchased without specific dates or securities.

¹⁵Dollar roll transactions continued to take place over TradeWeb.

¹⁶The Desk also has the authority to conduct coupon swaps to facilitate settlement, but chose not to execute any in 2014. A coupon swap is a transaction that involves the sale of one agency MBS and the simultaneous purchase of another agency MBS, which may have a different coupon, issuer, or both.

¹⁷Dollar roll transactions are only conducted with primary dealers, however.

¹⁸The daily effective federal funds rate is currently calculated as a volume-weighted average of rates on trades arranged by major brokers in the federal funds market. The target federal funds rate is the rate that the FOMC has chosen to be consistent with its mandate of maximum employment, stable prices, and moderate long-term interest rates.

¹⁹Because MBS purchases are conducted in the TBA market, a gap exists between the purchase date and the settlement date. Portfolio size figures include unsettled purchase amounts, unless otherwise stated. As of the end of 2014, net unsettled commitments totaled \$29 billion.

²⁰As of December 31, 2014, the Treasury had approximately \$12.5 trillion in marketable debt held by the public (inclusive of SOMA holdings) outstanding. Further information can be found at: <http://www.treasurydirect.gov/govt/reports/pd/mspd/2014/opds122014.pdf>.

²¹The weighted average loan age statistic presented here is dependent on a model of future prepayments, and therefore is subject to some uncertainty and model sensitivity.

²²Consistent with typical market practice, this report uses units of years for quantifying duration. For Treasury and agency debt securities, which have fixed cash flows, “modified duration” approximates the percentage change in the price of an asset given a 100 basis point parallel shift in the yield curve. For agency MBS, “effective duration” also approximates the percentage change in price for such a parallel shift, but additionally incorporates the fact that cash flows vary as interest rates change owing to the embedded option borrowers hold. Nonetheless, effective duration is an incomplete estimate of the price sensitivity of MBS because it does not fully account for the changes in cash flows attributable to changes in borrowers’ prepayment behavior.

The effective duration numbers for agency MBS here are calculated by BlackRock Solutions. Effective duration estimates are subject to frequent model changes, and those changes can cause significant variation in duration estimates.

²³Duration calculations here refer to settled securities only.

²⁴Inversely, the duration of agency MBS increases as interest rates rise, in contrast to the behavior of most other fixed-income investments that do not have embedded options. Interest rates are not the only source of uncertainty for MBS holders. The holders must also account for the fact that homeowners may choose to prepay their mortgages for many other factors, including the sale of a home or participation in a government-backed assistance program such as the Home Affordable Refinance Program (HARP).

²⁵Reserves may also be held as vault cash.

A depository institution is a financial institution that is legally permitted to accept deposits from individuals.

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²⁶Reserves are measured on a biweekly average basis to reflect reserve maintenance periods, which begin on a Thursday and end on a Wednesday two weeks later. The reserve balance requirement need only be met on average over each maintenance period.

²⁷At the end of 2014, balances exceeding the upper bound of the penalty-free bands were \$9 billion lower than the simple difference between reserve balances and reserve balance requirements. The definition of excess reserve balances changed on June 27, 2013, as a consequence of revisions to Federal Reserve Regulation D, which governs the administration of reserve requirements. Prior to June 27, 2013, excess reserves were defined as the difference between actual reserve balances held by depository institutions and the institutions' reserve balance requirements. Effective June 27, 2013, changes to Regulation D introduced penalty-free bands around reserve requirements. In light of this change, the excess balances listed by the Federal Reserve Board in its weekly H.3 report since June 27, 2013, have been the sums of balances exceeding the upper bound of depository institutions' penalty-free bands.

²⁸In this discussion, Federal Reserve notes outstanding are net of Federal Reserve Bank holdings.

²⁹Although the Federal Reserve pays no interest on these notes, Reserve Banks pay expenses incidental to the issuance and retirement of currency (such as costs related to manufacturing, shipping, educational services, and research and development). These expenses do not vary with the level of interest rates, unlike those associated with some other liabilities. Currency costs were \$711 million in 2014, little changed from \$705 million in 2013.

³⁰In late 2008, the Treasury ceased its practice of targeting a fixed level of cash balances and investing the excess in various short-term instruments. Prompted by the very low rates of return available on alternative investments, the Treasury began keeping almost all of its funds at the Federal Reserve. As a result, the TGA at the Federal Reserve absorbed all of the Treasury's cash flow volatility. The Federal Reserve does not currently need to accurately forecast the net value of these factors over short time horizons in order to manage the federal funds rate, as it had to prior to the 2008 financial crisis.

³¹Daily TGA balances are available at <https://www.fms.treas.gov/dts/index.html>.

³²While average usage over 2014 was quite low, central banks drew more than \$1 billion over the end of 2014. Further details on this and other aspects of the liquidity swaps can be found in the New York Fed's *Treasury and Federal Reserve Foreign Exchange Operations* reports.

³³The Federal Reserve's standing arrangements with the Bank of Canada, Bank of England, European Central Bank, and Swiss National Bank also include foreign currency liquidity swap lines. The Federal Reserve may draw foreign currency via these lines to deliver to U.S. institutions if conditions warrant. The Federal Reserve executed one small-value draw of euros from the European Central Bank in October solely for operational readiness purposes. Federal Reserve draws on its foreign currency swap lines have no effect on the level of U.S. dollar reserve balances.

