



DOMESTIC OPEN MARKET OPERATIONS

During 2016

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 2016. Linsey Molloy, Deborah Leonard, Cindy Hull, and Michael Place were primarily responsible for preparation of the report.

<i>Overview</i>	1
<i>The Federal Reserve’s Framework for Monetary Policy Implementation</i>	3
<i>Domestic Open Market Operations</i>	7
Monetary Policy Implementation	7
Short-Term Interest Rate Management	7
Money Market Developments.....	7
Reverse Repurchase Agreements	9
Money Market Benchmarks	13
Balance Sheet Management.....	15
Treasury Securities Operations.....	15
Agency MBS Operations.....	16
Securities Lending and Treasury Market Functioning.....	19
Operational Flexibility.....	20
Operational Readiness	20
Counterparty Management	20
<i>Selected Balance Sheet Developments</i>	23
Selected Assets	23
Domestic Securities Holdings.....	23
Portfolio Size and Composition.....	24
Portfolio Risk Metrics.....	26
Foreign Currency–Denominated Assets	27
Short-Term Liquidity Provision.....	28

Selected Liabilities	29
Reserve Balances.....	29
Federal Reserve Notes	29
Reverse Repurchase Agreements.....	30
Deposits	31
Financial Results.....	31
SOMA Income	31
Federal Reserve Remittances.....	32
SOMA Unrealized Gains and Losses	32
Projections for the SOMA Portfolio and Net Income	33
Baseline Assumptions	33
Portfolio Path Results.....	34
SOMA Net Income Results	36
Effect on Remittances.....	37

<i>Conclusion</i>	39
-------------------------	----

<i>Appendixes</i>	41
Appendix 1: Authorization for Domestic Open Market Operations.....	41
Appendix 2: Guidelines for the Conduct of System Open Market Operations in Federal-Agency Issues	43
Appendix 3: Domestic Policy Directives Issued to the Federal Reserve Bank of New York	43
Appendix 4: Summary of Baseline Projection Assumptions.....	45
Appendix 5: Reference Web Pages	46

<i>Endnotes</i>	48
-----------------------	----

<i>Index of Charts and Tables</i>	52
---	----

Note: Charts 6 and 13 have been corrected since this report was first released online.

Overview

The Federal Open Market Committee (FOMC) maintained the target range for the federal funds rate at $\frac{1}{4}$ to $\frac{1}{2}$ percent through most of 2016 to foster continued progress toward its dual objectives of maximum sustainable employment and price stability. On December 14, in view of progress the economy had made toward these dual objectives, the FOMC raised its target by $\frac{1}{4}$ percentage point, to a range of $\frac{1}{2}$ to $\frac{3}{4}$ percent, while noting that the stance of monetary policy remains accommodative.

To effect control of short-term interest rates, the Federal Reserve used the rate of interest paid on excess reserves (IOER) that banks hold at the Federal Reserve, supplemented by overnight reverse repurchase agreements (ON RRP) offered at a specified rate. These tools were successful at keeping the effective federal funds rate (EFFR) within the FOMC's relevant target range throughout the year. Overnight rates in both unsecured and secured money markets moved up roughly in line with the increase in the effective rate in December, and the expected increase passed through into term money market instruments.

Throughout 2016, the FOMC directed the Open Market Trading Desk at the Federal Reserve Bank of New York (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. To this end, the Desk rolled over \$216 billion in Treasury securities in 2016—marking a resumption of sizable rollover activity following several years of negligible rollovers that had resulted from short-term Treasury sales and redemptions during the Maturity Extension Program (MEP). The Desk also reinvested \$7 billion in principal payments from agency debt and agency MBS in agency MBS.¹ These actions kept the domestic securities portfolio of the System Open Market Account (SOMA) at about \$4.26 trillion throughout the year and the allocation between Treasury securities and non-Treasury securities largely unchanged.

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 \$2.95 trillion at the end of 2016. The composition of liabilities shifted over the course of the year, with growth in Federal Reserve notes, increased balances in the Treasury General Account (TGA), and increased levels of reverse repurchase agreements prompting a decline in reserve balances.

The portfolio continued to contribute to elevated levels of Federal Reserve income and remittances to the U.S. Treasury. In 2016, a total of \$91 billion was paid to the Treasury, a slight decline from 2015—largely reflecting increased interest expenses associated with higher short-term interest rates—but well above levels prior to the financial crisis. As the FOMC reduces monetary policy accommodation, both the size of the portfolio and its associated net income are expected to decline from currently elevated levels. Staff projections for the future path of the portfolio and income show that the timing for the portfolio to reach its long-run size will depend on numerous variables. The projections, calculated using publicly available survey-based inputs, suggest that the portfolio's net income will remain solidly positive in both a baseline scenario and several alternative scenarios.

Over the course of the year, the Desk also strengthened its operational flexibility and enhanced the robustness and transparency of money market benchmarks. To ensure the smooth and efficient conduct of open market operations, the Desk undertook a series of operational readiness exercises and introduced an integrated framework for managing its relationships with counterparties. To further the Federal Reserve's ongoing efforts to enhance the quality and quantity of information available to the public about funding activity in U.S. money markets, in March 2016 the New York Fed implemented revisions to the calculation methodology for the effective federal funds rate and introduced the overnight bank funding rate as an additional reference for unsecured money

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

market rates; it also began publishing a range of summary statistics for both rates. In November, the New York Fed proposed the future publication of secured benchmark rates based on overnight repo transactions collateralized by Treasury securities.

This report begins with an explanation of the Federal Reserve’s framework for implementing monetary policy. It then describes the open market operations the Desk undertook in money markets and securities markets to achieve the FOMC’s operating objectives for short-term interest rate management and balance sheet management, and considers related market developments. It also discusses securities lending operations that support market functioning and the efforts related to operational readiness and counterparty

management that enhanced the Desk’s operational flexibility. 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 3 provide the full text of the authorizations and directives guiding the Desk’s activity. Appendix 4 presents the assumptions underlying the projection exercises outlined in the report, and Appendix 5 provides links to web pages where source material for Federal Reserve-related content can be found.

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

The Federal Reserve's Framework for Monetary Policy Implementation

Monetary policy implementation refers to the tools and practices that a central bank uses to achieve its policy objectives. The Federal Reserve's current framework for monetary policy implementation features the use of a short-term interest rate target to communicate the FOMC's policy stance and the use of rates set by the Federal Reserve—administered rates—and market operations to promote money market rate conditions consistent with the policy rate target. Together, the elements of this approach represent the primary mechanism to support the achievement of the Federal Reserve's objectives of maximum sustainable employment and price stability. The Federal Reserve has also accumulated and maintained a sizable securities portfolio as an additional tool to help foster broader financial conditions that are supportive of its policy objectives.

Framework Tools

The money market tools currently used by the Federal Reserve for policy implementation were developed to maintain short-term interest rate control in the prevailing environment of abundant reserve balances in the banking system, an abundance that was created by the Federal Reserve's large-scale asset purchase programs from 2008 through 2014. The FOMC's key policy rate remains a target range for the federal funds rate (the rate for overnight unsecured transactions in central bank balances among depository institutions and other eligible entities). The Federal Reserve sets its administered rates—the interest rate paid on excess reserves that a bank holds at the Federal Reserve, supplemented by overnight reverse repos offered at a specified rate—as a means to move the federal funds rate into the target range and to maintain it in that range without actively adjusting the supply of reserve balances.³

Throughout 2016, the target range for the federal funds rate was 25 basis points wide.⁴

The IOER rate is meant to act as a floor beneath overnight interest rates. If a bank can earn interest on the reserves it holds at the central bank, then given the safety and convenience of this investment, little incentive exists for the bank to lend at a rate lower than that offered by the central bank. Further, if the bank 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 close to the interest rate on reserves. In practice, however, some short-term interest rates in U.S. money markets are slightly 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 makes key cash lenders in U.S. money markets such as government-sponsored enterprises and money market mutual funds ineligible to earn IOER), credit limits imposed by cash lenders, and other impediments to market competition, as well as the costs incurred by banks through balance sheet expansions related to arbitrage activity—create frictions that have made IOER act more like a magnet that pulls up short-term interest rates than a firm floor beneath them.

To help fortify the floor on short-term rates, the Federal Reserve uses an overnight reverse repurchase facility, through which it offers a daily risk-free overnight investment with same-day settlement at a rate managed by the Federal Reserve. The facility establishes an important outside investment option for a wide range of money market participants that are active lenders in short-term funding markets, including certain nonbank institutions that are not

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Box 1

Implementation Roles and Communications

The tools used to implement monetary policy are governed by different decision-making bodies within the Federal Reserve System. The settings of these tools, such as the applicable prices or quantities associated with them, are established with the intent of achieving the Federal Reserve's dual mandate of maximum employment and price stability.

The FOMC is responsible for policy tools related to open market purchases and sales of securities for the Federal Reserve's System Open Market Account. The FOMC's selection of the New York Fed as the Reserve Bank responsible for executing open market operations is one of the Committee's annual organizational tasks (Appendixes 1 and 2).^a Within

the New York Fed, the Desk, with the guidance of a SOMA manager appointed by the FOMC, conducts these open market operations under the authorization and direction of the Committee. In practice, the FOMC's objective for the operations is communicated to the Desk through a policy "directive" that the Committee votes on at the conclusion of each meeting. The directive instructs the Desk to conduct transactions for the SOMA in furtherance of the FOMC's desired operating objective (Appendix 3).

The Board of Governors of the Federal Reserve System is responsible for policies surrounding the reserves held by banks at the Fed, including reserve requirements, payment of interest on reserve balances,

and term deposits.^b Discount rates are established by each Reserve Bank's board of directors, subject to the review and determination of the Board of Governors of the Federal Reserve System.

To promote transparency regarding monetary policy implementation, the Federal Reserve issues a note in conjunction with the release of each FOMC monetary policy statement. This implementation note outlines the specific decisions made by the FOMC and the Board of Governors to implement the FOMC's monetary policy stance, announcing, for example, the rates of interest on required and excess reserves and the primary credit rate, and the directive to the Desk to conduct open market operations.

^a For resiliency purposes, the New York Fed maintains and staffs alternative sites for executing and settling open market operations in other Reserve Bank locations throughout the system. These arrangements ensure that the Desk has the capacity to carry out its critical operational and analytical activities should a contingency event impede operations in the greater New York area.

^b The Board of Governors is also responsible for the supervision and regulation of banks and systemically important financial institutions, for payments systems and infrastructure, and for overall oversight of the Federal Reserve System.

eligible to earn IOER. In this way, the ON RRP facility supports policy implementation as a complement to IOER, with the Desk undertaking ON RRP open market operations as directed by the FOMC to maintain the federal funds rate in the FOMC's target range (Box 1).

How the Framework Evolved

This approach to monetary policy implementation contrasts with the approach used by the Federal Reserve before the financial crisis. In the pre-crisis implementation framework, the FOMC's target rate was achieved by actively adjusting the supply of reserve balances in the banking system through temporary and permanent purchases and sales of securities by the Desk in the open market. These open market operations 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 target rate. This approach worked in an environment with a relatively low

aggregate level of reserves, where small variations in the aggregate supply of reserves could cause meaningful changes in the level of rates in the federal funds market. These changes occurred as individual banks traded reserves to balance the costs of falling short of reserve requirements—costs that included the assessment of penalties or the need to borrow reserves at what could be relatively high rates—and the opportunity cost of holding excess reserves, which at that time were not remunerated.

While both the pre-crisis and current monetary policy operating frameworks rely on the management of short-term interest rates as the primary mechanism for policy implementation, the two approaches are notably different. In the pre-crisis environment, reserves were relatively scarce, and short-term rate control was achieved by actively managing the *quantity* of reserves supplied relative to reserve demand. This system relied on interbank trading to move rates to the FOMC's federal funds rate target level. In the

current environment, reserves are abundant, and interest rate control is achieved by managing the *price* of certain Federal Reserve liabilities, including reserves and reverse repurchase agreements. By directly administering rates, this system relies upon arbitrage trading in funding markets to keep rates in the FOMC's target range.

Since the financial crisis, the Federal Reserve has used balance sheet management, as well as short-term interest rate management,

as a means to achieve its policy objectives. By setting operating objectives for the size and composition of its securities portfolio—at times through large-scale asset purchase programs, or currently through the use of reinvestments to maintain a sizable portfolio—the Federal Reserve has used its balance sheet to maintain downward pressure on long-term interest rates, to support the mortgage markets, and to help create or maintain accommodative financial conditions.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016



Domestic Open Market Operations

In 2016, the Desk continued to conduct open market operations in money markets and securities markets at the direction of the FOMC to support the implementation of monetary policy. The Desk also operated a securities lending program, ancillary to monetary policy implementation, to support the smooth functioning of some of the markets in which the Federal Reserve operates. Throughout 2016, the Desk continued to enhance its flexibility to conduct open market operations by undertaking operational readiness exercises and improving its counterparty framework.

Monetary Policy Implementation

To implement monetary policy, the New York Fed conducted open market operations in money markets to influence short-term interest rates. Money market operations included reverse repo operations to support the IOER rate. The New York Fed also conducted open market operations in the Treasury and agency MBS markets to achieve the FOMC's balance sheet objectives.

SHORT-TERM INTEREST RATE MANAGEMENT

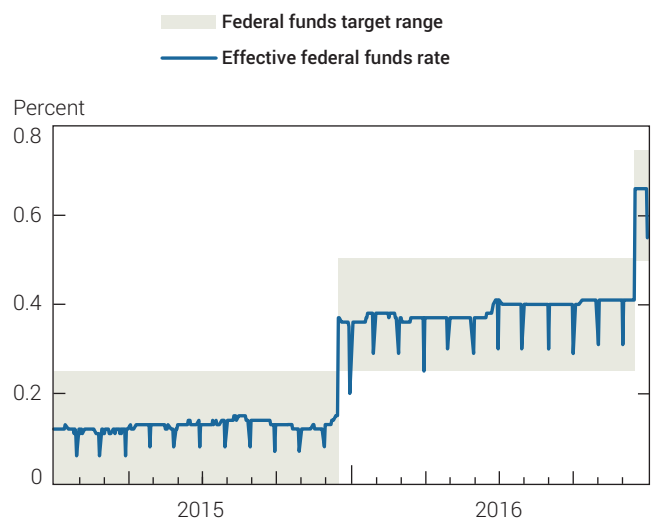
As noted earlier, the Federal Reserve's main mechanism for implementing monetary policy is the management of short-term interest rates using a set of administered rates. The FOMC maintained the federal funds target rate in a range of $\frac{1}{4}$ to $\frac{1}{2}$ percent for most of 2016. To accomplish this operational objective, the Board of Governors kept the interest rate paid on required and excess reserve balances at 0.50 percent and the FOMC directed the Desk to undertake overnight reverse repo operations at an offering rate of 0.25 percent. On December 14, in view of realized and expected labor market conditions and inflation, the FOMC announced an increase in its target rate to a range of $\frac{1}{2}$ to $\frac{3}{4}$ percent, saying that the stance of monetary policy remained accommodative,

thereby supporting some further strengthening in labor market conditions and a return to the FOMC's long-run inflation objective of 2 percent. To implement this increase, the Board of Governors raised the interest rate paid on required and excess reserves to 0.75 percent and the FOMC directed the Desk to undertake ON RRP operations at an offering rate of 0.50 percent, effective December 15.

MONEY MARKET DEVELOPMENTS

Use of IOER, with support from ON RRPs offered at a rate set by the FOMC, was successful in maintaining the effective federal funds rate within the FOMC's target range throughout the year (**Chart 1**).

Chart 1
Federal Funds Target and Effective Federal Funds Rate



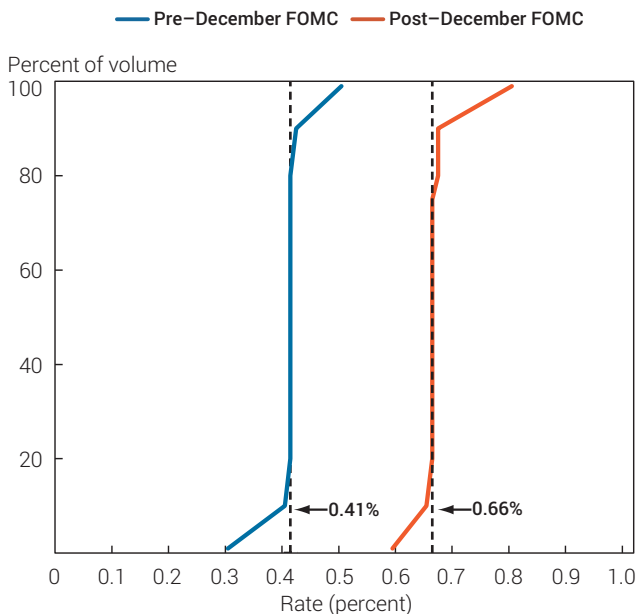
Source: Federal Reserve Bank of New York.

Note: Figures are daily.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

The effective rate printed between $\frac{1}{4}$ and $\frac{1}{2}$ percent through December 14, averaging 39 basis points on non-month-end dates. The rate moved slightly higher within the range during the year, reaching 41 basis points in the beginning of the fourth quarter of 2016. Following the FOMC's decision to increase the target range from $\frac{1}{4}$ to $\frac{1}{2}$ percent to $\frac{1}{2}$ to $\frac{3}{4}$ percent on December 14, the Federal Reserve's tools successfully supported the increase in the effective rate. The distribution of traded rates in the federal funds market essentially rose in parallel, with the average effective federal funds rate climbing 25 basis points, from 41 basis points before the December FOMC meeting to 66 basis points after the meeting (**Chart 2**). In line with typical patterns, the effective rate showed temporary softness on month-end dates (**Box 2**, page 10); however, it remained within the FOMC's target range, even at year-end, in contrast to December 31, 2015, when the rate temporarily dipped below the bottom of the prevailing target range.

Chart 2
Average Distribution of Overnight Federal Funds Rates



Source: Federal Reserve.

Notes: Pre-December FOMC period covers December 1 through December 14, 2016. Post-December FOMC period covers December 15 through December 29, 2016. 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 the average daily effective federal funds rates for each period.

