

APRIL 2018

OPEN MARKET OPERATIONS

DURING 2017

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 open market operations of the Federal Reserve System for the calendar year 2017. Linsey Molloy, Kathryn Chen, Cindy Hull, and Joseph Andros were primarily responsible for preparation of the report.

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Overview

Highlights from 2017

In 2017, the Federal Open Market Committee (FOMC) continued to normalize the stance of monetary policy by further raising the federal funds rate and by beginning the gradual reduction of the Federal Reserve's securities portfolio—the largest asset on its balance sheet. The FOMC increased the target for the federal funds rate from a range of ½ to ¾ percent at the start of the year to a range of 1¼ to 1½ percent at the end, in increments of ¼ percentage point at each of the March, June, and December FOMC meetings. To effect short-term interest rate control, 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 and executed by the Open Market Trading Desk at the Federal Reserve Bank of New York (the Desk). These tools continued to be successful in keeping the effective federal funds rate (EFFR) within the FOMC's target range. Overnight rates in both unsecured and secured money markets moved up roughly in line with the increases in the effective rate, and the expected increases passed through into rates on term money market instruments.

The FOMC began to gradually reduce the Federal Reserve's securities holdings in 2017 using principles that it outlined in its September 2014 Policy Normalization Principles and Plans and an Addendum adopted in June 2017. The FOMC directed the Desk to lower the Federal Reserve's domestic securities holdings starting in October 2017 by decreasing its reinvestment of the principal payments it receives from securities held in the System Open Market Account (SOMA). Specifically, it instructed the Desk to reinvest such payments only to the extent that they exceeded gradually rising caps. In line with this directive, the Desk began to redeem some of the payments of principal received from the SOMA's Treasury, agency debt, and agency mortgage-backed securities (MBS) holdings in the last three

months of the year. Prior to that period, the Desk was rolling over all maturing Treasury securities at auction and reinvesting all principal payments from agency debt and agency MBS in agency MBS. With the commencement of gradual portfolio reductions near the end of the year, the domestic securities portfolio of the SOMA declined modestly from \$4.26 trillion at year-end 2016 to \$4.24 trillion at year-end 2017.¹

To ensure effective conduct of open market operations, the Desk continued to execute securities lending operations in 2017, at volumes of \$22 billion each day on average. In both 2016 and 2017, the Desk lent a larger volume of on-the-run and recently off-the-run securities than in prior years as Treasury rollover activity into newly issued securities sustained the SOMA's available pool of on-the-run and recently off-the-run Treasuries.

The foreign currency reserve portfolio—examined more fully in this year's annual report than in past reports—was largely steady over the year. The Desk did not conduct any foreign exchange intervention activity that would alter the size of these reserves, which totaled \$21.3 billion at year-end.² Meanwhile, the Desk continued to conduct transactions to ensure that the foreign portfolio holdings conformed to investment objectives related to portfolio liquidity, safety, and return. The FOMC also continued to supply U.S. dollars to foreign central banks through U.S. dollar liquidity swaps. Reflecting limited demand given muted dollar funding pressures, the total dollar volume of liquidity swap transactions declined roughly 18 percent over the year.

Consistent with the large SOMA portfolio, the total level of the Federal Reserve's liabilities, mostly in the form of reserves, remained elevated at about \$4.41 trillion at the end of 2017. The composition of the Federal Reserve's liabilities fluctuated over

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the course of the year, largely owing to variation in the Treasury General Account (TGA) and participation in ON RRP operations.

The SOMA portfolio continued to contribute to elevated levels of Federal Reserve income and remittances to the U.S. Treasury. In 2017, a total of \$80 billion was paid to the Treasury. Although this amount was lower than the \$91 billion paid in 2016—largely because of the increased interest expenses associated with higher short-term interest rates—the level of remittances remained well above the levels before the financial crisis, which typically ranged between roughly \$20 billion and \$30 billion.

As the FOMC continues to reduce monetary policy accommodation, both the size of the domestic securities portfolio and its associated net income are expected to decline. 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, including the path of longer-term interest rates, banks' demand for reserves, the FOMC's future choices about its operating regime, and the evolution of other non-reserve liabilities. The projections begin in December 2018 and reflect assumptions derived from responses to questions about the future size and composition of the Federal Reserve's balance sheet in the Survey of Primary Dealers and Survey of Market Participants conducted by the New York Fed ahead of the December 2017 FOMC meeting. They suggest that the size of the portfolio normalizes sometime between 2020 and 2022 at levels between \$2.5 trillion and \$3.3 trillion. The projections also indicate that the portfolio's net income will remain solidly positive across a range of scenarios, a finding consistent with the results of a similar analysis conducted by the Desk in July 2017.

Over the course of 2017, the Desk also continued to strengthen its operational flexibility and resiliency. The Desk undertook ten types of small-value exercises, three more than in 2016, in order to test operational readiness to implement a range of potential FOMC directives.

To further enhance the quality and quantity of information available to the public about funding activity in U.S. money markets, in April 2018 the Federal Reserve began publishing a set of secured reference rates based on overnight repo transactions collateralized by Treasury securities. This set includes the Secured Overnight Funding Rate (SOFR), which was selected by an industry

group in 2017 as its recommended alternative to U.S. dollar LIBOR for new U.S. dollar derivatives and other financial contracts.

A GUIDE TO THIS REPORT

The report is divided into four key sections:

- 1. Domestic Open Market Operations:** The opening section reports steps undertaken by the Desk in money markets and securities markets to achieve the FOMC's operating objectives for short-term interest rates and the balance sheet, and describes securities lending operations that supported market functioning. (pp. 3-15)
- 2. Foreign Open Market Operations:** Included for the first time in this year's report, this section focuses on the Desk's operations to maintain the Federal Reserve's portfolio of foreign currency-denominated assets and to provide U.S. dollar liquidity to foreign central banks. (pp. 17-18)
- 3. Operational Flexibility and Resiliency:** This section reviews the network of counterparties maintained by the Federal Reserve to ensure that it can conduct open market operations in various scenarios, and also highlights operational readiness exercises undertaken during the year. (pp. 19-22)
- 4. Selected Balance Sheet Developments:** The final section examines issues affecting the composition of the Federal Reserve's balance sheet, financial developments related to the domestic SOMA portfolio, and domestic portfolio and income projection results. (pp. 23-39)

Appendixes 1 through 5 provide the complete text of the FOMC authorizations and directives guiding the Desk's activity. Appendix 6 summarizes the Desk's public disclosures about its operations, Appendix 7 presents the assumptions underlying the portfolio projection exercises outlined in the report, and Appendix 8 provides links to webpages where source material for Federal Reserve-related content can be found.

Underlying data for the charts shown in this report is provided on the New York Fed's website to the extent that its release is allowed by data suppliers.³ Additional questions regarding this report and the underlying data can be addressed to ny.mkt.soma.annualreport@ny.frb.org.

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Domestic Open Market Operations

In 2017, the Desk continued to conduct open market operations in U.S. money markets and securities markets at the direction of the FOMC to support the implementation of monetary policy. The Desk also maintained 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.

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 uses a set of short-term interest rate management tools as the primary mechanism to achieve its dual mandate of maximum employment and price stability. The Federal Reserve's framework for monetary policy implementation features a short-term interest rate target to communicate the FOMC's policy stance, the use of rates set by the Federal Reserve, and market operations directed by the FOMC and conducted by the Desk to promote money market rate conditions consistent with the policy rate target. The FOMC can also alter the size and composition of its balance sheet as a tool for achieving its objectives.