³⁴SOMA income reflects the interest income earned on outright holdings of domestic securities, as well as other earnings (including interest income from foreign currency-denominated assets and central bank liquidity swaps, any realized capital gains or losses, foreign currency translation gains or losses, and noninterest sources of income), less direct interest expenses, such as interest paid on reverse repurchase agreements associated with the SOMA portfolio. SOMA *net* income includes the cost of funding the portfolio, and is defined as SOMA income less the interest paid on the reserve balance liabilities created by some SOMA assets in excess of Federal Reserve notes outstanding.

³⁵SOMA income is the largest contributor to the Federal Reserve's net income. The Federal Reserve is statutorily required to pay dividends on capital paid in. Under policy set by the Board of Governors, the Federal Reserve Banks remit residual net income to the U.S. Treasury after retaining sufficient earnings to equate surplus capital to capital paid-in.

³⁶Even absent the large-scale asset purchases that expanded the size and lengthened the maturity structure of the SOMA portfolio in response to the crisis, the SOMA portfolio's holdings of Treasury securities would have been expected to grow to accommodate market demand for currency. Over time, this increase would be expected to result in growth of portfolio income and remittances from their average pre-crisis levels.

³⁷For further detail on the modeling approach and the Federal Reserve's balance sheet, see Seth B. Carpenter et al., "[The Federal Reserve's Balance Sheet: A Primer and Projections](#)" (Federal Reserve Board, 2013).

³⁸Projections for the size of the ON RRP facility are derived from the Desk's December 2014 Survey of Primary Dealers and peak at \$275 billion immediately following liftoff before declining until the portfolio reaches its long-run steady state. In addition, the 25 basis point range between the administered rates bracketing the fed funds rate target reflects the dealers' median expectations for interest rates immediately after liftoff. As a simplifying assumption, the range is held constant over the forecast horizon.

³⁹The \$100 billion level at which the portfolio's size is assumed to have reached a steady state is greater than the \$25 billion level assumed in past annual report projections. (The new assumption roughly reflects the current level of reserve balance requirements.) The actual level of reserves maintained in a future steady state will depend, in part, on the FOMC's longer-run operating framework.

⁴⁰The higher and lower interest rate scenarios shown here assume that all interest rates are 1 percentage point (100 basis points) higher or lower, respectively, than the rates used in the baseline scenario. Income projection results for two larger interest rate shock scenarios, which assume that all interest rates are 2 and 3 percentage points (200 and 300 basis points) higher than those in the baseline scenario, are provided in the data file accompanying this report on the New York Fed's website. In each case, the shocks are phased in over two quarters, beginning in the second quarter of 2015 when the federal funds target rate is assumed to rise above its current level. All other assumptions, including changes in the size and composition of the portfolio, are held constant.

⁴¹Ultimately, remittances depend not only on the SOMA portfolio, but also on other items on the Federal Reserve's balance sheet. It is possible for the portfolio to show positive levels of net income but be insufficient to cover the Federal Reserve's expenses, dividends, and transfers to surplus. A reduction in income to such levels could prompt a temporary halt in remittances to the Treasury.

⁴²See <http://libertystreeteconomics.newyorkfed.org/2014/04/just-released-the-2013-soma-annualreport-in-a-historical-context.html> for further discussion of income projections under a counterfactual scenario.

⁴³See <http://libertystreeteconomics.newyorkfed.org/2013/08/more-than-meets-the-eye-some-fiscal-implications-of-monetary-policy.html> for a discussion of the fiscal implications of monetary policy.

⁴⁴Eurodollars are defined as unsecured U.S. dollar deposits at banks outside the United States, although only domestic banks are required to report these on the FR 2420. Eurodollars and federal funds are also traded in terms longer than overnight, generally out to one year. However, the volume of these Eurodollar and federal funds term transactions is very small relative to overnight markets.

⁴⁵According to the minutes of the FOMC meeting held on September 16-17, 2014, "Testing these design features was generally seen as furthering the Committee's understanding of how an ON RRP facility might be structured to best balance its objectives of supporting monetary control and of limiting the Federal Reserve's role in financial intermediation as well as reducing potential financial stability risks the facility might pose during periods of stress." For further information, see Joshua Frost et al., "[Overnight RRP Operations as a Monetary Policy Tool: Some Design Considerations](#)," Federal Reserve Bank of New York *Staff Reports*, no. 712, 2015.

⁴⁶Until January 15, 2014, operations were conducted from 11:15 a.m. to 11:45 a.m.

⁴⁷Term deposits may be offered through a number of formats: a competitive single-price auction (with a noncompetitive tender option for smaller bidders), a fixed-rate format with full allotment at an interest rate specified in advance, or a floating-rate format with full allotment in which the interest rate is set equal to the sum of a reference rate plus a fixed spread.

⁴⁸The Liquidity Coverage Ratio mandates a minimum amount of short-term liquid assets relative to potential cash outflows. In order for a deposit to count as a liquid asset under this regulation, it must be available upon demand. Without this feature, banks were discouraged from investing cash in term deposits, because they would need to expand liquidity in other ways to offset the impact. With early withdrawal, investments in term deposits are neutral for the ratio and improve net interest margins. The liquidity coverage ratio is evaluated as HQLA (high-quality liquid assets) / net 30-day cash outflow \geq 100 percent. Central bank term deposits without an early withdrawal option do not count toward HQLA, thus reducing the ratio.

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