



DOMESTIC OPEN MARKET OPERATIONS DURING 2015

*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 2015. Dinah Cook, Deborah Leonard, and Logan Suba were primarily responsible for preparation of the report.

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Overview

On December 16, 2015, the Federal Open Market Committee (FOMC) raised the target for the federal funds rate to a range of $\frac{1}{4}$ to $\frac{1}{2}$ percent, after seven years of maintaining the target range at 0 to $\frac{1}{4}$ percent. To effect this change, the Federal Reserve refined and put into use a new approach to implementing monetary policy that would allow it to control short-term interest rates while operating with the abundant reserve balances created in the banking system since 2008 as a result of the Federal Reserve's large-scale asset purchase programs. Effective December 17, the Federal Reserve raised the interest rate paid on required and excess reserve balances to 0.50 percent, and the FOMC directed the Open Market Trading Desk at the Federal Reserve Bank of New York (the Desk) to undertake overnight reverse repurchase (ON RRP) operations at an offering rate of 0.25 percent to maintain the federal funds rate within the target range.

The new framework was successful in lifting overnight interest rates into the FOMC's new target range. Following "liftoff," the effective federal funds rate—a volume-weighted measure of overnight federal funds transactions—made a parallel shift higher, printing toward the middle of the target range through the end of 2015 on all but the year-end date. Overnight rates in both secured and unsecured money markets moved up roughly in line with the increase in the effective rate, and the increase in overnight rates passed through successfully into term money market instruments. The effective rate's dip below the bottom of the FOMC's target range on December 31 reflected transitory and predictable effects seen in money markets around certain calendar dates and had no adverse effect on policy implementation.

Throughout 2015, the FOMC directed the Desk to continue rolling over maturing Treasury securities at auction and reinvesting principal payments from agency debt and agency mortgage-backed securities (MBS) in agency MBS. The FOMC's directive kept the

System Open Market Account's (SOMA) domestic securities portfolio at about \$4.26 trillion throughout the year, and the allocation between Treasury securities and non-Treasury securities was largely unchanged.¹ The Desk reinvested \$338 billion in principal payments from agency debt and MBS into agency MBS and rolled over approximately \$3.5 billion in Treasury securities in 2015. To reduce operational risk, simplify portfolio administration, and reduce custodial costs, the Desk initiated an effort to consolidate many small individual agency MBS into fewer and larger securities, similar to an aggregation program it conducted in 2011.

Consistent with the large SOMA portfolio, the total level of the Federal Reserve's liabilities in excess of Federal Reserve notes (U.S. dollar paper currency), mostly in the form of reserves, remained elevated at about \$3.07 trillion as of the end of the year. The composition of liabilities fluctuated over the course of the year as a result of the testing and use of new monetary policy implementation tools, as well as changes in activity of the U.S. Treasury and foreign official accounts.

The portfolio continued to contribute to elevated levels of Federal Reserve income and remittances to the Treasury. In 2015, a total of \$117 billion was paid to the Treasury, including a transfer of \$19.3 billion of the Federal Reserve's capital surplus in accordance with the Fixing America's Surface Transportation (FAST) Act that was enacted in December. Unrealized gains on the SOMA's domestic securities portfolio declined modestly in 2015 owing to a rise in longer-term interest rates, but remained solidly positive. As the FOMC continues to normalize the stance and conduct of monetary policy, both the size of the portfolio and its associated net income are expected to decline from currently elevated levels; projections of the decline, calculated using publicly available survey-based inputs, are presented in this report.

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Throughout 2015, the Federal Reserve continued to enhance its collection of data on money markets through the *Report of Selected Money Market Rates* (FR 2420). The report, which collects transaction-based data on unsecured borrowing from certain depository institutions on a daily basis, was expanded to capture a broader range of Eurodollar activity, among other changes. Using data from the report, the New York Fed pursued several initiatives related to its production and publication of money market statistics, including a revised method of calculating the effective federal funds rate and the introduction of an overnight bank funding rate—changes that were implemented on March 2, 2016.

This report begins with an explanation of the Federal Reserve’s new framework for controlling interest rates while operating with a large balance sheet. It then describes the open market operations the Desk undertook in money markets and securities markets in 2015 to implement the FOMC’s policy decisions and to support market

functioning, and discusses related market developments. The final section of the report examines selected developments affecting the composition of the Federal Reserve’s balance sheet, financial developments related to the domestic SOMA portfolio, and portfolio and income projection results. Appendixes 1 through 4 provide the full text of the authorizations, directives, and resolutions guiding the Desk’s activity. Appendix 5 summarizes information on operational exercises the Federal Reserve conducted prior to liftoff to support the technical execution of monetary policy. Appendix 6 provides background detail on the New York Fed’s counterparties for open market operations. Appendix 7 provides links to webpages where source material for Federal Reserve–related content can be found, and Appendix 8 catalogues corrections made to last year’s annual report, *Domestic Open Market Operations during 2014*.

Underlying data for the charts shown in this report are provided, to the extent allowed by data suppliers, on the New York Fed’s website.²

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A New Approach to Monetary Policy Implementation

In 2015, the Federal Reserve refined and put into use a new approach to implementing monetary policy that would allow it to control short-term interest rates even while operating with a large balance sheet. The FOMC's traditional approach to policy implementation had relied on small adjustments in the supply of reserve balances in the banking system through small purchases and sales of securities in the open market. However, this approach would no longer work in the environment of abundant reserves created by the Federal Reserve's large-scale asset purchase programs, conducted since 2008 in response to and following the financial crisis.³

Policy Implementation before and after the Financial Crisis

Before the financial crisis, the FOMC set a target for the federal funds rate, an unsecured overnight interbank borrowing rate, and achieved the target by directing the Desk to conduct open market operations to maintain conditions in reserve markets consistent with the given target. The open market operations, which could be permanent or temporary purchases and sales of securities, were designed to bring the supply of reserves to a level that was expected to match the estimated quantity of reserves demanded at the FOMC's overnight federal funds rate target. All else equal, if the Desk wanted the effective federal funds rate to rise in order to achieve the FOMC's target rate, it reduced the amount of reserves in the banking system; if it wanted the effective rate to decline, it slightly increased the amount. Permanent purchases of Treasury securities were conducted to support trend growth of the Federal Reserve's balance sheet (which was driven largely by growth of currency and

other liabilities and capital), while repurchase agreement operations (repos) and reverse repurchase agreement operations (reverse repos) were conducted to make small adjustments in the aggregate supply of reserves, adding or draining reserves temporarily in response to transitory factors.⁴

In the aggregate, the system operated with a structural deficiency of reserves, meaning that permanent additions to the supply of reserve balances fell short of the total need, which was driven largely by reserve requirements and contractual clearing balances. The Desk therefore conducted daily fine-tuning operations to add (or sometimes drain) balances temporarily to get to the desired aggregate level. Individual depository institutions traded reserves within the system in efforts to balance the cost of falling short of required reserves (and paying penalties or having to borrow reserves at what might be relatively high rates) and the opportunity cost of holding excess reserves (which were not remunerated). Thus, individual depository institutions with a deficiency of reserves had to find and trade with depository institutions with reserve surpluses. In the five years prior to the crisis, this system functioned with an average of \$20 billion in reserve balances and about \$1.5 billion in excess reserves. Under this framework of announcing the target level and making small changes in the aggregate supply of reserves, the Federal Reserve was able to reliably affect the market-determined level of the federal funds rate and keep it close to the FOMC's target.

The crisis brought on several important changes in the conduct of monetary policy. Following its easing in the stance of monetary policy—from a point target for the federal funds rate of 5¼ percent

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in mid-2007 to a target range of 0 to ¼ percent in December 2008—the FOMC shifted the focus of its monetary policy implementation operations to changes in the size and composition of its balance sheet. With its overnight policy rate constrained by the zero lower bound, the FOMC used large-scale purchases of longer-term securities to maintain downward pressure on longer-term interest rates, support mortgage markets, and help make broader financial conditions more accommodative.⁵ Reserve balances, which had previously been tightly managed, grew as a byproduct of the growth in the SOMA securities portfolio (and from a temporary expansion of credit during the crisis). Significantly, against this backdrop, the introduction of the Federal Reserve’s ability to pay interest on reserve balances held by depository institutions was expedited to October 2008.⁶

Policy Implementation during Normalization

Between 2008 and the end of 2015, several rounds of large-scale asset purchase programs raised the level of Federal Reserve liabilities in excess of Federal Reserve notes to \$3.07 trillion (mostly in the form of reserves), a level at which small variations in the supply of reserves would be unlikely to cause meaningful changes in the level of rates in the federal funds market, as they did before the crisis. In an environment of abundant reserves, implementation of monetary policy would therefore require a new operational approach to influence short-term interest rates when the FOMC determined the time had come to start raising them. The FOMC developed a framework for maintaining interest rate control, based on a system of rates administered directly by the central bank to influence the level of short-term market rates.

POLICY NORMALIZATION PRINCIPLES AND PLANS

The FOMC outlined its anticipated approach to removing monetary policy accommodation in a statement of Policy Normalization Principles and Plans, published in September 2014.⁷ In its statement, the Committee noted its plans to reduce monetary policy accommodation by raising its target range for the federal funds rate. It said that the Federal Reserve intended to move the federal funds rate into the target range primarily by adjusting the interest rate it paid on excess reserve balances (IOER), and would use an overnight reverse repurchase agreement facility and other supplementary tools, as needed,

to help control the federal funds rate. The Committee noted that an ON RRP facility would be used only to the extent necessary and would be phased out once it was no longer needed to help control the federal funds rate.

In its March 2015 meeting minutes, the FOMC provided additional details about its intended operational approach at the commencement of policy firming. The Federal Reserve affirmed that it intended to target a range for the federal funds rate that was 25 basis points wide, and to set the IOER rate and the offering rate associated with an ON RRP facility equal to the top and bottom of the target range, respectively (**Box 1**). The FOMC indicated that it intended to allow aggregate capacity of the ON RRP facility to be temporarily elevated to support policy implementation, but noted that it expected it would be appropriate to reduce the capacity of the facility fairly soon after policy firming commenced. It also said that the Federal Reserve could adjust the IOER rate and parameters of the facility, and use other tools such as term operations, as necessary for appropriate monetary control based on policymakers’ assessments of the efficacy and costs of their tools.

With respect to the Federal Reserve’s balance sheet, the FOMC indicated in its Policy Normalization Principles and Plans that it intended to reduce securities holdings in a gradual and predictable manner, primarily by ceasing to reinvest repayments of principal on securities held in the SOMA.⁸ It noted that it expected to cease or commence phasing out reinvestments after it began increasing the target federal funds rate, with the timing depending on how economic and financial conditions and the economic outlook evolved. In the longer run, the Committee noted that the Federal Reserve intended to hold no more securities than were necessary to implement monetary policy efficiently and effectively, and that such holdings would consist primarily of Treasury securities.

FRAMEWORK TOOLS

Thus, after seven years of using changes in the size and composition of its balance sheet (and forward guidance on short-term interest rates) to provide monetary policy accommodation while the FOMC’s target for the federal funds rate was near zero, the FOMC’s normalization framework now focuses once again on tools for managing short-term interest rates as the main mechanism for

Box 1

The IOER–ON RRP Rate Spread

The 25 basis point spread that the Federal Reserve set between the IOER rate and the offering rate on overnight reverse repos when policy firming commenced on December 17, 2015, helps guard against the possibility that the ON RRP facility will induce a large change in the structure of money markets and preserves activity in the federal funds market. This spread should not be confused with the FOMC's stance on monetary policy, which is expressed through a target range for the federal funds rate in order to provide some flexibility in interest rate control when the quantity of reserves remains elevated.

Nor should the spread be thought of as a corridor operating system. Corridor frameworks generally rely on reserve scarcity and market operations that are used to adjust the supply of reserves. They also employ marginal deposit and

lending facilities to limit the range of rate movements in the market (within the corridor) by setting penalties and costs for holding too many or too few reserves, respectively. In principle, market participants should be unwilling to lend at rates below what they can earn at the central bank's deposit facility and unwilling to borrow at rates above the rate available from the central bank's lending facility. In this type of system, relatively small changes in the supply of reserves can have a significant effect on equilibrium short-term rates.

In an environment in which the supply of reserves far exceeds the demand at a given rate, changes in the supply of reserves are not linked to movements in money market rates. Central banks supplying a relatively large quantity of reserves therefore cannot rely on scarcity to move interest rates accord-

ing to changes in their policy stance. They instead set the interest rate on their deposit facility at or close to their policy rate, with the deposit rate acting as a floor for their target rate, and then rely on arbitrage to steer market rates to their target. The framework the FOMC outlined to implement policy normalization resembles such a floor operating system, in which interest rate control is established by directly administering a minimum rate in money markets—or, in the Federal Reserve's case, two floor rates that reflect unique features of U.S. money markets. While the Committee set the IOER rate at the top of the target range for the federal funds rate and the ON RRP rate at the bottom of the range, both the IOER rate and the ON RRP offering rate are rates paid on liabilities of the Federal Reserve, intended to establish a level near or above which market rates trade.^a

^a The primary credit rate remains available as a marginal lending facility; however, there has been little demand for borrowing from it given the high level of reserves.

implementing monetary policy. Unlike the pre-crisis framework of reserves management, however, the normalization framework relies on an IOER rate and (at least temporarily) on an ON RRP offering rate as administered rates directed by the central bank as the means for moving the federal funds rate into the FOMC's target range, without necessarily draining reserves.

In theory, the IOER rate is meant to act as a floor beneath overnight interest rates. If a depository institution can invest cash in the central bank's standing deposit facility, then given the safety and convenience of this investment, there is no incentive for the institution to deploy funds in a way that earns less than what can be earned from balances maintained at the central bank. Further, if banks can acquire funds in the wholesale market at rates below the rate paid on reserves, competition for these funds to earn an arbitrage profit would suggest that banks will bid up these rates to equal the interest

rate on reserves. In practice, however, rates in U.S. money markets have fallen below the IOER rate. With the large levels of excess reserves in the system, certain institutional aspects of U.S. money markets—including bank-only access to IOER (which prevents key cash lenders such as government-sponsored enterprises and money funds from earning it), credit limits imposed by cash lenders, and other impediments to market competition, as well as the costs of balance sheet expansion associated with arbitrage activity—appear to create frictions that have made IOER act more like a magnet that pulls up short-term interest rates than a firm floor beneath them.

A standing ON RRP facility—through which the Federal Reserve offers a risk-free overnight asset with same-day settlement to a broad range of money market participants, at a rate managed by the Federal Reserve (subject to certain limitations)—can be used to support policy implementation during normalization by helping

to firm the floor beneath money market rates. Making such assets available widens the universe of counterparties that should be unwilling to lend at rates below those available from the Federal Reserve, thereby strengthening the bargaining position of nonbank lenders and enhancing competition in markets.⁹ In this way, an ON RRP facility can complement the upward pull of IOER as the FOMC raises its target range for the federal funds rate.

An eventual reduction in the size of the Federal Reserve's securities portfolio, when the FOMC ceases or phases out reinvestments, will lead to a permanent decline in the level of reserve balances.¹⁰ However, the FOMC could also use temporary tools, such as quantity-based term reverse repurchase agreements or term deposits, as supplementary tools for large-scale draining of reserves to facilitate a return to an environment of reserve scarcity.

Implementation Roles and Communications

Within the Federal Reserve System, different tools of monetary policy are governed by different decision-making bodies.

The FOMC is responsible for setting the stance of monetary policy and for the use of open market operations, purchases and sales of securities in the open market for the Federal Reserve's System Open Market Account (SOMA). Since 1936, the FOMC has selected the New York Fed as the Federal Reserve Bank responsible for the execution of open market operations and management of the SOMA.¹¹ Within the New York Fed, the Desk, under the guidance of a manager of the SOMA appointed by the FOMC, is responsible for conducting the operations under the authorization and direction of the Committee (Appendixes 1 and 2). In practice, the FOMC's operating objective for the operations is communicated to the Desk through a policy "directive" that the Committee votes on at the conclusion of

each meeting or through other ad hoc resolutions (Appendixes 3 and 4). The directive specifically instructs the Desk to conduct transactions for the SOMA in furtherance of the FOMC's desired operating objective.

The Board of Governors of the Federal Reserve System is responsible for policy tools pertaining largely to depository institutions, including the rates at which banks borrow from the discount window (the Fed's lending facility administered through the twelve regional Federal Reserve Banks), and policies around reserves held by depository institutions at the Fed, such as reserve requirements, payment of interest on reserve balances, and term deposits.¹²

Each of these tools is merely a means to an end, used to influence financial conditions in order to achieve the Federal Reserve's dual mandate of full employment and price stability. In the pre-crisis operating framework described above, open market operations were traditionally the primary tool through which monetary policy was implemented. In the normalization framework, however, the Federal Reserve makes use of several of these tools, with the Desk's reverse repo open market operations playing a supplementary role to support IOER.

Under this framework, the Federal Reserve issues an implementation note that outlines the specific decisions it made to implement its monetary policy stance, including the operational settings of the tools it is using. The note consolidates information that was previously provided in disparate communications and is aimed at promoting greater transparency about monetary policy implementation. The note is released following each FOMC meeting in conjunction with the release of the FOMC's policy statement, which explains the FOMC's formulation of monetary policy.

Domestic Open Market Operations

On December 16, citing considerable improvement in labor market conditions and reasonable confidence that inflation would rise over the medium term to its 2 percent objective, the FOMC lifted its federal funds target from the 0 to ¼ percent range that had been in effect since December 2008. The FOMC commenced policy firming (a process that some refer to as liftoff) by raising its target for the federal funds rate to a range of ¼ to ½ percent and by rolling out the policy implementation framework described in the preceding section of this report. Specifically, the Board of Governors raised the interest rate paid on required and excess reserves to 0.50 percent, effective December 17.¹³ Additionally, effective December 17, the FOMC directed the Desk to undertake ON RRP operations at an offering rate of 0.25 percent and term RRP operations spanning the year-end to maintain the federal funds rate in the new target range. Prior to liftoff, the Desk conducted daily tests of ON RRPs and tests of term RRPs at and away from quarter-ends to explore how such operations might improve interest rate control.

Throughout 2015, the FOMC also directed the Desk to continue rolling over maturing Treasury securities at auction and to continue reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency MBS. By keeping the FOMC's holdings of longer-term securities at sizable levels, these actions were intended to help maintain accommodative financial conditions. Through long-standing practice, the Desk also conducted a daily securities lending operation to promote smooth clearing of Treasury and agency securities.

Money Market Operations

Under the framework for policy implementation during the normalization process, open market operations in the money market have consisted of reverse repo operations to support IOER. These

operations are centered primarily on running a standing ON RRP facility, using an offering rate set by the FOMC, and when directed by the FOMC, offering term reverse repos (**Box 2**). After continuing to conduct tests of both overnight and term reverse repos throughout 2015, these operations were deployed to implement policy in conjunction with the FOMC's December 16 decision to raise its target range for the federal funds rate to ¼ to ½ percent. Together with IOER, the implementation approach successfully lifted the effective federal funds rate toward the middle of its new target range on every day but one, December 31 (**Chart 1**). The rate increase passed through effectively to other money market instruments as well. However, a number of developments in money markets affecting the supply and demand for safe short-term assets contributed to heightened volatility in money market rates at year-end.

REVERSE REPURCHASE AGREEMENTS

The Desk's operational approach to overnight and term reverse repo operations in 2015 did not materially differ between the exercise operations and policy implementation operations. However, specific settings—such as the offering rates and maximum operational sizes—did vary in line with changes in the FOMC's authorizations in the two phases of the year.

The Desk offered reverse repos to a broad set of money market participants, including primary dealers and an expanded set of counterparties that included money market funds, government-sponsored enterprises, and banks (Appendix 6). The Desk's reverse repo operations were conducted over FedTrade, the New York Fed's proprietary trading platform, with ON RRP operations typically running from 12:45 p.m. to 1:15 p.m. (eastern time), and term RRP operations running from 9:30 a.m. to 10:00 a.m. (eastern time). All reverse repo operations were conducted according

Box 2

A Day on the Money Markets Desk: Then vs. Now

Changes in the policy implementation framework have brought on significant changes in the analytical and operational work of the Desk's staff.