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 federal funds

rate is the rate at which depository institutions and other eligible entities conduct overnight unsecured transactions in central bank balances.) Throughout 2017, the target range for the federal funds rate was 25 basis points wide.⁴

The Federal Reserve sets administered rates—the interest rate paid on excess reserves (IOER) 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.⁵ The IOER rate is designed 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 to a level 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 features of U.S. money markets create frictions that have made IOER act more like a magnet that pulls up short-term interest rates than a firm floor beneath them. These features include 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.

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Box 1

The FOMC's Approach to Balance Sheet Normalization

On September 20, 2017, the FOMC announced that in October it would initiate the balance sheet normalization program described in its June 2017 Addendum to the Policy Normalization Principles and Plans. Through the program, the FOMC intends to reduce the Federal Reserve's securities holdings gradually by directing the Desk to decrease reinvestment of the principal payments received from securities held in the SOMA. Principal payments will be reinvested only to the extent that they exceed gradually rising caps. Initially, the decline in SOMA securities holdings was

capped at \$6 billion per month for Treasury securities and \$4 billion per month for agency debt and agency MBS. The FOMC anticipates that these caps will rise in steps at three-month intervals, to maximums of \$30 billion per month for Treasury securities and \$20 billion per month for agency debt and agency MBS, and that the caps will remain in place throughout the normalization process (see table).

In the Addendum, the Committee noted that reducing the Federal Reserve's securities holdings would result in a declining supply of reserve

balances, and indicated that it anticipated reducing the quantity of reserve balances to a level appreciably below that seen in recent years but larger than before the financial crisis. The Committee expects the level of reserve balances to reflect the banking system's demand as well as the Committee's decisions about how to implement monetary policy most efficiently and effectively in the future.

The Committee also affirmed that changing the target range for the federal funds rate is its primary tool for implementing monetary policy, but said that

it would be prepared to resume reinvestment of principal payments received on securities held by the Federal Reserve if a material deterioration in the economic outlook were to warrant a sizable reduction in the Committee's target for the federal funds rate. Moreover, the Committee stated that it would be prepared to use its full range of tools, including altering the size and composition of the Federal Reserve's balance sheet, if future economic conditions were to warrant a more accommodative monetary policy than could be achieved solely by reducing the federal funds rate.

Schedule of Realized and Anticipated Monthly Caps on SOMA Securities Reductions

Billions of U.S. Dollars per Month

	October–December 2017	January–March 2018	April–June 2018	July–September 2018	From October 2018
U.S. Treasury securities	6	12	18	24	30
Agency debt and MBS	4	8	12	16	20

Source: Federal Open Market Committee, Addendum to the Policy Normalization Principles and Plans, June 2017.

To strengthen the floor under short-term rates, the Federal Reserve uses an overnight reverse repo facility through which it offers a daily risk-free overnight investment with same-day settlement. The FOMC sets the rate and other terms, and the Desk conducts the open market operations. This facility establishes an important investment option for a wide range of active lenders in short-term funding markets, including certain nonbank institutions that are not eligible to earn IOER. In this way, the ON RRP facility supports policy implementation as a complement to IOER to keep the federal funds rate in the FOMC's target range.

With the onset of the financial crisis of 2008, short-term interest rates were lowered effectively to zero, leading the Federal Reserve to use its balance sheet 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 through the use of reinvestment policies—the Federal Reserve has used its balance sheet to maintain downward pressure on long-term interest rates, to support the mortgage market, and to help create or maintain accommodative financial conditions. In October 2017, with normalization of the level of the federal funds rate well under way, the FOMC initiated the process of gradually reducing the

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Table 1

Key Policy Rates Effective in 2017

FOMC Meetings Announcing Policy Rate Changes	Effective Date Range for Policy Rates during 2017	Federal Funds Target Range (Percent)	Interest Rate on Required and Excess Reserve Balances (Percent)	Overnight Reverse Repo Offering Rate (Percent)
December 2016	January 1–March 15	$\frac{1}{2}$ – $\frac{3}{4}$	0.75	0.50
March 2017	March 16–June 14	$\frac{3}{4}$ –1	1.00	0.75
June 2017	June 15–December 13	1– $1\frac{1}{4}$	1.25	1.00
December 2017	December 14–December 31	$1\frac{1}{4}$ – $1\frac{1}{2}$	1.50	1.25

Sources: Federal Open Market Committee; Board of Governors of the Federal Reserve System.

Federal Reserve's securities holdings in a manner that places changes in the balance sheet in the background of the Federal Reserve's current policy implementation framework (**Box 1**).

Monetary Policy Implementation

In 2017 the New York Fed conducted open market operations in money markets to influence short-term interest rates—namely, reverse repo operations to support IOER. Additionally, the New York Fed conducted open market operations in the Treasury and agency MBS markets to achieve the FOMC's balance sheet objectives. Lastly, to help inform monetary policy implementation, the New York Fed continued to develop money market reference rates, which provide a better understanding of money market dynamics and aid market functioning by providing enhanced transparency for both policymakers and market participants (**Box 2, p.6**).

SHORT-TERM INTEREST RATE MANAGEMENT

The FOMC raised the target for the federal funds rate from a range of $\frac{1}{2}$ to $\frac{3}{4}$ percent to a range of $1\frac{1}{4}$ to $1\frac{1}{2}$ percent over the year, in increments of $\frac{1}{4}$ percentage point at each of the March, June, and December 2017 FOMC meetings. To achieve these targets, the Board of Governors increased the interest rate paid on required and excess reserve balances by 25 basis points and the FOMC directed the Desk to increase the offering rate on overnight reverse repo operations by 25 basis points following each of these meetings (**Table 1**).

REVERSE REPURCHASE AGREEMENTS

To maintain the federal funds rate in the FOMC's target range, the FOMC directed the Desk to conduct ON RRP operations at an offering rate that was increased by 0.25 percentage point three times in 2017 to 1.25 percent. The FOMC also directed the Desk to limit ON RRP operation amounts by the value of Treasury securities held outright in the System Open Market Account that were available for such operations, and imposed a per-counterparty daily limit of \$30 billion. The Desk reaffirmed in mid-September that, as of the beginning of the FOMC's balance sheet normalization program, around \$2 trillion of Treasury securities would be available for such operations, but noted that as the amount of Treasury securities declined over time, the amount available would be expected to decrease.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 market funds, government-sponsored enterprises (GSEs), and banks. (For more information on reverse repo agreement counterparties, see the "Operational Flexibility and Resiliency" section of this report.) The Desk's reverse repo operations were conducted over FedTrade, the New York Fed's proprietary trading platform, with each counterparty permitted to submit one bid at a rate not exceeding the specified offering rate for each operation. Awards were made based on the offering rate and total demand at each operation. Since total demand at every operation in 2017 was significantly lower than the \$2 trillion of Treasury

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Box 2

Money Market Reference Rates

The Federal Reserve has taken steps over the past several years to improve insight into money market dynamics, including strengthening the effective federal funds rate (EFFR) calculation and introducing a new rate, the overnight bank funding rate (OBFR).^a