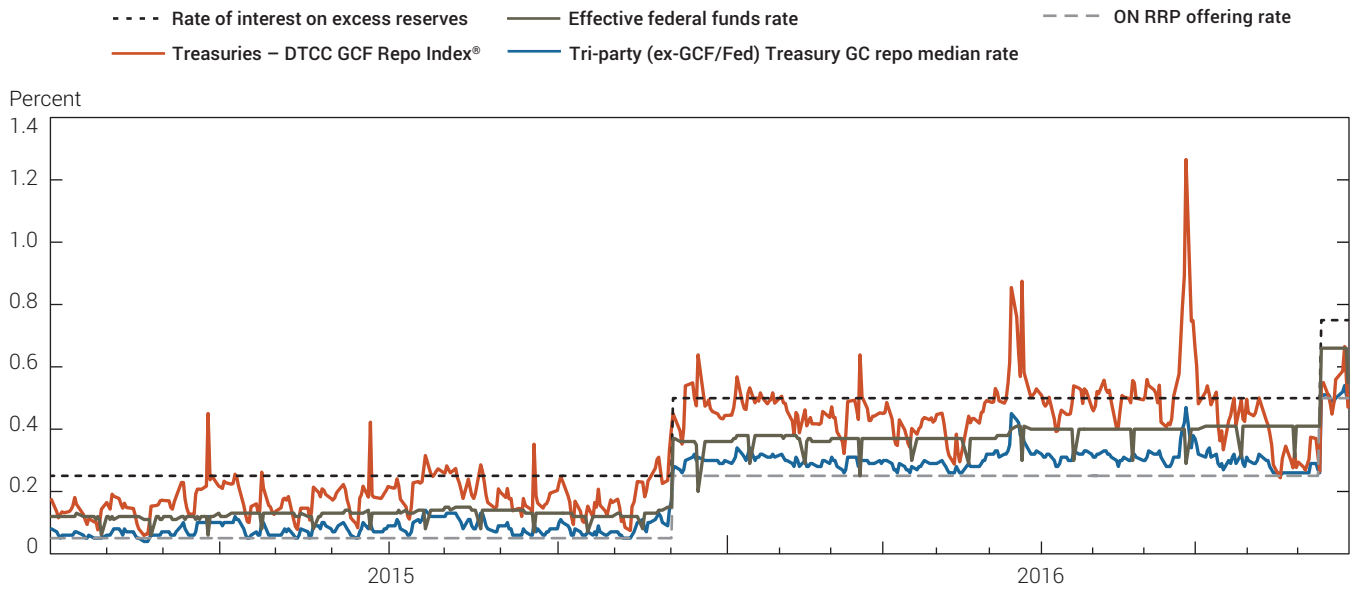
Although the FOMC communicates its monetary policy stance using the overnight federal funds rate, successful transmission of monetary policy depends on that stance passing through to other money market rates. This pass-through ensures that expectations for the FOMC's future policy stance are properly incorporated in the term structure of interest rates, thereby affecting financial conditions and the broader economy.

Data from a range of money markets demonstrate the successful transmission of the monetary policy stance across a broad constellation of short-term rates. Overnight rates in both secured and unsecured money markets fluctuated within generally stable ranges over the course of the year, and moved up 25 basis points with the increase in the effective federal funds rate following the FOMC's December rate increase. The ON RRP offering rate provided a soft floor beneath overnight money market rates, including rates on overnight transactions for tri-party repos of Treasury securities, agency debt, and agency MBS collateral and for General Collateral Finance Repo (GCF Repo[®]) transactions (**Chart 3**). Overnight money market rates appeared notably stable in 2016 despite substantial shifts in investor activity related to the implementation of money market mutual fund (MMF, or money market fund) reform (**Box 3**, pages 11-12). In particular, despite a sharp decline in overnight unsecured lending by prime money market funds, the overnight bank funding rate, which reflects rates on federal funds transactions and certain Eurodollar transactions, mirrored movements in the effective federal funds rate.

The expected increase in overnight rates passed through effectively into term money market instruments: Rates on a range of one- and three-month instruments rose ahead of the December FOMC meeting in response to widespread expectations for an increase in the FOMC's target range (**Chart 4**).⁵ Treasury bill yields were roughly unchanged amid the expected increase in overnight rates. Treasury bills also typically trade below other money market rates. Since bills are short-term instruments that offer intraday liquidity and are directly guaranteed by the U.S. government, they attract strong demand and are an important part of many investors' portfolios. Additionally, demand for Treasury bills has increased amid the shift in MMF assets from prime to government funds that resulted from MMF reform.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

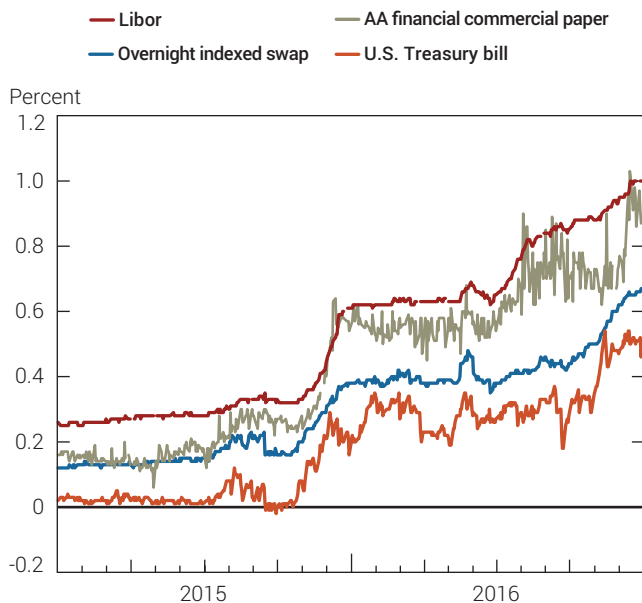
Chart 3

Overnight Money Market Rates

Sources: Federal Reserve Bank of New York; DTCC Solutions LLC, an affiliate of The Depository Trust & Clearing Corporation; Bank of New York Mellon; JPMorgan Chase.

Note: Figures are daily.

Chart 4

Three-Month Money Market Rates

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

Note: Figures are daily.

REVERSE REPURCHASE AGREEMENTS

To carry out the FOMC's directives and to maintain the federal funds rate in the FOMC's target range, the Desk conducted ON RRP operations at an offering rate of 0.25 percent through December 14 and at an offering rate of 0.50 percent from December 15 to December 31. ON RRP operation amounts were limited only by the value of Treasury securities held outright in the System Open Market Account that were available for such operations and by a per-counterparty limit of \$30 billion per day through one proposition. The Desk announced that it anticipated that about \$2 trillion of Treasury securities would be available for such operations.⁶

Operational Approach

In its daily ON RRP operations, 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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Box 2

Money Market Dynamics

In recent years, overnight rates in U.S. money markets have typically exhibited temporary volatility and an associated decline in trading volumes around month- and quarter-end dates, with relatively more pronounced volatility on quarter-ends. Several dynamics contribute to this trend. On reporting dates, the marginal balance sheet costs of many depository institutions increase as the institutions publish financial statements and, in certain jurisdictions, calculate regulatory ratios. As a result, these institutions temporarily decrease the size and adjust the composition of their balance sheets. Although this phenomenon is broad-based, it is particularly true for institutions in jurisdictions that calculate regulatory ratios—such as the leverage ratio—based on a period-end balance sheet “snapshot” rather than a daily average over the reporting period.

The increased costs of engaging in balance sheet-intensive activities on reporting dates mean that depository institutions borrowing funds in unsecured money markets to earn interest on excess reserves are incentivized to do so at a lower interest rate, or curtail their activity. In 2016, the effective federal funds rate and overnight bank funding

rate declined roughly 10 basis points on month- and quarter-ends. Meanwhile, on month-ends, trading volumes for both rates decreased an average of 6 percent, while quarter-ends saw declines in trading volume of 26 percent and 33 percent, respectively, for the effective rate and the overnight bank funding rate. The declines were short-lived, with rates and volumes typically returning to pre-period-end levels the next business day.

The reduction in balance sheet capacity can temporarily lower the bargaining power of lenders in overnight unsecured markets, contributing to the lower rates on reporting dates. Many lenders in the federal funds and Eurodollar markets with access to the Federal Reserve’s overnight reverse repurchase facility responded to the lower rates by temporarily increasing their use of ON RRP on month- and quarter-ends. 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 RRPs to be an imperfect substitute for lending in private markets owing to structural differences across markets, such as the timing of the return of invested funds.

Overnight secured markets, such as the market for overnight repurchase agreements collateralized by government securities, also exhibited volatility around reporting dates, as many securities dealers affiliated with bank holding companies—entities that typically borrow in the repo market—also reduced activity amid temporary balance sheet contractions. For example, reduced willingness by some securities dealers to undertake balance sheet-intensive activities on reporting dates often contributed to temporarily elevated overnight repo rates on month- and quarter-ends in the GCF Repo[®] market—a largely interdealer market in which the Fixed Income Clearing Corporation serves as a central counterparty.³ As is the case in unsecured markets, many lenders of cash in repo markets (lenders that in many cases also operate in unsecured markets) turn to the ON RRP facility as an alternative to lending in the private market on reporting dates. Trading volumes and rates in secured markets subsequently revert back to their non-reporting-date levels. However, the adjustment process often takes place over the course of several days leading up to and after the reporting date, longer than in unsecured markets.

³ The overnight Treasury GCF repo rate fell at year-end 2016 as a result of increased demand for repo agreements following the implementation of MMF reform.

market funds, government-sponsored enterprises, and banks. (For more information on reverse repo agreement counterparties, see the discussion of operational flexibility later in this section of the report.) The Desk’s reverse repo operations were conducted over FedTrade, the New York Fed’s proprietary trading platform, from 12:45 p.m. to 1:15 p.m. Each counterparty was permitted to submit one bid of up to \$30 billion in each operation, at a rate not to exceed the specified offering rate for each operation. Awards were made at the specified offering rate to all counterparties.⁷

All reverse repo operations were conducted according to terms that were announced in operating statements and in frequently asked questions (FAQs) published on the New York Fed’s website, and the results of the operations, including the amounts submitted and accepted, the award rate, and the number of bidders, 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.⁸

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Box 3

Money Market Fund Reform

The Securities and Exchange Commission’s money market fund reform measures, introduced in July 2014, were fully implemented by October 14, 2016. The reforms were designed to reduce money market funds’ susceptibility to destabilizing runs by investors, as well as to increase the transparency and resiliency of the funds. As a result of the reforms, prime and tax-free institutional funds are now required to adopt a floating net asset value in place of the stable net asset value accounting method that historically all money market funds were permitted to utilize; moreover, all nongovernment funds will be allowed to impose liquidity fees on withdrawals or to halt the redemption of shares under certain conditions, subject to approval from the fund’s board.^a

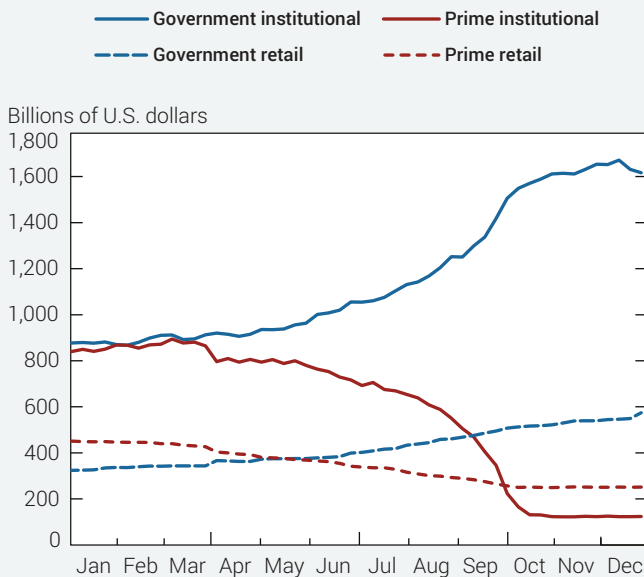
The reforms resulted in considerable shifts in the industry’s composition (Chart A). In the year preceding implementation, more than \$1 trillion in assets under management left prime and tax-exempt money market funds as a result of conversions to government funds, closures of funds undertaken by asset managers, and investor redemptions. The vast majority of the outflow from these funds was reallocated to government funds, leaving overall assets under management in the industry little changed.

These shifts affected markets for the types of instruments in which money market funds invest. MMF holdings of government security investments, including agency debt, repo collateralized by government

securities, and U.S. Treasury securities, increased notably. Conversely, MMF holdings of commercial paper, Eurodollar time deposits, and other bank obligations declined (Chart B). The significant reduction in prime funds’ assets prompted overnight Eurodollar trading volumes to fall to roughly half their pre-reform levels. Additionally, reduced term lending from prime money funds—which have traditionally been significant lenders of U.S. dollars to foreign banks in a variety of markets, including the Eurodollar, certificate of deposit, and commercial paper markets—contributed to a marked increase in unsecured term funding rates and a decrease in funding volumes. The costs of unsecured term funding in the markets for certificates of deposit and commercial

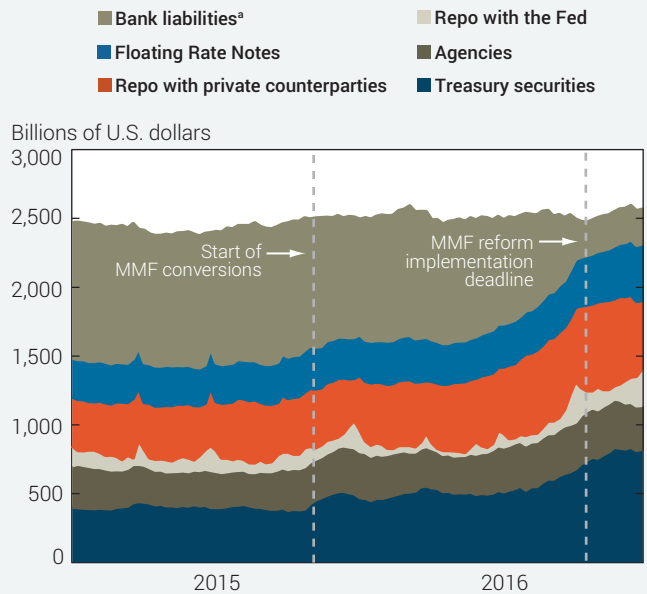
Continued ►

Chart A
Money Market Fund Assets under Management in 2016



Source: iMoneyNet.
Note: Figures are weekly.

Chart B
Composition of Assets Held by Taxable Money Market Funds



Sources: iMoneyNet; Federal Reserve Bank of New York.
Note: Figures are weekly.
^aBank liabilities consist of time deposits, commercial paper, and domestic and foreign bank obligations as defined by iMoneyNet.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Box 3

Money Market Fund Reform (continued)

paper partially retraced their rise following the implementation of reform as a result of an increase in term lending by remaining prime MMFs and non-MMF investors. However, costs for U.S. dollar funding through the foreign exchange market—an alternative funding source for foreign banks—remained high. (See the discussion of central bank liquidity swaps in the “Balance Sheet

Developments” section of this report for more information on U.S. dollar funding and central bank liquidity swap demand.)

The impact of the substantial changes in money market structure was tempered by the Federal Reserve’s ON RRP facility, which absorbed government money market funds’ increased demand for

safe investments. Use of the facility increased in the months leading up to the implementation date of the reform and remained elevated through the end of the year, with much of the increase coming from government funds. However, government funds’ use of the facility as a proportion of their overall assets under management was little changed.

^a “Government” money market funds are defined as those that invest at least 99.5 percent of their total assets in cash, government securities, or repurchase agreements collateralized fully by cash and government securities. “Nongovernment” money market funds are all other money market funds.

Operational Results

ON RRP operations were effective in establishing a soft floor under short-term interest rates, since the offer rate on the ON RRP facility provides an outside investment option that enables lenders to negotiate higher rates in private funding markets. The facility also helped to smooth shifts in money market investor composition in 2016 by providing an ample supply of an eligible short-term, high-quality investment for government money funds experiencing substantial inflows associated with money market fund reform.

Participation in the Federal Reserve’s ON RRP operations was sensitive to several factors, including the pricing of the Federal Reserve’s reverse repos relative to the pricing and availability of comparable money market investments, including private repo, Treasury bills, and agency debt. ON RRP take-up also reflected cyclicalities in counterparties’ cash management needs, as well as shifting dynamics in the money market fund industry (see **Box 3**). Take-up in ON RRPs generally increased as the supply of alternative investment options declined and as the spread between alternative short-term market rates and the ON RRP offering rate narrowed.

During the first half of 2016, daily ON RRP take-up excluding month-end dates averaged \$58 billion—roughly half the \$108 billion of non-month-end daily average participation seen in 2015 and some of the lowest participation levels seen since the early days of the facility’s lengthy testing phase (**Chart 5**).⁹ ON RRP

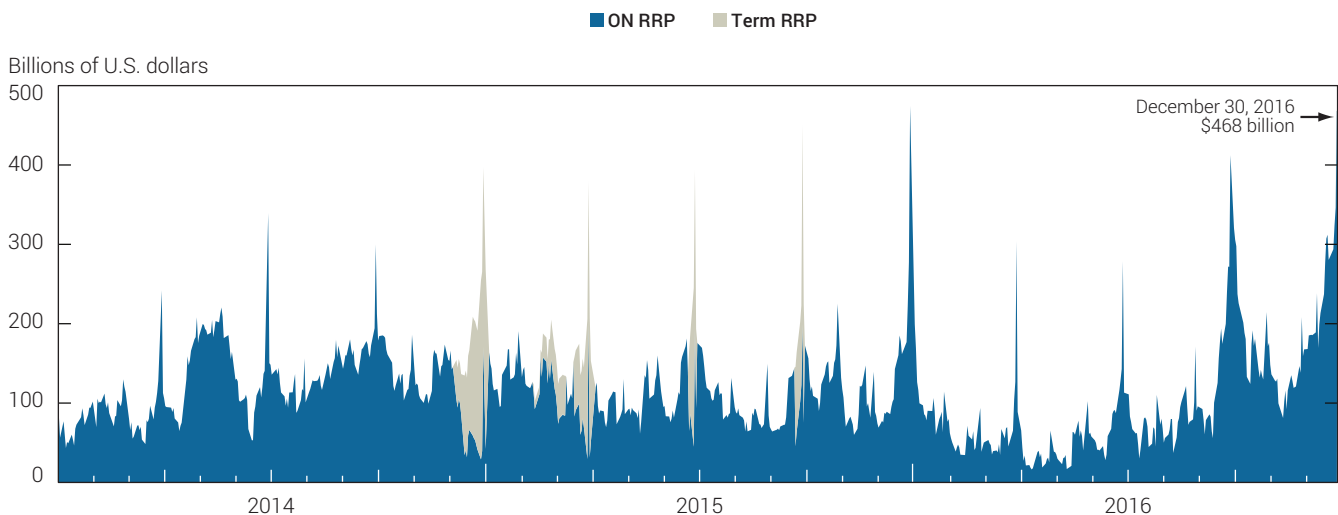
take-up reached a low of roughly \$17 billion on April 13, 2016, with the decline largely reflecting an increase in the availability to ON RRP counterparties of alternative investment options at more attractive rates than the ON RRP rate. Control of short-term interest rates was maintained during this period, demonstrating that the current monetary policy implementation framework, combining the pull of IOER with support from an ON RRP facility, is effective, even during periods of relatively limited ON RRP take-up.