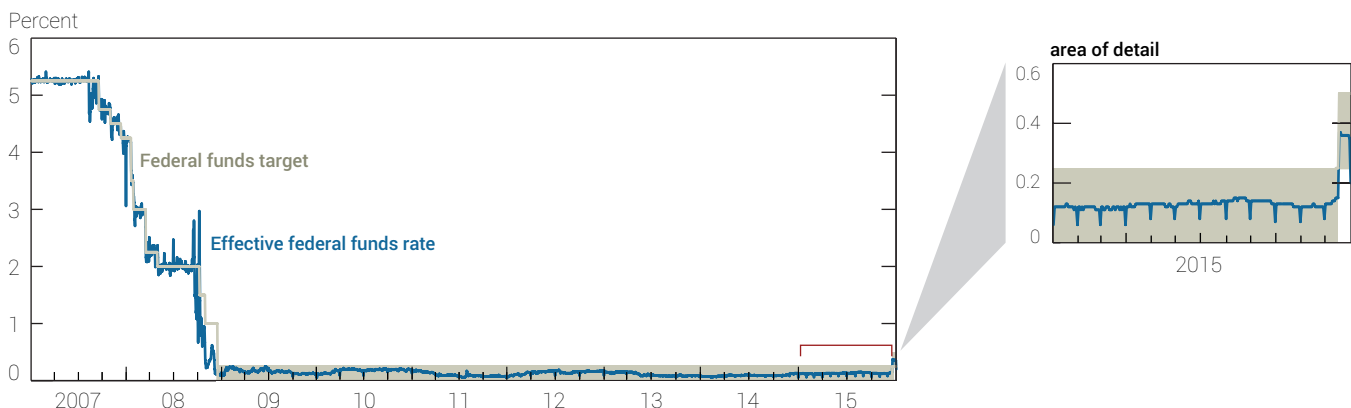
In the pre-crisis environment of reserve scarcity, the operating regime was based on managing the supply of reserves. The Desk's job was to design and execute open market operations to adjust the supply of reserves in the banking system to a level that would intersect the demand for reserves at the FOMC's target rate. This framework relied on a structural deficiency, meaning that the Desk created permanent additions to the supply of reserves (through outright purchases of Treasury securities) that were somewhat lower than the total need. Then, on a seasonal and daily basis, the Desk was in a position to add (or occasionally drain) reserve balances temporarily to get to the desired level through fine-tuning repo (or reverse repo) operations with primary dealers. Each workday, Desk staff had to gather information to assess near-term conditions in the

repo and federal funds markets, as well as banks' reserve needs and plans for meeting them. Reserve forecasters at the New York Fed and Board of Governors compiled data on bank reserves for the previous day and made projections of factors that could affect reserves over upcoming days. These factors, many of which were driven by forces outside of the Federal Reserve, affected currency growth, the Treasury's account balance, and accounts held by foreign official institutions at the New York Fed. Using this collection of information, staff developed plans for the day's operation(s), outlining the quantity of reserves to add or drain and the term of the operation(s). This plan was reviewed by staff at the Board of Governors before the Desk executed it in the open market, and the FOMC ratified the Desk's transactions over each intermeeting period at the Committee's subsequent meeting.

In the current environment of reserve abundance, the operating regime is based on administered overnight rates, which, by encouraging market competi-

tion for short-term funds, help to guide rates up into the FOMC's target range. The payment of interest on reserves is the primary tool, and reverse repo operations conducted by the Desk play a supplementary role. In addition, the design of the reverse repo operations differs from that before the crisis. Unlike the quantity-based temporary operations the Desk previously used to fine-tune the supply of reserves, the Desk now offers reverse repos through a temporary facility at a pre-established rate set by the FOMC. (The FOMC continues to ratify the Desk's intermeeting period transactions at each meeting.) The staff's primary analytical role has changed from reserve forecasting to monitoring and analyzing medium-term trends and relationships in a range of money markets, with the goal of assessing market participants' behavior, measuring the impact of the Federal Reserve's operations on market structure, calibrating the Federal Reserve's implementation tools, and analyzing policy transmission across money markets broadly.

Chart 1
Federal Funds Target and Effective Federal Funds Rate



Source: Federal Reserve Bank of New York.

Note: Figures are daily.

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to terms that were announced in operating statements and FAQs published on the New York Fed's website, and the results of operations, including the amounts submitted and accepted and the award rate, were posted on the New York Fed's website shortly after the conclusion of each operation. Data on daily allotments aggregated by counterparty type were released on a lagged, quarterly basis.¹⁴

Pre-Liftoff Operational Exercises

From January through December 16, the Desk did not conduct open market operations to achieve the FOMC's directive to maintain the federal funds rate in the target range of 0 to ¼ percent. However, the Desk conducted daily ON RRP operations in a continuation of the technical exercise that began in September 2013. The Desk did not vary any of the operational parameters of the ON RRP exercise operations it conducted in 2015 prior to liftoff. Each counterparty was permitted to submit one bid of up to \$30 billion in each operation, at a rate not to exceed 5 basis points. The operations were also subject to an overall size limit of \$300 billion per day, although this limit did not bind in any ON RRP operations in 2015. Accordingly, ON RRPs were awarded at 5 basis points to all submitters in every operation.¹⁵

The Desk also continued to examine how term RRP operations might work as an additional supplementary tool to help control the federal funds rate. Pre-announced term RRP operations spanning quarter-end dates in 2015 provided additional investment capacity, on top of the \$300 billion offered through ON RRPs, around dates when ON RRP usage tended to rise as cash investors faced temporary reductions in investment options with private counterparties. The Desk also conducted a series of four consecutive one-week term operations in February and early March. Over the course of its term RRP testing in 2015, the Desk varied numerous operational parameters, including total amounts offered, maximum offering rates, tenors, and time span relative to quarter-end.

Appendix 5 offers more information on the operational design and results of these exercises, as well as other operational exercises in money markets conducted by the Federal Reserve in 2015 (including the Term Deposit Facility and small-value exercises of repo operations).

Liftoff Operations

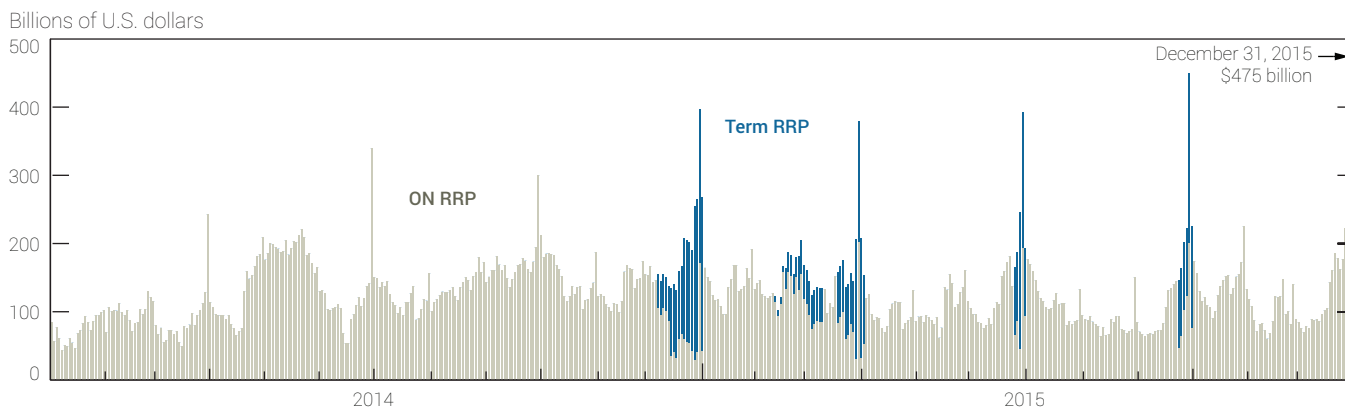
Following liftoff, the FOMC directed the Desk, effective December 17, to undertake open market operations as necessary to maintain the federal funds rate in the new target range, including (1) ON RRP operations at an offering rate of 0.25 percent, in amounts limited only by the value of Treasury securities held outright in the SOMA that are available for such operations and by a per-counterparty limit of \$30 billion per day, and (2) term RRP operations to the extent authorized in the resolution on term RRP operations approved by the Committee at its March 17-18 meeting. That resolution permitted the Desk to conduct up to \$300 billion in term RRP operations between December 17 and 30, subject to a maximum bid rate of 5 basis points above the ON RRP offering rate in effect on the day of the operation, and maturing no later than January 8, 2016.

In accordance with the domestic policy directive issued by the FOMC, the Desk began conducting daily ON RRP operations at an offering rate of 0.25 percent on December 17. To ensure sufficient monetary control at the onset of the normalization process, the FOMC suspended the \$300 billion aggregate cap on ON RRP transactions that had been in place since September 22, 2014, during the testing phase of the facility. The Desk provided further information in an operating statement that was released in conjunction with the FOMC's implementation note, indicating that it anticipated that around \$2 trillion of Treasury securities would be available for ON RRP operations to fulfill the FOMC's domestic policy directive.¹⁶ This amount would be reduced by any term RRP operations outstanding on the day of each ON RRP operation. In the highly unlikely event that the value of bids received in the ON RRP operation exceeded the amount of available securities, the Desk would allocate awards using the same single-price auction mechanism used during the ON RRP exercise.

Operational Results

Demand for reverse repos with the Federal Reserve exhibited broadly similar patterns during the pre-liftoff testing phase and the implementation phase following liftoff (**Chart 2**). Combined overnight and term reverse repos outstanding averaged \$122 billion, and ranged from \$60 billion to \$277 billion, on non-quarter-end dates over the course of the year. Daily participation levels remained

Chart 2
Reverse Repo Amounts Outstanding

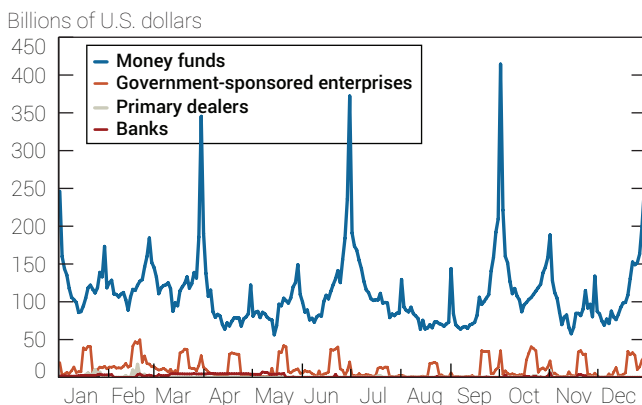


Source: Federal Reserve Bank of New York.
 Note: Figures are daily.

sensitive to several predictable factors, including the pricing and availability of reverse repos relative to the pricing and availability of comparable money market investments, settlement dates associated with Treasury auctions, and cyclical in counterparties' cash management needs. Take-up in reverse repos generally increased as the supply of alternative investments declined and as the spread between alternative short-term market rates and the ON RRP offering rate narrowed. Money market funds remained the most active participants in the facility (**Chart 3**).

A scarcity of alternative investment options around quarter-ends contributed to a considerable, though transitory, rise in demand for reverse repos with the Federal Reserve at those times. Total ON and term RRPs outstanding on quarter-end dates in 2015 exceeded \$375 billion each quarter in 2015, reaching a high of \$475 billion on December 31. Prior to liftoff, when ON RRP capacity was constrained, term RRPs expanded total RRP capacity, and they were offered at a premium over the prevailing ON RRP offering rate. There appeared to be a high degree of substitution between RRP transactions, and term RRPs absorbed a significant share of total RRP demand. In contrast, following liftoff, the increased demand ahead of December 31 was absorbed nearly entirely by ON RRPs, given the suspension of the aggregate cap and the offering of term RRPs at a rate with no premium over the overnight offering rate.¹⁷

Chart 3
RRPs Outstanding by Counterparty Type

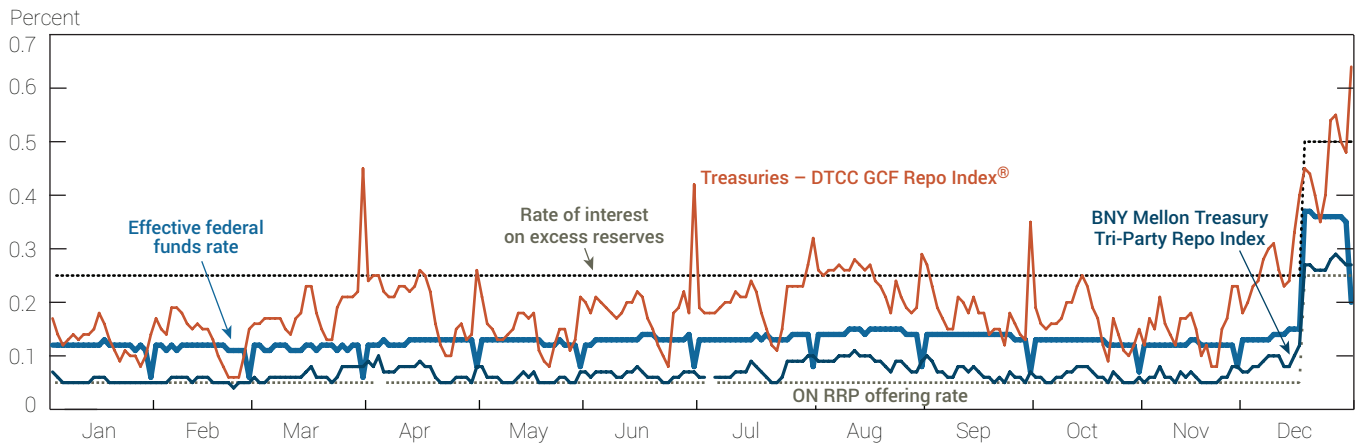


Source: Federal Reserve Bank of New York.
 Notes: Figures are daily and include overnight and term operations.

FEDERAL FUNDS AND OTHER SHORT-TERM RATES

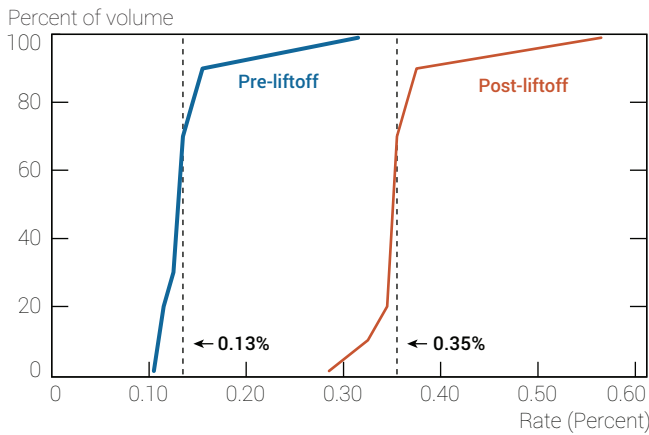
Prior to December 17, the upward pull from the payment of interest on excess reserves, with support from the zero lower bound, kept the effective federal funds rate within the FOMC's 0 to ¼ percent target range. The effective rate averaged 0.13 percent on non-month-end dates from January 1 through December 16. It tended to show short-lived softness on month-end dates during the period, when it

Chart 4
Overnight Money Market Rates



Sources: Federal Reserve Bank of New York; Bank of New York Mellon, repointex.bnymellon.com; The Depository Trust & Clearing Corporation.
 Note: Figures are daily.

Chart 5
Average Distribution of Overnight Federal Funds Rates



Source: Federal Reserve.

Notes: Pre-liftoff period covers December 3 through December 16, 2015. Post-liftoff period covers December 17 through December 30, 2015. Distributions represent the volume-weighted 1st, 10th, 20th, 25th, 30th, 40th, 50th, 60th, 70th, 75th, 80th, 90th, and 99th percentiles of rates associated with federal funds transactions reported in the FR 2420 *Report of Selected Money Market Rates*. Dashed lines represent volume-weighted median rates. The average effective federal funds rates for comparable periods were 0.14 percent and 0.36 percent.

dipped to an average of 0.07 percent amid the heightened dispersion in overnight interest rates associated with changes in intermediation patterns around financial and regulatory reporting dates (Chart 4).

Following liftoff, the Federal Reserve’s tools successfully lifted the federal funds rate into the FOMC’s new ¼ to ½ percent target range. The distribution of traded rates in the federal funds market essentially made a parallel shift higher (Chart 5). Nearly all trading occurred within the new range, and between December 17 and 30, the effective federal funds rate was in the target range. It averaged 0.36 percent during this period, about 0.25 percent above its average level during the two-week period preceding liftoff, when the target range was 0 to ¼ percent.

On December 31, the effective federal funds rate dipped to 0.20 percent, 0.15 percent below its prior-day value and 0.05 percent below the bottom of the FOMC’s target range. In addition, the dispersion of traded rates in the federal funds market increased that day, with a substantial amount of trading activity at relatively low rates, as was typical on prior quarter-ends. The year-end softness in the effective rate was consistent with pre-liftoff trends and the broader money market dynamics that affect trading activity around calendar dates. The dip was expected and transitory; the level and distribution of rates in the federal funds market returned to pre-year-end conditions

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Table 1

Money Market Rates in the Fourth Quarter of 2015

	Pre-Liftoff	Post-Liftoff	December 31, 2015	Change (Pre-Liftoff to Post-Liftoff)
Effective federal funds rate	0.12	0.36	0.20	0.24
Overnight Eurodollar deposits	0.12	0.35	0.20	0.23
BNY Mellon Treasury Tri-Party Repo Index	0.07	0.27	0.27	0.20
3-month U.S. Treasury bill	0.10	0.21	0.16	0.11
90-day AA financial commercial paper	0.33	0.57	0.54	0.24

Sources: Federal Reserve Bank of New York; Bank of New York Mellon, repoindex.bnymellon.com; Board of Governors of the Federal Reserve System.

Notes: Pre-liftoff period covers October 1 through December 16, 2015. Post-liftoff period covers December 17 through December 30, 2015. Eurodollar deposit rates are based on data from major U.S. brokers. Figures are rounded.

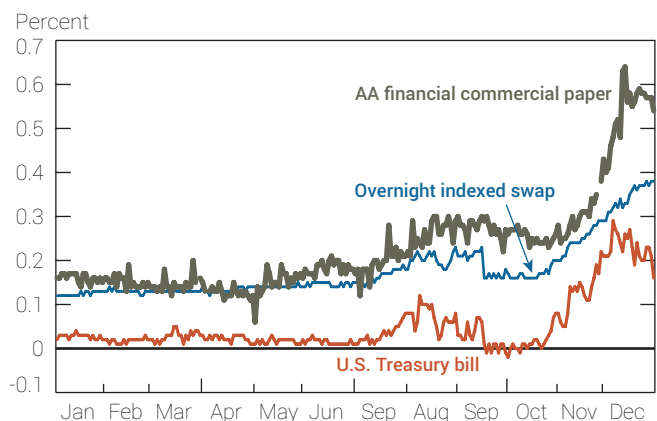
on the following day. Policymakers have emphasized that they do not view temporary declines in the federal funds rate as a materially adverse factor for monetary control. In fact, in the pre-crisis era, the Desk regularly experienced misses in hitting its target.

The FOMC's operating objective for policy implementation is expressed in terms of overnight rates in the federal funds market, which consists of domestic unsecured borrowings in U.S. dollars by depository institutions from other depository institutions and certain other entities, primarily government-sponsored enterprises. However, it is important that the stance of monetary policy be passed through into other money market rates as well. This allows expectations for the FOMC's future policy stance to be properly incorporated into the term structure of interest rates, thereby affecting financial conditions and the economy more broadly.

Data across a range of money markets provide evidence that the Federal Reserve's tools were effective in raising a broad constellation of short-term rates (**Table 1**). Overnight rates in both secured and unsecured money markets moved up roughly in line with the increase in the effective federal funds rate. However, rates on overnight transactions for Treasury tri-party repos settled modestly lower in the target range than they had in the pre-liftoff period. This outcome may in part reflect the fact that the ON RRP offering rate before liftoff was 0.05 percent, a level slightly above the bottom of the target range, but 0.25 percent after lift-off, equal to the bottom of the target range.