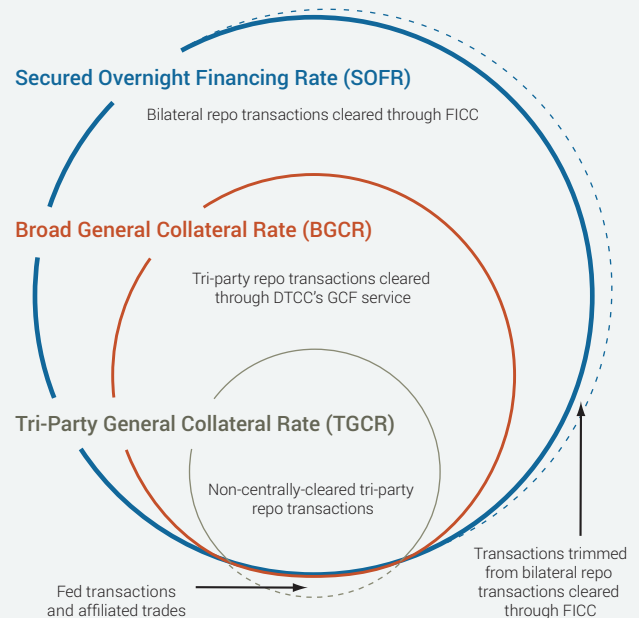
In 2016, the New York Fed, in cooperation with the Treasury Department's Office of Financial Research (OFR), announced plans to produce three Treasury repo reference rates based on overnight Treasury repo transactions, in order to improve repo market transparency.^b This effort reflects the critical role that secured money markets—the Treasury repo market in particular—play in the efficient functioning of financial markets and the implementation of monetary policy, as well as policymaker interest in making more data on the Treasury repo market available to the public.

The Federal Reserve now produces the following reference rates based on data from various segments of the repo market: (1) the Tri-party General Collateral Rate (TGCR), a rate based on non-centrally-cleared tri-party

repo transactions other than the Federal Reserve's transactions in this market; (2) the Broad General Collateral Rate (BGCR), a rate based on the same data as the TGCR plus tri-party transactions within The Depository Trust & Clearing Corporation's GCF Repo[®] Service; and (3) the Secured Overnight Financing Rate (SOFR), a rate based on the same transaction-level data as the BGCR plus FICC-cleared bilateral repo transactions (see diagram).^c These rates, first published in April 2018, are reliable measures of market activity because they are anchored in active underlying markets, are based on a comprehensive set of transactions with controls to mitigate risks related to potential errors and manipulation, are capable of being published every day even in adverse circumstances, and are inclusive of multiple repo market segments, allowing for future market evolution.

In June 2017, the Alternative Reference Rates Committee (ARRC), a group convened by the Federal Reserve in cooperation with the Treasury Department and the Commodity Futures Trading Commission (CFTC) in 2014 to identify a robust alternative to

Composition of Treasury Market Repo Reference Rates



U.S. dollar LIBOR, selected the SOFR as “best practice for use in certain new U.S. dollar derivatives and other financial contracts.”^d While the Federal Reserve has not historically produced rates with the explicit goal of having them referenced in financial contracts, the rates have nonetheless been frequently used for this purpose. Therefore, the Federal Reserve is committed to administering the rates in a manner consistent

with the Principles for Financial Benchmarks published by the International Organization of Securities Commissions (IOSCO). Accordingly, in early 2018, the New York Fed released a Statement of Compliance confirming that the EFFR and OBFR were in compliance with the IOSCO Principles. The New York Fed intends to update this statement in the second quarter of 2018 to cover the TGCR, BGCR, and SOFR as well.^e

^aFor 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>. For more information on the overnight bank funding rate, see Marco Cipriani, Julia Gouny, Matthew Kessler, and Adam Spiegel, “The New Overnight Bank Funding Rate,” *Liberty Street Economics*, November 9, 2015, <http://libertystreeteconomics.newyorkfed.org/2015/11/the-new-overnight-bank-funding-rate.html#.Vth1OXIUXcs>.

^bIn May 2017, these plans were refined to include cleared bilateral transactions from The Depository Trust & Clearing Corporation's (DTCC) Fixed Income Clearing Corporation (FICC) and to exclude Federal Reserve open market operations in the broadest measure of the Treasury financing rate. For further details about FICC-cleared bilateral repo data and the reference rates, see <https://www.federalreserve.gov/econresdata/notes/feds-notes/2017/cleared-bilateral-repo-market-and-proposed-repo-benchmark-rates-20170227.html>.

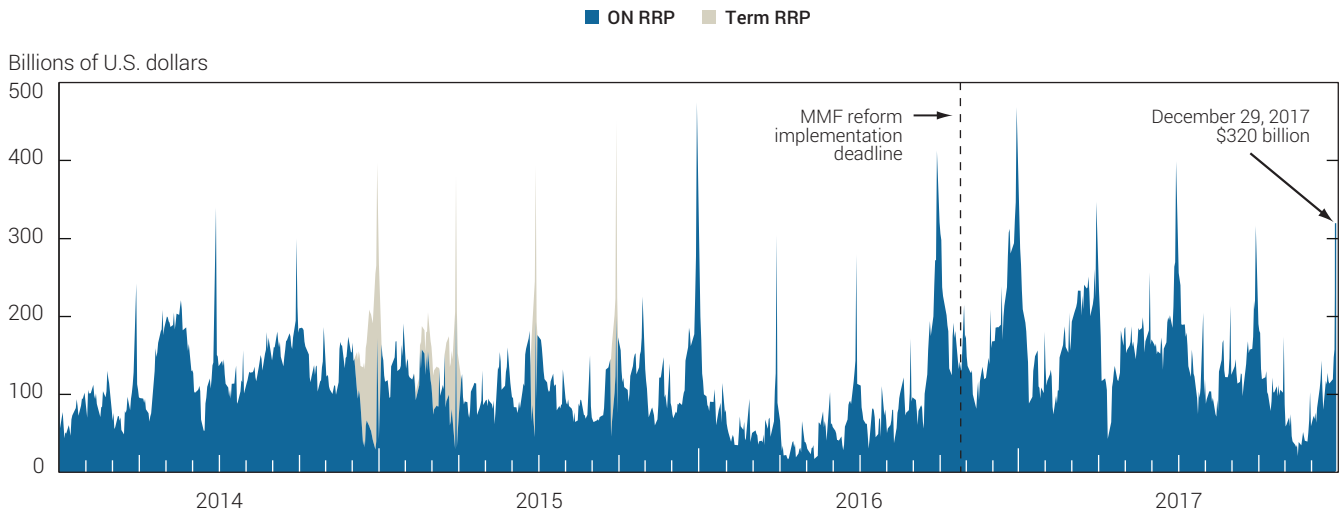
^cTo mitigate the potential influence of Treasury securities trading with a scarcity premium, a portion of the transactions in the FICC-cleared bilateral repo market conducted at lower rates are trimmed from the calculation of the SOFR. For additional information about the production of these reference rates, see <https://www.federalregister.gov/documents/2017/12/12/2017-26761/production-of-rates-based-on-data-for-repurchase-agreements>.

^dFor additional information about the Alternative Reference Rates Committee, see <https://www.newyorkfed.org/arrc/index.html>.

^eFor more discussion of money market reference rates, see Lorie Logan, “The Role of the New York Fed as Administrator and Producer of Reference Rates” (remarks at the Annual Primary Dealer Meeting, Federal Reserve Bank of New York, January 9, 2018).