Daily ON RRP take-up more than doubled during the second half of 2016, averaging \$138 billion per day on non-month-ends. The increased take-up reflected a rise in demand for short-term government securities and repo agreements collateralized by government securities from government money market funds in the months leading up to the implementation date for MMF reform. Money market fund usage remained elevated through the end of the year (**Chart 6**). The reduced availability of alternative investment options further supported the rise in ON RRP take-up toward the end of the year, reflecting declines in available collateral for private repos and reductions in the supply of Treasury bills.

Demand for ON RRPs on quarter-end dates in 2016 averaged \$366 billion, within the range of RRP use on prior quarter-ends. Participation rose to near-record levels at quarter-ends in the second half of the year, consistent with higher daily participation in the facility related to money market fund reform. The temporarily elevated usage over quarter-ends reflected declining availability of other investments on key reporting dates (see **Box 2**).

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Chart 5
Reverse Repo Amounts Outstanding



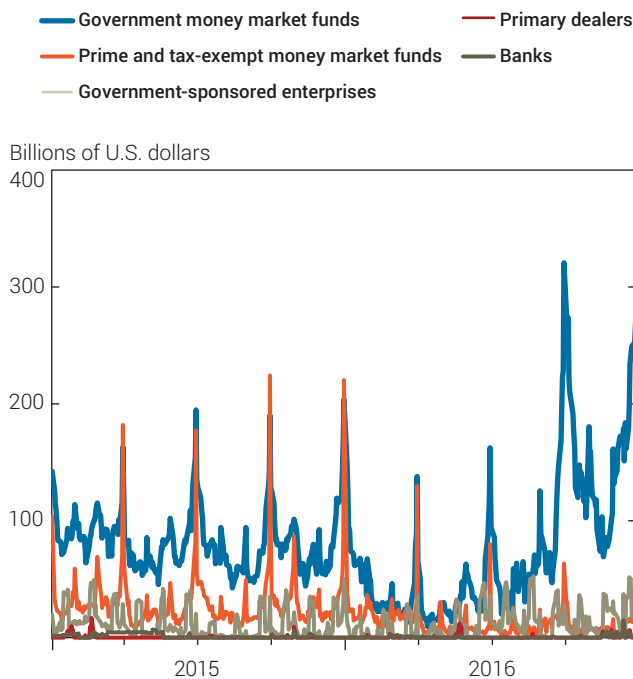
Source: Federal Reserve Bank of New York.

Note: Figures are daily.

MONEY MARKET BENCHMARKS

The Federal Reserve has undertaken efforts over the past several years to enhance its collection of money market data and to publish robust benchmark rates. To this end, in March 2016 the New York Fed implemented changes in the calculation methodology and data source for the effective federal funds rate and introduced the overnight bank funding rate as an additional reference for money market rates. Both the effective federal funds rate and the overnight bank funding rate draw from the Federal Reserve’s *Report of Selected Money Market Rates* (Reporting Form FR 2420). FR 2420 data provide useful insight into how unsecured markets function—information that helps Desk staff understand trends and relationships across money markets and assess the effectiveness of monetary policy implementation. In November 2016, the New York Fed announced a proposal for the future publication of secured benchmark rates based on overnight repo transactions collateralized by Treasury securities.

Chart 6
Reverse Repo Amounts Outstanding by Counterparty Type



Source: Federal Reserve Bank of New York.

Notes: Figures are daily and include overnight and term operations. Money market fund categorizations through October 14, 2016, reflect staff estimates.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Effective Federal Funds Rate

The new calculation methodology for the effective federal funds rate was introduced with the March 1, 2016, rate. The rate is now calculated as a volume-weighted median of overnight federal funds transactions reported by depository institutions in the FR 2420. Previously, the rate had been calculated as a volume-weighted mean using aggregated data supplied by federal funds brokers.¹⁰ The FR 2420 data capture a greater share of federal funds activity by including transactions negotiated directly between counterparties as well as transactions intermediated by brokers. In addition, because it has direct access to the transaction-level data in the FR 2420, the Federal Reserve can better monitor the quality of the data underlying the rate's calculation, supporting a more robust calculation process.¹¹ The shift to a volume-weighted median tends to provide a more accurate reflection of the bulk of trading activity in circumstances where the mean and median differ. In addition, a median is more resilient to outlier values, which enhances the reliability and integrity of the computed rate.¹²

In conjunction with the new calculation methodology, the New York Fed began publishing daily statistics for overnight trading in the federal funds market, including volume and volume-weighted 1st, 25th, 75th, and 99th percentile rates. The New York Fed publishes the effective federal funds rate and these statistics for the prior business day each day at approximately 9:00 a.m. A full quarter's worth of additional summary statistics—including the volume-weighted mean rate, the standard deviation, and a disaggregation of volumes reported by domestic banks and foreign banking organizations—as well as updates to previously reported data are published with a one-quarter lag.

Overnight Bank Funding Rate

Beginning with the March 1, 2016, rate, the New York Fed began publishing an overnight bank funding rate based on transaction-level data in both the federal funds and Eurodollar markets. Together, these markets represent a substantial share of banks' overnight unsecured borrowings.¹³ The overnight bank funding rate is calculated as a volume-weighted median using data reported on the FR 2420 by U.S.-based banking offices; the calculation includes unsecured borrowings of U.S. dollars booked at international banking facilities and at offshore branches located in the Caribbean that are managed and controlled by a U.S. banking

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

The New York Fed publishes the overnight bank funding rate for the prior business day each day at approximately 9:00 a.m. It also publishes similar summary statistics and updates for the data sets underlying the overnight bank funding rate on a daily and quarterly frequency, as it does for the effective federal funds rate.

Overnight Treasury General Collateral Repo Rates

On November 4, 2016, the New York Fed announced that, in cooperation with the U.S. Treasury Department's Office of Financial Research, it was considering the publication of three benchmark rates based on overnight repurchase agreement transactions collateralized by Treasury securities. The rationale for publishing the rates was to bring greater transparency to the repo market by increasing the amount and improving the quality of information available about the overnight Treasury general collateral (GC) repo market.

The three proposed benchmark rates would be based on transaction-level data from various segments of the repo market: 1) a rate based on transaction-level data from non-centrally cleared tri-party repo platforms, excluding the Federal Reserve's transactions in the repo market; 2) a rate based on the same transaction-level data as the first rate plus tri-party activity occurring within The Depository Trust & Clearing Corporation's General Collateral Financing (GCF) Service; and 3) a rate based on the same transaction-level data as the second rate plus the Federal Reserve's overnight Treasury repo-based open market transactions. The announcement noted that one or more of the rates could be modified over time, as appropriate, to incorporate additional data sources, such as information on bilateral repo transactions.

The New York Fed is working with the Board of Governors of the Federal Reserve System to seek public comment on the composition and calculation methodology for these rates before adopting a final publication plan.

BALANCE SHEET MANAGEMENT

Throughout 2016, the FOMC maintained the size of its balance sheet by directing the Desk to continue rolling over maturing Treasury securities at auction and to continue reinvesting principal payments on all agency debt and agency MBS in agency MBS. These actions were intended to help maintain accommodative financial conditions by keeping the FOMC's holdings of longer-term securities at sizable levels.

TREASURY SECURITIES OPERATIONS

At the direction of the FOMC, the Desk continued to roll over maturing Treasury securities into new Treasury issues at auction throughout 2016.

Rollovers

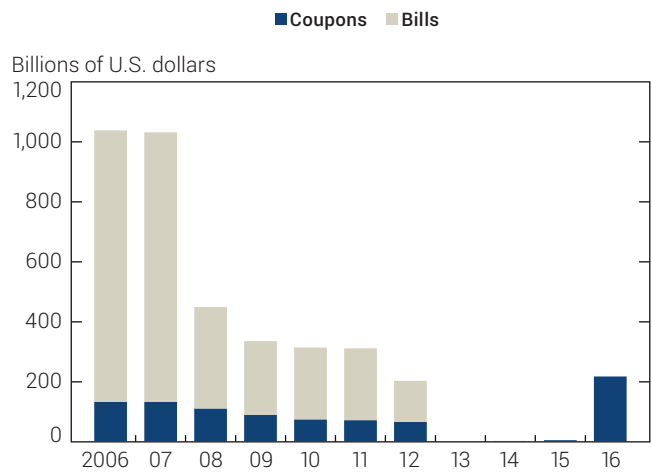
In line with long-standing practice, Treasury rollovers were conducted by placing bids for the SOMA at Treasury auctions that were equal in amount to the par value of holdings maturing on the issue date of the securities being auctioned.¹⁴ Bids are allocated across the securities being auctioned in proportion to their announced offering amount.¹⁵ Bids at Treasury auctions are placed as noncompetitive tenders and are treated as add-ons to announced auction sizes.

Data on the SOMA's Treasury holdings are published on the New York Fed's website. The amount awarded to the SOMA at auction is reported in the auction results released by the Treasury upon the conclusion of each auction.

In 2016, the Desk rolled \$216 billion of maturing Treasury security holdings into new securities. This volume marked a resumption of sizable rollover activity following several years of negligible rollovers—a pattern that had stemmed from the Federal Reserve's sales and redemptions of its shorter-term securities during the Maturity Extension Program that ran from September 2011 to December 2012 (**Chart 7**). The profile of securities acquired at auction is driven by both the distribution of SOMA maturities across issuance dates and the Treasury's auction calendar. As a result, in 2016 a majority of SOMA's maturing Treasury securities were rolled into two-, five-, and seven-year Treasury securities in end-of-month auctions (**Chart 8**).

Chart 7

Maturities of SOMA Treasury Securities

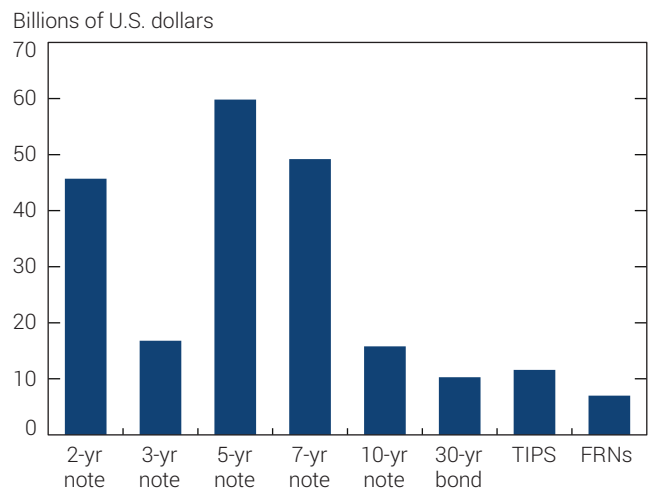


Source: Federal Reserve Bank of New York.

Note: There were \$4 billion in cumulative Treasury coupon maturities from 2013 through 2015 and no bill maturities.

Chart 8

Distribution of SOMA Rollovers in 2016



Source: Federal Reserve Bank of New York.

Note: Bars show the cumulative amount of Treasury securities acquired at each maturity point through rollovers in 2016.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

AGENCY MBS OPERATIONS

The FOMC continued to direct the Desk to reinvest principal payments on all agency debt and agency MBS in agency MBS, as it has since September 2011. In 2016, this instruction resulted in the purchase of \$387 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 2016 was muted.

Reinvestments

The Desk conducted agency MBS reinvestment operations on most trading days in 2016 for a total purchase amount of \$387 billion, of which 96 percent resulted from the reinvestment of principal pay-downs from agency MBS and 4 percent from agency debt maturities. The total amount was somewhat higher than the \$338 billion in reinvestments in 2015. Agency MBS purchases continued to be concentrated in newly produced coupons in thirty- and fifteen-year securities in the “to-be-announced” (TBA) market.¹⁶ These securities are closely linked to new primary issuance and accordingly are tied to primary mortgage rates.

Operational Approach. On or around the eighth business day of each month in 2016, the Desk published a tentative amount of reinvestment-related purchases expected to take place between the middle of that 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 approximately every two weeks, detailing operation dates and times, the type of securities to be purchased (including agency, term, and coupon), and the maximum purchase amounts for each type of security. Operations were

conducted over FedTrade with primary dealers that transact in the agency MBS market. Counterparties 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 offer rate. Offers were evaluated based on their proximity to prevailing market prices at the auction close.

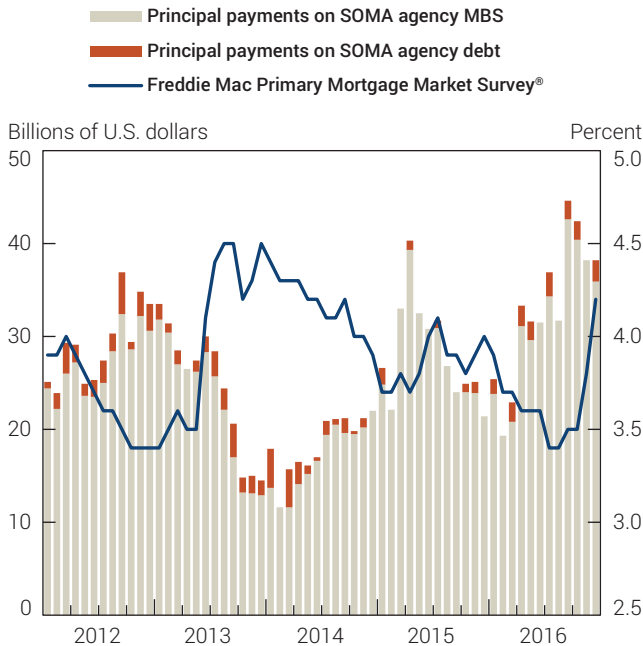
Operation results, including the total amount accepted for each security, were posted on the New York Fed’s public website following the close of the operation window; participating counterparties received their own award notifications directly. On a monthly basis, the Desk released information on trades that had taken place in the prior month, including price, trade amount, agency, term, coupon, and settlement date.

The Desk’s TBA purchases can be scheduled to settle—meaning a security is 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 exposure to counterparties obligated to deliver securities in the future.

Operational Results. The monthly volume of reinvestments varied in 2016, from a low of \$22 billion in March to a high of \$43 billion in October, and averaged about \$32 billion. Monthly reinvestment amounts were determined by pay-downs of SOMA agency MBS principal (which depend largely on the speed of prepayments that are sensitive to interest rates and other variables) and the fixed schedule of agency debt maturities (**Chart 9**).

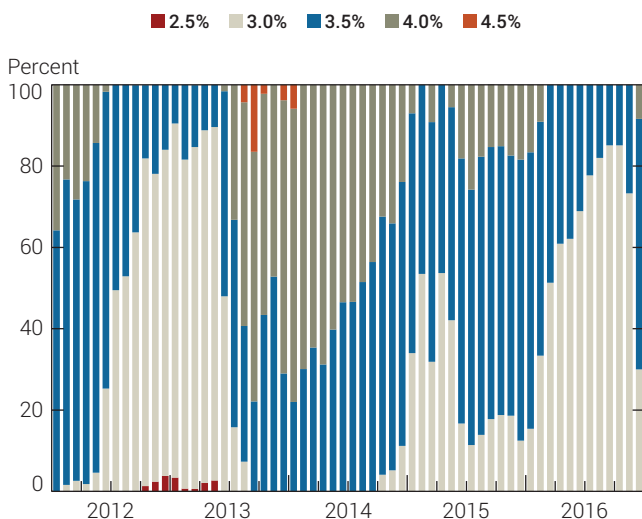
The increased volume of reinvestments in 2016 was largely attributable to higher refinancing activity throughout the year, particularly in the second half, stemming from a decline in the thirty-year primary mortgage rate to close to historically low levels. This decline led to a moderate increase in the production of lower-coupon agency MBS, a shift that was reflected in the Desk’s purchases, which are aligned with production. Accordingly, the bulk of the Desk’s thirty-year purchases shifted from 3.5 percent coupons in 2015 to 3.0 percent coupons in 2016, and the majority of the Desk’s fifteen-year purchases shifted from

Chart 9
SOMA Agency Debt and Agency MBS Principal Payments and the Primary Mortgage Rate



Sources: Federal Reserve Bank of New York; Freddie Mac®.
 Note: Figures are monthly.

Chart 10
SOMA Purchases of Thirty-Year Agency MBS by Coupon



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

2.5 and 3.0 percent coupons in 2015 to 2.5 percent coupons in 2016 (Charts 10 and 11). Furthermore, the Desk began purchasing fifteen-year Fannie Mae and Freddie Mac 2.0 percent coupons for the first time in several years.

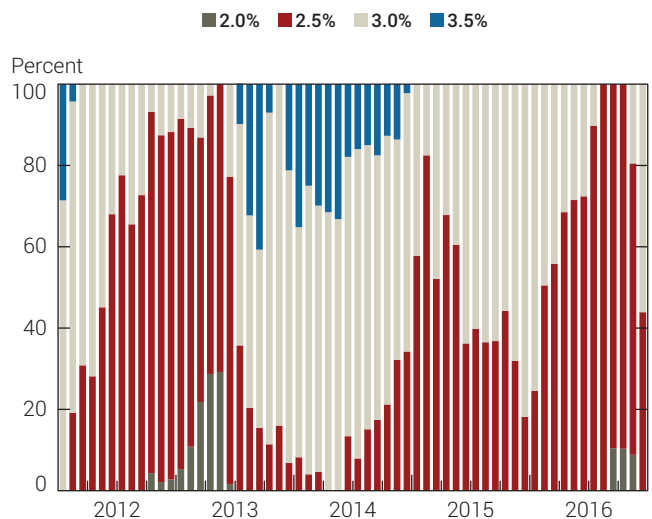
Approximately 90 percent of the Desk’s purchases in 2016 were of thirty-year securities, which make up the majority of issuance among the three agencies in the TBA market. The remainder of the purchases consisted of fifteen-year Fannie Mae and Freddie Mac securities.