The increase in overnight rates passed through effectively into term money market instruments, with rates on a range of one- and three-month instruments rising ahead of the December FOMC meeting given widespread expectations for an increase in the FOMC's target range (**Chart 6**).¹⁸ Treasury bill yields rose to a lesser degree than other instruments with comparable terms (and even traded at yields somewhat below the ON RRP offering rate). Although bill yields have typically traded below other money market rates during tightening cycles, the stickiness in these yields likely also reflected unique qualities associated with bills. As short-term instruments that are directly guaranteed by the U.S. government and that offer intraday liquidity,

Chart 6
Three-Month Money Market Rates



Sources: Board of Governors of the Federal Reserve System; Bloomberg L.P.

Note: Figures are daily.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

bills attract strong demand from investors—particularly those that cannot directly access interest on reserves or reverse repos with the Federal Reserve. Demand for bills tends to be particularly elevated around year-end. Moreover, regulatory constraints and money market mutual fund investment mandates oblige some investors to hold Treasury bills. Finally, some investors that require intraday liquidity may find Treasury bills to be suitable vehicles for placing late-day cash.

MONEY MARKET DYNAMICS

Money markets are undergoing a period of considerable change that has affected both the supply of and demand for various safe short-term assets, including demand for the Federal Reserve's reverse repos and comparable instruments. Some of these changes have reinforced the heightened dispersion in money market rates that has historically occurred around month-, quarter- and year-ends. These changes help to explain the year-end miss in hitting the federal funds target and the higher demand for reverse repos with the Federal Reserve around quarter-ends.

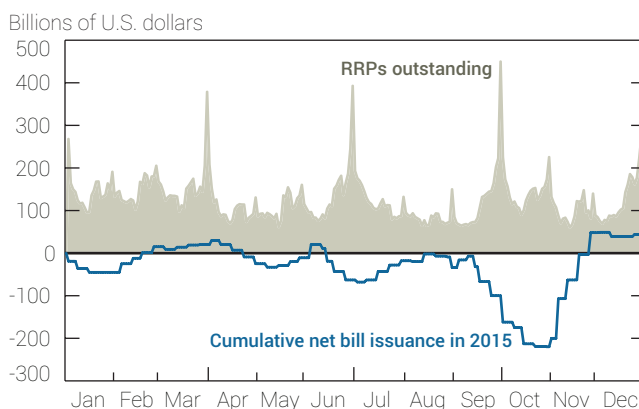
Several dynamics contribute to downward pressure on unsecured rates on key calendar dates. On quarter-ends, the actual and perceived marginal balance sheet costs of a number of depository institutions increase as they publish financial statements and calculate regulatory ratios. These increased balance sheet costs mean that depository institutions borrowing funds in money markets to earn interest on excess reserves must do so at a lower interest rate to account for these costs. Further, the reduction in balance sheet capacity can temporarily lower the bargaining power of lenders, again allowing borrowers to obtain funds at lower rates.

Many lenders in the federal funds and Eurodollar markets with access to the Federal Reserve's ON RRP facility responded to these low rates by increasing their use of Fed RRP. However, other lenders remained in these markets, either because they lacked ON RRP access, received funds late in the afternoon after the ON RRP operation had already occurred, or found ON RRP to be an imperfect substitute for lending in private markets. For example, some market participants may be willing to accept a lower rate in order to obtain the liquidity provided by "early return" investments (which unwind early in the morning); in contrast, ON RRP, which are conducted through the tri-party system, do not release maturing funds until late in the day.

Higher balance sheet costs also appear to have contributed to a wider dispersion in secured rates, as the costs of financial intermediation have risen. Although rates in the tri-party repo market for Treasury, agency debt, and agency MBS general collateral were relatively stable, the spread between these rates and rates for General Collateral Finance Repo (GCF Repo®), a service used primarily by securities dealers, widened. The effects were particularly pronounced around calendar dates.

Other factors are also affecting relationships in money markets. Reforms in the money fund industry have provided incentives for money fund managers to convert from prime funds to government-only funds, and are expected to prompt investors to shift their funds from prime funds to government-only funds as well. Because government-only funds have a relatively narrow universe of eligible money market instruments in which to invest, this shift brings a structural increase in demand for high-quality short-term assets. Meanwhile, the Treasury's announced plans to increase bill issuance in conjunction with its new cash management policy (discussed later in this report) should expand the stock of safe investable assets for nonbank money market investors and put upward pressure on Treasury bill rates and potentially other term money market rates. However, in September and October 2015, a net reduction in the supply of bills related to debt limit constraints reduced the available supply of safe short-term investments (**Chart 7**).

Chart 7
Treasury Bill Issuance and RRP Outstanding



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

Note: Figures are daily and include overnight and term operations.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

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MONEY MARKET INDICATORS

Throughout 2015, the Federal Reserve continued to enhance its collection of data on money markets through the *Report of Selected Money Market Rates* (Reporting Form FR 2420). The FR 2420 was launched in April 2014 to collect transaction-based data on unsecured borrowing—including federal funds, Eurodollars, and certificates of deposit—from certain depository institutions on a daily basis, with the aim of supporting implementation of monetary policy and the analysis of money market conditions.¹⁹ Using these data, the New York Fed pursued several initiatives related to its production and publication of money market statistics—changes to the effective federal funds rate and the publication of an overnight bank funding rate (OBFR)—that were implemented on March 2, 2016.

FR 2420 Report Enhancements

On October 20, 2015, the Federal Reserve revised the FR 2420 to improve the Federal Reserve’s ability to carry out its monetary policy and supervisory responsibilities. The revised collection allows for the New York Fed to use FR 2420 data in the calculation and publication of the effective federal funds rate and an overnight bank funding rate. In addition, the data enhancements support the Federal Reserve’s ability to monitor firm-specific liquidity conditions for supervisory purposes.

The most significant change was the expansion of the Eurodollar collection to include transactions from U.S. branches and agencies of foreign banking organizations (FBOs), as well as transactions of international banking facilities of domestic banks and FBOs.²⁰ Prior to the revision, only domestic banks reported Eurodollar transactions. Additionally, the asset size threshold of domestic banks required to report on FR 2420 was lowered from \$26 billion to \$18 billion, with an activity threshold for banks with assets between \$5 billion and \$18 billion, in order to capture more borrowing by small banks. Lastly, the definition of federal funds was changed to better align it with that of Federal Reserve Regulation D, which governs reserve requirements of depository institutions.

Publication of Interest Rate Statistics

Over the course of 2015, the New York Fed reviewed the methodology and procedures governing its calculation and publication of interest rate statistics for selected money market instruments. As a

result of this review, the New York Fed announced plans not only to change the data source and calculation method for the effective federal funds rate but also to introduce a new rate, the overnight bank funding rate. In addition, the New York Fed took steps toward increasing the transparency surrounding the production of these rates. These initiatives were implemented on March 2, 2016.

EFFECTIVE FEDERAL FUNDS RATE

On February 2, 2015, the New York Fed said it planned to begin calculating the effective federal funds rate using transaction-level data reported by U.S. banking offices on the FR 2420, in place of the existing practice of using aggregated data supplied by federal funds brokers.²¹ The FR 2420 data capture a greater share of federal funds activity by including both transactions intermediated by brokers (already represented in the effective federal funds rate calculation) and transactions negotiated directly between counterparties. In addition, direct access to the transaction-level data through the FR 2420 enables the Federal Reserve to monitor the quality of the data underlying the rate’s calculation, supporting a robust calculation process.²²

On July 8, 2015, the New York Fed announced plans to change the calculation of the effective federal funds rate to a volume-weighted median measure, rather than a volume-weighted mean. Analysis revealed that changing the calculation to a volume-weighted median—the rate associated with transactions at the 50th percentile of overnight transaction volume—would produce values close to the mean under most circumstances. However, when the mean and median differed, the median would be a better reflection of money market activity, so reporting the median would enhance the reliability and integrity of the computed rate.²³

OVERNIGHT BANK FUNDING RATE

On February 2, 2015, the New York Fed also announced plans to begin publishing an overnight bank funding rate based on transaction-level data in both federal funds and Eurodollar markets, which collectively represent a substantial share of banks’ overnight unsecured borrowings.²⁴ The overnight bank funding rate would be calculated as a volume-weighted median using data reported on the FR 2420 by U.S.-based banking offices, including unsecured borrowings of U.S. dollars booked at international banking facilities and at offshore branches that

are managed or controlled by a U.S. banking office. Since little transaction-based information is available to the public on broad overnight funding costs for U.S.-based banking offices, development and publication of the overnight bank funding rate provides insight into these costs and complements the effective federal funds rate.

Securities Market Operations

The Federal Reserve conducts operations in Treasury and agency MBS markets to implement monetary policy. It also runs a securities lending program, which is ancillary to monetary policy, to support smooth functioning in some of the securities markets in which the Federal Reserve operates.

MONETARY POLICY IMPLEMENTATION

Throughout 2015, the FOMC directed the Desk to maintain its policy of rolling over maturing Treasury securities at auction and its policy of reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. By keeping its holdings of longer-term securities at sizable levels, the Committee was able to use rollovers and reinvestments to help maintain accommodative financial conditions.

Agency MBS Operations

The FOMC's directive to the Desk to reinvest principal payments on all agency debt and agency MBS in agency MBS throughout 2015 was associated with the purchase of \$338 billion of MBS guaranteed by the two government-sponsored enterprises—Fannie Mae and Freddie Mac—and by the government corporation Ginnie Mae. The FOMC also directed the Desk to conduct dollar rolls as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions, although dollar roll activity in 2015 remained relatively muted.

Additionally, in 2015 the Desk conducted a small-value agency MBS sales exercise to test operational readiness, and began an effort to consolidate the MBS held in the SOMA portfolio into larger securities.

REINVESTMENTS

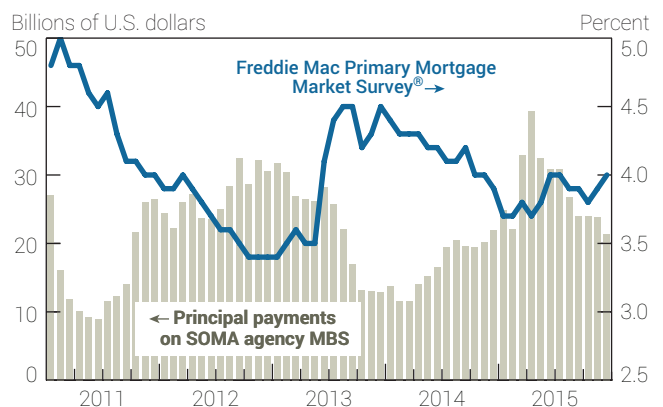
The Desk's purchase of MBS guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae was consistent with recent practices. Purchases were targeted toward newly produced coupons in thirty- and

fifteen-year securities in the “to-be-announced” (TBA) market. These securities are closely linked to new primary issuance and accordingly tied to primary mortgage rates.²⁵

The Desk conducted agency MBS reinvestment operations on most trading days in 2015 for a total purchase amount of \$338 billion. The corresponding figure for MBS purchases in 2014 was \$420 billion (\$220 billion of which was associated with reinvestments and \$200 billion of which was associated with additional purchases under the outcome-based large-scale asset purchase program).

Operational Results. The volume of reinvestment operations varied from month to month, ranging from a high of \$37 billion in April to a low of \$21 billion in December. The monthly amount was determined by pay-downs of SOMA agency MBS principal (which depend largely on the speed of prepayments, which are sensitive to interest rates and other variables) and the fixed schedule of agency debt maturities (which accounted for just \$6 billion in reinvestment purchases in all of 2015) (**Chart 8**).²⁶ The larger cumulative volume of reinvestments in 2015 as compared with 2014 can be attributed to a period of relatively high prepayments early in the year related to a decline in the general level of market interest rates (including mortgage rates) around that time and a 50 basis point reduction in the mortgage insurance premium on Federal Housing

Chart 8
**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.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Administration loans (which account for around 60 percent of the mortgages backing Ginnie Mae-issued MBS). These developments triggered an increase in refinancing activity.

Almost 90 percent of purchases were of thirty-year securities, which make up the majority of issuance among the three agencies in the TBA market. The remainder consisted of fifteen-year Fannie Mae and Freddie Mac securities. Agency MBS purchases in 2015 remained concentrated in relatively low-coupon securities, in line with relatively low primary mortgage rates, since issuers issue securities with coupons close to that rate minus a spread (which incorporates compensation for servicing the mortgage). The bulk of the Desk's thirty-year purchases were made in 3.5 percent coupons, while fifteen-year purchases were split between 2.5 and 3.0 percent coupons (Table 2). By comparison, in 2014, the bulk of thirty-year purchases were made in the 3.5 and 4.0 percent coupons and the bulk of fifteen-year purchases were in the 3.0 percent coupon (Chart 9).

Operational Approach. On or around the eighth business day of each month, the Desk published a tentative amount of reinvestment-related purchases expected to take place between the middle of the current month and the middle of the following month. This amount was approximately equal to the amount of principal payments from agency debt and agency MBS expected to be received over that period, adjusted for any variations from prior periods.

The Desk executed reinvestment-related purchases on most days in which fixed income markets were trading, during one or more of three operation windows throughout the day. A tentative schedule of planned agency MBS operations was released to the public every two weeks, detailing operation dates and times, the type of securities to be purchased (including term, agency, and coupon), and the maximum purchase amounts for each type of security. Operations were conducted over 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 multiple-price auction, meaning that each offer at or lower than the stop-out rate was transacted at the actual offer rate. Offers were evaluated based on their proximity to prevailing market prices at the auction close. Results, including the total amount accepted for each security, were generally posted within a minute of the close of the operation window on the New York Fed's public website;

Table 2
Distribution of Agency MBS Operations in 2015

Agency	Coupon (Percent)	SOMA Purchases (Billions of U.S. Dollars)	SOMA Purchases as a Share of Gross Issuance (Percent)
30-year			
Fannie Mae	3.0	32.5	46
	3.5	71.8	33
	4.0	16.2	24
Freddie Mac	3.0	23.0	39
	3.5	50.4	34
	4.0	9.3	22
Ginnie Mae	3.0	29.0	31
	3.5	57.9	26
	4.0	10.8	14
Subtotal		301.0	29
15-year			
Fannie Mae	2.5	10.5	35
	3.0	11.7	34
Freddie Mac	2.5	7.4	27
	3.0	7.8	30
Subtotal		37.4	27
Total		338.4	28

Sources: Federal Reserve Bank of New York; Knowledge Decision Services, LLC.

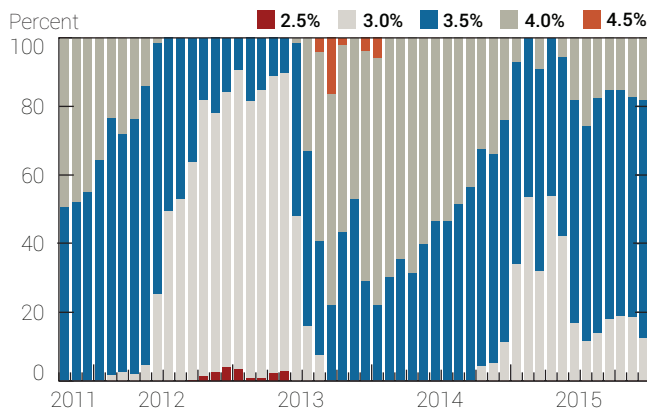
Notes: Figures may be rounded. Gross issuance represents all fixed-rate agency MBS issued in 2015, including non-TBA-eligible securities. Subtotal issuance comprises all coupons, including those not purchased for the SOMA, with original terms to maturity of fifteen or thirty years. Total issuance comprises all coupons and all original terms to maturity.

participating counterparties received their own award notifications simultaneously. On a monthly basis, the Desk released information on trades that took place in the prior month, including price, trade amount, agency, coupon, term, and settlement date.

Desk counterparties in agency MBS operations were primary dealers that transact in this market and Mortgage Operations Counterparty (MOC) participants (Appendix 6). The MOC program,

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

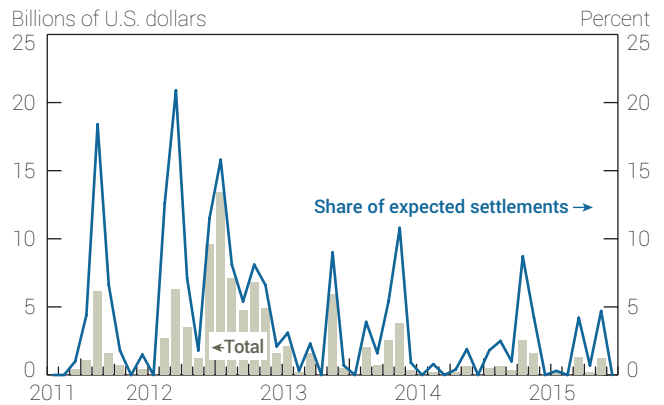
Chart 9
SOMA Purchases of Agency MBS by Coupon



Source: Federal Reserve Bank of New York.

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

Chart 10
SOMA Dollar Roll Sales



Source: Federal Reserve Bank of New York.

Note: Figures are monthly by settlement month.

announced in August 2014, 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. The MOC program ran from December 2014 through December 2015, during which the three participants all met the minimum requirements for participation and offered amounts that were consistent with their relative size.²⁷

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. Given the forward exposure, the Desk required counterparties to post margin on their unsettled trade amounts. The margin was calculated on a daily basis and served to protect the Federal Reserve from its exposure to counterparties obligated to deliver securities in the future. There has been no change in this policy since it was introduced in November 2011.

DOLLAR ROLLS

Given the forward-settling nature of the Desk's agency MBS transactions in the TBA market, MBS securities could potentially become relatively scarce in the market between the transaction's trade date and settlement date. In these instances, the Desk conducted dollar roll sales transactions to facilitate settlement, in accordance with the FOMC's directive. Specifically, 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 could thus help the Desk alleviate security shortages by allowing dealers more time to obtain securities required to settle transactions, in exchange for a market price that compensated the Federal Reserve.

Settlement of the Desk's agency MBS reinvestment transactions generally went smoothly throughout the year, as evidenced by the limited amount of dollar rolls undertaken by the Desk. Dollar roll sales represented an average of roughly 2 percent of the Desk's expected agency MBS settlements over 2015; this figure, consistent with the small shares seen in recent years, suggests minimal settlement stress in agency MBS markets (**Chart 10**).²⁸ The Desk's dollar roll transactions took place over TradeWeb, a commercial trading platform.

SMALL-VALUE AGENCY MBS SALES

From time to time, the Desk conducts small-value exercises of operations approved by the FOMC in its Authorization for Domestic Open Market Operations in order to test operational readiness. The exercises are conducted as a matter of prudent advance planning and do not represent a change in the stance of monetary policy, nor do they imply a signal on the timing of any change in the stance of monetary policy in the future.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

On January 5, 2015, the Desk announced a series of small-value agency MBS sale exercises. Over the course of the following three weeks, the Desk completed five small-value sales operations over FedTrade. The exercises were designed to test the Desk's ability to sell agency MBS that have a range of characteristics, such as different issue dates or coupons, and unique underlying traits such as low loan balances or geographic concentration. The Desk also tested its ability to sell securities in which the underlying characteristics are known prior to trading (known in the market as specified pools, in contrast to TBA trades) and to conduct basket sales, which bundle several different securities together for sale as one. The individual operations ranged in size from \$20 million to \$126 million, and the total value of operations across the series of exercises was \$441 million. Overall, the exercises were viewed as successful tests of operational readiness.

CUSIP AGGREGATION

During the week of August 17, 2015, the Desk initiated an effort to consolidate many small individual agency MBS into fewer and larger securities. Through this process, known as CUSIP aggregation, a number of existing agency MBS with similar characteristics—including uniform agency backing, coupon, and original term to maturity—are consolidated into a larger pass-through security.²⁹ The cash flows from the underlying agency MBS provide the cash flows for the aggregated CUSIP.