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Chart 1

Reverse Repo Amounts Outstanding

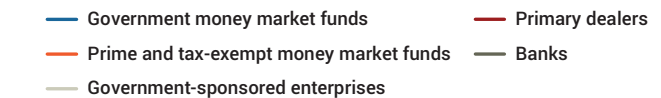
Source: Federal Reserve Bank of New York.

Note: Figures are daily.

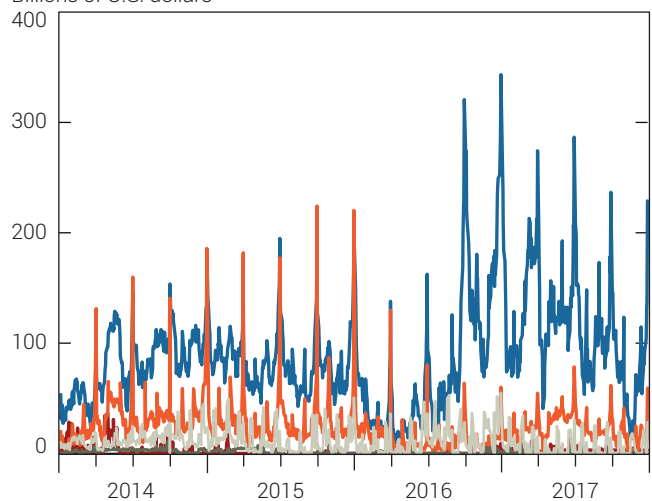
securities available for the operation, awards were always made at the specified offering rate to all counterparties.⁷

Operational results. On average, daily take-up in the ON RRP operations was higher in 2017 than in previous years, reflecting a broad increase in demand from government money market mutual funds (MMFs), which accounted for about 90 percent of ON RRP demand in 2017 (**Chart 1**). This increased demand started in 2016 ahead of the implementation of MMF reform in the latter part of that year, a development that prompted many investors to shift into government MMFs and out of prime MMFs. This shift led to higher overall demand for assets eligible for investment by government MMFs, including ON RRP (**Chart 2**). However, as the availability of alternative investment options at more attractive rates, such as repos with securities dealers, increased in 2017, ON RRP take-up trended downward. Daily ON RRP take-up excluding month-end dates averaged \$165 billion in the first half of 2017 and \$113 billion in the second half, reaching an eighteen-month low of \$21 billion in mid-November.⁸ By comparison, the 2016 daily take-up excluding month-end dates averaged \$98 billion.

Chart 2

Reverse Repo Amounts Outstanding by Counterparty Type

Billions of U.S. dollars



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.

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ON RRP take-up on quarter-end dates in 2017 averaged \$345 billion and was within the range of RRP use over quarter-ends in recent years. The temporary elevation in ON RRP use over quarter-ends reflected reduced availability of other investments on dates when some financial institutions—most notably, some foreign institutions that play a major role in U.S. money markets—recorded financial results and regulatory ratios to report to investors and regulators.⁹ The primary driver of increased ON RRP take-up over quarter-ends shifted from prime to government MMFs, consistent with the marked shift in assets from prime to government MMFs in 2016.

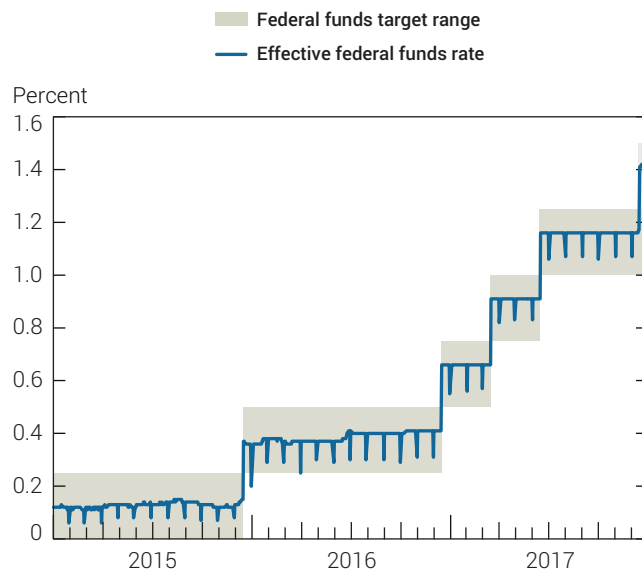
MONEY MARKET DEVELOPMENTS

Use of IOER, with support from ON RRPs, successfully maintained the effective federal funds rate—a measure of conditions under which depository institutions and other eligible entities conduct overnight unsecured transactions in central bank balances in the federal funds market—within the FOMC’s target range throughout the year (Chart 3). The average effective federal

funds rate rose by roughly 25 basis points with each increase in the federal funds target range: it averaged 66 basis points on non-month-end dates from January 1 through March 15, 91 basis points from March 16 through June 14, 116 basis points from June 15 through December 13, and 142 basis points from December 14 through December 31. The distribution of traded rates in the federal funds market rose in parallel with the increase in the effective federal funds rate, and the distribution around the effective federal funds rate generally remained the same (Chart 4). In line with typical patterns, the effective rate declined temporarily on month-end dates; however, it remained within the FOMC’s target range. (Further discussion of the money market dynamics at month- and year-ends can be found in Box 2 in the “Money Market Developments” section of *Domestic Open Markets Operations during 2016*.)

Although the FOMC communicates its monetary policy stance using the federal funds rate, successful transmission of monetary policy depends on that stance passing through to other money market rates, and ultimately affecting financial conditions and the broader economy.

Chart 3
Federal Funds Target Range and Effective Federal Funds Rate



Source: Federal Reserve Bank of New York.

Note: Figures are daily.

Data from a range of money markets demonstrate that the monetary policy implementation framework was also successful in transmitting the monetary policy stance across a broad constellation of short-term rates. Overnight rates in both secured and unsecured money markets moved up roughly 25 basis points with the increases in the effective federal funds rate following the FOMC’s March, June, and December meetings, and fluctuated within generally stable ranges over the course of the year (Chart 5). The ON RRP offering rate provided a floor beneath most overnight money market rates, including rates on overnight transactions for tri-party repos of Treasury securities, agency debt, and agency MBS collateral. The expected increase in overnight rates passed through into term money market instruments. Rates on a range of one- and three-month instruments generally rose in tandem with increases in the FOMC’s target range (Chart 6).