Desk purchases averaged approximately 27 percent of gross market issuance of fixed-rate agency MBS over the course of 2016 (Table 1). The slight decline from last year’s average share of 28 percent of issuance is attributable to faster growth in gross issuance than in the amount of Desk purchases.

Dollar Rolls and Agency MBS Market Functioning

Broad indicators of market functioning and liquidity conditions in the agency MBS market were mixed in 2016. Measures of aggregate trading activity, such as transaction volume and average

Chart 11
SOMA Purchases of Fifteen-Year Agency MBS by Coupon



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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Table 1

Distribution of Agency MBS Operations in 2016

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	82.6	33
	3.5	41.3	32
	4.0	3.5	8
Freddie Mac	3.0	59.9	34
	3.5	29.0	33
	4.0	2.3	8
Ginnie Mae	3.0	79.4	33
	3.5	48.7	27
	4.0	2.6	6
Subtotal		349.3	29
15-year			
Fannie Mae	2.0	0.8	11
	2.5	16.4	28
	3.0	5.9	28
Freddie Mac	2.0	0.3	8
	2.5	10.0	25
	3.0	4.3	30
Subtotal		37.7	24
Total		387.0	27

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 2016, 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.

trade size, increased slightly on net over the course of the year. Measures of transaction costs and the price impact of trades were stable throughout most of 2016, though they increased notably in June and December amid elevated levels of interest rate volatility

and finished 2016 higher on a year-over-year basis. Despite some periods of heightened volatility, the execution of the Desk's agency MBS operations proceeded smoothly.

Given the forward-settling nature of the Desk's agency MBS transactions in the TBA market, MBS securities could potentially become scarce in the market between the transaction's trade date and settlement date. In these instances, in accordance with the FOMC's directive, the Desk could conduct dollar roll sales to facilitate settlement.¹⁷ Dollar roll sales help the Desk to alleviate MBS market shortages by allowing dealers more time to obtain securities required to settle transactions, in exchange for a market price that compensates the Federal Reserve for the delay in settlement.¹⁸

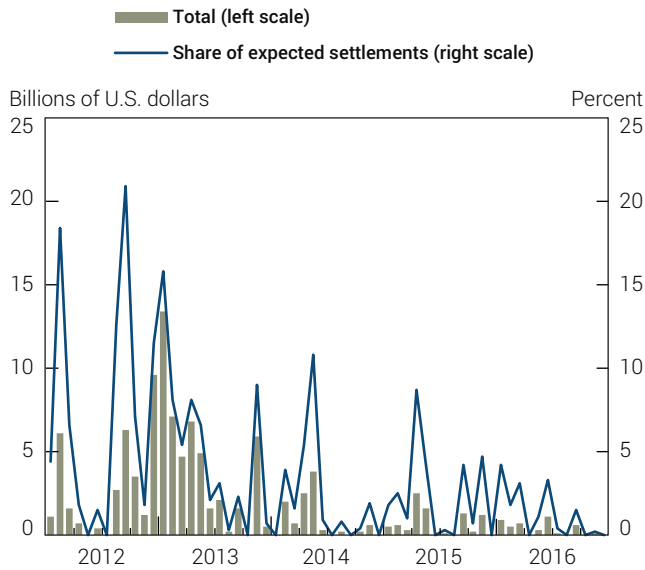
Settlement of the Desk's agency MBS reinvestment transactions was generally smooth throughout 2016, as evidenced by the limited amount of dollar rolls undertaken by the Desk. Dollar roll sales represented an average of only 1.3 percent of the Desk's expected agency MBS settlements over the year; this figure, consistent with the small shares seen in recent years, suggests that limited settlement stress was present in the agency MBS sectors in which the Desk concentrated its purchases (**Chart 12**). The Desk's dollar roll transactions were conducted over TradeWeb, a commercial trading platform.

CUSIP Aggregation

In 2016, the Desk continued an effort initiated in 2015 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.¹⁹ 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 trim custodial costs, which are assessed on a per-CUSIP basis. As of the end of 2016, nearly 53,300 CUSIPs had been aggregated into 223 new MBS, with a current face value of approximately \$1.1 trillion.

Chart 12
SOMA Dollar Roll Sales



Source: Federal Reserve Bank of New York.

Note: Figures are monthly by settlement month.

Securities Lending and Treasury Market Functioning

To support 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 basis. These 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.

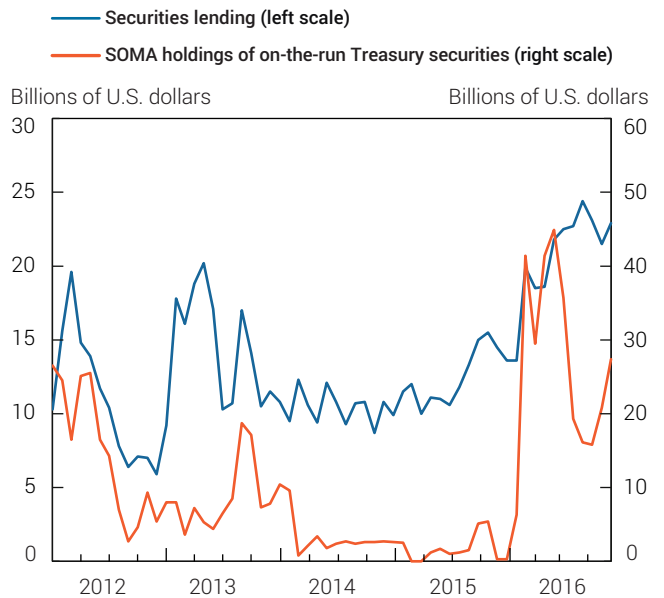
In 2016, the Desk continued to lend Treasury and agency debt securities held in the SOMA portfolio to primary dealers based on competitive bidding in a multiple-price auction held each business day at noon. Primary dealers bid on a fee to borrow the security; the fee is economically equivalent to a spread between the general collateral repo rate and the overnight rate at which the dealers would be willing to borrow the security. As has been the case since 2009, the minimum bid fee was 5 basis points and all loans were for

an overnight term. Dealers borrowing securities were required to pledge other Treasury securities to the New York Fed, plus margin, as collateral for the securities loan.

Average securities lending volumes in Treasury securities increased substantially in 2016, from about \$10 billion to \$15 billion per day in the 2009-15 period to approximately \$20 billion per day—the highest level since 2011 (**Chart 13**). Lending in on-the-run securities reached a record-high level of approximately \$5 billion per day; near-off-the-run and eligible cheapest-to-deliver securities held in the SOMA were also subject to elevated demand. In line with the increased lending volume of these securities, the volume-weighted average lending rate on SOMA securities nearly tripled from the prior year to about 15 basis points.

Increased lending of on-the-run securities in 2016 reflected both elevated demand for these securities and greater access to lendable supply through the SOMA. On-the-run securities are frequently used for shorting and hedging purposes; as a result,

Chart 13
SOMA Securities Lending in Treasuries



Source: Federal Reserve Bank of New York.

Notes: Figures are monthly averages of daily lending results and holdings.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

they are typically more costly to procure in the Treasury financing markets than general Treasury collateral. In 2016, this dynamic led to more frequent and severe episodes of settlement fails for on-the-run securities.²⁰ In addition, with a resumption of sizable Treasury rollovers, the SOMA acquired a large supply of on-the-run Treasury securities that became available for lending, helping to satisfy the increased demand and boosting SOMA securities lending activity.

While the Treasury market experienced some settlement strains during 2016, trading in the secondary Treasury market in general continued to be liquid and efficient. For example, bid-ask spreads held steady at very narrow levels by historical standards, and trading volumes and quote sizes remained within historical ranges.

With respect to agency debt, primary dealers on average borrowed less than \$1 billion of agency debt securities per day in 2016, a low level consistent with levels observed in prior years. Loans of agency debt were collateralized with Treasury securities.

Operational Flexibility

In 2016, the Desk continued to enhance its operational flexibility by undertaking operational readiness exercises and by improving its counterparty framework.

OPERATIONAL READINESS

Over the course of 2016, the Desk conducted small-value readiness exercises in order to maintain technical preparedness to carry out various types of policy implementation operations that are not currently in use (Table 2). The conduct of these exercises was a matter of prudent planning. They did not represent a change in the stance of monetary policy, nor did they signal the timing of any change in the stance of monetary policy.

Consistent with the limits in the Authorization for Domestic Open Market Operations approved by the FOMC for the purpose of testing operational readiness, the aggregate par value of outright purchase and sale transactions did not exceed \$5 billion per calendar year, and the outstanding amount of repo and reverse repo transactions did not exceed \$5 billion at any

given time. Operational readiness exercises were announced in advance and results were posted on the New York Fed's website.

In addition, the Federal Reserve Board periodically tested the Term Deposit Facility (TDF), through which it offers interest-bearing term deposits to depository institutions (Table 3). The TDF was developed as a supplementary tool that could be used to help control the federal funds rate. Quarterly testing helped to maintain operational readiness and provided eligible institutions with an opportunity to maintain familiarity with term deposit procedures.

COUNTERPARTY MANAGEMENT

The Desk relies on a robust network of trading counterparties to provide the necessary operational capacity to execute open market operations and to relay information on global financial market developments that can help inform monetary policy formulation and execution. On November 9, the New York Fed published a comprehensive overview of its counterparty framework, including a new policy on counterparties for domestic and foreign market operations. The new policy, which was the result of a multiyear review, emphasizes a common philosophy and shared principles across operation types, sets expectations and eligibility requirements for each type of counterparty, and increases transparency about counterparty relationships, particularly pertaining to the Desk's foreign market operations.²¹ The new counterparty policy also establishes a discipline for regularly reviewing, assessing, and updating the Desk's counterparty framework.

Counterparties for domestic open market operations include primary dealers and reverse repurchase agreement counterparties.

PRIMARY DEALERS

Primary dealers are trading counterparties of the New York Fed in its implementation of monetary policy, and are expected to participate in open market operations consistently and competitively, in a variety of market environments. They are also expected to make markets for the New York Fed on behalf of its official accountholders as needed, and to bid on a pro rata basis in all Treasury auctions

Table 2

Small-Value Exercise Results in 2016

Operation Type	Operation Date	Maximum Amount (Millions of U.S. Dollars)	Operation Amount (Millions of U.S. Dollars)	Additional Information
Repurchase agreements	May 25	700	610	Overnight tenor; multi-tranche (Treasury, agency, and agency MBS)
	Dec 7	70	59	Overnight tenor; multi-tranche (Treasury, agency, and agency MBS)
Treasury outright purchases	Feb 23	250	226	10–20 year sector
	Aug 16	400	400	5.75–7 year sector
Treasury outright sales	May 24	250	200	2–3 year sector
	Dec 6	400	400	7–10 year sector
Agency MBS outright sales	May 25	{150}	99	4 specified pools
	Jun 1		30	2 baskets of MBS
	Nov 29	{100}	58	4 specified pools
	Dec 1		20	1 basket of MBS
Agency MBS coupon swaps	Oct 5-6	{20}	5	Sell Fannie Mae 30-year 3.5% Buy Fannie Mae 30-year 3.0%
			5	Sell Fannie Mae 30-year 3.0% Buy Freddie Mac 30-year 3.5%
			5	Sell Freddie Mac 15-year 2.5% Buy Freddie Mac 15-year 2.0%
			5	Sell Ginnie Mae II 30-year 3.0% Buy Ginnie Mae II 30-year 3.5%

Source: Federal Reserve Bank of New York.

Notes: Figures may be rounded. Under the Authorization for Foreign Currency Operations approved by the FOMC, the Desk conducted small-value U.S. dollar and non-U.S. dollar liquidity swap operations and transactions related to the holdings of government-backed securities in the foreign reserves portfolio.

Table 3

Term Deposit Facility Operation Results in 2016

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 18	Feb 25	7	IOER + 1 (51)	5.0	63.9	40
May 19	May 26	7	IOER + 1 (51)	5.0	66.8	43
Aug 11	Aug 18	7	IOER + 1 (51)	5.0	58.6	32
Oct 20	Oct 27	7	IOER + 1 (51)	5.0	48.6	24

Source: Board of Governors of the Federal Reserve System.

Note: Awarded amount figures are rounded.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

at reasonably competitive prices. The Desk also expects primary dealers to provide ongoing insight into market developments in the daily market monitoring activities that the Desk conducts to support the formulation and implementation of monetary policy. As of December 31, 2016, there were twenty-three primary dealers.

In March, the New York Fed introduced new geographic dispersion standards for primary dealers. The new standards stem from the recognition that in the event of wide-scale disruptions in large metropolitan areas (in particular, the New York region, where many market participants are located), the Federal Reserve must continue to conduct open market operations, Treasury auctions, and settlement activities. To ensure ongoing dealer participation in Desk operations amid such disruptions, primary dealers will be required to establish geographically dispersed primary and secondary locations.

Eligibility criteria for primary dealers underwent three significant changes as a result of the counterparty policy introduced in November. First, the minimum net regulatory capital (NRC) threshold for broker-dealers was reduced from \$150 million to \$50 million in order to expand and diversify the pool of firms eligible to apply for primary dealer status. The belief was that such an expansion could potentially increase the Desk's operational capacity and enhance competitive pricing in open market operations. This change was informed by the New York Fed's experiences in conducting pilot programs with small dealers for Treasury operations and MBS operations in 2013 and 2014, respectively.

Second, the minimum Tier 1 capital threshold for banks and branches and agencies of foreign banking organizations was raised from \$150 million to \$1 billion, to better align the Tier 1 threshold with the new NRC threshold. The threshold is measured with respect to Tier 1 capital of the bank holding company, which is a gross measure of capital across the consolidated operations of the firm. By contrast, the NRC measure for broker-dealers is a net measure of the capital of the broker-dealer subsidiary.

Third, a 0.25 percent minimum Treasury market share threshold was introduced as a means to more directly quantify the business capabilities of firms that express interest in becoming primary dealers. The threshold measures a dealer's market-making activity in both the primary and secondary markets.

REVERSE REPURCHASE AGREEMENT COUNTERPARTIES

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 RRP counterparties—which include money market funds, government-sponsored enterprises, and banks—augment the existing set of primary dealer counterparties with which the Federal Reserve can conduct reverse repos. As of December 31, 2016, there were 135 RRP counterparties, comprising 101 money market funds from 28 investment managers, 14 government-sponsored enterprises (GSEs), and 20 banks.

In September, the New York Fed, motivated by changes associated with reform of the money market fund industry and the objective of equitable treatment in the selection of government-sponsored enterprise (GSE) counterparties, revised the RRP counterparty eligibility criteria. The first modification was to allow money funds that do not meet a minimum asset requirement of \$5 billion to remain as, or apply to become, a counterparty if they nonetheless maintain a significant presence in the repo market—specifically, if they have, measured at each month-end for the most recent six consecutive months, an average outstanding amount of RRP transactions of no less than \$1 billion. The second modification was to allow GSEs that do not maintain an average daily outstanding amount of RRP transactions of no less than \$1 billion to remain as, or apply to become, a counterparty if they nonetheless maintain a significant presence in overnight money markets—specifically, if they have an average daily amount outstanding of overnight money market transactions of no less than \$100 million.

Selected Balance Sheet Developments

The overall size of the Federal Reserve's balance sheet remained fairly stable in 2016 as the continued reinvestment of repayments of principal on securities held in the SOMA portfolio kept the overall size of the domestic securities portfolio steady at about \$4.26 trillion. The composition of the Federal Reserve's liabilities, however, shifted over the course of the year, owing largely to increases in Federal Reserve notes, in Treasury General Account balances (cash balances held by the Treasury at the Federal Reserve), and in levels of reverse repurchase agreements.

While the portfolio continued to contribute to elevated levels of Federal Reserve income in 2016, net income was modestly lower than in 2015, driven largely by higher interest expense. Remittances to the Treasury fell slightly, to \$91 billion, commensurate with the decline in income.²² As summarized in a projection exercise later in this section, 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

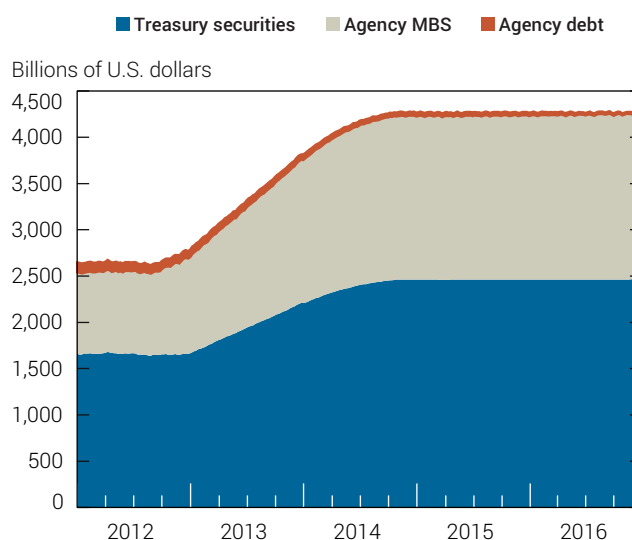
The System Open Market Account comprises the Federal Reserve's domestic and foreign portfolios, as well as the short-term credit that the Federal Reserve extends to foreign central banks through liquidity swaps. The domestic portfolio, which totaled \$4.26 trillion at year-end 2016, consists of Treasury and federal agency securities held on an outright basis. The foreign currency portfolio, which had an amortized cost of \$19 billion at year-end 2016, 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).