By reducing the number of individual securities held in the SOMA portfolio, CUSIP aggregation can reduce operational risk, simplify back-office portfolio administration, and reduce custodial costs, which are assessed on a per-CUSIP basis. The Desk conducted a similar aggregation program in 2011, during which the roughly 44,000 CUSIPs in the SOMA portfolio were consolidated into fewer than 10,000 CUSIPs. As a result of additional agency MBS purchases and ongoing reinvestment activity since that time, the number of CUSIPs held by the SOMA has risen, reaching around 80,000 just before the start of the renewed aggregation program. Through this program, the Desk expects to reduce the number of individual agency MBS securities held in the SOMA to around 20,000. As of the end of 2015, it had aggregated nearly 12,000 CUSIPs into 68 new MBS with a current face value of approximately \$265 billion.

MARKET FUNCTIONING

Measures of agency MBS market functioning were largely stable in 2015. Agency MBS spreads to Treasury securities of similar duration were in line with recent historical averages, net issuance increased, and liquidity metrics such as average daily trade volumes improved marginally from 2014.

Desk purchases accounted for approximately 28 percent of gross market issuance of fixed-rate agency MBS on average over the course of the year. This share is down significantly from approximately 50 percent in 2014, when the Desk was still conducting new purchases under the FOMC's last large-scale asset purchase program for most of the year. Although the Desk's purchases declined as a share of annual issuance, private demand for agency MBS increased, and major indicators of liquidity in agency MBS markets, such as trading volumes and average trade size, were relatively stable throughout the year.

Agency MBS markets appeared to experience smooth clearing throughout 2015. The implied financing rate (IFR) on dollar roll transactions for production coupon securities, which is a measure of the availability of a particular cohort of MBS for delivery into TBA contracts, was near or just above zero for much of 2015, slightly higher than levels seen in 2014.³⁰ Relatively higher IFRs were partly a function of reduced scarcity of production coupons in the market, as net issuance increased and the overall volume of the Federal Reserve's purchases declined relative to 2014. Higher IFRs were also a function of higher money market rates, such as MBS repo rates, since the cost of funding MBS positions through dollar rolls is linked to the cost of funding in other markets. Fails to deliver securities in agency MBS remained at multiyear lows, as well.

Treasury Securities Operations

At the direction of the FOMC, the Desk rolled over maturing Treasury securities into new Treasury issues at auction throughout 2015.

ROLLOVERS

In line with long-standing practice, rollovers were accomplished by placing bids for the SOMA at Treasury auctions equal in par amount to the value of holdings maturing on the issue date of the securities being auctioned, allocated proportionally across those securities by announced offering amount. Maturing SOMA holdings of Treasury

notes, bonds, Treasury Inflation-Protected Securities (TIPS), and Floating Rate Notes (FRNs) were exchanged proportionally across all Treasury notes, bonds, TIPS, and FRNs issued on that day; SOMA holdings of Treasury bills would typically be exchanged for newly issued bills.³¹ Bids at Treasury auctions were placed as noncompetitive tenders and were treated as add-ons to announced auction sizes. For operational efficiency, when the SOMA's Treasury security holdings that matured on a given day totaled less than \$2 million, the Desk allowed those securities to mature without rollover.

In 2015, the Desk rolled \$3.5 billion of maturing Treasury holdings into new securities across five issue dates, and allowed \$8 million of securities to mature without reinvestment. The relatively low volume of rollovers is an enduring consequence of the Maturity Extension Program, which ran from September 2011 to December 2012, during which the Desk sold or redeemed nearly all of the SOMA's Treasury securities that would have matured before December 2015.

TREASURY MARKET FUNCTIONING

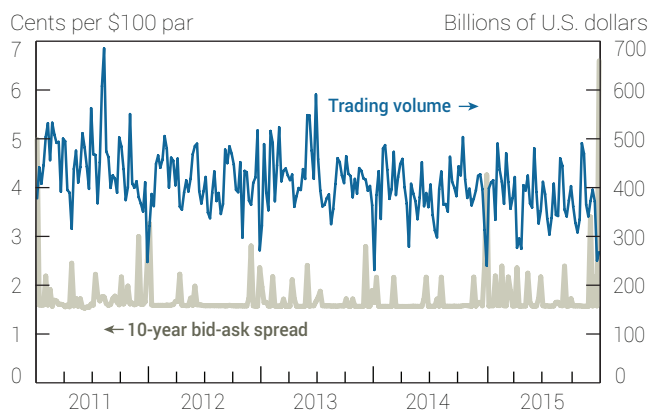
As of the end of 2015, the SOMA held 20 percent of outstanding marketable Treasury securities, roughly similar to the share of outstanding Treasury securities held at the end of 2014. Over the course of the year, the size of the SOMA Treasury portfolio remained steady, while Treasury marketable debt held by the public (inclusive of SOMA holdings) increased \$600 billion.³²

By many metrics, the liquidity and efficiency of trading in the Treasury market are as robust as they have ever been. For example, throughout 2015, bid-ask spreads remained steady at very low levels by historical standards, and trading volumes and quote sizes remained within historical ranges (**Chart 11**). However, changes in market structure also raise questions about evolving risks, such as whether an improvement in average liquidity conditions may come at the cost of rare but severe bouts of volatility that coincide with significant strains in liquidity (**Box 3**).

SECURITIES LENDING

To ensure the effective conduct of open market operations, the FOMC authorized the New York Fed to lend eligible Treasury and agency debt securities held in the SOMA to dealers on an overnight

Chart 11
Treasury Market Liquidity Measures



Sources: Federal Reserve Bank of New York; BrokerTec.

Notes: The chart shows the one-week average of the on-the-run ten-year Treasury bid-ask spread calculated from BrokerTec data and the weekly average of primary dealer Treasury transaction volume (excluding TIPS and FRNs) reported in the FR 2004 *Government Securities Dealers Reports*. Trading volume data may reflect revisions since prior publication.

basis. These 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 SOMA securities, especially those in which the SOMA has a significant market share, may help to mitigate periods of scarcity or elevated fails.

In 2015, the Desk continued to lend Treasury and agency debt securities held in the SOMA portfolio to primary dealers based on competitive bidding in daily auctions at noon, 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 were willing to borrow the security. As has been the case since 2009, the minimum bid was 5 basis points and all loans were for an overnight term, as determined by market convention. 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 Treasury and agency debt securities per day in the first three quarters of 2015, an amount in line with daily averages in 2014. By the end of the fourth quarter, SOMA securities lending of Treasury securities increased to as much as \$18 billion per day, the highest level since mid-2014, largely driven by an increase in demand for short-dated

Box 3

The Evolving Structure of the U.S. Treasury Market

On October 15, 2014, the market for U.S. Treasury securities, futures, and other related financial markets experienced an unusually high level of volatility and a rapid round-trip in prices. The abrupt occurrence of such significant and unexplained volatility called for a deep examination of the conditions that precipitated it and the structure of the Treasury market. This work culminated in the publication of an interagency report, *Joint Staff Report: The U.S. Treasury Market on October 15, 2014*, on July 13, 2015, by the staffs of the U.S. Department of the Treasury, the Federal Reserve Board, the Federal Reserve Bank of New York, the U.S. Securities and Exchange Commission, and the U.S. Commodity Futures Trading Commission.

The analysis revealed that the U.S. Treasury market has undergone broad structural changes over the past two decades. In the past several years, trading has become increasingly electronic, and, in many cases, highly automated—a trend that has sharply increased the importance of principal trading firms (PTFs) in interdealer markets. As a result of the growth in high-speed electronic trading in the Treasury market, PTFs now account for the majority of trading and provide the vast majority of market depth in interdealer markets, the primary price discovery venue for benchmark Treasury securities.

However, further analysis of the dealer-to-customer market shows that primary dealers still hold a significant

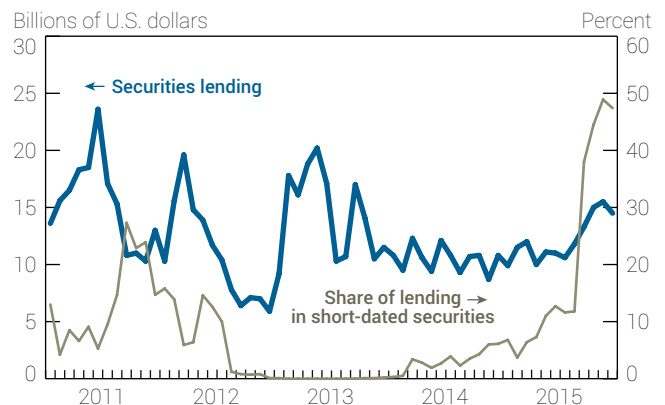
intermediary role through their relationships and trading with clients, and that primary dealers retain a majority share of overall secondary market trading volume, although they no longer account for a majority of trading in interdealer markets. Recent changes to Treasury market intermediation have been driven by a number of factors, including changing business models, growth in participation by PTFs, costs associated with adapting to new technologies, and balance sheet and competitive pressures. These changes in intermediation and the provision of liquidity have coincided with significant growth in the U.S. fixed-income market and potential changes in the demand for liquidity by many market participants.^a

^a See U.S. Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, U.S. Securities and Exchange Commission, and U.S. Commodity Futures Trading Commission, *Joint Staff Report: The U.S. Treasury Market on October 15, 2014* (Washington, D.C.:U.S. Department of the Treasury, 2015), at https://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf.

coupon securities (**Chart 12**). The Treasury reduced bill issuance starting in September as it approached its debt limit, while investors' desire for safe, liquid short-term assets remained steady. Because of the reduced supply and resulting increased specialness of bills in the market, investors began purchasing more short-dated coupon securities, which also started trading with heightened scarcity value. At the time, SOMA held approximately \$200 billion in Treasury securities due to mature before the end of 2016, and did not hold any bills.

On average, primary dealers borrowed less than \$1 billion of agency debt securities per day in 2015, an amount similar to that in prior years. Loans of agency debt were collateralized with Treasury securities.

Chart 12
SOMA Securities Lending in Treasuries



Source: Federal Reserve Bank of New York.

Notes: Figures are monthly averages of daily results. Share of lending in short-dated securities represents lending of Treasury securities with two years or less remaining to maturity as a share of total securities lending in Treasuries.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Selected Balance Sheet Developments

Over the course of 2015, the ongoing reinvestment of repayments of principal on securities held in the SOMA portfolio kept the overall size of the domestic securities portfolio fairly steady at about \$4.26 trillion. The composition of the Federal Reserve's liabilities associated with those assets shifted over the course of the year, with the total level of liabilities in excess of Federal Reserve notes (which are mostly in the form of reserves) remaining elevated at around \$3.07 trillion at year-end.

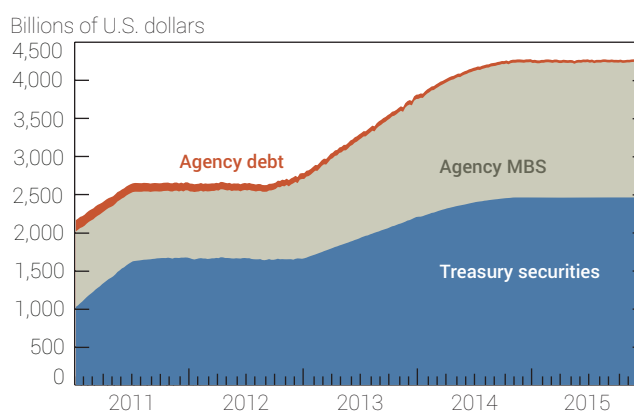
The portfolio continued to contribute to elevated levels of Federal Reserve income and remittances to the Treasury. However, a projection exercise, summarized below, illustrates how both the size of the portfolio and its associated net income are expected to decline from currently elevated levels as the FOMC continues to normalize the stance and conduct of monetary policy.

Selected Assets

The SOMA comprises the Federal Reserve's domestic and foreign portfolios, along with reciprocal currency arrangements made with foreign official institutions. The SOMA's domestic portfolio, which as of year-end stood at \$4.26 trillion, consists of U.S. Treasury and federal agency securities held on both an outright and a temporary basis. The foreign currency portfolio, which at year-end stood at almost \$20 billion, is composed of investments denominated in euros and yen. The Federal Reserve also extends short-term credit to depository institutions through the primary credit facility (which is not part of the SOMA) and to foreign central banks through liquidity swaps.

All else equal, an increase in a particular asset leads to a corresponding increase in reserve balances on the Federal Reserve's balance sheet.

Chart 13
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.

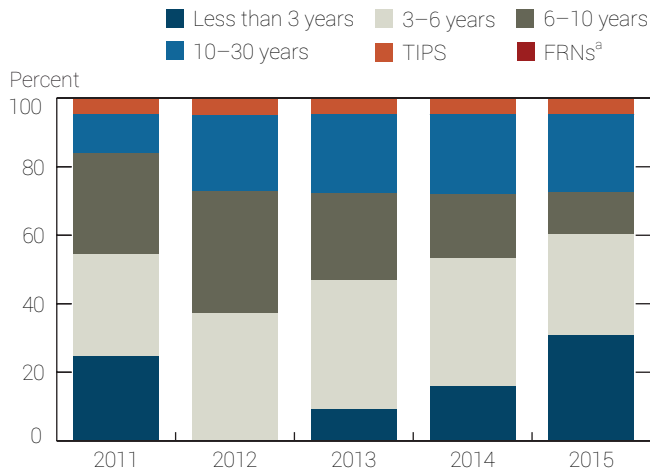
SOMA DOMESTIC SECURITIES HOLDINGS

The size and composition of the SOMA's domestic securities portfolio were little changed during 2015—a consequence of the FOMC's policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction. By keeping the Committee's holdings of longer-term securities at sizable levels, this policy was intended to help maintain accommodative financial conditions.

Portfolio Size and Composition

As of the end of 2015, the SOMA stood at \$4.26 trillion in par value terms, and was composed of \$2.46 trillion (58 percent) in Treasury

Chart 14
Maturity Distribution of SOMA Treasury Holdings

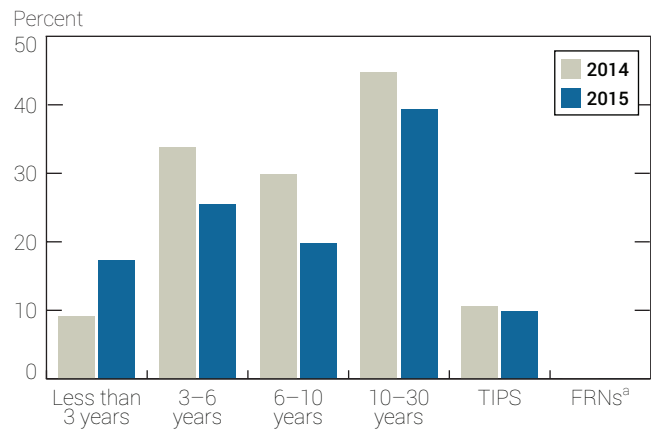


Source: Federal Reserve Bank of New York.

Note: Figures are as of year-end.

^aLess than 1 percent of holdings in 2014 and 2015 are Floating Rate Notes (FRNs).

Chart 15
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 and consist of coupon securities only.

^aSOMA held less than 1 percent of the outstanding supply of Floating Rate Notes (FRNs) in 2014 and 2015.

securities, \$1.77 trillion (41 percent) in agency MBS, and \$33 billion (1 percent) in agency debt (Chart 13).³³ The size of the portfolio and the allocation between Treasury securities and non-Treasury securities were largely unchanged from October 2014, when the FOMC ceased new purchases of securities under its third large-scale asset purchase program.

COMPOSITION OF TREASURY HOLDINGS

Throughout 2015, ongoing rollovers of maturing Treasury securities kept the size of the portfolio fairly steady at \$2.46 trillion. Securities in the portfolio continued to age, with the weighted average maturity of the portfolio declining from 9.6 years to 8.6 years over the course of the year. The share of the portfolio held in securities with less than three years to maturity increased from 16 to 31 percent, while the share of securities held in the three- to six-year and six- to ten-year maturity sectors declined (Chart 14).

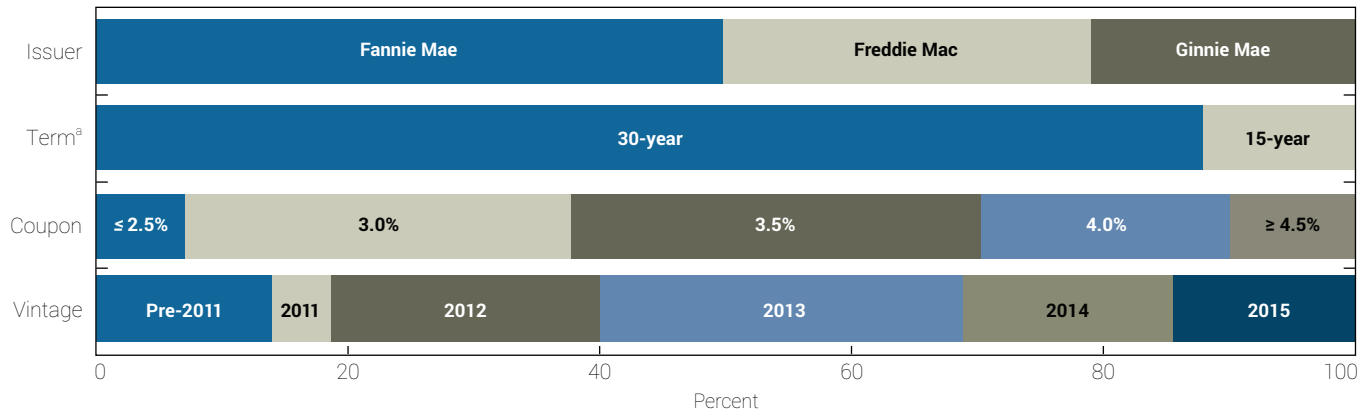
SOMA holdings of Treasury coupon securities as a share of the outstanding Treasury market remained steady at around 20 percent over the course of the year. The SOMA continued to hold a larger share of longer-term securities outstanding as a result of prior years'

large-scale asset purchase programs; for example, roughly 40 percent of Treasury securities with ten to thirty years remaining until maturity were held in the SOMA as of year-end, compared with just 17 percent of Treasury securities with up to three years remaining until maturity (Chart 15).

COMPOSITION OF AGENCY MBS HOLDINGS

Throughout 2015, the size of the agency MBS portfolio was roughly unchanged at approximately \$1.77 trillion, and the composition of the portfolio remained fairly steady as well. Because the Desk conducts its purchases in the market for newly issued securities, the characteristics of the portfolio are broadly consistent with those of the outstanding agency MBS market; the composition of the portfolio also reflects the fact that certain securities have been refinanced or repaid over the years and so have exited the portfolio. At the end of the year, 50 percent of the settled agency MBS portfolio was held in MBS guaranteed by Fannie Mae, 29 percent in MBS guaranteed by Freddie Mac, and 21 percent in MBS guaranteed by Ginnie Mae (Chart 16). Almost 90 percent of holdings were held in thirty-year MBS, with the remainder in fifteen-year MBS. As of the end of 2015, the weighted average life of the SOMA's agency MBS portfolio was 6.5 years.³⁴

Chart 16

Distribution of SOMA Agency MBS Holdings

Source: Federal Reserve Bank of New York.

Notes: Figures are as of December 31, 2015. Holdings total \$1,747 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.

Because the Desk purchases newly issued securities, about 60 percent of the securities held in the portfolio were originated in 2013, 2014, and 2015 as of the end of the year. Most of the securities purchased during the first round of large-scale asset purchases have been paid off, as homeowners either refinanced or fully repaid their loans. Sixty-three percent of the MBS portfolio—a slightly higher proportion than at the end of 2014—was held in securities with 3.0 and 3.5 percent coupons; the increased share reflects the fact that these coupons constituted the bulk of new issuance in 2015. The weighted-average coupon of the agency MBS held in the SOMA portfolio was largely steady, declining from 3.6 percent at the end of 2014 to 3.5 percent at the end of 2015.

The Federal Reserve's ownership of the outstanding stock of fixed-rate agency MBS declined slightly from 32 percent to 31 percent over the past year, as the size of the MBS portfolio remained largely steady while the outstanding stock of agency MBS increased by \$206 billion. The weighted-average coupon of underlying loans in MBS pools held in the SOMA is 4.0, slightly below the broader market's weighted average coupon of 4.2 percent, and the SOMA holds newer loans than the broader market. The average age of loans held by the SOMA is thirty-seven months, while the average age of loans in the broader market is forty-one months. These differences

between the SOMA and the broader market are driven by the Desk's practice of purchasing newly issued securities.