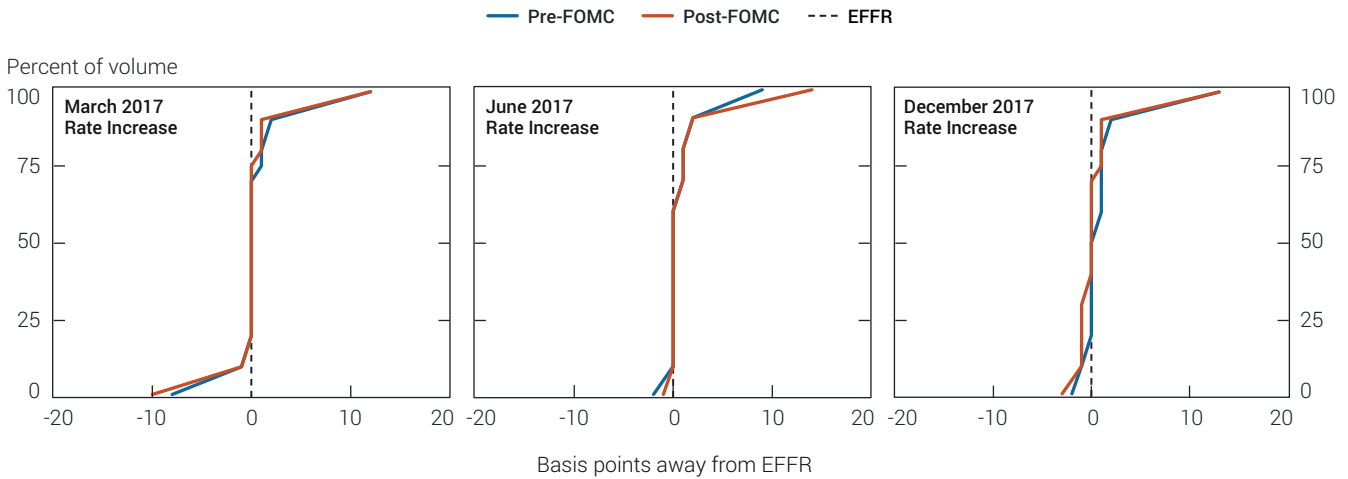
BALANCE SHEET MANAGEMENT

For the first three quarters of 2017, the FOMC maintained the size of the Federal Reserve’s balance sheet by directing the Desk to continue rolling over maturing Treasury securities at auction

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Chart 4

Average Distribution of Overnight Federal Funds Rates around the Effective Federal Funds Rate (EFFR)



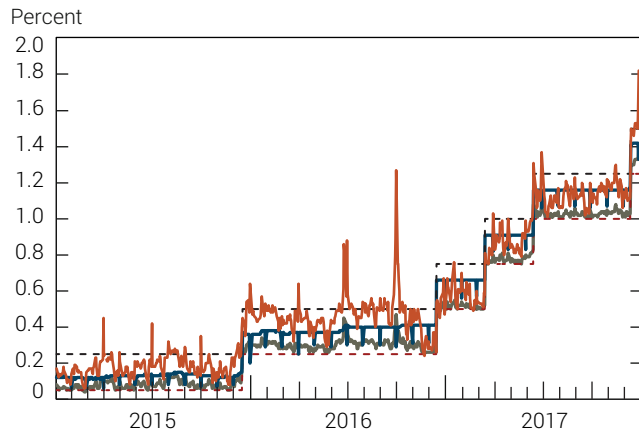
Source: Federal Reserve Bank of New York.

Notes: Each period comprises the ten non-month-end business days prior to and following a change to the federal funds target range. Distributions represent the volume-weighted 1st, 10th, 20th, 25th, 30th, 40th, 50th, 60th, 70th, 75th, 80th, 90th, and 99th percentiles of the spread between rates on federal funds transactions reported in the FR2420 *Report of Selected Money Market Rates* at the time of publication and the concurrent EFFR.

Chart 5

Overnight Money Market Rates

- Rate of interest on excess reserves
- Treasuries – DTCC GCF Repo Index
- Effective federal funds rate
- Tri-party (ex-GCF/Fed) Treasury GC repo median rate
- ON RRP offering rate



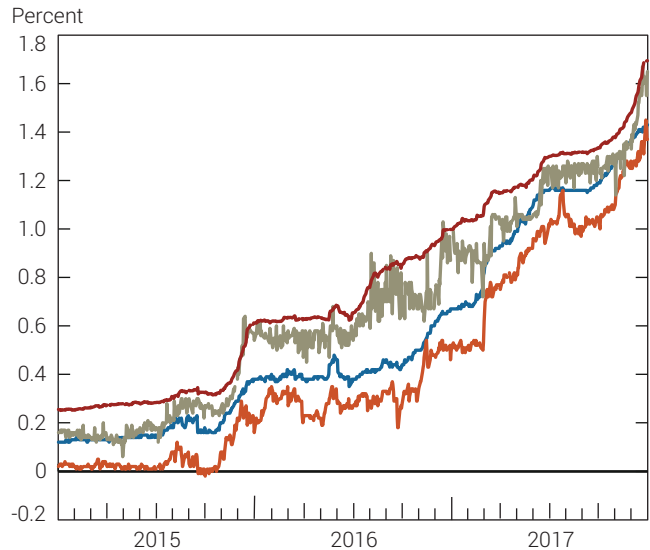
Sources: Federal Reserve Bank of New York; DTCC Solutions LLC, an affiliate of The Depository Trust & Clearing Corporation; Bank of New York Mellon; JPMorgan Chase.

Note: Figures are daily.

Chart 6

Three-Month Money Market Rates

- LIBOR
- AA financial commercial paper
- Overnight indexed swap
- U.S. Treasury bill



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

Note: Figures are daily.

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and to continue reinvesting principal payments on all agency debt and agency MBS in agency MBS. In September 2017, the FOMC directed the Desk to begin balance sheet normalization in October by gradually reducing the Federal Reserve’s securities holdings (see **Box 1, p. 4**).

TREASURY SECURITIES OPERATIONS

Through most of 2017, the FOMC continued to direct the Desk to roll over all maturing Treasury securities into new Treasury issues at auction. Beginning in October 2017, the FOMC directed the Desk to roll over principal payments from maturing Treasury securities in excess of the monthly cap amount, which was \$6 billion per month through the end of 2017.

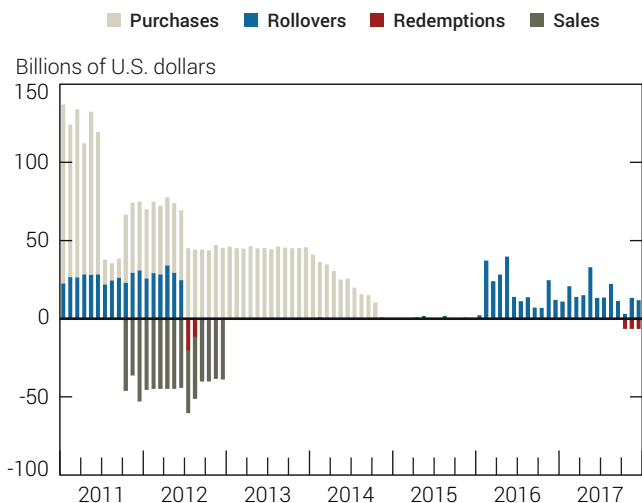
Rollovers

Operational approach. In line with long-standing practice, the Desk conducts Treasury rollovers by placing noncompetitive bids for the SOMA at Treasury auctions; these bids are treated as additions to announced auction sizes. From January through September of 2017, Treasury rollovers were equal in amount to the principal payments on holdings maturing on the issue date of the securities being auctioned. Starting in October, the Desk began to roll over the

portion of monthly principal payments from the SOMA holdings of maturing Treasury securities that exceeded the \$6 billion cap for that month, allocating that amount between the mid-month and end-of-month maturity dates in proportion to the amount of SOMA securities scheduled to mature on those dates.¹⁰ Bids for the SOMA securities at Treasury auctions were allocated across the securities being auctioned in proportion to their announced offering amount.¹¹