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

DOMESTIC SECURITIES HOLDINGS

The size and composition of the SOMA's domestic securities portfolio were little changed during 2016, owing to 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

Chart 14
Composition of SOMA Domestic Securities Holdings

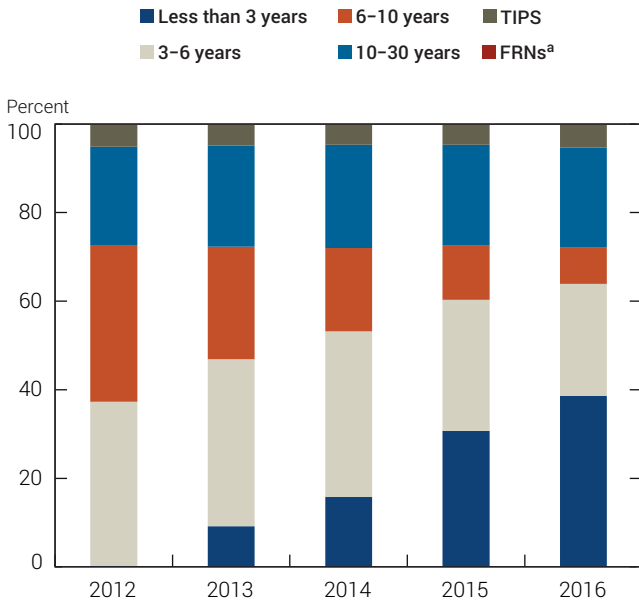


Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly and include unsettled holdings.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Chart 15

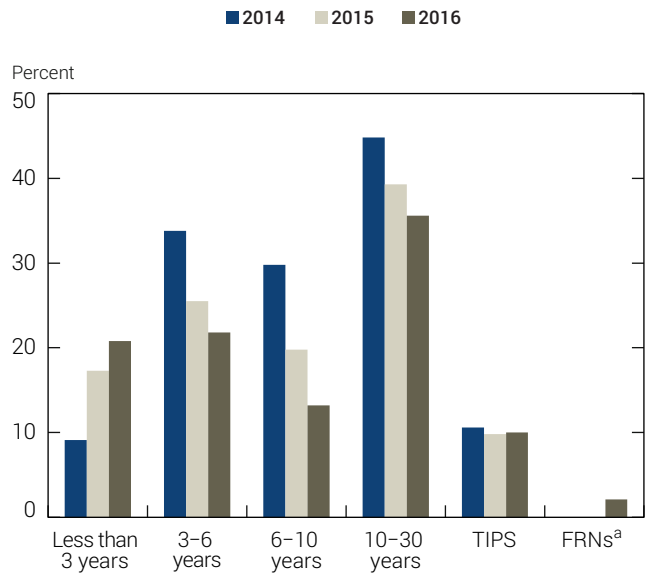
Distribution of SOMA Treasury Holdings

Source: Federal Reserve Bank of New York.

Note: Figures are as of year-end.

^aLess than 1 percent of holdings in 2014, 2015, and 2016 are Floating Rate Notes (FRNs).

Chart 16

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 yearend 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.

at sizable levels, this policy was intended to help maintain accommodative financial conditions.

PORTFOLIO SIZE AND COMPOSITION

As of year-end 2016, the domestic SOMA stood at \$4.26 trillion in par value terms and was composed of Treasury securities (58 percent) totaling \$2.46 trillion, agency MBS (42 percent) totaling \$1.78 trillion, and agency debt (less than 1 percent) totaling \$16 billion (**Chart 14**).²³ The size of the portfolio and the relative allocation of Treasury 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 2016, rollovers of maturing Treasury securities kept the size of the Treasury portfolio steady at about \$2.46 trillion. The weighted average maturity of the portfolio declined from 8.6

years to 8.1 years as the portfolio continued to age, although rollovers of maturing securities into new securities across the maturity spectrum offset some of this effect. On average, the weighted average maturity of Treasury securities acquired through rollovers was 6.7 years. The share of the Treasury portfolio held in nominal coupon securities with less than three years to maturity increased from 31 percent to 39 percent, while the shares held in the three-to six-year and six- to ten-year sectors declined; the share held in longer-term securities was little changed. The share held in Floating Rate Notes increased as the SOMA accumulated holdings through rollovers into the relatively new asset (**Chart 15**).

SOMA holdings of Treasury securities as a share of the outstanding Treasury market decreased slightly over the course of the year from 19 percent to 18 percent. Since the par value of the SOMA holdings was unchanged, the decline in the SOMA's share of the outstanding marketable Treasury securities reflected a \$717 billion increase in Treasury marketable debt held by the

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

public (inclusive of SOMA holdings).²⁴ The SOMA continued to hold a relatively larger share of longer-term securities outstanding as a result of the Federal Reserve's earlier large-scale asset purchase programs; for example, about 36 percent of outstanding Treasury securities with more than ten years remaining until maturity were held in the SOMA as of year-end, compared with 21 percent of outstanding Treasury securities with up to three years remaining until maturity (**Chart 16**). Consistent with the SOMA's concentrated holdings in longer-term securities, at the end of 2016 the weighted average maturity of the SOMA Treasury portfolio was greater than that of the outstanding stock of Treasury debt—8.1 years, as compared with 5.9 years.

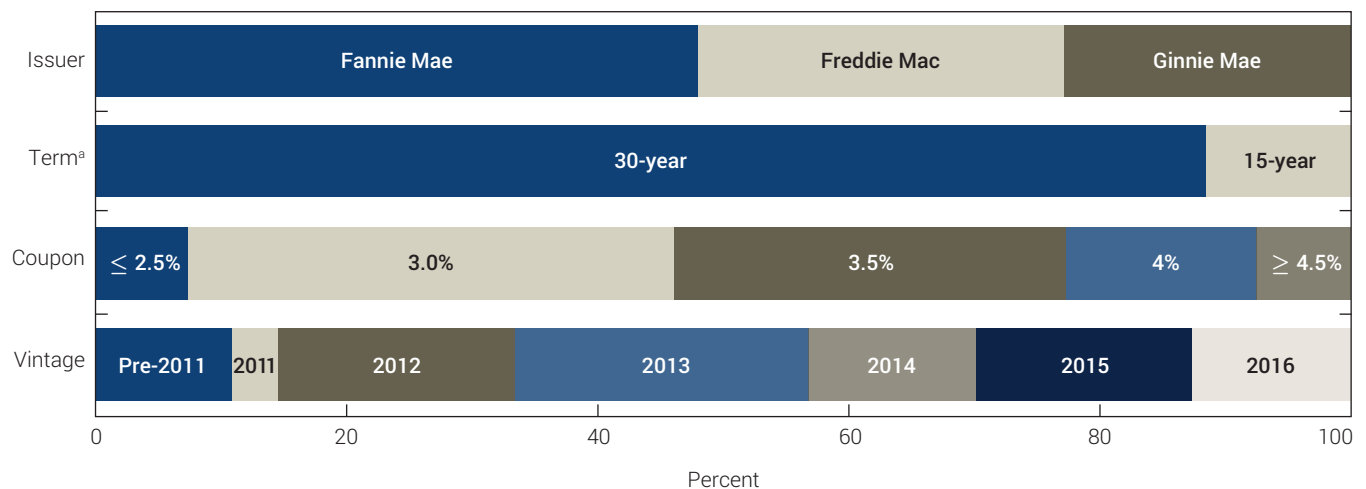
Composition of Agency MBS Holdings

Throughout 2016, the size of the agency MBS portfolio was roughly unchanged at approximately \$1.78 trillion, and the composition of the portfolio also remained fairly steady. The Desk conducts its purchases in the market for newly issued MBS; therefore, the characteristics of the portfolio are broadly consistent with those of the outstanding agency MBS market. Changes in the composition of the portfolio, such as those relating to the

agencies, terms, coupons, and vintages of the securities held, reflect the fact that securities that are refinanced or repaid over the years are replaced by newer securities. At the end of the year, 48 percent of the settled agency MBS portfolio was held in MBS guaranteed by Fannie Mae, 29 percent in MBS guaranteed by Freddie Mac, and 23 percent in MBS guaranteed by Ginnie Mae (**Chart 17**). Almost 90 percent of the portfolio was held in thirty-year MBS, with the remainder in fifteen-year MBS. As of the end of 2016, the weighted average life of the SOMA's settled agency MBS portfolio was 7.2 years.²⁵

Forty-three percent of the securities held in the portfolio as of year-end were originated in the past three years. Most of the securities purchased during the first round of large-scale asset purchases have been paid down and replaced with newer securities as homeowners either refinanced or fully repaid their loans. Reflecting the shift to lower-coupon issuance in 2016, the share of the settled MBS portfolio held in securities with 3.0 and 3.5 percent coupons rose to nearly 70 percent, from 63 percent at the end of 2015. The weighted average coupon of the agency MBS held in the SOMA portfolio was largely steady, edging down from 3.5 percent at the end of 2015 to 3.4 percent at the end of 2016.

Chart 17
Distribution of SOMA Agency MBS Holdings



Source: Federal Reserve Bank of New York.

Notes: Figures are as of December 30, 2016. Holdings total \$1.74 trillion and consist of settled holdings only.

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

The Federal Reserve's ownership of the outstanding stock of fixed-rate agency MBS declined slightly over the past year, from 31 percent to 29 percent, as the size of the MBS portfolio remained largely steady while the outstanding stock of agency MBS increased by roughly \$300 billion. The weighted average coupon of underlying loans in MBS pools held in the SOMA was 3.9 percent, slightly below the broader market's weighted average coupon of 4.1 percent. The average age of loans held by the SOMA was thirty-nine months, while the average age of loans in the broader market was forty-two months. These differences between the SOMA and the portfolio held by the broader market are explained by the Desk's practice of purchasing newly issued securities.

Composition of Agency Debt Holdings

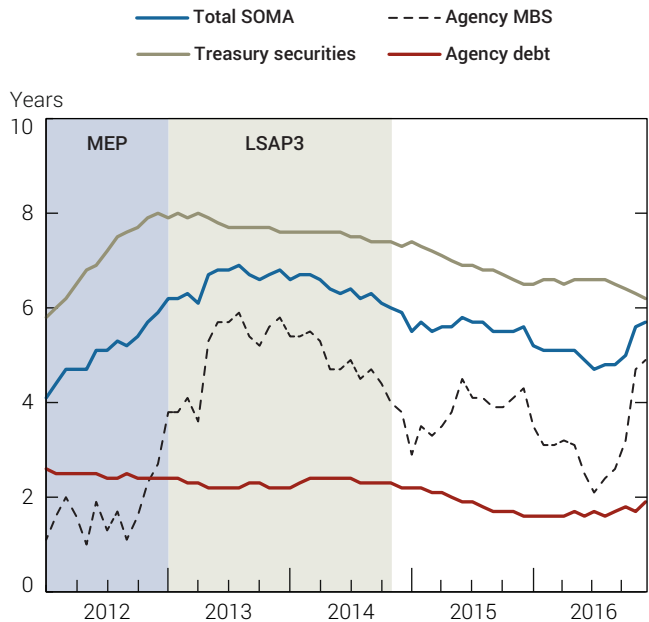
Nearly \$17 billion in agency debt securities matured in 2016, leaving the SOMA with agency debt securities totaling \$16 billion in face value at year-end—the remainder of the \$172 billion of direct obligations of the housing-related GSEs acquired between 2008 and 2010 as part of the Federal Reserve's first asset purchase program. Close to \$12 billion of these securities will mature in 2017, with the remaining \$4 billion set to mature in sporadic, small increments through 2032.

PORTFOLIO RISK METRICS

The duration of the total SOMA domestic securities portfolio was, on net, little changed in 2016. A gradual decline in the duration of the Treasury securities portfolio was offset by a net increase in the effective duration of the agency MBS portfolio, leaving the total portfolio's duration in par-weighted average terms at around 5.7 years, below the peak reached in August 2013 (**Chart 18**).²⁶ 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.

The duration of the SOMA's holdings of Treasury securities edged down from 6.5 years to 6.2 years, largely as a result of the aging of the Treasury portfolio. This aging effect more than offset the duration extension associated with rolling maturing Treasury securities into newly issued securities across the maturity spectrum.

Chart 18
Average Duration of SOMA Domestic Securities Holdings



Source: Federal Reserve Bank of New York.

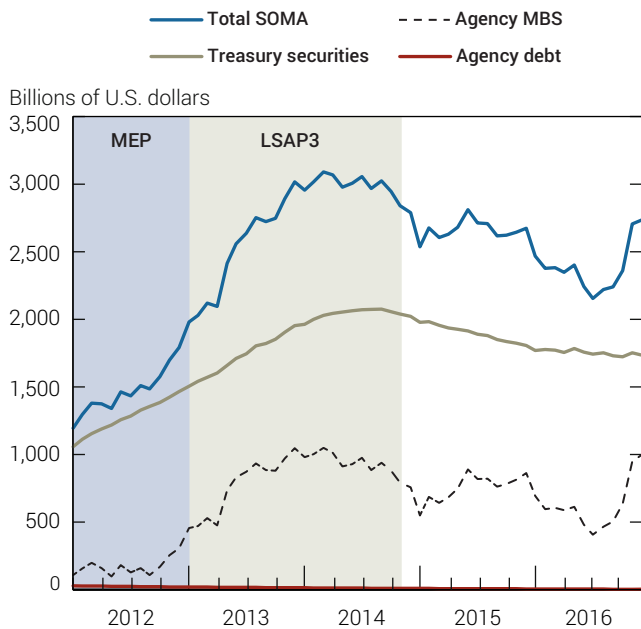
Notes: Figures are as of month-end. Calculations are par-weighted. LSAP3 purchases of agency MBS began in September 2012.

In contrast, the effective duration of the SOMA's holdings of agency MBS rose from 4.3 years to 4.9 years, on net, following sharp intra-year moves prompted by changes in interest rates.²⁷ The agency MBS portfolio's effective duration dropped over the first half of the year to 2.1 years, its lowest level since late 2012, as long-term interest rates initially declined. A subsequent rise in long-term interest rates later in the year prompted a steep reversal of the agency MBS portfolio's effective duration, which ended the year at a two-and-a-half-year high. The sensitivity of duration to changes in interest rates highlights the prepayment risk absorbed by the SOMA portfolio—a risk arising from the prepayment option embedded in agency MBS. Homeowners' right to prepay their mortgage at any time adds uncertainty to the agency MBS holder's expected cash flows.

Measures of the dollar value of duration risk held in the SOMA portfolio rose slightly in 2016 (**Chart 19**). One method of measuring dollar duration is in terms of ten-year equivalents—that is, the amount of ten-year Treasury securities that would be

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Chart 19
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.

needed to match the duration risk of the portfolio. Even as the size of the SOMA portfolio remained constant over the year, the portfolio's ten-year equivalent measure inched up from \$2.67 trillion at the end of 2015 to \$2.73 trillion at the end of 2016, driven by the net increase in average effective duration of agency MBS holdings.

FOREIGN CURRENCY-DENOMINATED ASSETS

The Federal Reserve holds foreign currency-denominated assets, which are invested to ensure adequate liquidity to meet anticipated foreign exchange intervention needs. Such operations are conducted under the direction of the FOMC, acting in close and continuous cooperation and consultation, as appropriate, with the U. S. Treasury, which has overall responsibility for U.S. international financial policy, including foreign exchange market intervention policy.²⁸

The 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. The Desk recently concluded the implementation of a new investment framework for U.S. foreign currency reserves that is intended to enhance the management of the foreign currency assets. The framework involves a routine affirmation of objectives and constraints from policymakers. The Desk then utilizes an investment approach designed to meet those objectives to maximize return subject to maintaining sufficient liquidity and a high degree of safety.

The new investment framework also includes revisions to the various documents governing SOMA foreign currency operations in order to simplify and clarify guidance provided to the Desk on the management of the SOMA foreign currency reserves. These revised documents, the Authorization for Foreign Currency Operations and the Foreign Currency Directive, were approved by the FOMC on September 20, 2016.

A significant portion of the SOMA's foreign currency reserves were invested on an outright basis in German, French, Dutch, and Japanese government securities. They were also invested 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.

As of December 31, 2016, the amortized cost of the SOMA foreign currency portfolio totaled \$19 billion, close to its year-end 2015 value. Absent foreign exchange intervention, any change in the portfolio's U.S. dollar value largely reflects the change in the foreign exchange value of the dollar over the year. In 2016, the decline in value of the euro holdings attributable to the euro's roughly 3 percent depreciation against the dollar was mostly offset by the increase in the dollar value of yen holdings that stemmed from the approximately 3 percent appreciation of the Japanese yen in 2016. The U.S. monetary authorities did not undertake any foreign exchange intervention operations during 2016—operations that would have affected the stock of the SOMA's foreign currency-denominated assets had they occurred.²⁹

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

SHORT-TERM LIQUIDITY PROVISION PRIMARY CREDIT FACILITY

The primary credit facility, the discount window's main lending program, serves as a backup source of liquidity for depository institutions in generally sound financial condition that have appropriate collateral pledged to a Reserve Bank.³⁰ Loans are generally limited to overnight maturities and are initiated by depository institutions and approved by Reserve Banks. In 2016, the interest rate on primary credit loans remained at 1 percent through December 14, when, in conjunction with the FOMC's decision to raise the federal funds target range, the Board of Governors approved a 25 basis point increase in the primary credit rate to 1.25 percent, effective December 15.³¹ The spread between the primary credit rate and the top of the federal funds target range remained constant at 50 basis points.

Primary credit borrowings remained subdued in 2016 amid high levels of excess reserves and benign market funding conditions. In line with borrowing patterns in recent years, the average daily loan balance in 2016 was \$18 million and a large share of the primary credit loans were originated by banks as operational tests.

CENTRAL BANK LIQUIDITY SWAPS

Central bank liquidity swaps involve 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.

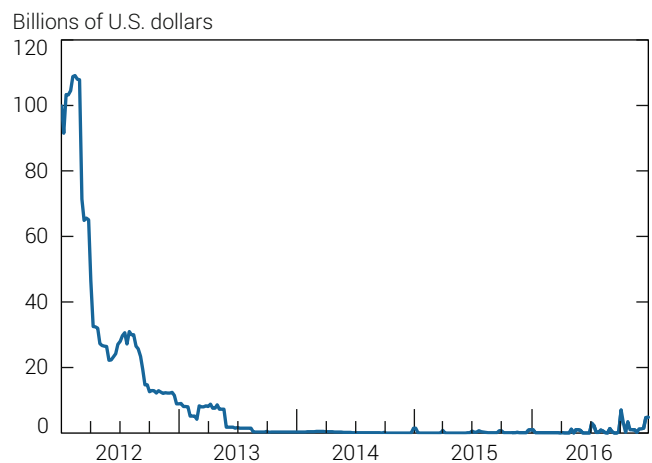
Since May 2010, the Federal Reserve has maintained dollar liquidity swap lines with the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank. In addition, since November 2011, the Federal Reserve has maintained foreign currency swap lines with the same institutions.³² On October 31, 2013, the FOMC announced the conversion of existing temporary currency swap lines to standing arrangements that will stay in place until further notice.