COMPOSITION OF AGENCY DEBT HOLDINGS

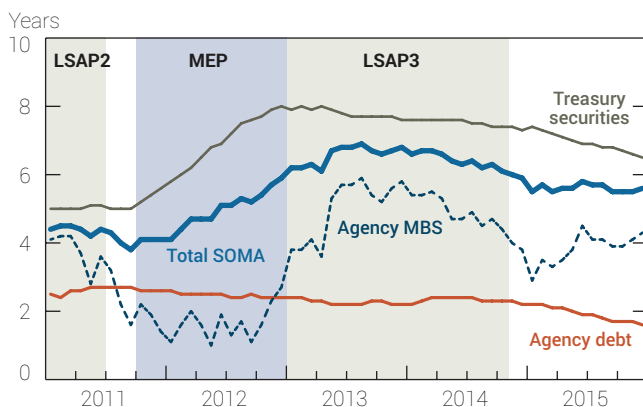
At the end of 2015, the SOMA held a total face value of \$33 billion of agency debt securities, acquired during the Federal Reserve's first asset purchase program from 2008 to 2010. Nearly \$17 billion of these securities will mature in 2016, and most of the remaining securities have less than five years to maturity.

Portfolio Risk Metrics

While the size of the domestic securities portfolio remained fairly steady over the course of 2015, the duration of the portfolio declined modestly. 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.³⁵

Over the course of 2015, the par-weighted average duration of the SOMA portfolio declined from 5.9 years to 5.6 years (**Chart 17**). The decline in the portfolio's duration was driven largely by a

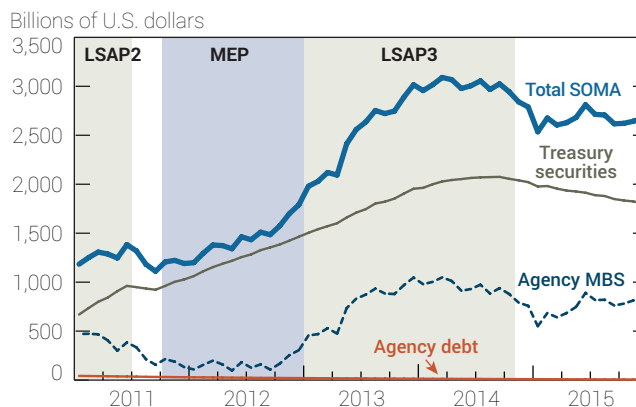
Chart 17
Average Duration of SOMA Domestic Securities Holdings



Source: Federal Reserve Bank of New York.

Notes: Figures are as of month-end. Calculations are par-weighted. LSAP3 purchases of agency MBS began in September 2012.

Chart 18
SOMA Domestic Securities Holdings in Ten-Year Equivalents



Source: Federal Reserve Bank of New York.

Notes: Figures are as of month-end. Calculations are par-weighted. LSAP3 purchases of agency MBS began in September 2012.

decline in the duration of the SOMA's holdings of Treasury securities. Over the course of the year, the duration of the Treasury portfolio edged lower, from 7.3 years at the end of 2014 to 6.5 years at the end of 2015. This decline reflected the aging of the Treasury portfolio, which more than offset any duration effects from the minimal rollovers of maturing Treasury securities into newly issued securities. Early in the year, the weighted average effective duration of the agency MBS portfolio reached its lowest level since late 2012 as interest rates declined, but it subsequently increased as interest rates rose. Movements in interest rates—and specifically, mortgage rates—result in variation in the effective duration of MBS holdings.³⁶ In particular, lower mortgage rates encourage homeowners to refinance their loans, thereby shortening the duration of MBS securitizing these loans, while higher mortgage rates discourage homeowners from refinancing, thereby lengthening the duration of MBS securitizing these loans. On net, the effective duration of the agency MBS portfolio increased, from 3.8 to 4.3 years, over the course of the year.

Like the average duration of the SOMA portfolio, the dollar value of duration held in the SOMA portfolio fell in 2015. One method of measuring dollar duration is in ten-year equivalents—that is, 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 slightly declined from \$2.79 trillion at the end of 2014 to \$2.67 trillion at the end of 2015 (Chart 18), driven

by the declining average duration of holdings in combination with steady portfolio size.

In addition to accommodating interest rate risk as measured by duration, the SOMA portfolio has also absorbed a substantial amount of prepayment risk, the risk arising from the prepayment option embedded in agency MBS. The prepayment 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.

FOREIGN CURRENCY-DENOMINATED ASSETS

The Federal Reserve holds foreign currency-denominated assets, which are invested to ensure that adequate liquidity is maintained to meet anticipated foreign exchange intervention needs. These operations are conducted under the direction of the FOMC, acting in close and continuous consultation and cooperation with the U.S. Treasury, which has overall responsibility for U.S. international financial policy, including foreign exchange market intervention policy.³⁷

Foreign currency reserves comprise euro and yen holdings and are invested in a variety of instruments that yield market rates of return in their respective currencies and have a high degree of liquidity and credit quality. These reserves may include outright holdings of German, French, and Japanese government securities;

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

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euro-denominated repurchase agreements; and deposits at the Bank for International Settlements and in facilities at other official institutions, such as the Deutsche Bundesbank, the Banque de France, and the Bank of Japan. The FOMC's Authorization for Foreign Currency Operations defines the permitted investments for the SOMA foreign currency portfolio.

As of December 31, 2015, the amortized cost of the SOMA foreign currency portfolio totaled \$20 billion, a decline from \$21 billion at the end of 2014. The decline in the portfolio's U.S. dollar value largely reflects the U.S. dollar's appreciation in 2015. Of note, the U.S. monetary authorities did not undertake any intervention operations during 2015, which would affect the stock of the SOMA's foreign currency-denominated assets.³⁸

SHORT-TERM LIQUIDITY PROVISION

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.³⁹ Loans are generally limited to overnight maturities and are initiated by depository institutions and approved by Reserve Banks. In addition to serving as a lender of last resort, the facility is intended to limit upward pressure on overnight interest rates, in particular the federal funds rate, if a net reserve shortage or a disruption to payment flows should occur. In 2015, the interest rate on primary credit loans remained at 75 basis points until mid-December, when, in conjunction with the FOMC's decision to raise the federal funds target range, the Board of Governors announced a 25 basis point increase in the primary credit rate to 1 percent, effective December 17. The spread between the primary credit rate and the top of the federal funds target range has remained constant at 50 basis points since February 18, 2010.

Primary credit borrowings remained subdued in 2015 amid high levels of excess reserves and benign market funding conditions. The \$17.4 million average daily loan balance in 2015 was roughly consistent with average daily loan balances in recent years, but below average daily loan balances in the pre-crisis period. In line with recent trends, over half of the loans from the facility were originated

for test purposes. Banks test their ability to borrow money from the discount window to ensure that they have access to the facility.

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.

Since May 2010, the Federal Reserve has maintained dollar liquidity swap lines with the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank. In addition, since November 2011, the Federal Reserve has maintained foreign currency swap lines with the same institutions.⁴⁰ On October 31, 2013, the FOMC announced the conversion of existing temporary currency swap lines to standing arrangements that will remain in place until further notice.

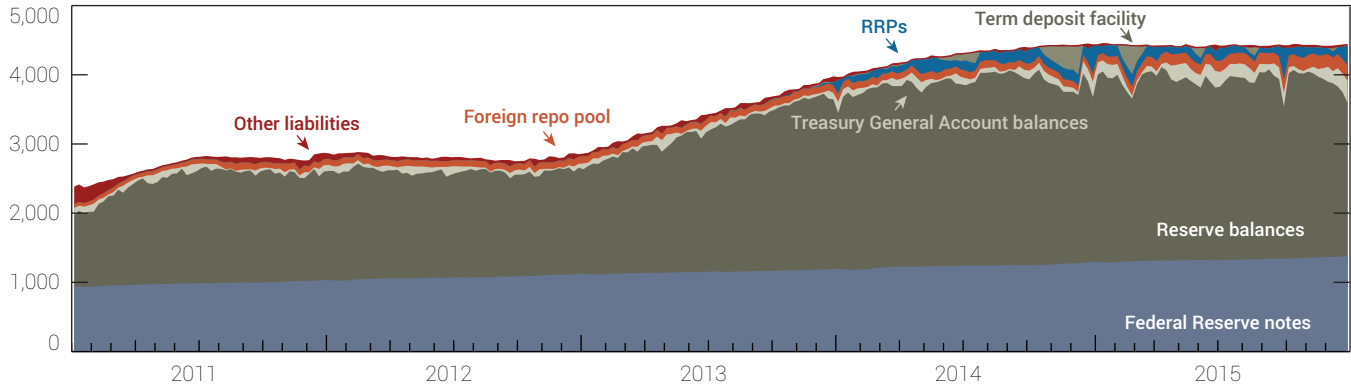
Although average use of dollar liquidity swaps was low for much of 2015, demand for swap draws by the European Central Bank rose to almost \$700 million over the summer, as uncertainty over the prospect of an agreement between Greece and its creditors increased. In addition, draws by some central banks tended to temporarily rise over quarter- and year-end dates, contributing to almost \$1.5 billion outstanding at the start of the year and almost \$1 billion outstanding over the 2015 year-end. This trend appeared consistent with wider foreign exchange swap basis spreads, a measure of the cost of borrowing dollars offshore after hedging the corresponding foreign exchange risk. Throughout 2015, the rate on the swap arrangements remained at the U.S. dollar overnight index swap rate for the relevant tenor plus 50 basis points.⁴¹

Selected Liabilities

The Federal Reserve's assets back its liabilities, whose size is in some cases, but not others, under the Federal Reserve's control (**Chart 19**). Some liabilities are interest bearing, and the interest rate paid varies by liability category. All else equal, an increase or decrease in one liability results in a shift in the composition of the

Chart 19
Federal Reserve Liabilities

Billions of U.S. dollars



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly.

Federal Reserve's liabilities but does not change the size of the Federal Reserve's balance sheet.

RESERVE BALANCES

Reserve balances, which are deposits held by depository institutions at the Federal Reserve, remained at historically elevated levels during 2015, a byproduct of the FOMC's decision to maintain a sizable domestic securities portfolio through ongoing reinvestments.⁴² At \$2.21 trillion outstanding as of December 30, reserve balances represented the Federal Reserve's largest liability.⁴³ All else equal, fluctuations in the level of reserve balances over the course of the year were inversely related to increases or decreases in other liability categories.

As has been the case since the financial crisis, the level of total reserve balances remains well in excess of required levels.⁴⁴ However, reserve balance requirements, which represent a very small share of total reserve balances, grew only modestly last year, rising \$5 billion from year-end 2014 to \$90 billion at year-end 2015. This increase was in line with slower growth in depository institutions' transaction deposits, against which the institutions are required to hold reserves. From 2009 to 2014, transaction deposits grew at historically high rates in tandem with the growth of the SOMA's securities portfolio. In 2015, annual growth slowed to 5 percent,

from 11 percent in 2014, following the conclusion of the Federal Reserve's last large-scale asset purchase program in October 2014.

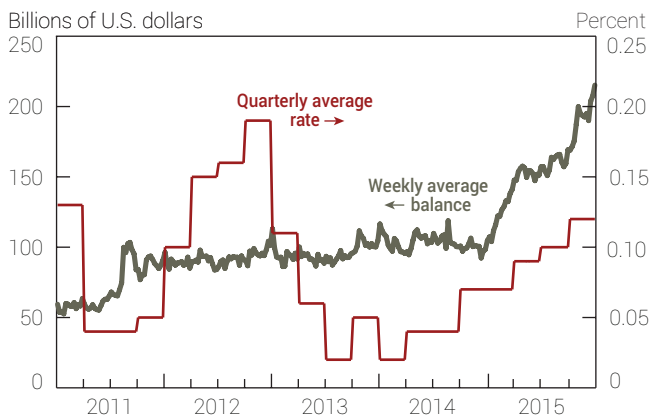
In June 2015, the Federal Reserve Board announced changes in the calculation of interest payments to depository institutions with excess balances. The changes were intended to enhance the effectiveness of changes in the rate of interest on excess reserves in moving the federal funds rate into the target range established by the FOMC. These interest payments are now based on the IOER rate in effect each day and the level of balances held each day, rather than on the maintenance period average. Through December 16, 2015, the Federal Reserve paid depository institutions an interest rate of $\frac{1}{4}$ percent on both required and excess reserves; following liftoff, the Federal Reserve increased the interest rate on required and excess reserves to $\frac{1}{2}$ percent, effective December 17.

FEDERAL RESERVE NOTES

Federal Reserve notes, more commonly known as U.S. dollar paper currency, have traditionally been the largest liability of the Federal Reserve and remained a large liability in 2015.⁴⁵ Demand for Federal Reserve notes generally increases from year to year, but the rate of growth varies with the pace of economic growth and the demand for currency as a store of value. Federal Reserve notes outstanding grew by \$81 billion in 2015 to \$1.38 trillion, reflecting a deceleration in annual

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Chart 20
Foreign Repo Pool



Sources: Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York.

growth from a little more than 8 percent in 2014 to a little more than 6 percent in 2015. The growth rate in 2014 was somewhat elevated because of increased foreign demand for Federal Reserve notes. The Federal Reserve pays no interest on Federal Reserve notes.⁴⁶

REVERSE REPURCHASE AGREEMENTS

Open Market Operations

Throughout 2015 the Federal Reserve conducted overnight and term reverse repurchase agreements—initially as part of an ongoing operational exercise, and after December 17 at the direction of the FOMC to support the implementation of monetary policy. While demand for the Federal Reserve’s reverse repo liabilities is driven by a complex set of market dynamics (described further in the money market dynamics section of this report), the FOMC may limit the amount of reverse repo demand it will fulfill by imposing an aggregate cap on operational capacity. Throughout 2015, the daily amount of RRP’s outstanding across overnight and term operations conducted by the Desk ranged from \$60 billion to \$475 billion, with a non-quarter-end average of \$122 billion. Increased demand for RRP’s on quarter-ends and year-end contributed to larger-than-usual declines in reserve balances on those calendar dates. The rate paid on these reverse repo liabilities is administered by the Federal Reserve through an offering rate (subject to certain constraints).

Foreign Repo Pool

As part of a range of services offered to foreign official and international account holders, the New York Fed has long offered an overnight repurchase agreement investment known as the foreign repo pool. At the end of each business day, account holders’ cash balances are swept into an overnight reverse repo secured by the Federal Reserve’s securities holdings.⁴⁷ Upon maturity on the following business day, the SOMA repurchases the securities at a price that reflects a rate of return tied to comparable market-based Treasury repo rates. The foreign repo pool is not used as a means for implementing monetary policy.

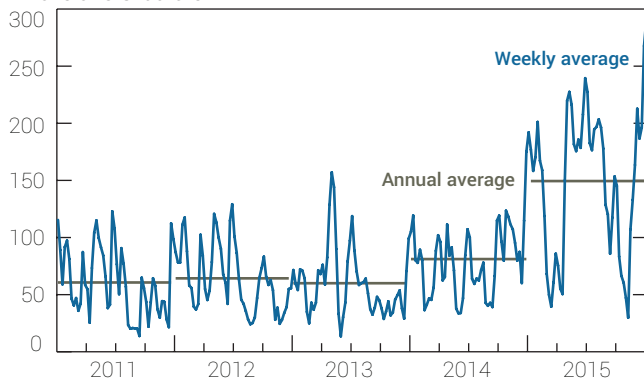
Demand for investments in the foreign repo pool is driven autonomously by the New York Fed’s account holders, and a change in the size of the pool shifts the composition of the Federal Reserve’s liabilities, altering the availability of reserves in the U.S. banking system. In the pre-crisis operating framework, the Desk would offset variations in the pool’s size with repo operations. To ease the Desk’s job in the daily forecasting of autonomous factors, tight limits were imposed on customers’ ability to rapidly vary the size of their investment in the pool. However, in the current environment of reserve abundance, the change in the composition of the Federal Reserve’s liabilities associated with marginal fluctuations in the size of the pool have little to no impact in unsecured markets because of the large amount of reserves in the system. The New York Fed is therefore able to provide greater flexibility to account holders with regard to their foreign repo pool balances.

Over the course of 2015, the size of the foreign repo pool more than doubled, from \$113 billion to \$238 billion (Chart 20). The increase in the size of the pool was driven by some central banks’ preferences to maintain robust dollar liquidity buffers, by the reduced availability of alternative investments with private counterparties, and by the New York Fed’s removal over time of constraints on customers’ ability to vary the size of their investments. The rate of return on the pool moved in line with other market-based Treasury repo rates through 2015. The rate was fairly stable through most of the year and then moved higher following the FOMC’s decision on December 16 to raise the target range for the federal funds rate by 25 basis points.

Chart 21

Treasury General Account Balances

Billions of U.S. dollars



Sources: Board of Governors of the Federal Reserve System; Federal Reserve Bank of St. Louis.

DEPOSITS**Term Deposits**

The Federal Reserve has periodically tested a Term Deposit Facility (TDF), through which it offers interest-bearing term deposits to depository institutions. The Federal Reserve conducted eight TDF operations in 2015. The terms of individual operations ranged from seven to twenty-one days, and the maximum amount outstanding was \$404 billion. For a detailed discussion of TDF test operations in 2015, see Appendix 5.

Treasury General Account

The U.S. Department of the Treasury holds its cash balances at the Federal Reserve in the Treasury General Account, which is its primary account for managing cash flows. Balances in the General Account exhibit significant volatility, typically rising when auctions of Treasury securities settle and on tax receipt dates, and shrinking when large payments are made (**Chart 21**).

In May, the Treasury announced a change in its cash management policy.⁴⁸ To help protect against a potential interruption in market access, the Treasury said it would hold a level of cash generally sufficient to cover one week of outflows from the General Account, subject to a minimum balance of roughly \$150 billion. On average, the weekly average balance during 2015 was \$149 billion, but the balance ranged between \$30 billion and \$290 billion over the

course of the year. General Account balances fell sharply from mid-August to early November, well below the Treasury's announced target minimum, as the Treasury reduced bill supply and drew down cash balances amid debt limit-related borrowing constraints. Balances subsequently rebounded in November after the standoff over the debt limit was resolved.⁴⁹

On December 28, the Federal Reserve transferred to the Treasury General Account \$19.3 billion, which was the amount necessary to reduce the aggregate Reserve Bank capital surplus to \$10 billion, the limit specified in the Fixing America's Surface Transportation Act (FAST Act), enacted on December 4, 2015.

The Federal Reserve does not pay interest to the Treasury on balances held in the TGA.

Foreign Official and Other Deposits

In 2015, deposits of foreign official institutions averaged \$5 billion per week. Other deposits, which include balances held at the Reserve Banks by international and multilateral organizations, government-sponsored enterprises, and designated financial market utilities, averaged \$17 billion per week.

Financial Results

The expansion of the Federal Reserve's balance sheet since the crisis was designed to promote the central bank's dual mandate of fostering maximum employment and price stability. Accordingly, SOMA portfolio changes were motivated by monetary policy objectives rather than profit. Nonetheless, in recent years, both SOMA net income and remittances to the Treasury have been elevated by historical standards because of increased income from the expanded portfolio and low funding costs.⁵⁰

SOMA INCOME

In 2015, total SOMA income was \$112 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 \$105 billion in 2015 (**Table 3**).⁵¹ This sum was roughly in line with SOMA net income of \$106 billion in 2014. The large size of the portfolio, its concentration in longer-term securities, and the low interest

Table 3
SOMA Net Income

Billions of U.S. Dollars

	2015	2014
Interest income		
Treasury securities	63.3	63.0
Agency debt	1.3	1.6
Agency MBS	48.9	51.3
Other	—	0.1
	113.5	116.0
Interest expense		
Reverse repurchase agreements		
Overnight and term RRP	(0.1)	(0.1)
Foreign repo pool	(0.1)	(0.1)
Other	—	—
	(0.2)	(0.2)
Non-interest income (loss)		
Foreign currency translation losses	(1.4)	(2.9)
Other	0.1	0.1
	(1.3)	(2.8)
SOMA income	112.0	113.0
Assumed funding cost	(6.9)	(6.9)
SOMA net income	105.1	106.1

Sources: Federal Reserve Bank of New York; Board of Governors of the Federal Reserve System.