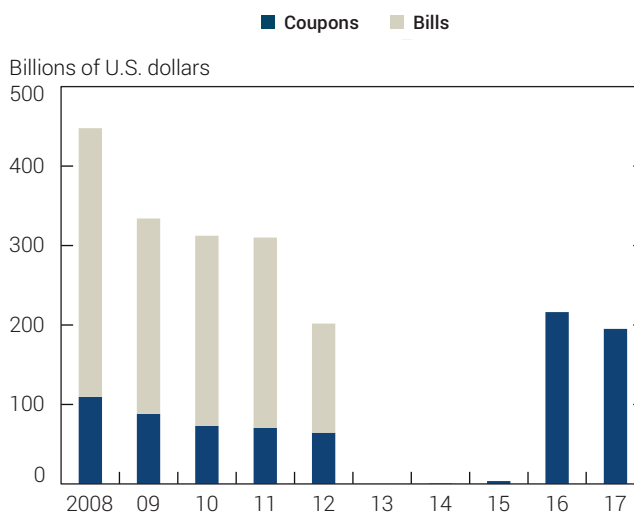
Operational results. The Desk rolled over \$177 billion in Treasury securities holdings in 2017, down from \$216 billion in the preceding year. The decline was primarily the result of fewer maturities over the year and the redemption caps in the last quarter (**Chart 7**). Specifically, the Desk redeemed \$18 billion in securities holdings in the fourth quarter of 2017 because of the redemption caps. However, rollovers remained significantly above their negligible levels in 2013-15, when the SOMA had few maturities as a result of the Federal Reserve’s sales and redemptions of its shorter-term securities during the Maturity Extension Program that ran from September 2011 through December 2012 (**Chart 8**). The profile of securities acquired at

Chart 7
SOMA Treasury Transactions and Redemptions



Source: Federal Reserve Bank of New York.

Chart 8
Maturities of SOMA Treasury Securities

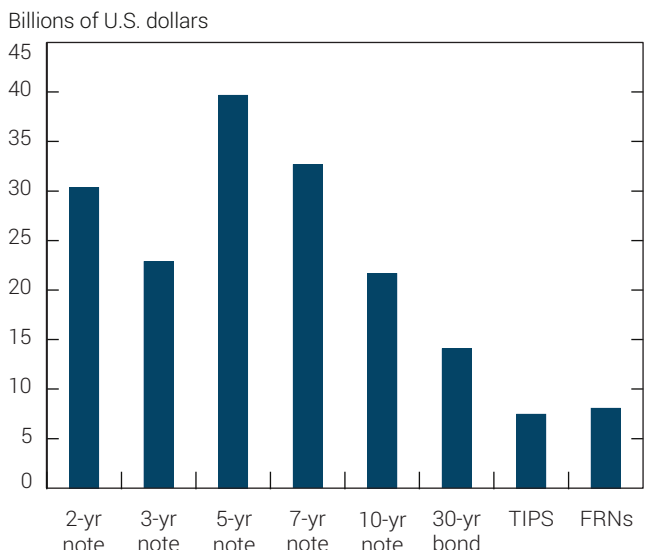


Source: Federal Reserve Bank of New York.

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

OPEN MARKET OPERATIONS DURING 2017

Chart 9
Distribution of SOMA Rollovers in 2017



Source: Federal Reserve Bank of New York.
 Note: Bars show the cumulative amount of Treasury securities acquired at each maturity point through rollovers in 2017.

auction is driven both by the distribution of SOMA maturities across issuance dates and the Treasury’s auction calendar. As a result, in 2017, a majority of the SOMA’s maturing Treasury securities were rolled into two-, five-, and seven-year Treasury securities (**Chart 9**).

AGENCY MBS OPERATIONS

Through most of 2017, the FOMC continued to direct the Desk to reinvest principal payments received from holdings of agency debt and agency MBS in agency MBS. Beginning in October 2017, the FOMC directed the Desk to reinvest these principal payments only to the extent that they exceeded the monthly cap amount, which was \$4 billion per month through the end of 2017. The FOMC also directed the Desk to conduct dollar rolls and coupon swaps as necessary to facilitate settlement of the Federal Reserve’s agency MBS transactions.

Reinvestments

Operational approach. As has been the case since the inception of the agency MBS purchase program, the Desk purchased MBS guaranteed by the two government-sponsored enterprises—

Fannie Mae and Freddie Mac—and by the government corporation Ginnie Mae. Purchases were concentrated in newly produced coupons in thirty- and fifteen-year securities in the “to-be-announced” (TBA) market, because these securities are closely linked to new primary issuance and, accordingly, are tied to primary mortgage rates.¹²

The Desk determined the amount to purchase each reinvestment period and conducted purchases between the middle of one month and the middle of the following month. Prior to October 2017, 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. Starting in October 2017, the Desk calculated this amount by subtracting the \$4 billion cap from the amount of principal payments from agency debt and agency MBS expected to be received during each calendar month.¹³

The Desk published a tentative amount of reinvestments for the upcoming purchase period on or around the ninth business day of each month. The Desk also published a tentative schedule of planned agency MBS operations 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 security.

The Desk conducted operations over FedTrade with primary dealer counterparties 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 below 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.

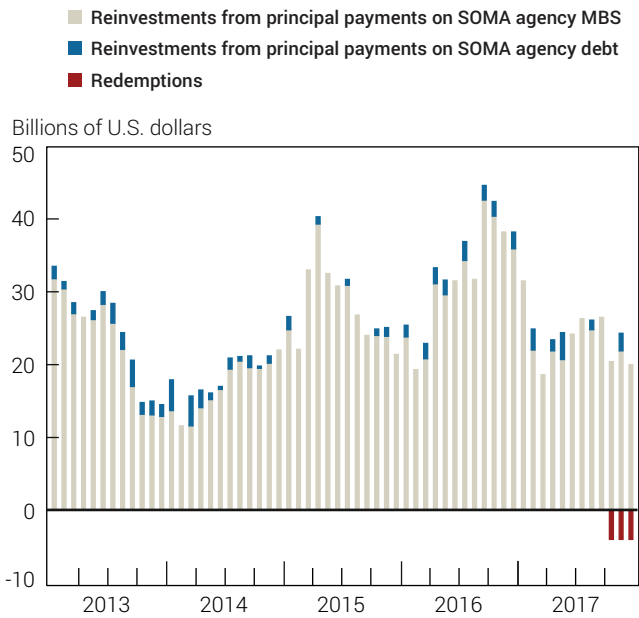
The Desk’s TBA purchases can settle—meaning that securities are delivered to the Federal Reserve—up to three months after the trade date. Given the forward exposure, the Desk required counterparties to post margin on their unsettled trade amounts. The margin was calculated daily and served to protect the Federal Reserve from exposure to counterparties obligated to deliver securities in the future.

OPEN MARKET OPERATIONS DURING 2017

Operational results. The Desk received \$303 billion in principal payments from agency debt and agency MBS in 2017 (Chart 10). Given the monthly cap of \$4 billion on redemptions in the final three months of the year, \$12 billion of principal payments were redeemed and \$291 billion of total principal payments were reinvested into agency MBS. Principal payments decreased \$93 billion from \$396 billion in 2016 as a sharp increase in the thirty-year primary mortgage rate in late 2016 led to lower refinancing activity the following year.