In 2016, use of the dollar liquidity swaps was greater and more frequent than in recent years; however, use remained markedly less than during the global financial crisis and the euro area sovereign debt and financial crisis (**Chart 20**). In particular, dollar liquidity

swaps outstanding reached nearly \$7 billion in September 2016, their highest level since mid-2013. The Bank of Japan and European Central Bank drew on their swap lines primarily around month- and quarter-ends in order to provide dollar funding for financial institutions in their jurisdictions over those periods.

As seen in domestic money markets, banks' cautious balance sheet management around key reporting dates contributed to a temporarily reduced supply of U.S. dollar funding in private markets. This pullback placed upward pressure on foreign exchange swap bases—which indicate the implied cost of borrowing U.S. dollars offshore through the foreign exchange market—and made dollar borrowing through foreign central banks' liquidity swap operations relatively more attractive. (Liquidity swaps are priced at the U.S. dollar overnight indexed swap rate for the relevant tenor plus 50 basis points.) More broadly, foreign exchange swap bases also widened outside of these calendar-specific events during the second part of the year in conjunction with the implementation of money market fund reform, as a reduction in term lending by prime MMFs constrained the supply of U.S. dollar funding available to some foreign financial institutions (see **Box 3**). In addition, demand for U.S. dollar assets contributed to increased U.S. dollar funding needs amid widening interest rate differentials.

Chart 20
Foreign Exchange Liquidity Swaps Outstanding

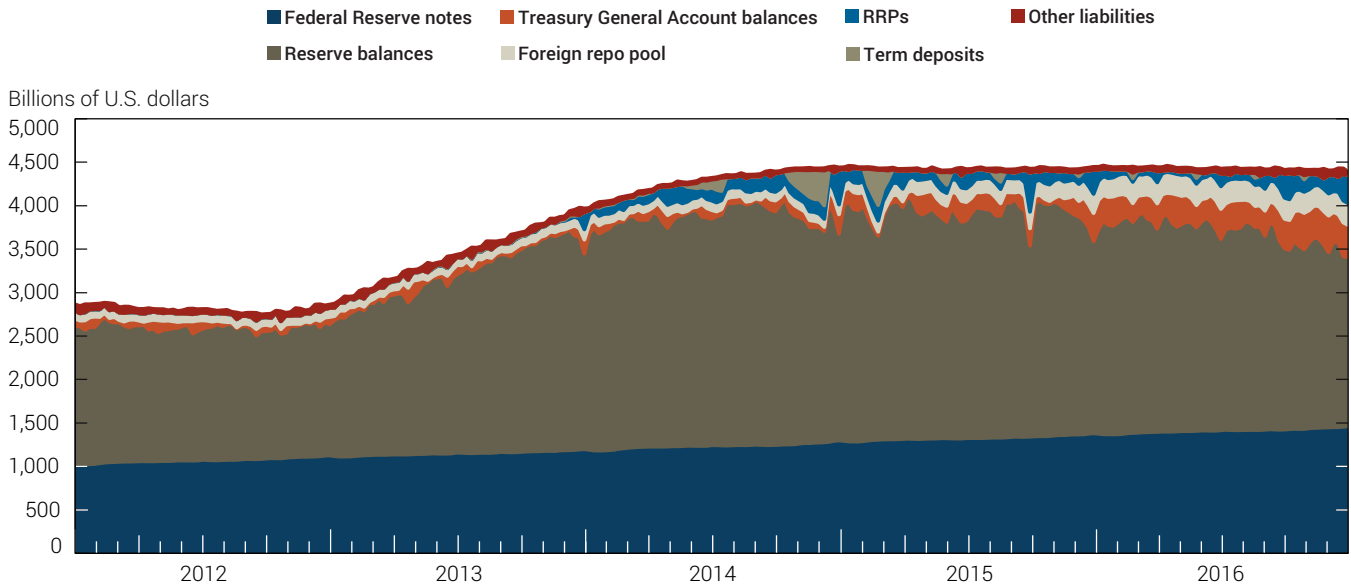


Source: Federal Reserve Bank of New York.

Note: Figures are weekly.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Chart 21
Federal Reserve Liabilities



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly.

Selected Liabilities

The Federal Reserve's assets are funded by a variety of liabilities, the composition of which shifted slightly over the course of 2016 (Chart 21). All else equal, changes in the composition of the Federal Reserve's liabilities do not change the overall size of its balance sheet. The total amount of liabilities in excess of currency—a central bank's traditional liability—remained at a historically elevated level.

RESERVE BALANCES

Reserve balances, which are deposits held by depository institutions at the Federal Reserve, represented the Federal Reserve's largest liability.³³ At \$1.94 trillion outstanding as of December 28, reserve balances remained at elevated levels but were below their October 2014 peak of \$2.82 trillion.³⁴ All else equal, against a steady level of SOMA portfolio holdings, fluctuations in reserve balances reflect changes in other liability categories—that is, an increase (decrease) in one liability is offset by a decrease (increase) in reserve balances. The decline in reserve balances over the course

of the year primarily reflects increases in Federal Reserve notes, in Treasury General Account balances, and in levels of reverse repurchase agreements.

As has been the case since the financial crisis, total reserve balances remained well in excess of reserve balance requirements even as these requirements increased. From year-end 2015 to year-end 2016, reserve balance requirements rose from \$90 billion to \$109 billion owing to the growth of transaction deposits against which depository institutions are required to hold reserves.³⁵ These transaction deposits increased by 6 percent during 2016, exceeding the 3 percent growth rate during 2015 and in keeping with the higher rates of growth from 2009 to 2014.

FEDERAL RESERVE NOTES

Federal Reserve notes, more commonly known as U.S. dollar paper currency, remained an important, exogenously driven liability that composes about one-third of the Federal Reserve's balance sheet.³⁶ 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. In 2016, Federal Reserve notes outstanding grew by \$82 billion to \$1.46 trillion, representing an annual growth rate of roughly 6.0 percent, similar to the pace of growth in 2015.

The increase in Federal Reserve notes results in a corresponding decline in reserve balances. The Federal Reserve pays no interest on Federal Reserve notes.³⁷

REVERSE REPURCHASE AGREEMENTS

OPEN MARKET OPERATIONS

Throughout 2016, the Federal Reserve conducted overnight reverse repurchase agreements to support the implementation of monetary policy (described further in the “Short-Term Interest Rate Management” section of this report). Over the course of the year, the daily amount of ON RRP outstanding that were conducted by the Desk ranged from \$17 billion to \$468 billion, with a non-quarter-end average of \$99 billion. Increased demand for RRPs at 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 for ON RRPs.

FOREIGN REPO POOL

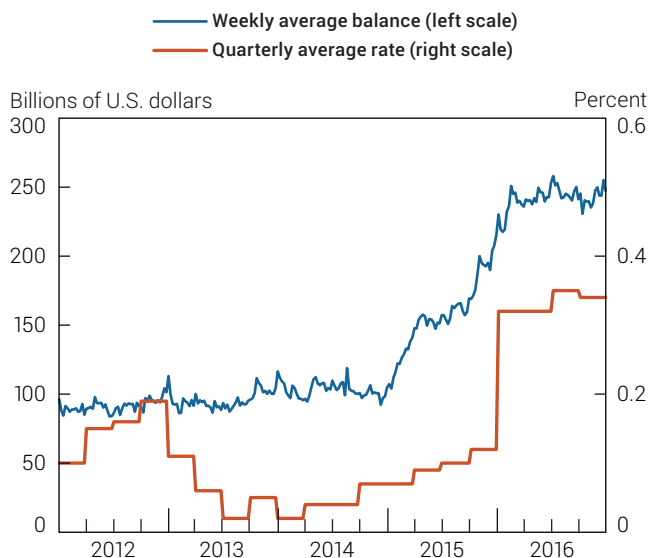
As part of a range of services offered to foreign official and international account holders, the New York Fed has long offered an overnight repurchase agreement investment known as the foreign repo pool. At the end of each business day, account holders’ cash balances are swept into an overnight reverse repo secured by the Federal Reserve’s securities holdings.³⁸ 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 of 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 prevent large unpredictable swings in autonomous factors, 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 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.

The size of the foreign repo pool continued its rapid 2015 growth in the first months of 2016, but then leveled out to a weekly average fluctuating between \$230 billion and \$258 billion for the rest of the year (**Chart 22**). The rise in balances in recent years reflects central banks’ preferences to maintain robust dollar liquidity buffers, the reduced availability of alternative investment options with private counterparties, and the New York Fed’s removal over time of constraints on customers’ ability to vary the size of their investments. Consistent with recent patterns, account holders generally held

Chart 22
Foreign Repo Pool



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

increased foreign repo pool balances on month- and quarter-ends. The rate of return on the pool moved in line with other market-based Treasury repo rates through 2016. The rate was fairly stable for most of the year and then increased following the FOMC's decision on December 14 to raise the target range for the federal funds rate by 25 basis points.

DEPOSITS

TREASURY GENERAL ACCOUNT

The U.S. Treasury holds cash balances at the Federal Reserve in the Treasury General Account, which is its primary account for managing cash flows. TGA balances exhibit significant seasonal variation stemming from the settlement of Treasury securities auctions and the receipt of tax payments.

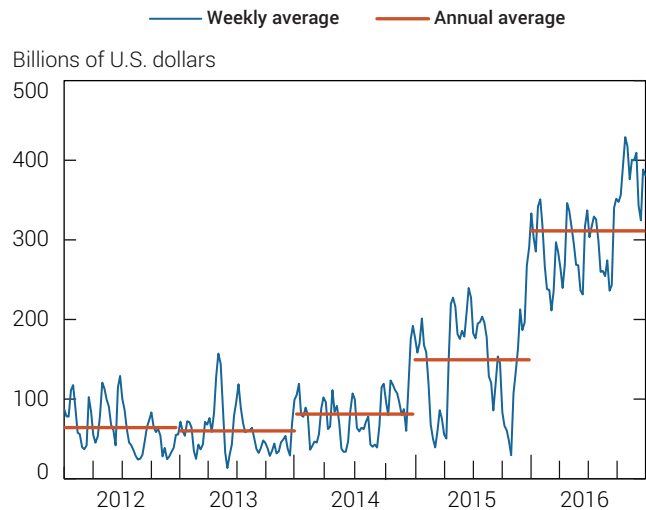
To help protect against an interruption in market access, the Treasury aims to hold in the Treasury General Account a level of cash generally sufficient to cover one week of outflows, subject to a minimum balance of roughly \$150 billion. TGA balances in 2016 were well above this minimum threshold, averaging \$311 billion over the year (**Chart 23**). They rose to more than \$400 billion in October as the Treasury increased bill issuance, in part to satisfy growing demand for short-dated government assets amid the implementation of money market fund reforms.³⁹ The TGA balance was \$399 billion at year-end. Although the Federal Reserve does not pay interest to the Treasury on balances held in the TGA, the Treasury earns an implied return on these balances through the Federal Reserve's earnings remittances.

FOREIGN OFFICIAL AND OTHER DEPOSITS

Deposits of foreign official institutions averaged \$5 billion per week, and other deposits averaged \$40 billion per week during 2016. Other deposits include balances held at the Reserve Banks by international and multilateral organizations, government-sponsored enterprises, and designated financial market utilities (DFMUs), as well as cash collateral. Deposits held by DFMUs may be remunerated at the rate paid on balances maintained by depository institutions or another rate determined by the Board of Governors from time to time, not to exceed the general level of short-term interest rates.⁴⁰

Chart 23

Treasury General Account Balances



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

Note: Figures are averages of daily balances.

TERM DEPOSITS

The Federal Reserve periodically tested the Term Deposit Facility, through which it offers interest-bearing term deposits to depository institutions. TDF amounts outstanding ranged from \$49 billion to \$67 billion across four seven-day periods over the course of the year.

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 U.S. Treasury have been elevated from pre-crisis levels because of increased income from the expanded portfolio and low funding costs.⁴¹

SOMA INCOME

In 2016, total SOMA income was \$110 billion, primarily derived from interest income on its domestic security holdings. SOMA net income, which takes into account the costs of funding the portfolio,

Table 4
SOMA Net Income

Billions of U.S. Dollars

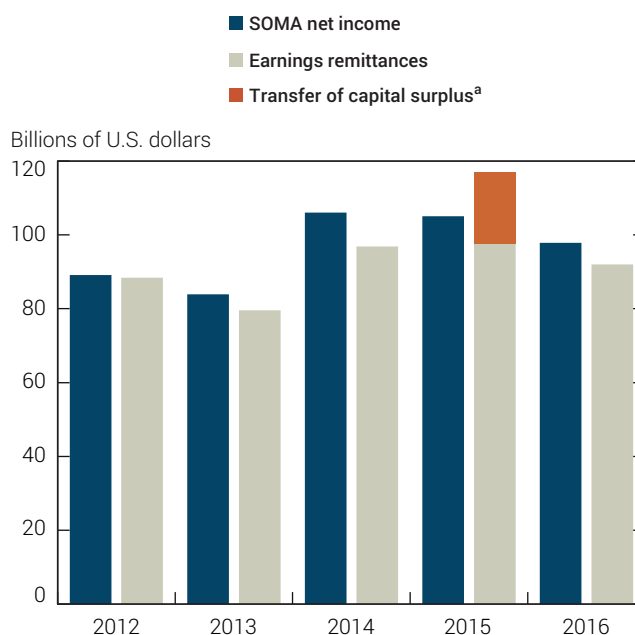
	2016	2015
Interest income		
Treasury securities	63.8	63.3
Agency debt	1.0	1.3
Agency MBS	46.3	48.9
Other	—	—
	111.1	113.5
Interest expense		
Reverse repurchase agreements		
Overnight and term RRP	(0.3)	(0.1)
Foreign repo pool	(0.8)	(0.1)
Other	—	—
	(1.1)	(0.2)
Non-interest income (loss)		
Foreign currency translation losses	(0.1)	(1.4)
Other	—	0.1
	(0.1)	(1.3)
SOMA income	109.9	112.0
Assumed funding cost	(12.0)	(6.9)
SOMA net income	97.9	105.1

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

Notes: The 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 \$12.0 billion for 2016 and \$6.9 billion for 2015. These liabilities fund non-SOMA assets of the Federal Reserve in addition to SOMA net assets.

was \$98 billion in 2016 (Table 4).⁴² This sum represents a decline from SOMA net income of \$105 billion in 2015, attributable largely to higher interest rates. However, the large size of the portfolio, its concentration in longer-term securities, and the relatively low interest rates paid on the Federal Reserve's liabilities through 2016 continued to generate portfolio income well in excess of pre-crisis levels.

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



Sources: Federal Reserve Bank of New York; Federal Reserve System.

^aDecember 28, 2015, transfer of capital to reduce aggregate Reserve Bank surplus to the \$10 billion limitation in the FAST Act (implemented by means of an amendment to the Federal Reserve Act).

FEDERAL RESERVE REMITTANCES

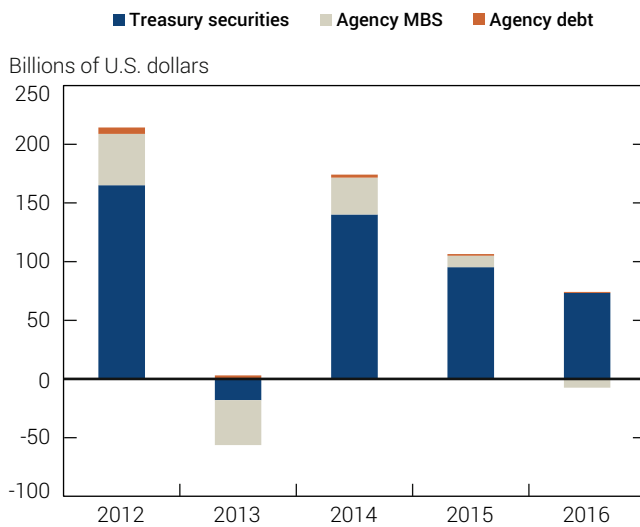
The Federal Reserve remits excess earnings to the U.S. Treasury after providing for the cost of operations, payment of dividends, and reservation of any amount necessary to maintain aggregate Reserve Bank capital surplus at no more than \$10 billion. Remittances to the Treasury are made on a weekly basis. In 2016, the Federal Reserve remitted a total of \$91 billion to the Treasury. The decline in SOMA net income contributed to the decline in remittances in 2016 (Chart 24).⁴³

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 2016, 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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Chart 25
SOMA Domestic Portfolio Unrealized Gains and Losses



Source: Federal Reserve System.

Note: Figures are as of year-end.

portfolio and its book value (which reflects amortized cost), fell to \$67 billion at the end of 2016 from \$106 billion at the end of 2015 (Chart 25). Year-over-year, the agency MBS portfolio moved from carrying an unrealized gain of \$10 billion to an unrealized loss of \$8 billion, and the Treasury portfolio's unrealized gain decreased from \$95 billion to \$73 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. When securities are held to maturity, their unrealized gains or losses fall to zero over time as their price reverts to par at maturity. In the meantime, unrealized gains and losses 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 FOMC continues to normalize monetary policy—that is, takes steps to raise the federal funds rate and other short-term interest rates to

more normal levels and to reduce the Federal Reserve's securities holdings. The projection exercise presented here illustrates how the path of the domestic securities portfolio and its associated net income may evolve in the coming years. The exercise considers a baseline scenario and several alternative scenarios to demonstrate the sensitivity of portfolio size and portfolio net income to changes in various factors.⁴⁴ 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 policy normalization.

BASELINE ASSUMPTIONS

The future path of the SOMA portfolio and its associated net 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 exogenous balance sheet developments. Key assumptions about these factors are summarized in Appendix 4.

In the baseline scenario, the assumed paths of the target federal funds rate and longer-term interest rates are taken from the Survey of Primary Dealers and the Survey of Market Participants conducted by the Desk before and after the December 2016 FOMC meeting. The median respondent expects the federal funds target range to gradually rise from its year-end level to 2.75 percent in the long run, and the ten-year Treasury yield and thirty-year fixed primary mortgage rate to rise to approximately 3. percent and 5.00 percent, respectively, in the long run.