Notes: Assumed funding cost represents the interest expense on interest-bearing liabilities assumed to be associated with SOMA net assets in excess of Federal Reserve notes outstanding and the Treasury General Account balance held at the Federal Reserve Bank of New York. Actual interest expense on all non-SOMA interest-bearing liabilities of the Federal Reserve (including reserves and term deposits) totaled \$6.9 billion for both 2015 and 2014. These liabilities fund non-SOMA assets of the Federal Reserve in addition to SOMA net assets.

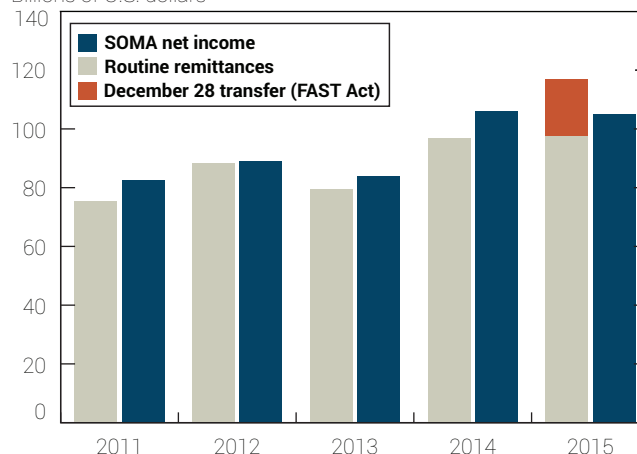
rates paid on the Federal Reserve's liabilities through 2015 continued to generate portfolio income well in excess of pre-crisis levels.

FEDERAL RESERVE REMITTANCES

The Federal Reserve remits residual net income (income less operating expenses, dividends, and transfers to or from surplus) on

Chart 22
SOMA Net Income and Federal Reserve Remittances to the U.S. Treasury

Billions of U.S. dollars



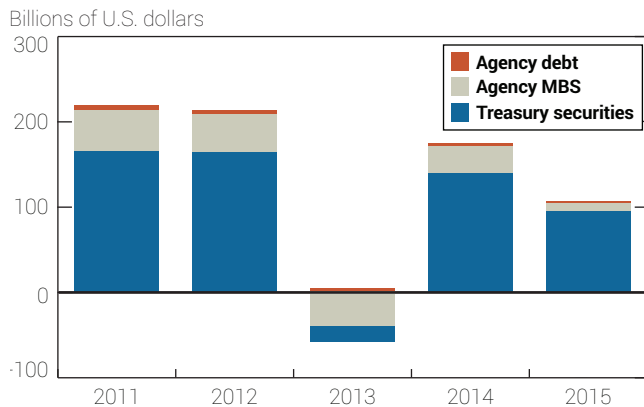
Source: Federal Reserve Bank of New York.

a weekly basis to the Department of the Treasury.⁵² In 2015, the Federal Reserve remitted a total of \$117 billion to the Treasury, owing largely to net income from the domestic SOMA portfolio and including a one-time transfer made on December 28 to reduce aggregate Reserve Bank capital surplus to \$10 billion as required by the FAST Act (**Chart 22**). The FAST Act also mandated change in the dividend that the Federal Reserve is statutorily required to pay on capital paid in (previously paid as a fixed dividend of 6 percent). The FAST Act reduced dividend payments to Federal Reserve member banks with assets in excess of \$10 billion to the lesser of 6 percent or the highest rate awarded at the most recent Treasury ten-year note auction.

SOMA UNREALIZED GAINS AND LOSSES

The market value of the SOMA's domestic securities portfolio fluctuates with changes in the prevailing level of interest rates. In 2015, a rise in longer-term interest rates contributed to a decline in the portfolio's market value. Unrealized gains on the portfolio, calculated as the difference between the market value of the portfolio and its book value (which reflects amortized cost), totaled \$106 billion at the end of 2015 (**Chart 23**). This unrealized gain is smaller than the \$174 billion unrealized gain in the portfolio at the end of 2014. The unrealized

Chart 23
SOMA Domestic Portfolio Unrealized Gains and Losses



Source: Federal Reserve Bank of New York.

Note: Figures are as of year-end.

gain on the agency MBS portfolio decreased from \$31 billion to \$10 billion over the course of the year, while the unrealized gain on the Treasury portfolio decreased from \$140 billion to \$95 billion.

The SOMA's unrealized gain or loss position has no effect on net income or Federal Reserve remittances to the Treasury unless assets are actually sold and those gains or losses are realized. Unrealized gains and losses also have no effect on the conduct of monetary policy.

Projections for the SOMA Portfolio and Net Income

Although SOMA net income has been elevated in recent years, it is likely to decline from its recent high levels as the policy normalization process proceeds. Even so, average levels of income are expected to be higher than pre-crisis averages. A projection exercise illustrates how the path of SOMA net income may evolve over the next decade. The exercise shows income projections under both a baseline scenario and several alternative scenarios that demonstrate the sensitivity of portfolio net income to changes in various factors.⁵³ 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 SCENARIO

In the baseline scenario, the assumed paths of the target federal funds rate and longer-term interest rates were taken from the Survey of Primary Dealers (SPD) and Survey of Market Participants (SMP) conducted by the Desk before and after the December 2015 FOMC meeting (Box 4). According to the surveys, the median respondent expects the federal funds target to slowly rise from the current range to a level of 3.25 percent in the long run. The median survey respondent also expects the ten-year Treasury yield and the thirty-year fixed primary mortgage rate to rise from current levels to approximately 3.75 percent and 5.25 percent, respectively, in the long run.

Normalization of interest rates and the size of the Federal Reserve's securities portfolio is assumed to follow the framework presented in the FOMC's September 2014 Policy Normalization Principles and Plans, with details on the framework's application drawn from median expectations in the December SPD and SMP. Specifically, the FOMC is assumed to use interest on excess reserves as its primary tool for controlling interest rates, with an overnight reverse repo facility providing supplementary support. These administered rates are set at the top and bottom of a 25 basis point range that is centered around survey respondents' projected target for the federal funds rate. Expectations for ON RRP take-up are also derived from the surveys.

With regard to the changes in the Federal Reserve's securities holdings, the projections start with actual SOMA domestic securities holdings as of December 31, 2015, then assume that the portfolio's path evolves in a manner consistent with SPD and SMP respondents' median expectations related to reinvestments. Specifically, these expectations suggest that full reinvestment of principal payments from SOMA holdings of Treasury securities and agency debt and MBS will continue until the first quarter of 2017, after which reinvestments are gradually reduced over the course of one year.⁵⁴ The size of the SOMA portfolio is assumed to have reached a steady state when reserve balances decline to a level of \$100 billion.⁵⁵ At that point, the Federal Reserve is assumed to resume purchases of Treasury securities in order to offset the ongoing runoff of agency debt and MBS holdings and to support normal balance sheet growth.⁵⁶

Under these assumptions, the size of the SOMA portfolio is projected to remain around its current level of \$4.26 trillion through

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Box 4

Desk Surveys of Primary Dealers and Market Participants

In advance of each FOMC meeting, the Desk surveys its primary dealer counterparties on topics widely discussed in public and addressed in FOMC statements, meeting minutes, and remarks by FOMC members. In the past, survey respondents were queried about their expectations for the federal funds rate, other money market indicators, the Federal Reserve's balance sheet, and usage of the ON RRP facility, as well as forecasts of economic indicators. The FOMC is not consulted in the formulation of the survey questions.

A subset of questions from this survey is sent to buy-side market participants, with the objective of better understanding the expectations of active investment decision makers. Initial eligibility to participate in the

survey is limited to a subset of firms associated with the following advisory and sponsored groups of the New York Fed: the Investor Advisory Committee on Financial Markets, the Foreign Exchange Committee, the Treasury Market Practices Group, and the Buyside General Counsel Committee. Participation in the survey is voluntary and the list of participants is posted on the New York Fed's public website.

The results of both surveys, in conjunction with analysis of market prices, help the FOMC to evaluate the market's expectations for the economic outlook, monetary policy, and the financial markets. And combined with information from other sources such as the Beige Book survey of regional economic conditions and the Senior Loan Officer Opinion

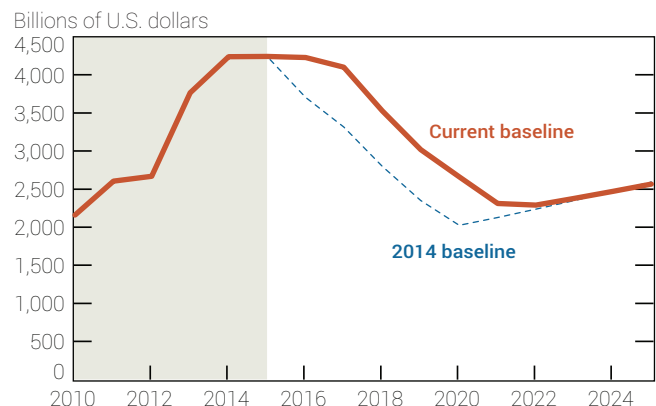
Survey of lending conditions, these findings inform the FOMC's judgments as to how best to advance its mandate to promote full employment and price stability. The survey does not in any way dictate the policy actions taken by the FOMC. Occasionally, the Desk asks respondents to update their responses following an FOMC meeting to gauge how expectations have changed in response to new information.

The survey questions are published on the New York Fed's website at the same time they are distributed to respondents, approximately two weeks ahead of each FOMC meeting. Summaries of the results of the surveys are published three weeks after each meeting, following the release of the meeting minutes.

2016, while full reinvestments continue. It then starts to decline as reinvestments are phased out and then ended altogether. The Federal Reserve's securities holdings subsequently decline until the portfolio's steady-state size is reached in the second quarter of 2022, almost a year and a half later than previously projected owing to a longer assumed reinvestment period (**Chart 24**).

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 25**). The timing of principal payments from maturing U.S. Treasury securities and agency debt securities is a known function of current 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. The actual pay-down path will depend on a variety of factors, including the path of interest rates, changes in housing prices, credit conditions, and other government policy initiatives.

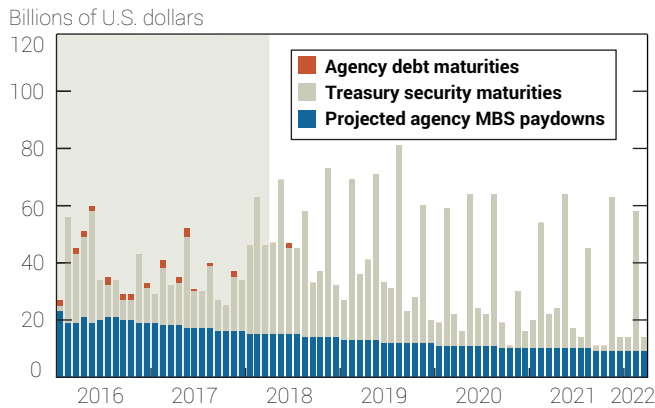
Chart 24
Projected SOMA Domestic Securities Holdings: Baseline



Source: Federal Reserve Bank of New York.

Note: Figures for 2010-15 (shaded area) are historical settled holdings. Projected figures are rounded.

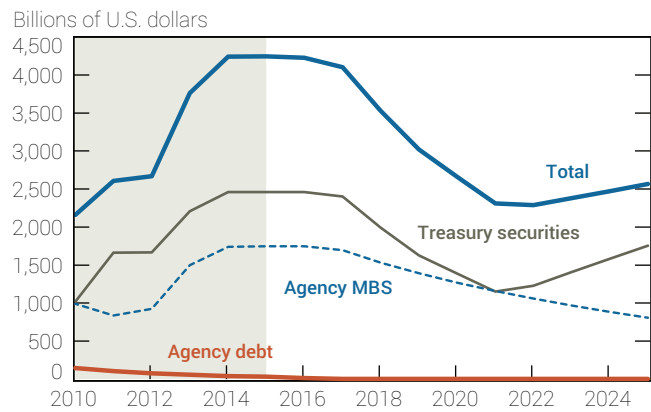
Chart 25
Projected Receipts of Principal on SOMA Domestic Securities: Baseline



Source: Federal Reserve Bank of New York.

Notes: Principal receipts for January 2016 through March 2018 (shaded area) are assumed to be fully or partially reinvested. Figures are monthly and are rounded.

Chart 26
Projected SOMA Domestic Securities Holdings: Baseline by Asset Class



Source: Federal Reserve Bank of New York.

Note: Figures for 2010-15 (shaded area) are historical settled holdings. Projected figures are rounded.

At the time it reaches a normalized size, the domestic securities portfolio is estimated to be about \$2.2 trillion, split roughly evenly between Treasury securities and agency MBS (**Chart 26**). Thereafter, agency debt and MBS holdings continue to run off, while purchases of Treasury securities resume. In a steady state, growth of the portfolio is assumed to be driven by trend growth of currency and other balance sheet items, while the level of reserve balances remains constant.

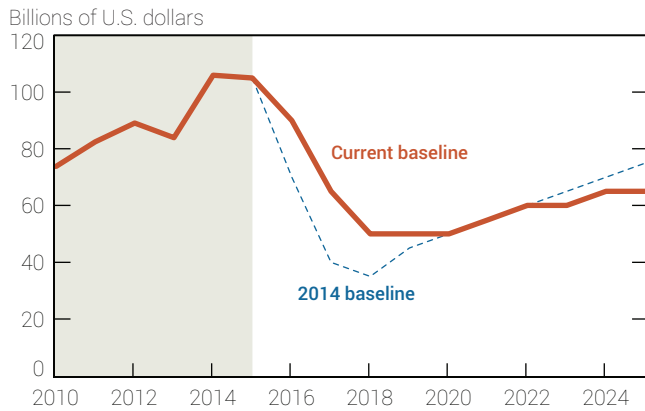
SOMA net income is projected to decline from its recent high levels starting in 2016 as interest payments on reserve balances increase with rising interest rates and the balance sheet remains at an elevated size. Income then falls more sharply once reinvestments end as interest income declines with the shrinking of the SOMA securities portfolio and as interest rates continue to rise. SOMA net income is projected to reach a trough of approximately \$50 billion in 2019, compared with a historical average of about \$30 billion in the years prior to the crisis. Portfolio net income is projected to rise after 2019 as the level of reserve balances gradually declines. Once the portfolio reaches a steady state, purchases of Treasury securities (which resume at higher yields) support further net income growth (**Chart 27**).

The level of net income projected for the current baseline is higher than the level projected a year ago for a large part of the normalization process. This result reflects several changes in underlying assumptions. One change stems from survey respondents' expectation of a longer reinvestment period, which leads to a larger SOMA portfolio size over a longer time period and boosts interest income. A second change relates to survey respondents' expectations for lower levels of interest rates. Expectations for lower federal funds rates result in lower funding costs over the entire forecast horizon; however, expectations for lower ten-year Treasury yields contribute to slightly lower net income since Treasury securities would be purchased at lower yields than previously anticipated. On net, under the current baseline assumptions, cumulative portfolio net income from 2016 to 2025 is projected to be approximately \$610 billion, roughly \$45 billion higher than in last year's baseline projection.

ALTERNATIVE SCENARIOS

The path of SOMA net income is sensitive to a number of factors, some influenced by the Federal Reserve and others not. To demonstrate how income might be affected by such important variables as interest rates and changes in the composition of Federal Reserve

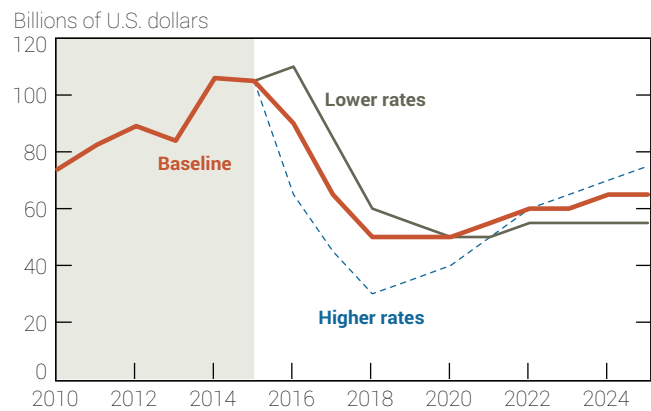
Chart 27
Projected SOMA Net Income: Baseline



Source: Federal Reserve Bank of New York.

Note: Figures for 2010-15 (shaded area) are realized returns. Projected figures are rounded.

Chart 28
Projected SOMA Net Income: Alternative Interest Rate Paths



Source: Federal Reserve Bank of New York.

Notes: Figures for 2010-15 (shaded area) are realized returns. Projected figures are rounded. Higher- and lower-rate scenarios use baseline interest rates plus or minus 100 basis points.

liabilities, profiles for SOMA net income were projected under a set of alternative scenarios. In these scenarios, SOMA net income follows the same general contours as in the baseline projection, but with significant differences in magnitude.

The first set of alternative scenarios illustrates the sensitivity of SOMA net income to alternative interest rate paths (Chart 28).⁵⁷ Under a higher rate scenario, a sharper reduction in SOMA net income is expected through the normalization period, driven by higher interest expense relative to the baseline. Net income falls to a trough of roughly \$30 billion in 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, in a lower rate scenario, the decline in portfolio income is initially more muted during the normalization process owing to lower funding costs, but net income grows at a slower pace in the steady state since Treasury securities are purchased at lower yields.

A second set of alternative scenarios illustrates the sensitivity of SOMA net income to changes in the composition of the Federal Reserve liabilities. Currency is particularly important, because the Federal Reserve pays no interest on it and its level affects the level of

reserves.⁵⁸ Compared with the baseline, a slower pace of currency growth contributes to lower portfolio net income over the projection period (Chart 29). D remittances to the U.S. Treasury during the normalization process, slower currency growth causes a slower projected reduction in the level of reserve balances, which in turn increases interest costs and pushes out the portfolio normalization date. After the balance sheet reaches its steady-state size, a slower pace of currency growth results in a smaller SOMA portfolio, which contributes to lower coupon income in the later part of the projection period. The reverse holds for a faster pace of currency growth, in which the level of reserves contracts faster relative to the baseline projection; in this case interest costs decline, the portfolio normalizes earlier, and the steady-state size of the SOMA portfolio is relatively larger. As a result, portfolio net income is higher over the projection period.

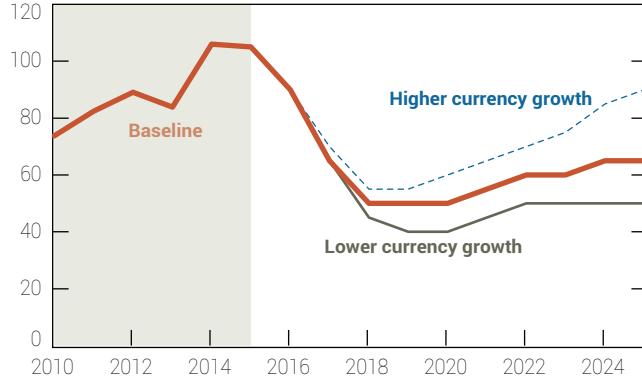
EFFECT ON REMITTANCES

These projections are merely illustrative. The actual portfolio path and future income will be influenced by a range of factors, including decisions the FOMC makes about its securities portfolio, as well as interest rate, economic, and autonomous balance sheet developments. Nevertheless, these scenarios demonstrate how SOMA

Chart 29

Projected SOMA Net Income: Alternative Currency Growth Scenarios

Billions of U.S. dollars



Source: Federal Reserve Bank of New York.

Notes: Figures for 2010-15 (shaded area) are realized returns. Projected figures are rounded. Higher and lower currency growth scenarios use baseline annualized growth rates plus or minus 3 percentage points.

income could evolve under a set of baseline assumptions or possible shocks. Although SOMA net income has been elevated in recent years, it is likely to decline from its recent high levels as the policy normalization process proceeds. 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.⁵⁹ Even so, remittances associated with the projections shown here remain positive, and on a cumulative basis, net income generated by the SOMA portfolio is likely to remain quite high over the projection period, even under several alternative scenarios.