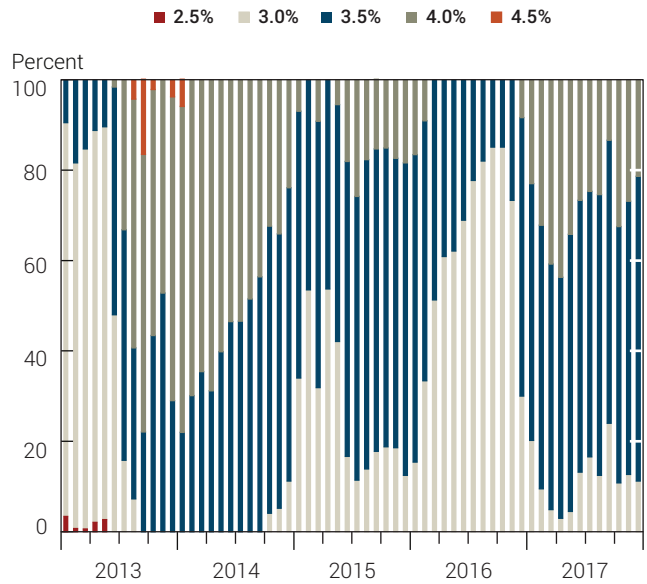
The increase in yields in late 2016, which resulted in higher primary mortgage rates on average in 2017 than in 2016, also drove a moderate increase in the market’s production of higher-coupon agency MBS. This development prompted the Desk to shift the bulk of its thirty-year purchases from 3.0 percent coupons in 2016 to 3.5 percent coupons in 2017. Similarly, purchases of fifteen-year securities shifted from primarily 2.5 percent coupons in 2016 to 3.0 percent coupons in 2017 (Charts 11 and 12).

Chart 10
SOMA Reinvestments and Redemptions



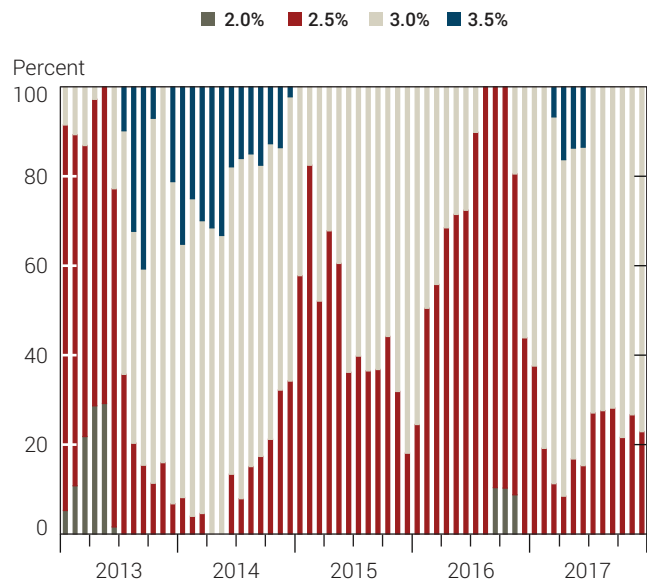
Source: Federal Reserve Bank of New York.
Note: Reinvestment purchases of agency MBS occur from mid-month to the following mid-month.

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



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

Chart 12
SOMA Purchases of Fifteen-Year Agency MBS by Coupon



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

OPEN MARKET OPERATIONS DURING 2017

Nearly 90 percent of the Desk's purchases in 2017 were of thirty-year Fannie Mae, Freddie Mac, and Ginnie Mae 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 24 percent of issuance of fixed-rate agency MBS over the course of 2017 (Table 2), down from last year's average of 27 percent of issuance. The decrease was attributable to a faster decline in the amount of Desk purchases than in gross issuance.

Dollar Rolls and Agency MBS Market Functioning

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 during the time between a transaction's trade date and its settlement date. In these instances, and in accordance with the FOMC's directive, the Desk could conduct dollar roll sales to facilitate settlement.¹⁴ Dollar roll sales allow 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. The Desk's dollar roll transactions are conducted over TradeWeb, a commercial trading platform.

Settlement of the Desk's agency MBS reinvestment transactions was smooth throughout 2017. As a consequence, the volume of dollar roll sales was very small, representing an average of 0.8 percent of the Desk's expected agency MBS settlements during the year (Chart 13). 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.¹⁵ Indeed, broad indicators of market functioning and liquidity conditions in the agency MBS market were steady or improved in 2017. For example, measures of aggregate trading activity, such as transaction volume and average trade size, increased slightly over the year. Measures of transaction costs and the price impact of trades were stable throughout most of 2017, and were lower on net over the year.

Table 2

Distribution of Agency MBS Operations in 2017

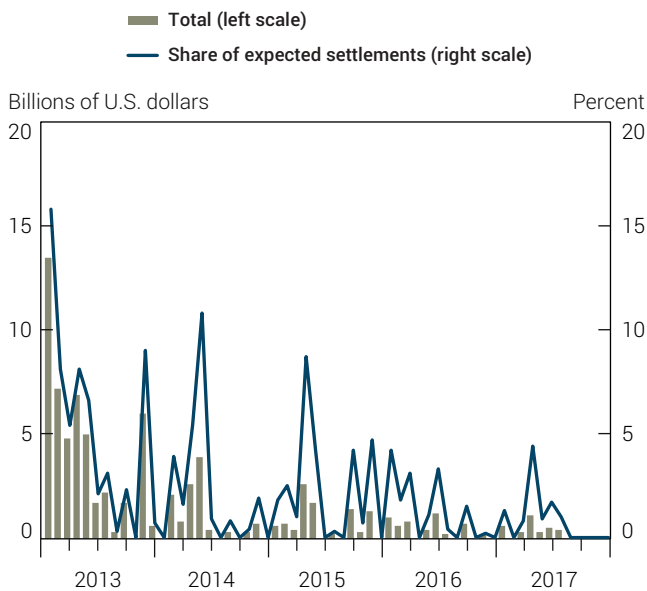
Agency	Coupon (Percent)	SOMA Purchases (Billions of U.S. Dollars)	SOMA Purchases as a Share of Gross Issuance (Percent)
30-year			
Fannie Mae	3.0	10.7	39
	3.5	55.2	30
	4.0	30.7	22
Freddie Mac	3.0	7.5	26
	3.5	39.5	29
	4.0	22.2	26
Ginnie Mae	3.0	15.3	21
	3.5	62.6	29
	4.0	21.9	21
Subtotal		265.6	24
15-year			
Fannie Mae	2.5	4.4	32
	3.0	14.2	37
	3.5	0.8	8
Freddie Mac	2.5	3.1	23
	3.0	9.6	36
	3.5	0.6	11
Subtotal		32.7	28
Total		298.3	24

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

Notes: Figures are for calendar year 2017 and are rounded. SOMA purchases as a share of gross issuance considers fixed-rate agency MBS issued in 2017, including non-TBA-eligible securities. Subtotal shares are calculated using gross issuance of all coupons with original terms to maturity of fifteen or thirty years, including those not purchased for the SOMA. Total share is calculated using gross issuance of all coupons and all original terms to maturity.

OPEN MARKET OPERATIONS DURING 2017

Chart 13
SOMA Dollar Roll Sales



Source: Federal Reserve Bank of New York.

Note: Figures are monthly by settlement month.

CUSIP Aggregation

In 2017, 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 agency backing, coupon, and original term to maturity—are consolidated into a larger pass-through security.¹⁶ 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 lower operational risk, simplify back-office portfolio administration, and trim custodial costs, which are assessed on a per-CUSIP basis. In 2017, nearly 7,724 CUSIPs were aggregated into 36 new agency MBS, with a face value of approximately \$119 billion at the time of issuance. Since the beginning of the 2015 CUSIP aggregation initiative, nearly 61,014 CUSIPs have been consolidated into 259 new agency MBS, with a face value of roughly \$1.22 trillion at the time of issuance. As a result of these aggregations, as well as ongoing

purchases, the SOMA agency MBS portfolio held 40,615 CUSIPs at the end of 2017.