Consistent with the FOMC's September 2014 statement on Policy Normalization Principles and Plans, the Federal Reserve is assumed to use interest on excess reserves as its primary tool for controlling the level of the federal funds rate, with supplementary support from an overnight reverse repo facility. In line with current practice, the IOER rate and the ON RRP offering rate are assumed to be set at the top and bottom of a 25 basis point range that is centered at the median survey respondent's projected target for the federal funds rate. Expectations for ON RRP take-up are also derived from the Desk surveys.

The analysis of changes in the Federal Reserve's securities holdings starts with the SOMA domestic securities portfolio as

of December 30, 2016. Staff assume that decisions about the securities portfolio are guided by the statement on Policy Normalization Principles and Plans, which asserts that the FOMC intends to reduce the Federal Reserve’s securities holdings in a gradual and predictable manner, primarily by ceasing to reinvest repayments of principal on securities held in the SOMA, and that agency MBS sales are not anticipated as part of the normalization process.⁴⁵ The statement also notes that the Federal Reserve, in the longer run, intends to hold no more securities than are necessary to implement monetary policy efficiently and effectively, and will hold primarily Treasury securities.

In its December 2016 policy statement, the FOMC said it anticipated that reinvestments would continue until normalization of the level of the federal funds rate was “well underway.” The median respondent to the Desk’s December surveys expected full reinvestment of principal payments from SOMA holdings of Treasury securities and agency debt and MBS to continue until the second quarter of 2018, corresponding to a level of the federal funds rate target of about 1.50 percent. Survey results indicated expectations that, subsequent to that date, the FOMC would phase out reinvestments over the course of one year.⁴⁶

After a period of redemption-driven contractions, the balance sheet’s size reaches “normalization” when the securities portfolio and associated quantities of reserves and other liabilities return to a level the FOMC eventually deems appropriate for its long-run policy implementation framework. The projections assume that over the long run, the evolution of the size of the Federal Reserve’s balance sheet will be driven by changes in the need to maintain an appropriate quantity of reserves in the banking system and to accommodate changes in other Federal Reserve liabilities such as currency, the TGA, the foreign repo pool, and account balances held by DFMUs.

In a preliminary discussion about the long-run operating framework at the November 2016 FOMC meeting, policymakers agreed that decisions about the longer-run implementation framework were not necessary at that time. However, meeting minutes revealed that the participants generally commented on the advantages of a framework similar to the one currently in use with an abundant level of reserves. Under such an approach, the balance sheet would likely be much smaller than at present, but at

least somewhat larger than in the years before the financial crisis, reflecting trend growth of balance sheet items such as currency as well as a larger supply of reserves. In the absence of more specific guidance, the baseline scenario in this projection exercise assumes a long-run level of \$500 billion in reserve balances—a level that falls within a range of estimates amid uncertainty about the future operating framework and demand for reserve balances. Balance sheet projections also require assumptions about future levels of TGA and foreign repo pool balances, usage of the ON RRP facility, and currency and capital growth, and these assumptions are subject to uncertainty as well.⁴⁷

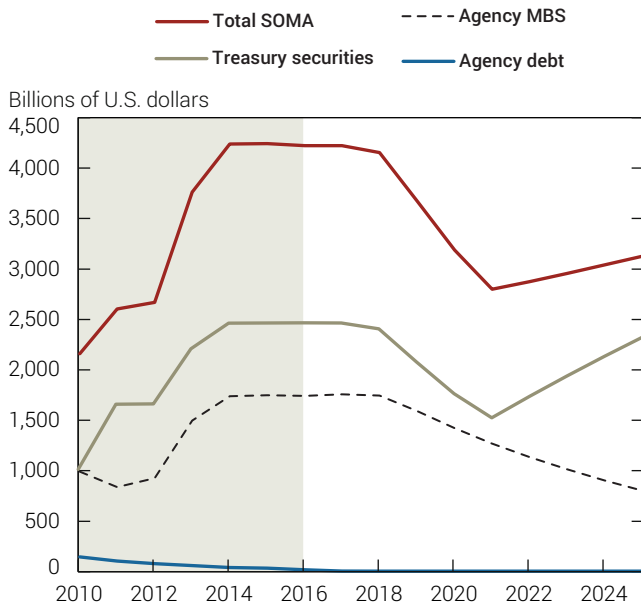
Staff further assume that upon achievement of normalization in the size of the balance sheet, rollovers of maturing Treasury securities resume and that additional purchases of Treasury securities are conducted both to offset the ongoing runoff of agency debt and MBS holdings and to support trend growth of currency and other liabilities and capital. At that point, the size of reserve balances is assumed to remain constant.

PORTFOLIO PATH RESULTS

Under these assumptions, the size of the SOMA portfolio is projected to remain largely unchanged at its current level of approximately \$4.2 trillion through mid-2018, while full reinvestments continue. After that date, it starts to decline as reinvestments are phased out and then ended altogether in mid-2019. The Federal Reserve’s securities holdings then decline until the portfolio reaches its normalized size in the fourth quarter of 2021 (**Chart 26**). At that time, the domestic securities portfolio is estimated to be about \$2.8 trillion, with a slightly higher concentration in Treasury securities than in agency MBS. Thereafter, Treasury-driven growth of securities holdings supports trend balance sheet growth, and agency debt and agency MBS holdings continue to run off.

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 27**). The timing of principal payments from maturing Treasury securities and agency debt securities is a known function of current SOMA holdings. In contrast, projected principal pay-downs associated with agency MBS are model-based estimates that are

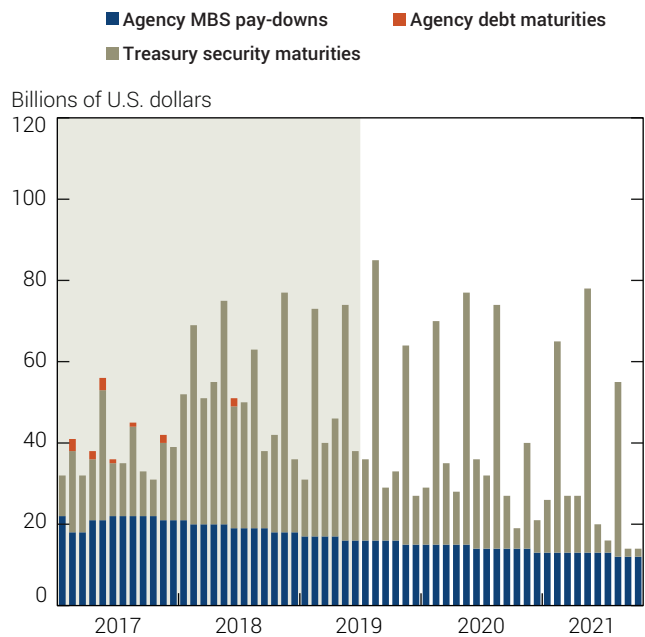
Chart 26
Projected SOMA Domestic Securities Holdings: Baseline by Asset Class



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-16 (shaded area) are historical settled holdings. Projected figures are rounded.

Chart 27
Projected Receipt of Principal on SOMA Domestic Securities: Baseline



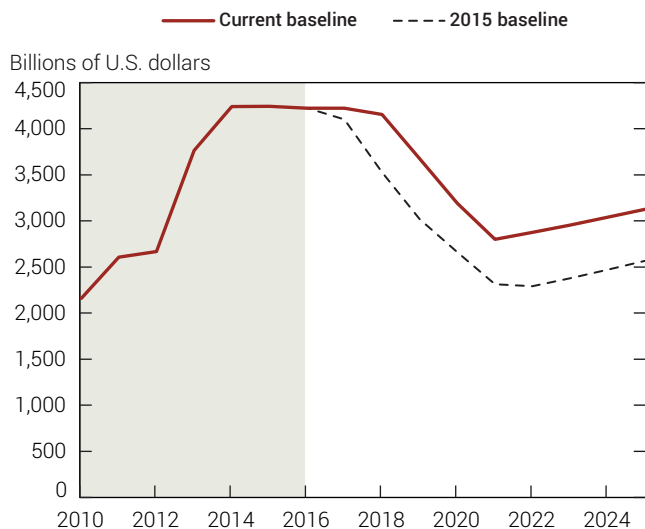
Source: Federal Reserve Bank of New York.

Notes: Principal receipts for January 2017 through June 2019 (shaded area) are assumed to be fully or partially reinvested.

subject to considerable uncertainty because of 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.

The point of normalization in late 2021 is projected to occur almost two quarters earlier than in the 2015 baseline (**Chart 28**). The balance sheet starts to contract just over a year later than it was expected to in the 2015 baseline given a longer-than-previously anticipated period for reinvestments to continue. (The December 2015 baseline was modeled on an assumption that reinvestments would begin to be phased out in the first half of 2017.) However, a larger long-run balance sheet size in the current baseline, driven by the assumption about a higher level of reserve balance liabilities in a future policy implementation framework, requires less of the portfolio to run off once such a contraction starts.⁴⁸

Chart 28
Projected SOMA Domestic Securities Holdings: Baseline



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-16 (shaded area) in current baseline are historical settled holdings. Projected figures are rounded.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

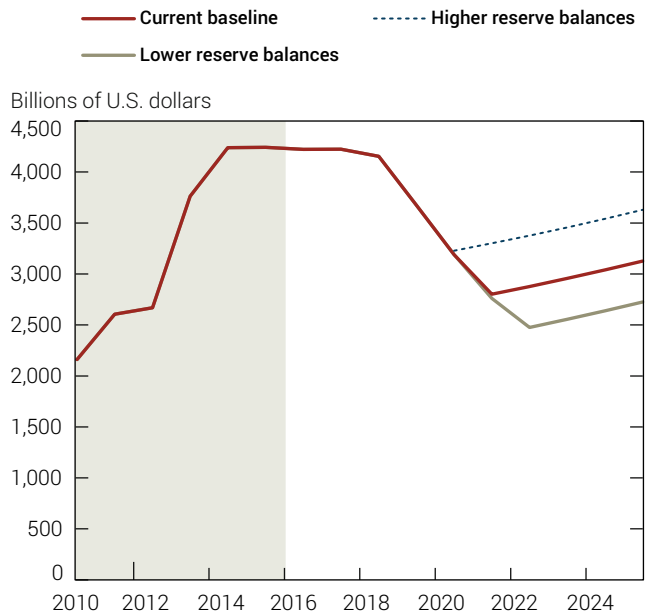
Of course, banks’ demand for reserves and the level of reserves the FOMC will choose to maintain in its long-run policy implementation framework remain uncertain. A set of alternative scenarios highlights the sensitivity of SOMA portfolio balances to different long-run levels of Federal Reserve liabilities. These scenarios illustrate the degree to which increases (decreases) in liabilities imply a larger (smaller) level of the SOMA in the long run and how long it might take to achieve a normalized portfolio size. While the projections are modeled with regard to alternative levels of reserve balances, the specific type of liability is not material; the effect on SOMA portfolio balances would be similar if the alternative levels of liabilities arose from changes in other line items, such as Federal Reserve notes, the TGA, the foreign repo pool, or DFMU balances.

Under a scenario in which reserve balances are \$100 billion in the long run (the baseline in prior years’ reports), the size of the balance sheet is normalized in the fourth quarter of 2022, approximately one year later than in the baseline scenario (Chart 29). In contrast, under a scenario in which reserves are \$1 trillion in the long run, the size of the balance sheet is normalized in the fourth quarter of 2020, nearly one year sooner than in the baseline. Given that Treasury purchases resume at an earlier date, by the end of the forecast horizon the portfolio is more heavily weighted to Treasury securities than it is in the baseline scenario.⁴⁹

SOMA NET INCOME RESULTS

Under year-end 2016 baseline assumptions, SOMA net income is projected to continue to decline as interest payments on reserve balances increase with rising interest rates and reserve balances remain at elevated levels. Net income then falls more sharply once reinvestments end as interest income declines with the shrinking of the SOMA securities portfolio and as interest expense increases with rising interest rates. SOMA net income is projected to reach a trough of approximately \$55 billion in 2020, compared with a historical average of about \$30 billion in the years prior to the crisis. Portfolio net income is projected to rise after 2020 as the level of reserve balances declines further to its long-run level. Once the size of the portfolio is normalized, purchases of Treasury securities—which resume at higher yields—support further net income growth (Chart 30).

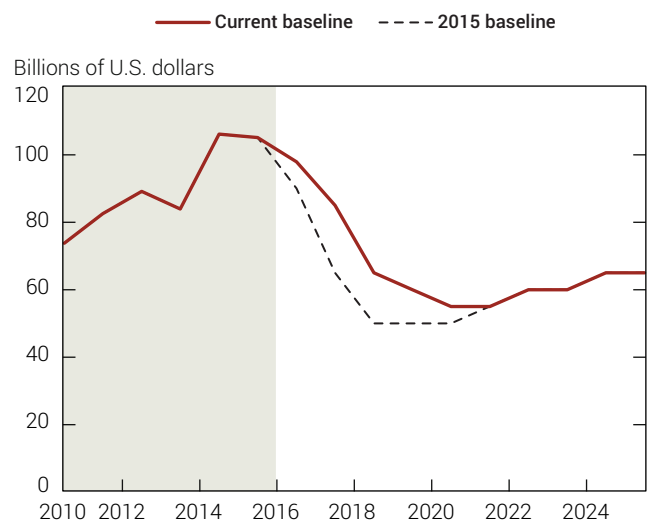
Chart 29
Projected SOMA Domestic Securities Holdings: Alternative Reserve-Balance Scenarios



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-16 (shaded area) are historical settled holdings. Projected figures are rounded. Lower and higher reserve-balance scenarios assume a long-run supply of reserve balances of \$100 billion and \$1 trillion, respectively.

Chart 30
Projected SOMA Net Income: Baseline



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-16 (shaded area) in current baseline are historical SOMA net income amounts. Projected figures are rounded.

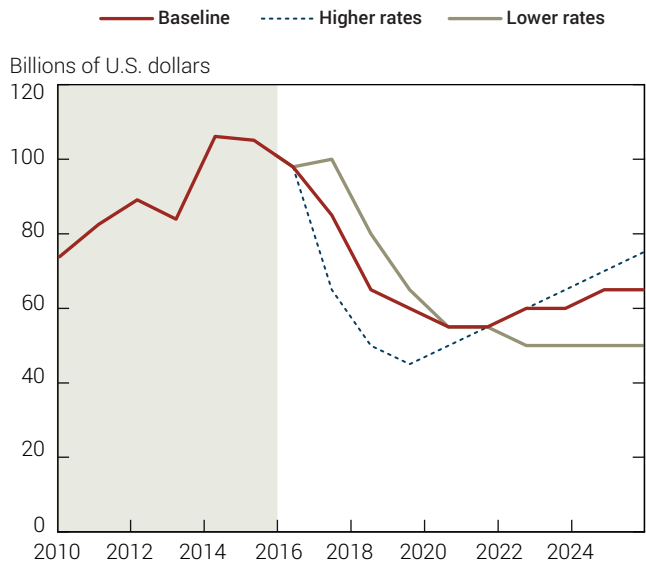
DOMESTIC OPEN MARKET OPERATIONS DURING 2016

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 forecast horizon. 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 a shift in survey respondents' expectations toward 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 in the long run since Treasury securities would be purchased at lower yields than previously anticipated. On net, under the current baseline assumptions, cumulative portfolio net income from 2017 to 2025 is projected to be approximately \$570 billion, roughly \$50 billion higher than in last year's baseline projection.

Interest rates are an important variable, affecting the portfolio's coupon income, funding costs, and the pace at which agency MBS holdings pay down. A set of alternative scenarios illustrates the sensitivity of SOMA net income to alternative interest rate paths (**Chart 31**).⁵⁰ Under a higher rate scenario, a sharper reduction in SOMA net income is expected while the size of the portfolio remains in excess of its normalized size, driven by higher interest expense relative to the baseline. Net income falls to a trough of roughly \$45 billion in 2019. 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 contrast, in a lower rate scenario, the agency MBS portfolio declines at a more rapid pace as prepayment speeds increase. Consistent with both a faster decrease in the level of reserve balances and lower interest rates, net portfolio income is initially higher relative to the baseline; however, once the size of the balance sheet is normalized, net income decreases relative to the baseline as new Treasury securities are added to the portfolio at comparatively lower market yields.

SOMA net income associated with the alternative scenarios for long-run levels of reserve balance liabilities is projected to be nearly identical across the baseline and alternative scenarios (not shown, although one can see a similar effect by comparing projected net

Chart 31
Projected SOMA Net Income: Alternative Interest Rate Paths



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-16 (shaded area) are historical SOMA net income amounts. Projected figures are rounded.

income in the later years of the current baseline with net income in last year's baseline). This outcome is a result of the relatively flat yield curves associated with the survey-based interest rate expectations used in this exercise. As such, the yield of the additional securities purchased to back higher levels of liabilities in the long run is offset by substantially similar funding costs. The actual composition of liabilities will also have implications for income since different types of liabilities bear different costs (and some liabilities bear none).

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 and its long-run operating framework, as well as interest rate, economic, and autonomous balance sheet developments. Nevertheless, these scenarios demonstrate how SOMA income could evolve under a set of baseline and alternative assumptions.

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 result in declines in the Federal Reserve's remittances to the U.S. Treasury.⁵¹ 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 intended 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 2016, the Federal Reserve gained additional experience using the framework for monetary policy implementation that it introduced in December 2015. The implementation framework—which employs interest on excess reserves, supplemented by overnight reverse repurchase agreements, to influence overnight funding rates and encourage arbitrage trading—was successful in achieving the FOMC’s operating objective of a target range for the federal funds rate, and the effective federal funds rate printed within this range throughout the year. When the FOMC raised its target range for the federal funds rate in December, the implementation framework’s tools were successful at keeping overnight rates in line with the increase. Expectations for a change in the monetary policy stance effectively passed through into term money market instruments.

Throughout 2016, the FOMC directed the Desk to maintain its policy of rolling over maturing Treasury securities at auction and reinvesting principal payments from agency debt and agency mortgage-backed securities. The rollover of \$216 billion in Treasury securities in 2016 marked the first year of significant rollover activity since the end of the Maturity Extension Program in 2012. The Desk also reinvested \$387 billion in principal payments from agency

debt and agency MBS in agency MBS. These activities maintained the total size of the SOMA’s domestic securities portfolio at about \$4.26 trillion.