It is also 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 that the implications of such decisions for government finances extend well beyond the direct influence of the Federal Reserve's earnings.

Conclusion

In 2015, the Federal Reserve refined and adopted a new framework for monetary policy implementation that allows it to control interest rates while operating with the large balance sheet it has acquired since the financial crisis. This framework was implemented on December 17, 2015, after the FOMC decided to raise its target range for the federal funds rate to $\frac{1}{4}$ to $\frac{1}{2}$ percent—its first interest rate increase since 2006. The new framework, based on interest rates administered directly by the Federal Reserve, proved effective in raising the federal funds rate into the FOMC’s target range. Both unsecured and secured money market rates rose in line with the increase in the federal funds rate, and the change in monetary policy stance was transmitted through to term rates.

Throughout 2015, the FOMC directed 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 FOMC has indicated that it expects to continue reinvestments until policy normalization is well under way. A projection exercise, based on a set of publicly available survey-based expectations and presented in this report, illustrates how the path of the Federal Reserve’s portfolio

might evolve over time, suggesting that the size of the balance sheet and level of reserves will not normalize for some time.

The development of this framework was informed by careful analysis of money market dynamics that continue to evolve. It will be important to continue to monitor structural changes in financial markets and assess their implications for monetary policy implementation as the Federal Reserve gains more experience with its new operating regime. Enhanced data collection on money markets is contributing importantly to this effort, including improvements in 2015 to the Federal Reserve’s FR 2420 report and the New York Fed’s pursuit of several initiatives relating to the production and publication of money market statistics. Efforts to make the calculation of the effective federal funds rate more robust and the introduction of a new measure of overnight funding costs for U.S.-based banking offices, the overnight bank funding rate, add to the quantity and quality of information available to the public about depository institutions’ funding activities.

In carrying out both its operational and its analytical responsibilities, the Desk will continue to help ensure that the Federal Reserve’s policy tools can support the System’s monetary policy objectives going forward.



Appendix 1: Authorization for Domestic Open Market Operations

On January 27, 2015, by unanimous vote, the FOMC approved the Authorization for Domestic Open Market Operations with two sets of amendments. The first set of amendments was designed to simplify the Authorization’s language by defining common terms, eliminating duplication of language, and standardizing references to the Committee. References to “the FOMC,” “the Federal Open Market Committee,” and “the Committee” were standardized, where appropriate, around the convention of “the Committee.”

The second set of amendments clarified or modified existing authority. The term “Selected Bank” was introduced as part of prudent planning to simplify transfer of authority from the Federal Reserve Bank of New York to another Federal Reserve Bank selected by the Committee in the event of a significant contingency. The authorization to use agents for agency mortgage-backed securities (MBS) transactions was removed, and a definition of the types of collateral accepted in securities lending operations described in paragraph 3 was added. In addition, the language relating to the Chair’s authority to act in exceptional circumstances was updated.

AUTHORIZATION FOR DOMESTIC OPEN MARKET OPERATIONS

As amended effective January 27, 2015

1. The Federal Open Market Committee (the “Committee”) authorizes and directs the Federal Reserve Bank selected by the Committee to execute open market transactions (the “Selected Bank”), to the extent necessary to carry out the most recent domestic policy directive adopted by the Committee:
 - A. To buy or sell in the open market securities that are direct obligations of, or fully guaranteed as to principal and interest by, the United States, and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, that are eligible for purchase or sale under

Section 14(b) of the Federal Reserve Act (“Eligible Securities”) for the System Open Market Account (“SOMA”):

- i. As an outright operation with securities dealers and foreign and international accounts maintained at the Selected Bank: on a same-day or deferred delivery basis (including such transactions as are commonly referred to as dollar rolls and coupon swaps) at market prices; or
 - ii. As a temporary operation: on a same-day or deferred delivery basis, to purchase such Eligible Securities subject to an agreement to resell (“repo transactions”) or to sell such Eligible Securities subject to an agreement to repurchase (“reverse repo transactions”) for a term of 65 business days or less, at rates that, unless otherwise authorized by the Committee, are determined by competitive bidding, after applying reasonable limitations on the volume of agreements with individual counterparties;
- B. To allow Eligible Securities in the SOMA to mature without replacement;
 - C. To exchange, at market prices, in connection with a Treasury auction, maturing Eligible Securities in the SOMA with the Treasury, in the case of Eligible Securities that are direct obligations of the United States or that are fully guaranteed as to principal and interest by the United States; and
 - D. To exchange, at market prices, maturing Eligible Securities in the SOMA with an agency of the United States, in the case of Eligible Securities that are direct obligations of that agency or that are fully guaranteed as to principal and interest by that agency.
2. The Committee authorizes the Selected Bank to undertake transactions of the type described in paragraph 1 from time to time for the purpose of testing operational readiness, subject to the following limitations:
 - A. All transactions authorized in this paragraph 2 shall be conducted with prior notice to the Committee;

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

- B. The aggregate par value of the transactions authorized in this paragraph 2 that are of the type described in paragraph 1.A.i shall not exceed \$5 billion per calendar year; and
- C. The outstanding amount of the transactions described in paragraph 1.A.ii shall not exceed \$5 billion at any given time.
3. In order to ensure the effective conduct of open market operations, the Committee authorizes the Selected Bank to operate a program to lend Eligible Securities held in the SOMA to dealers on an overnight basis (except that the Selected Bank may lend Eligible Securities for longer than an overnight term to accommodate weekend, holiday, and similar trading conventions).
- A. Such securities lending must be:
- i. At rates determined by competitive bidding;
 - ii. At a minimum lending fee consistent with the objectives of the program;
 - iii. Subject to reasonable limitations on the total amount of a specific issue of Eligible Securities that may be auctioned; and
 - iv. Subject to reasonable limitations on the amount of Eligible Securities that each borrower may borrow.
- B. The Selected Bank may:
- i. Reject bids that, as determined in its sole discretion, could facilitate a bidder's ability to control a single issue;
 - ii. Accept Treasury securities or cash as collateral for any loan of securities authorized in this paragraph 3; and
 - iii. Accept agency securities as collateral only for a loan of agency securities authorized in this paragraph 3.
4. 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 central bank and international accounts maintained at a Federal Reserve Bank (the "Foreign Accounts") and accounts maintained at a Federal Reserve Bank as fiscal agent of the United States pursuant to Section 15 of the Federal Reserve Act (together with the Foreign Accounts, the "Customer Accounts"), the Committee authorizes the following when undertaken on terms comparable to those available in the open market:
- A. The Selected Bank, for the SOMA, to undertake reverse repo transactions in Eligible Securities held in the SOMA with the Customer Accounts for a term of 65 business days or less; and
- B. Any Federal Reserve Bank that maintains Customer Accounts, for any such Customer Account, when appropriate and subject to all other necessary authorization and approvals, to:
- i. Undertake repo transactions in Eligible Securities with dealers with a corresponding reverse repo transaction in such Eligible Securities with the Customer Accounts; and
 - ii. Undertake intraday reverse repo transactions in Eligible Securities with Foreign Accounts. Transactions undertaken with Customer Accounts under the provisions of this paragraph 4 may provide for a service fee when appropriate. Transactions undertaken with Customer Accounts are also subject to the authorization or approval of other entities, including the Board of Governors of the Federal Reserve System and, when involving accounts maintained at a Federal Reserve Bank as fiscal agent of the United States, the United States Department of the Treasury.
5. The Committee authorizes the Chairman of the Committee, in fostering the Committee's objectives during any period between meetings of the Committee, to instruct the Selected Bank to act on behalf of the Committee to:
- A. Adjust somewhat in exceptional circumstances the stance of monetary policy and to take actions that may result in material changes in the composition and size of the assets in the SOMA; or
- B. Undertake transactions with respect to Eligible Securities in order to appropriately address temporary disruptions of an operational or highly unusual nature in U.S. dollar funding markets. Any such adjustment described in subparagraph A of this paragraph 5 shall be made in the context of the Committee's discussion and decision about the stance of policy 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 since the most recent meeting of the Committee. The Chairman, whenever feasible, will consult with the Committee before making any instruction under this paragraph 5.

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 2015.

Appendix 3: Domestic Policy Directives Issued to the Federal Reserve Bank of New York

In 2015, the FOMC authorized and directed the Open Market Desk at the Federal Reserve Bank of New York to execute transactions in the SOMA in accordance with the domestic policy directives below.

Open Market Operations from January 1 to December 16

The FOMC issued the following domestic policy directive on December 17, 2014; January 28, 2015; March 18, 2015; April 29, 2015; June 17, 2015; July 29, 2015; September 17, 2015; and October 28, 2015. This directive governed open market operations that were executed from January 1, 2015, through December 16, 2015.

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.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Open Market Operations from December 17 to December 31

The FOMC issued the following domestic policy directive on December 16, 2015. It governed open market operations that were executed from December 17, 2015, through December 31, 2015.

Effective December 17, 2015, the Federal Open Market Committee directs the Desk to undertake open market operations as necessary to maintain the federal funds rate in a target range of $\frac{1}{4}$ to $\frac{1}{2}$ percent, including: (1) overnight reverse repurchase operations (and reverse repurchase operations with maturities of more than one day when necessary to accommodate weekend, holiday, or similar trading conventions) at an offering rate of 0.25 percent, in amounts limited only by the

value of Treasury securities held outright in the System Open Market Account that are available for such operations and by a per-counterparty limit of \$30 billion per day; and (2) term reverse repurchase operations to the extent approved in the resolution on term RRP operations approved by the Committee at its March 17–18, 2015, meeting.

The Committee directs the Desk to continue rolling over maturing Treasury securities at auction and to continue 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.

Appendix 4: Resolutions Authorizing Overnight and Term Reverse Repo Operations

The FOMC authorized the Federal Reserve Bank of New York to conduct overnight and term reverse repo exercises according to the resolutions below.

Resolution Approved December 16, 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.

Resolutions Approved January 28, 2015

During the period of March 19, 2015, to March 30, 2015, 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 April 9, 2015; (ii) be subject to an overall size limit of \$200 billion outstanding at any one time; (iii) be subject to a maximum bid rate of five basis points above the ON RRP offering rate in effect on the day of the operation; (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 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 pre-announced size of the operation, 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 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.

During the period of February 12, 2015, to March 10, 2015, 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 March 12, 2015; (ii) be subject to an overall size limit of \$50 billion outstanding at any one time; (iii) be subject to a maximum bid rate of five basis points above the ON RRP offering rate in effect on the day of the operation; (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 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 preannounced size of the operation, 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 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 March 17, 2015

During each of the periods of June 18 to 29, 2015; September 18 to 29, 2015; and December 17 to 30, 2015, 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 July 8, 2015, October 7, 2015, and January 8, 2016, respectively; (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 five basis points above the ON RRP offering rate in effect on the day of the operation; (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 pre-announced size of the operation, 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 preannounced size of the operation, 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 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 authorized by the FOMC.

Appendix 5: Operational Exercises in Money Markets

Prior to the commencement of monetary policy firming in mid-December, the Federal Reserve continued to conduct exercises of tools—including overnight and term reverse repos and the Term Deposit Facility—to support its planning for improvements in the technical execution of monetary policy. The purpose of these exercises was to further assess how such operations might work as supplementary tools to help control the federal funds rate while the Federal Reserve operated with a large balance sheet. The Desk also conducted small-value repo operations for the purpose of testing operational readiness.

Reverse Repurchase Agreements

Through December 16, 2015, the Desk conducted daily overnight reverse repo operations in a continuation of the technical ON RRP exercise that began in September 2013. Each counterparty was permitted to submit one bid of up to \$30 billion per day, at a rate not to exceed 5 basis points, and the operations were subject to an overall size limit of \$300 billion per day. Overnight reverse repurchase agreements were awarded at 5 basis points to all submitters if the sum of bids was less than or equal to \$300 billion. If the sum of total bids exceeded \$300 billion, the agreements were awarded at a single price using an auction-determined stop-out rate at which the \$300 billion was achieved, with all bids below the stop-out rate awarded in full and bids at the stop-out rate awarded on a pro rata basis. This auction mechanism was not triggered in any of the ON RRP exercise operations conducted in 2015.

The Desk also continued to examine how term reverse repo operations might work as an additional supplementary tool to help control the federal funds rate. Pre-announced term RRP operations spanning quarter-end dates in 2015 provided additional investment capacity, on top of the \$300 billion offered through ON RRPs, around dates when ON RRP usage tended to rise as cash investors

faced temporary reductions in investment options with private counterparties. The Desk also conducted a series of four consecutive one-week term operations in February and early March.

Over the course of its term reverse repo testing in 2015, the Desk varied numerous operational parameters, including total amounts offered, maximum offering rates, tenors, and time span relative to quarter-end.⁶⁰ Each counterparty was permitted to submit two bids per operation. Each bid was subject to a maximum size equal to the total amount offered in a given operation and a rate not to exceed the maximum offering rate. If the sum of bids exceeded the pre-announced auction size, term reverse repos were awarded based on a single-price auction, like the one described above for ON RRPs. Undersubscribed auctions of term RRPs were awarded to all bidders at the highest rate submitted by any bidder. Any undersubscribed capacity in the initial operations in the series of term reverse repo operations spanning the March, June, and December quarter-ends was added to the final operation in each respective series.

Term reverse repo operation results follow in Table 4.

Term Deposit Facility

Throughout 2015, the Federal Reserve continued periodic testing of the Term Deposit Facility, through which it offers interest-bearing term deposits to depository institutions. These operations were designed to ensure the operational readiness of the TDF and to provide eligible institutions with an opportunity to gain familiarity with term deposit procedures. Term deposits may be offered through a number of formats: a quantity-based competitive single-price auction (with a noncompetitive tender option for small 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.

Table 4

Term Reverse Repo Operation Results in 2015

Billions of U.S. Dollars, Except as Noted

Operation Date	Maturity Date ^a	Term (Days)	Tentative Amount Offered	Actual Amount Offered	Amount Submitted	Amount Accepted	Maximum Offering Rate (Basis Points)	Stop-Out Rate (Basis Points)
Feb 12	Feb 19	7	10.0	10.0	69.4	10.0	ON RRP + 5 (10)	6
Feb 19	Feb 26	7	30.0	30.0	73.6	30.0	ON RRP + 5 (10)	6
Feb 26	Mar 5	7	50.0	50.0	87.7	50.0	ON RRP + 5 (10)	6
Mar 5	Mar 12	7	50.0	50.0	74.1	50.0	ON RRP + 3 (8)	6
Mar 19	Apr 2	14	75.0	75.0	81.0	75.0	ON RRP + 5 (10)	9
Mar 30	Apr 6	7	125.0	125.0	101.3	101.3	ON RRP + 5 (10)	10
Jun 25	Jul 2	7	100.0	100.0	115.8	100.0	ON RRP + 3 (8)	7
Jun 29	Jul 1	2	100.0	100.0	103.8	100.0	ON RRP + 3 (8)	7
Sep 24	Oct 1	7	100.0	100.0	112.1	100.0	ON RRP + 3 (8)	7
Sep 30	Oct 2	2	150.0	150.0	163.5	150.0	ON RRP + 3 (8)	7
Dec 18	Jan 4	17	50.0	50.0	< 0.1	< 0.1	ON RRP + 0 (25)	25
Dec 23	Jan 4	12	100.0	100.0	0.0	0.0	ON RRP + 0 (25)	N/A
Dec 30	Jan 5	6	150.0	300.0	0.0	0.0	ON RRP + 0 (25)	N/A

Source: Federal Reserve Bank of New York.

Notes: Amount figures are rounded. The actual amount offered on December 30 included the tentative amount plus undersubscribed capacity from the December 18 and December 23 operations. Similar adjustments would have been made in the March 30 and June 29 operations had prior operations in each series been undersubscribed.

^aThe January 4 and January 5 maturity dates associated with the December operations refer to 2016.

The Federal Reserve's TDF operations reflected ongoing enhancements in the functionality of the facility, including the introduction of same-day settlement. Previous TDF tests had a three-day lag between the execution of an operation and settlement. The four series of TDF tests that were conducted in 2015 offered floating-rate deposits and featured both same-day settlement and early withdrawal features. Other operational parameters varied across each series, including maximum award amounts, offering rate, tenors, and the number and laddering of operations within each test series.

TDF operation results follow in Table 5.

Repurchase Agreements

As a matter of prudent advance planning, the Desk conducted a few small-value repo operations in 2015. The Desk conducted two operations in May: a Treasury-only repo operation on May 19 in which \$220 million was awarded, followed by a multi-tranche operation (covering all three open market operation-eligible security types: Treasury securities, agency debt, and agency MBS) on May 20 in which a total of \$620 million was awarded. On December 2, the Desk conducted one multi-tranche operation in which a total of \$590 million was awarded across all three collateral types. All of the transactions had an overnight tenor and were conducted with primary dealers, who were limited to one \$10 million proposition in each tranche of the operation.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Table 5

Term Deposit Facility Operation Results in 2015

Operation Date	Maturity Date	Term (Days)	Rate (Basis Points)	Maximum Award Amount (Billions of U.S. Dollars)	Amount Awarded (Billions of U.S. Dollars)	Number of Participants
Feb 5	Feb 26	21	IOER + 3 (28)	20.0	188.1	87
Feb 12	Mar 5	21	IOER + 3 (28)	20.0	108.8	47
Feb 19	Mar 12	21	IOER + 3 (28)	20.0	107.2	52
May 21	Jun 4	14	IOER + 1 (26)	5.0	79.9	53
May 28	Jun 4	7	IOER + 1 (26)	5.0	65.8	42
Aug 6	Aug 20	14	IOER + 1 (26)	5.0	66.1	41
Aug 13	Aug 20	7	IOER + 1 (26)	5.0	57.2	36
Dec 3	Dec 10	7	IOER + 1 (26)	5.0	43.8	43

Source: Board of Governors of the Federal Reserve System.

Note: Awarded amount figures are rounded.

Appendix 6: Federal Reserve Bank of New York Counterparties for Domestic Open Market Operations

The Desk requires a robust network of trading counterparties in order to provide the necessary operational capacity for the implementation of monetary policy. In 2015, primary dealers and an expanded set of reverse repo counterparties participated in money market operations. Primary dealers and a few small firms in the Mortgage Operations Counterparty pilot program participated in outright purchases of agency mortgage-backed securities.

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. As of December 31, 2015, there were 22 primary dealers.

Reverse Repurchase Agreement Counterparties

In order to enhance its ability to support the monetary policy objectives of the FOMC, the New York Fed has arrangements with an expanded set of counterparties with whom it can conduct reverse repo transactions. These expanded RRP counterparties—which include money market funds, government-sponsored enterprises, and banks—augment the existing set of primary dealer counterparties with whom the Federal Reserve can already conduct reverse repos.

On January 16, 2015, 25 additional financial institutions were added as expanded RRP counterparties through a final application wave that was initiated in late 2014, bringing the total number of expanded RRP counterparties to 142.

On March 9, 2015, the New York Fed released a statement announcing that all expanded RRP counterparties are expected to satisfy the continued eligibility criteria previously set forth in a November 12, 2014, statement, which included minimum size requirements for each type of institution and expectations for meaningful participation in reverse repo transactions with the New York Fed. The March statement advised that the New York Fed may remove an entity from its counterparty list if such counterparty fails to continue to meet any of the eligibility criteria. The statement also indicated that the number of expanded RRP counterparties is not expected to exceed 150, and new counterparties will be added to the counterparty list only if the maximum number of expanded RRP counterparties has not been reached. Six new counterparties applied and were accepted throughout the rest of 2015, while 7 counterparties were removed owing to mergers, eligibility, and other factors. As of December 31, 2015, there were 141 expanded RRP counterparties.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

Mortgage Operations Counterparties

In recent years, the New York Fed has explored ways to broaden access to open market operations to determine whether firms other than primary dealers could augment operational capacity and resilience in its monetary policy operations. On August 5, 2014, the New York Fed announced the Mortgage Operations Counterparty (MOC) pilot program, modeled after a similar Treasury Operations Counterparty pilot program that it conducted from July 2013 to July 2014.

Three firms that were diverse with respect to size and geographic reach were selected for the MOC pilot program, which ran from

December 2014 to December 2015. During that time, these firms participated in the New York Fed's outright purchases and sales of agency MBS, along with primary dealers. Participants were subject to limitations on unsettled trade exposures to the New York Fed that were commensurate with capital at each firm.

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.

Appendix 7: Reference Web Pages

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 web pages where this source material may be found.

Federal Reserve Board

FOMC statements, minutes, and the Normalization Principles and Plans

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

Background on reserve requirements, interest on reserves, and interest on excess reserves (IOER)

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

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

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

Authorization for Foreign Currency Operations

http://www.federalreserve.gov/monetarypolicy/files/FOMC_ForeignAuthorization.pdf

Federal Reserve Bank of New York

Markets and Policy Implementation: primary web page

<https://www.newyorkfed.org/markets/index.html>

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

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

List of primary dealer counterparties and related policies

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

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

<https://apps.newyorkfed.org/markets/autorates/temp>
https://www.newyorkfed.org/markets/rrp_counterparties.html
https://www.newyorkfed.org/markets/rrp_op_policies.html
https://www.newyorkfed.org/markets/rrp_faq.html

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

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

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

<https://www.newyorkfed.org/markets/ambs/index.html>
<https://www.newyorkfed.org/markets/moc-pilot.html>

Foreign exchange quarterly reports and information on central bank liquidity swaps

https://www.newyorkfed.org/markets/quar_reports.html
https://www.newyorkfed.org/markets/liquidity_swap.html

System Open Market Account holdings

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

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

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

Desk surveys of primary dealers and market participants

https://www.newyorkfed.org/markets/primarydealer_survey_questions.html
https://www.newyorkfed.org/markets/survey_market_participants.html

FR 2420 Report of Selected Money Rates

<https://www.newyorkfed.org/markets/effr-obfr-data>

Services for Central Banks and International Institutions

<https://www.newyorkfed.org/aboutthefed/fedpoint/fed20.html>

Appendix 8: Revisions to *Domestic Open Market Operations during 2014*

In the course of preparing this report, staff discovered several data anomalies in last year's annual report, *Domestic Open Market Operations during 2014*, which resulted in the need for minor revisions. The anomalies have no market or financial reporting impact, and the revisions have no effect on the report's conclusions. The following revisions have been made to the report and its accompanying data file, which can both be found on the New York Fed's website, as of April 14, 2016:

- The data accompanying a chart showing the distribution of SOMA purchases of agency MBS by coupon (Chart 6) misstated the distribution of purchases for the month of April 2014. Purchases of 3.5 percent coupons represented 31 percent of purchases in that month, not 35 percent.
- A chart showing the composition of SOMA domestic securities holdings (Chart 11, page 15) reported agency debt holdings as weekly Wednesday levels in 2012 rather than weekly averages.
- A chart showing SOMA Treasury holdings as a share of the outstanding supply of Treasury securities (Chart 13, page 17) overstated the SOMA portfolio's share in two maturity sectors. The SOMA portfolio's share of the outstanding supply of securities with less than 3 years remaining to maturity as of the end of 2014 was 9.1 percent, not 13.1 percent. The SOMA portfolio's share of the outstanding supply of securities with 3 to 6 years remaining to maturity as of the end of 2014 was 33.8 percent, not 34.7 percent.
- A chart showing the average duration of SOMA domestic securities holdings (Chart 17, page 19) was at variance with the underlying data that accompanied the report. The inconsistency reflected the use of different calculation methodologies over time. All of the series have been revised using a consistent par-value weighting calculation methodology, which in most cases results in slightly lower levels of duration in each portfolio.
- The SOMA portfolio's weighted average duration at the start of LSAP3 has been revised to 5.3 years from 5.6 years (page 19).
- A chart showing SOMA domestic securities holdings in ten-year equivalents (Chart 18, page 20) was also at variance with the underlying data. In this case, inconsistencies in duration calculations over time accounted for the disparity. All of the series have been adjusted using the revised duration figures—a correction that in most cases, results in slightly lower levels of the ten-year equivalent measures of SOMA securities holdings.
- The SOMA portfolio's ten-year equivalent measure peaked at \$3.1 trillion in March 2014, not April 2014 (page 19).
- A chart showing SOMA portfolio unrealized gains and losses (Chart 25, page 24) understated the unrealized gain on each asset class in 2010 and 2011.
- As of year-end 2010, total unrealized gains on domestic securities held in the SOMA were \$71.0 billion (composed of unrealized gains of \$45.9 billion on Treasury securities, \$21.3 billion on agency MBS, and \$3.8 billion on agency debt), compared with a previously reported total gain of \$29.1 billion (composed of unrealized gains of \$18.8 billion on Treasury securities, \$8.7 billion on agency MBS, and \$1.6 billion on agency debt).
- As of year-end 2011, total unrealized gains on domestic securities held in the SOMA were \$219.9 billion (composed of unrealized gains of \$166.3 billion on Treasury securities, \$47.2 billion on agency MBS, and \$6.4 billion on agency debt), compared with a previously reported total gain of \$102.3 billion (composed of unrealized gains of \$77.3 billion on Treasury securities, \$22 billion on agency MBS, and \$3 billion on agency debt).

Endnotes

¹Unless otherwise stated, all dollar values of securities held in the domestic SOMA portfolio refer to inflation-adjusted par (face) values and include both settled and unsettled amounts. Values of agency MBS refer to the remaining principal balance of the securities. The Federal Reserve reports SOMA securities holdings at par (face) value, inflation compensation, 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.

²Annual reports on open market operations and accompanying data can be found at https://www.newyorkfed.org/markets/annual_reports.html. In preparing the material presented in this report, the Federal Reserve Bank of New York used data and other information from various third-party sources. The New York Fed's information suppliers are not responsible for the content of the report, and they do not warrant or guarantee the accuracy, timeliness, or completeness of information presented in the report.

³For more information on changes in the Federal Reserve's implementation framework, see Jane E. Ihrig, Ellen E. Meade, and Gretchen C. Weinbach, "Rewriting Monetary Policy 101: What's the Fed's Preferred Post-Crisis Approach to Raising Interest Rates?" *Journal of Economic Perspectives* 29, no. 4 (2015): 177-98, <http://www.federalreserve.gov/econresdata/feds/2015/files/2015047pap.pdf>.

⁴When the Desk conducts a repo transaction, it buys a security under an agreement to resell that security at an agreed-upon date in the future at a predetermined price. The transaction is economically equivalent to a collateralized loan, and the difference between the purchase price and the sale price (together with the length of time between the two legs of the transaction) implies a rate of interest (the repo rate) paid by the primary dealer to the Federal Reserve. In a reverse repo transaction, the Desk sells a security under an agreement to repurchase that security in the future. The transaction is economically equivalent to a collateralized deposit, in which the Federal Reserve's counterparty invests cash temporarily at the Federal Reserve in exchange for securities from the SOMA portfolio.

⁵The FOMC also provided policy accommodation through forward guidance—communications about the future path of the federal funds rate—to shape market participants' expectations for short-term interest rates.

⁶Congress granted the Federal Reserve the ability to pay interest on reserve balances held by depository institutions in the Financial Services Regulatory Relief Act of 2006. The authority was originally intended to become effective in October 2011, but Congress accelerated its implementation as part of the response to the financial crisis.

⁷The Policy Normalization Principles and Plans can be found at <http://www.federalreserve.gov/monetarypolicy/policy-normalization.htm>. This guidance replaced the FOMC's original Exit Strategy Principles, published in the June 2011 FOMC meeting minutes, which laid out a normalization plan based on a combination of temporary reserve draining operations (potentially through term reverse repos and term deposits) and asset sales to facilitate a return to an environment of reserve scarcity. Significant changes in the SOMA portfolio and enhancements to tools available to the FOMC after 2011 prompted a reassessment of aspects of this original strategy.

⁸The Committee further specified that, at that time, it did not anticipate selling agency mortgage-backed securities (MBS) as part of the normalization process, but noted that limited sales might be warranted in the longer run to reduce or eliminate residual holdings.

⁹The Desk's set of reverse repo counterparties account for about half of all overnight Treasury tri-party and General Collateral Finance repo volume, on average.

¹⁰Reserve balances will also decline over time with currency growth.

¹¹For 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 has the resources necessary to carry out its critical operational and analytical activities should a contingency scenario affect the greater New York area.

¹²The Board of Governors is also responsible for the supervision and regulation of banks and systemically important financial institutions, payments systems and infrastructure, and overall oversight of the Federal Reserve System. It may also authorize Federal Reserve Banks to extend credit to other entities under emergency lending authority.

¹³Under this framework, both the new target range and related changes in administered rates (including the interest rates on excess and required reserves, the overnight reverse repo offering rate, and the primary credit rate) went into effect on the day after the Committee’s policy decision. Making all such rate changes effective on the same day was intended to enhance the clarity of Federal Reserve communications and to help promote federal funds trading within the new target range, in part by enabling the Desk to conduct overnight reverse repo operations at the new rate specified by the Committee on the same day that the new target range became effective.

¹⁴ In addition, 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 repurchase and reverse repurchase agreements, Treasury securities, agency MBS, 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.

¹⁵Had the sum of total bids in an operation exceeded \$300 billion, ON RRP’s would have been awarded at a single price, using an auction-determined stop-out rate at which the \$300 billion was achieved, with all bids below the stop-out rate awarded in full and bids at the stop-out rate awarded on a pro rata basis.

¹⁶ In determining the value of Treasury securities held outright in the SOMA available for ON RRP operations, the Desk took several factors into account, including the need to hold back some of the SOMA’s Treasury securities to conduct reverse repurchase agreements with foreign official and international accounts and to support the Desk’s securities lending operations, and the need for buffers to cover possible changes in the demand for these activities and in the market value of the SOMA’s Treasury holdings.

¹⁷One counterparty bid for \$1 million in one of the term RRP operations offered in December.

¹⁸Ahead of the December 2015 FOMC meeting, respondents to the Desk’s Survey of Primary Dealers attached an 87 percent probability to the first increase in the federal funds rate target rate or range happening at the December meeting. Respondents to the Desk’s Survey of Market Participants attached a 90 percent probability to this outcome.

¹⁹The FR 2420 is a transaction-based report that collects daily liability data on federal funds, borrowings from non-exempt entities, Eurodollars, certificates of deposits, and time deposits from (1) domestically chartered commercial banks and thrifts that have \$18 billion or more in total assets, or \$5 billion or more in assets and meet certain unsecured borrowing activity thresholds, and (2) U.S. branches and agencies of foreign banks with total third-party assets of \$2.5 billion or more. For the instructions accompanying the reporting form, see http://www.federalreserve.gov/reportforms/forms/FR_242020160115_i.pdf.

²⁰The Eurodollar market consists of unsecured U.S. dollar deposits held at banks or bank branches outside of the United States. For more information on the U.S. Eurodollar market, see Marco Cipriani and Julia Gouny, “The Eurodollar Market in the United States,” *Liberty Street Economics*, May 27, 2015, at <http://libertystreeteconomics.newyorkfed.org/2015/05/the-eurodollar-market-in-the-united-states.html#Vth1331UXcv>.

²¹For more information on the decision to change the data source, see Marco Cipriani and Jonathan Cohn, “The FR 2420 Data Collection: A New Base for the Fed Funds Rate,” *Liberty Street Economics*, April 8, 2015, at <http://libertystreeteconomics.newyorkfed.org/2015/04/the-fr-2420-data-collection-a-new-base-for-the-fed-funds-rate.html#Vth0c31UXcs>.

²²As of January 1, 2016, 169 depository institutions reported their money market transactions on form FR 2420. Since October 2015, the total average overnight borrowing volume in the federal funds market reported on the form has been about \$70 billion, roughly 75 percent higher than volumes observed in brokered data. The number of reported overnight federal funds transactions has averaged about 300 per day.

²³For more information on the revised methodology for calculating the effective federal funds rate, see <https://www.newyorkfed.org/medialibrary/media/markets/EFFR-technical-note-070815.pdf>.

²⁴For more information on the overnight bank funding rate, see Marco Cipriani, Julia Gouny, Matthew Kessler, and Adam Spiegel, “The New Overnight Bank Funding Rate,” *Liberty Street*

Economics, November 9, 2015, at <http://libertystreeteconomics.newyorkfed.org/2015/11/the-new-overnight-bank-funding-rate.html#Vth10XIUXcs>.

²⁵The to-be-announced market is a forward market that is built on a trading convention that allows market participants to efficiently trade 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 the Federal Reserve’s agency MBS operations. Under a TBA contract, the buyer is notified by the seller of the specific securities that will be delivered (that is, the securities are “announced”) two days prior to settlement. For more on this subject, see James Vickery and Joshua Wright, “TBA Trading and Liquidity in the Agency MBS Market,” Federal Reserve Bank of New York *Economic Policy Review* 19, no. 1 (May 2013): 1-18, at <https://www.newyorkfed.org/medialibrary/media/research/epr/2013/1212vick.pdf>.

²⁶Prepayments can occur for a multitude of reasons, including borrowers selling their house, refinancing their mortgage, or, in the case of an agency MBS, borrower default, which requires the mortgage loan to be pulled from the pool and the remaining principal balance to be paid off by the guarantor. Refinanced mortgages are generally the largest source of prepayments of agency MBS principal received on the SOMA’s agency MBS holdings.

²⁷MOC participants were eligible to participate in the Desk’s agency MBS purchases, but not in dollar rolls, which the Desk conducted with primary dealers only.

²⁸The Desk was also directed to conduct coupon swaps to facilitate settlement of the Federal Reserve’s agency MBS transactions, but did not execute any in 2015. 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.

²⁹CUSIPs are codes that identify financial securities, allowing for efficient clearing and settlement in capital markets. See <http://www.cusip.com/>.

³⁰Implied financing rates reflect the relative availability or scarcity of a particular MBS cohort (for example, thirty-year Fannie Mae 3.5 percent securities) in the market. Higher (more positive) IFRs indicate greater availability of securities of that cohort, while lower (more negative) IFRs indicate greater scarcity.

³¹However, the SOMA has not owned any Treasury bills since 2012, when its Treasury bill holdings were allowed to mature without exchange as part of the Maturity Extension Program.

³²As of December 31, 2015, the Treasury had approximately \$13.21 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/2015/opds122015.pdf>.

³³Because 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 2015, net unsettled commitments totaled \$21 billion.

³⁴The weighted average life calculation presented here is dependent on a model of future prepayments, and therefore is subject to some uncertainty and model sensitivity.

³⁵“Modified duration” is used to calculate the duration of Treasury and agency debt securities, while “effective duration” is employed to measure the duration of mortgage-backed securities. Modified duration approximates the percentage change in the price of a fixed income security given a 100 basis point parallel shift in the yield curve and is most applicable to securities with fixed cash flows, such as Treasury and agency debt securities. Effective duration, which accounts for the potential alterations in cash flows as interest rates change, is suitable for capturing the duration of mortgage-backed securities as it is affected by the prepayment option exercise behavior of mortgage borrowers. Duration measures of the portfolio throughout this report are calculated on a par-weighted average basis.

³⁶The 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 reasons, including the sale of a home or participation in a government-backed assistance program such as the Home Affordable Refinance Program.

³⁷As fiscal agent for the U.S. Treasury, the Desk operates in the financial markets on behalf of the U.S. Treasury’s Exchange Stabilization Fund.

³⁸Further details can be found in the New York Fed’s quarterly reports *Treasury and Federal Reserve Foreign Exchange Operations*. See https://www.newyorkfed.org/markets/quar_reports.html.

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³⁹In addition to the primary credit facility, depository institutions have access to secondary credit and seasonal credit through the discount window.

⁴⁰If conditions warrant, the Federal Reserve may use these lines to draw foreign currency to deliver to U.S. institutions. Federal Reserve draws on its foreign currency swap lines have no effect on the level of U.S. dollar reserve balances. In 2015, the Federal Reserve executed small-value non-dollar swaps with the European Central Bank, Bank of Japan, Bank of England, and Swiss National Bank for the purpose of testing operational readiness.

⁴¹Further details can be found in the New York Fed’s quarterly reports *Treasury and Federal Reserve Foreign Exchange Operations* (https://www.newyorkfed.org/markets/quar_reports.html) and in weekly updates on the New York Fed’s website.

⁴²Reserves may also be held as vault cash. A depository institution is a financial institution that is legally permitted to accept deposits from individuals.

⁴³Reserves 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.

⁴⁴At the end of 2015, balances exceeding the upper bound of the penalty-free bands were \$9 billion higher than the simple difference between reserve balances and reserve balance requirements. The definition of 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, and the Board of Governors of the Federal Reserve System started to report the sum of balances exceeding the top of depository institutions’ penalty-free bands rather than excess balances.

⁴⁵In this discussion, Federal Reserve notes outstanding are net of Federal Reserve Bank holdings.

⁴⁶Although 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 \$689 million in 2015.

⁴⁷Upon the initiation of the transaction, each participant has an undivided interest, proportional to its investment, in a pool of securities from the SOMA that have been allocated toward this purpose.

⁴⁸For more information on the Treasury’s decision, see the announcement at <https://www.treasury.gov/press-center/press-releases/Pages/jl10045.aspx>.

⁴⁹The debt limit impasse was resolved on November 2, 2015, when legislation was passed to suspend the limit through March 15, 2017, and to fund the government for two years (H.R. 1314 Bipartisan Budget Act of 2015).

⁵⁰Even 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 have been expected to result in growth of portfolio income and remittances from their average pre-crisis levels.

⁵¹SOMA income reflects (1) interest income on SOMA assets, including interest on domestic and foreign currency-denominated investments, (2) interest expense on SOMA liabilities, which is primarily interest on reverse repurchase agreements, and (3) non-interest income or loss associated with SOMA assets, which is principally composed of foreign currency translation gains and losses and any realized capital gains or losses, as reported in the Federal Reserve System’s annual audited financial statements. SOMA net income includes the assumed cost of funding the SOMA portfolio, which is calculated as SOMA income less the interest expense on interest-bearing liabilities assumed to be associated with SOMA net assets in excess of Federal Reserve notes outstanding and the Treasury General Account balance held at the New York Fed.

⁵²Before the December 4, 2015, enactment of the FAST Act, transfers to (from) surplus represented the amount necessary to equate surplus with capital paid-in, in accordance with the Board of Governor’s policy. Subsequent to the enactment of the FAST Act, transfers to (from) surplus represent the amount necessary to maintain surplus at an amount equal to each Reserve Bank’s allocated portion of the aggregate surplus limitation.

DOMESTIC OPEN MARKET OPERATIONS DURING 2015

⁵³For 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 and Earnings: A Primer and Projections," Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2013-01, 2013, at <http://www.federalreserve.gov/pubs/feds/2013/201301/revision/201301pap.pdf>.

⁵⁴Consistent with current FOMC directives, it is assumed that maturing Treasury securities are rolled over at auction and that principal payments on all agency debt and agency MBS are reinvested in agency MBS.

⁵⁵This level of reserve balances 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.

⁵⁶Assumptions about the growth of other balance sheet items reflect recent trends, while assumptions about capital surplus and dividend payments reflect new limits established by the FAST Act.

⁵⁷The higher and lower interest rate scenarios examined in this report 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. All other assumptions, including expectations for reinvestments, are held

constant. The path of SOMA net income in each of these scenarios follow similar contours, with larger shocks being associated with more pronounced declines in income during the normalization period and rebounds in a steady state. Portfolio net income declines almost to zero in the 300 basis point scenario.

⁵⁸In the baseline scenario, Federal Reserve notes are assumed to grow in line with nominal GDP. The higher and lower currency growth scenarios apply 3 percentage point annualized shocks across the entire forecast period in the construction of the scenario.

⁵⁹Ultimately, 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 and dividends. A reduction in income to such levels could prompt a temporary halt in remittances to the Treasury. 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.

⁶⁰The term reverse repos offered over the September 2015 quarter-end included an operation that was not technically authorized by the resolution approved by the FOMC on March 17, 2015. That resolution authorized the New York Fed to conduct term reverse repos spanning the remaining quarters of 2015, specifically identifying the quarter-end dates for conducting such operations, including, for the third quarter, the period from September 18 to 29. The Desk conducted a two-day term reverse repo operation on September 30, 2015. The FOMC was informed of this technical error.



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