The FOMC indicated that it expects to continue reinvestments until normalization of the level of the federal funds rate is well under way. A projection exercise presented in this report illustrates how the path of the Federal Reserve’s portfolio and associated net income might evolve over time, based on a set of survey-based financial forecasts and expectations about monetary policy and the securities portfolio. An end to reinvestments will start the process of reducing the size of the securities portfolio. The portfolio’s eventual long-run size, and the time it takes to achieve this size, will depend importantly on future decisions about the quantity of reserves that the FOMC deems appropriate for its long-run policy implementation framework and the framework’s treatment of variations and growth in other, exogenously driven liabilities. SOMA net income is projected to decline as interest rates rise and the size of the portfolio eventually shrinks. However, net income generated by the SOMA portfolio is projected to remain above pre-crisis averages, even under several alternative scenarios.



Appendix 1: Authorization for Domestic Open Market Operations

On January 26, 2016, by unanimous vote, the FOMC approved the Authorization for Domestic Open Market Operations, which included a nonsubstantive amendment that changed terminology related to the provision of intraday credit to foreign central bank and international accounts maintained at a Federal Reserve Bank (“Foreign Accounts”) in exchange for securities.

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;
 - 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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

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 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 2016.

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

In 2016, 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 January 27

The FOMC issued the following domestic policy directive on December 16, 2015. This directive governed open market operations that were executed from January 1, 2016, through January 27, 2016.

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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

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.

Open Market Operations from January 28 to December 14

The FOMC issued the following domestic policy directive on January 27, 2016; March 16, 2016; April 27, 2016; June 15, 2016; July 27, 2016; September 21, 2016; and November 2, 2016. This directive governed open market operations that were executed from January 28, 2016, through December 14, 2016.

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 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.

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.

Open Market Operations from December 15 to December 30

The FOMC issued the following domestic policy directive on December 14, 2016. This directive governed open market operations that were executed from December 15, 2016, through December 30, 2016.

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 $\frac{1}{2}$ to $\frac{3}{4}$ percent, including 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 0.50 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.

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.

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

Appendix 4: Summary of Baseline Projection Assumptions

The assumptions underlying the baseline scenario for the portfolio and SOMA net income projection exercise are presented below. Sources for these assumptions include financial forecasts and expectations for policy drawn from the median responses to the Desk's Survey of Primary Dealers (SPD) and Survey of Market Participants (SMP) conducted before and after the December 2016 FOMC meeting. The scenario is also guided by the FOMC's September 2014 Policy Normalization Principles and Plans and the March 2015 augmentation of those plans.

Interest Rate Assumptions

- ◆ Responses to the Desk's survey questions on the modal path and longer-run level inform the assumed paths for
 - the federal funds target rate or midpoint of the target range (SPD and SMP flash surveys),
 - the ten-year Treasury yield (SPD), and
 - the thirty-year fixed primary mortgage rate (SPD).
- ◆ The MBS current coupon rate is assumed to be a constant 100 basis points over the primary mortgage rate.
- ◆ Money market rates are guided by FOMC communications on policy normalization:
 - The federal funds target range is 25 basis points wide.
 - The IOER rate is set at the top of the target range.
 - The ON RRP offering rate is set at the bottom of the target range.
 - The EFFR is assumed to be in the middle of the target range.

Balance Sheet Assumptions

- ◆ Projections start with the Federal Reserve balance sheet as of December 30, 2016.

- ◆ Asset-related assumptions:
 - Responses to the Desk's survey questions on expectations for changes in Treasury and agency debt and agency MBS reinvestment policies (SPD and SMP) inform assumptions on
 - the most likely time for a change in reinvestment policy,
 - the expected strategy for ending reinvestments, and
 - the most likely length of time to phase out reinvestments.
 - Agency MBS prepayments are derived from a staff model.
 - Policy Normalization Principles and Plans guide the evolution of the SOMA portfolio.
 - No agency MBS sales will be conducted.
 - The portfolio will consist primarily of Treasury securities in the long run.
 - The long-run portfolio size will be driven largely by the level of liabilities that is deemed appropriate for efficient and effective implementation of monetary policy.
- ◆ Liability-related assumptions:
 - Currency grows in line with forecasts for nominal GDP.
 - Reserve balances are \$500 billion in the long run.
 - The Treasury General Account balance is maintained at the Treasury's stated minimum (\$150 billion).
 - The foreign repo pool is maintained near the 2016 year-end level (\$250 billion).
 - ON RRP usage is guided by
 - responses to the Desk's survey questions on expectations for average demand each year through 2019, and
 - the assumption that usage declines to zero in proportion to the decline in reserve balances until the long-run level of reserve balances is reached.
- ◆ Capital grows at a five-year average annual rate (2.5 percent).

Appendix 5: 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 Rules and Authorizations

https://www.federalreserve.gov/monetarypolicy/rules_authorizations.htm

FOMC statements, implementation notes, minutes, and information about policy normalization

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

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

Background on reserve requirements, interest on reserves, and IOER

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

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

Operational results, announcements, and other details regarding the Term Deposit Facility

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

Federal Reserve System financial reports

https://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm

Detailed transaction information about discount window lending to depository institutions and open market operations

<https://www.federalreserve.gov/regreform/discount-window.htm>

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

Federal Reserve Bank of New York

Markets and Policy Implementation

<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

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/treasury-rollover-faq.html>

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

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

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

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

<https://www.newyorkfed.org/markets/ambs-treasury-faq.html>

Foreign currency operations, including foreign exchange quarterly reports, foreign reserves management, and central bank liquidity swaps

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

<https://www.newyorkfed.org/markets/foreign-reserves-management.html>

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

New York Fed counterparties for market operations

<https://www.newyorkfed.org/markets/counterparties>

System Open Market Account holdings

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

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

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

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

Desk statement regarding small-value exercises in 2016

https://www.newyorkfed.org/markets/opolicy/operating_policy_160217

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>

<https://www.newyorkfed.org/markets/obfrinfo>

https://www.newyorkfed.org/markets/opolicy/operating_policy_150708.html

<https://www.newyorkfed.org/medialibrary/media/markets/EFFR-technical-note-070815.pdf>

Services for Central Banks and International Institutions

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

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.

³The Federal Reserve also sets the interest rate paid on required reserves (IORR), which is intended to effectively eliminate the implicit tax that reserve requirements formerly imposed on depository institutions.

⁴This approach to policy implementation was outlined in the FOMC's September 2014 statement of Policy Normalization Principles and Plans, which sets forth the Committee's strategy to remove monetary policy accommodation. The Committee provided additional details about its intended operational approach in its March 2015 meeting minutes.

⁵Term rates faced upward pressure starting in mid-2016 owing to a reduction of money market fund lending as a result of MMF reform.

⁶In determining this value, 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.

⁷For each operation, the total amount of propositions received was less than or equal to the amount of available securities, so awards were made at the specified offering rate to all counterparties. In the highly unlikely event that the value of propositions received had exceeded the amount of available securities, awards would have been made at the rate at which this size limit was achieved (the stop-out rate), with all propositions below the rate awarded in full and all propositions equal to this rate awarded on a pro rata basis. The stop-out rate would have been determined by evaluating all propositions in ascending order by submitted rate up to the point at which the total quantity of propositions equaled the overall size limit.

⁸In 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 are 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.

⁹ON RRP operations were initiated as part of a technical exercise in September 2013. The operations became an active tool for the implementation of monetary policy on December 16, 2015.

¹⁰On October 21, 2016, the New York Fed released historical data detailing daily brokered federal funds volumes for the period from October 2006 through February 2016.

¹¹As of December 30, 2016, 170 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 80 percent higher than volumes observed in brokered data. The number of reported overnight federal funds transactions has averaged about 300 per day.

¹²For 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>.

¹³For 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* (blog), November 9, 2015, at <http://libertystreeteconomics.newyorkfed.org/2015/11/the-new-overnight-bank-funding-rate.html>.

¹⁴This approach to rollovers maintains a steady par value of Treasury securities held in the SOMA. There is a cost differential in the exchange, since securities mature at par while new securities are purchased at market values (which reflect premiums or discounts that are amortized over time). In contrast, the Bank of England reinvests the cash flows associated with the maturities of gilts held in its Asset Purchase Facility; it adjusts the par amount of new securities it acquires at market prices to match the original amount spent on asset purchases.

¹⁵The total value of maturing SOMA holdings of Treasury notes, bonds, Treasury Inflation-Protected Securities (TIPS), and Floating Rate Notes (FRNs) on a given day is exchanged proportionally across all Treasury securities issued on that day. SOMA holdings of Treasury bills would typically be exchanged for newly issued bills. However, 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.

¹⁶The to-be-announced market is a forward market 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>.

¹⁷The 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 2016 aside from the small-value coupon swap operations conducted to ensure operational readiness. 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.

¹⁸A dollar roll sale is a transaction that involves the sale of agency MBS for delivery in one month and the simultaneous agreement to purchase substantially similar securities in a later month.

¹⁹CUSIPs are codes that identify financial securities, allowing for efficient clearing and settlement in capital markets. See <http://www.cusip.com>.

²⁰In response to the recent rise in settlement fails, including the rise in fails for small-sized trades, the Treasury Market Practices Group (TMPG) modified its recommended fails charge for Treasury and agency debt securities. As of September 1, 2016, the minimum threshold for the application of the fails charge has been calculated on an aggregate basis by counterparty rather than on a trade-by-trade basis, thus effectively lowering the threshold for applying the charge. The TMPG fails charge is equal to the greater of (a) 3 percent per annum minus the TMPG reference rate (currently the lower limit of the FOMC target range) and (b) zero.

²¹The Desk maintains distinct sets of counterparty relationships to support its foreign exchange (FX) and foreign reserves management (FRM) operations. In conjunction with the publication of its revised counterparty framework, and to enhance transparency about foreign market operations and promote greater consistency across domestic and foreign market operations, the New York Fed for the first time published the lists of its FX and FRM counterparties, as well as information on specific expectations and eligibility requirements for FRM counterparties.

²²Remittances in 2015 included earnings remittances of \$98 billion plus a onetime transfer of \$19 billion of aggregate Reserve Bank capital surplus, as required by the FAST Act.

²³Because 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 2016, net unsettled commitments totaled \$35 billion.

²⁴As of December 30, 2016, the U.S. Treasury had approximately \$13.9 trillion in marketable debt held by the public (inclusive of SOMA holdings) outstanding. Further information can be found at <https://www.treasurydirect.gov/govt/reports/pd/mspd/2016/opds122016.pdf>.

²⁵The weighted average life of an MBS refers to the expected time outstanding until mortgage principal is repaid. This calculation is dependent on a model of future prepayments and is therefore subject to some uncertainty and model sensitivity.

²⁶“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 because it is affected by mortgage borrowers’ decisions to exercise or forgo their prepayment option. Duration measures of the portfolio throughout this report are calculated on a par-weighted average basis.

²⁷Lower 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.

²⁸As fiscal agent for the U.S. Treasury, the Desk operates in the financial markets on behalf of the Treasury’s Exchange Stabilization Fund.

²⁹Further 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.

³⁰Depository institutions also have access to secondary credit and seasonal credit through the discount window.

³¹The Board of Governors technically approved requests submitted by the Boards of Directors of the Federal Reserve Banks for a 25 basis point increase in the primary credit rate to 1.25 percent.

³²If 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 are reserve-neutral: in exchange for the foreign currency it borrows, the Federal Reserve credits the foreign central bank account with dollars that cannot be withdrawn. In 2016, the Federal Reserve executed small-value non-U.S.-dollar swaps with the European Central Bank, Bank of Japan, Bank of England, Bank of Canada, and Swiss National Bank for the purpose of testing operational readiness.

³³Reserves may also be held as vault cash.

³⁴Reserves 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.

³⁵At the end of 2016, balances exceeding the upper bound of the penalty-free bands were \$11 billion lower 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. Before this date, 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, however, 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.

³⁶In this discussion, Federal Reserve notes outstanding are net of Federal Reserve Bank holdings.

³⁷Although 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 \$701 million in 2016.

³⁸Upon the initiation of the transaction, each participant has an undivided interest, proportional to its investment, in a pool of securities from the SOMA that has been allocated toward this purpose.

³⁹For more information, see <https://www.treasury.gov/press-center/press-releases/Pages/jl0532.aspx> and <https://www.treasury.gov/press-center/press-releases/Pages/jl0592.aspx>.

⁴⁰Financial market utilities are multilateral systems that provide the infrastructure for transferring, clearing, and settling payments, securities, and other financial transactions among financial institutions or between financial institutions and the utility.

⁴¹Even 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.

⁴²SOMA income reflects (1) interest income on SOMA assets, including interest on investments denominated in domestic and foreign currencies, (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.

⁴³Total remittances of \$117 billion in 2015 were elevated because they included a onetime transfer of \$19 billion to reduce the aggregate Reserve Bank capital surplus to \$10 billion, as required by the Fixing America's Surface Transportation (FAST) Act.

⁴⁴A similar exercise showing confidence interval projections around a modal path for the Federal Reserve's balance sheet and income can be found in Erin E. Syron Ferris, Soo Jeong Kim, and Bernd Schlusche, "Confidence Interval Projections of the Federal Reserve Balance Sheet and Income," Board of Governors of the Federal Reserve System FEDS Note, January 13, 2017, at <https://www.federalreserve.gov/econresdata/notes/feds-notes/2017/confidence-interval-projections-of-the-federal-reserve-balance-sheet-and-income-20170113.html>. For additional background on the structure of the Federal Reserve's balance sheet and modeling approach, 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 <https://www.federalreserve.gov/pubs/feds/2013/201301/revision/201301pap.pdf>.

⁴⁵However, the statement notes that limited sales might be warranted in the longer run to reduce or eliminate residual agency MBS holdings.

⁴⁶For the period that full or partial reinvestments persist, staff assume that maturing Treasury securities continue to be rolled over at auction and that principal payments on all agency debt and agency MBS are reinvested in agency MBS, consistent with the Desk's current operational approaches.

⁴⁷The assumption of \$500 billion as a long-run level of reserve balances marks an increase from the \$100 billion level that was used in prior years' reports. Given the uncertainty attending future levels of several Federal Reserve liability items, this increase can be viewed as a proxy more generally for growth in any liabilities, since the impact on the level of the portfolio from changes in one liability category versus another is the same. However, the specific composition of liabilities may have implications for income; for a given-sized balance sheet, a higher relative share of liabilities held as reserves will generally result in lower levels of income if the rate of interest paid on reserves exceeds the rate paid on other liabilities (meanwhile, some liabilities bear no costs).

⁴⁸Had the 2015 baseline also assumed a long-run level of reserve balances of \$500 billion, the size of the balance sheet would have normalized in the first quarter of 2021.

⁴⁹The projected path for reserves associated with each of these scenarios is provided in the data file accompanying this report on the New York Fed's website.

⁵⁰The 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 and liability factors, are held constant. The path of SOMA net income in each of these scenarios follows similar contours: larger shocks are associated with more pronounced declines in income while the size of the portfolio remains elevated relative to its normalized size, after which income rebounds. Portfolio net income declines to near zero in the 300 basis point scenario.

⁵¹Ultimately, remittances depend not only on the SOMA portfolio but also on other items in 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 U.S. Treasury. Such a halt, however, would not affect the Desk's capacity to conduct open market operations or the FOMC's ability to manage short-term interest rates.)

Index of Charts and Tables

Charts

1. Federal Funds Target and Effective Federal Funds Rate.....	7	19. SOMA Domestic Securities Holdings in Ten-Year Equivalents	27
2. Average Distribution of Overnight Federal Funds Rates	8	20. Foreign Exchange Liquidity Swaps Outstanding.....	28
3. Overnight Money Market Rates	9	21. Federal Reserve Liabilities.....	29
4. Three-Month Money Market Rates.....	9	22. Foreign Repo Pool	30
A. Box Chart: Money Market Fund Assets under Management in 2016	11	23. Treasury General Account Balances	31
B. Box Chart: Composition of Assets Held by Taxable Money Market Funds	11	24. SOMA Net Income and Federal Reserve Remittances to the U.S. Treasury	32
5. Reverse Repo Amounts Outstanding.....	13	25. SOMA Domestic Portfolio Unrealized Gains and Losses.....	33
6. Reverse Repo Amounts Outstanding by Counterparty Type....	13	26. Projected SOMA Domestic Securities Holdings: Baseline by Asset Class.....	35
7. Maturities of SOMA Treasury Securities.....	15	27. Projected Receipt of Principal on SOMA Domestic Securities: Baseline	35
8. Distribution of SOMA Rollovers in 2016.....	15	28. Projected SOMA Domestic Securities Holdings: Baseline	35
9. SOMA Agency Debt and Agency MBS Principal Payments and the Primary Mortgage Rate.....	17	29. Projected SOMA Domestic Securities Holdings: Alternative Reserve-Balance Scenarios	36
10. SOMA Purchases of Thirty-Year Agency MBS by Coupon.....	17	30. Projected SOMA Net Income: Baseline.....	36
11. SOMA Purchases of Fifteen-Year Agency MBS by Coupon.....	17	31. Projected SOMA Net Income: Alternative Interest Rate Paths	37
12. SOMA Dollar Roll Sales.....	19		
13. SOMA Securities Lending in Treasuries	19		
14. Composition of SOMA Domestic Securities Holdings.....	23		
15. Distribution of SOMA Treasury Holdings.....	24		
16. SOMA Treasury Holdings as a Share of Outstanding Treasury Supply	24		
17. Distribution of SOMA Agency MBS Holdings	25		
18. Average Duration of SOMA Domestic Securities Holdings.....	26		

Tables

1. Distribution of Agency MBS Operations in 2016	18
2. Small-Value Exercise Results in 2016.....	21
3. Term Deposit Facility Operation Results in 2016	21
4. SOMA Net Income.....	32

DOMESTIC OPEN MARKET OPERATIONS DURING 2016

FEDERAL RESERVE BANK OF NEW YORK
33 LIBERTY STREET
NEW YORK, N.Y. 10045

To download a digital version of this report, go to www.newyorkfed.org/markets/annual_reports.

A REPORT PREPARED FOR THE FEDERAL OPEN MARKET COMMITTEE BY THE MARKETS GROUP OF THE FEDERAL RESERVE BANK OF NEW YORK



DOMESTIC OPEN MARKET OPERATIONS DURING 2016