Securities Lending and Treasury Market Functioning

To support the effective conduct of open market operations, the FOMC has authorized the Desk 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 Treasury securities, especially those in which the SOMA holds a significant market share, may help to mitigate periods of scarcity or elevated fails.

OPERATIONAL APPROACH

In 2017, 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 at noon each business day. Primary dealers bid 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 loans were for an overnight term.¹⁷ Dealers borrowing securities were required to pledge other Treasury securities to the New York Fed, plus margin, as collateral for the securities loan.

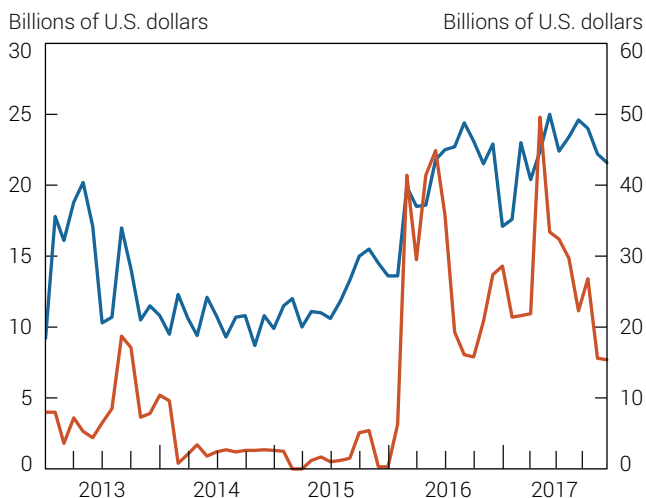
OPERATIONAL RESULTS

Securities lending volumes in Treasury securities remained elevated in 2017 at an average of \$22 billion per day, similar to last year's levels, but notably above average volumes of about \$10 billion to \$15 billion per day in the 2009-15 period (**Chart 14**). The increase in SOMA lending volumes over the past two years occurred across a range of security types, including on-the-run securities, near-off-the-run securities, securities considered the cheapest to deliver into futures contracts, and securities trading with a premium in the collateral market for specific securities. Lending in on-the-run securities, considered the most liquid and sought-after SOMA

OPEN MARKET OPERATIONS DURING 2017

Chart 14
SOMA Securities Lending in Treasuries

— Securities lending (left scale)
 — SOMA holdings of on-the-run Treasury securities (right scale)



Source: Federal Reserve Bank of New York.
 Note: Figures are monthly averages of daily lending results and holdings.

holdings, reached about \$4 billion per day on average. As in 2016, the Desk was able to lend a larger volume of on-the-run and recently off-the-run securities than in prior years, as Treasury rollover activity into newly issued securities continued to sustain the SOMA’s available pool of on-the-run and recently off-the-run Treasuries.

Despite the increased lending volume of these securities, the volume-weighted average accepted bid fee on SOMA securities fell to roughly 10 basis points, from roughly 14 basis points in

2016. The decline can generally be attributed to a decrease in the number of discrete episodes of on-the-run securities trading with an extreme scarcity premium compared with the previous year.

Lending of on-the-run securities in 2017 continued to be driven by 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, they are typically more costly to procure in the Treasury financing markets than general Treasury collateral. In 2017, this dynamic led to severe episodes of settlement fails for on-the-run securities that mirrored similar episodes experienced in 2016, though they occurred with less frequency. In addition, with ongoing Treasury rollovers, the SOMA continued to acquire additional on-the-run Treasury securities that became available for lending, helping to satisfy the increased demand and sustain SOMA securities lending activity.

While the Treasury market experienced some settlement strains during 2017, 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 \$20 million of agency debt securities per day in 2017, a low level consistent with levels observed in prior years. Loans of agency debt were collateralized with Treasury securities.

OPEN MARKET OPERATIONS DURING 2017



Foreign Open Market Operations

Consistent with activity in recent years, the Desk conducted two types of foreign currency operations for the SOMA in 2017—the investment of SOMA foreign reserves and the execution of standing dollar liquidity swap arrangements with foreign central banks.¹⁸

Foreign Reserves Management

The Federal Reserve holds euro- and yen-denominated assets, which are invested to ensure sufficient liquidity to meet anticipated foreign exchange intervention needs.¹⁹ The stock of foreign reserves is largely a result of past intervention in foreign exchange markets. The FOMC and U.S. Treasury make decisions on foreign exchange intervention activity; in 2017, the Desk was not directed to undertake any such activity.

INVESTMENT APPROACH

The Desk is directed by the FOMC to manage the SOMA's foreign currency holdings in a manner that ensures sufficient liquidity, maintains a high degree of safety, and, once these objectives have been met, provides the highest rate of return possible in each currency. Accordingly, the Desk passively manages its foreign currency reserve holdings against an internal asset allocation target, which is determined based on the FOMC's stated objectives and updated on an annual basis. In 2017, the SOMA's foreign currency reserves were invested on an outright basis in German, French, Dutch, and Japanese government securities. Foreign currency reserves may also be invested in deposits at the Bank for International Settlements, and at foreign central banks such as the Deutsche Bundesbank, Banque de France, and Bank of Japan.

OPERATIONAL APPROACH

In 2017, the Desk typically conducted foreign sovereign debt transactions in the secondary market with commercial counterparties over TradeWeb, a commercial trading platform; in some instances, transactions were conducted over the phone. To ensure execution at competitive prices, the Desk solicited offers for individual securities from multiple counterparties simultaneously.

INVESTMENT ACTIVITY

The Desk purchased foreign sovereign debt securities in the secondary market in order to meet its target portfolio allocation. The Desk also continued to maintain holdings of cash in various official accounts. As of year-end 2017, the SOMA foreign currency portfolio totaled \$21.3 billion, compared with \$19.4 billion at the end of 2016. Since no transactions associated with foreign exchange intervention were undertaken, changes in the portfolio's U.S. dollar value largely reflected the change in the foreign exchange value of the dollar against the euro and Japanese yen over the year.²⁰ (Foreign currency-denominated holdings are described further in the “Balance Sheet Developments” section of this report.)

Central Bank Liquidity Swaps

The FOMC continued to authorize and direct the Desk to maintain standing dollar and foreign currency swap lines with a network of five other major central banks—the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank.²¹ The swap lines, which involve a temporary exchange of currencies between two central banks, are designed to improve liquidity conditions in funding markets in the United States and abroad by providing foreign central banks with the

OPEN MARKET OPERATIONS DURING 2017

capacity to deliver U.S. dollar funding to institutions in their jurisdictions during times of market stress. Likewise, the swap lines provide the Federal Reserve with the capacity to offer liquidity in foreign currencies to U.S. financial institutions should the FOMC judge that such actions are appropriate. These arrangements have helped to ease strains in financial markets and mitigate their effects on economic conditions. The swap lines support financial stability and serve as a prudent liquidity backstop.

OPERATIONAL APPROACH

In a U.S. dollar liquidity swap, a foreign central bank (FCB) transfers a specified amount of its currency to the New York Fed in exchange for dollars at the prevailing market exchange rate. At the same time, the New York Fed and the FCB agree that the transfer will unwind on a specified future date at the same exchange rate as the initial transaction. At the conclusion of the second transaction, the FCB compensates the New York Fed at a market-based interest rate.²² Liquidity swaps are priced at the U.S. dollar overnight indexed swap rate plus 50 basis points.

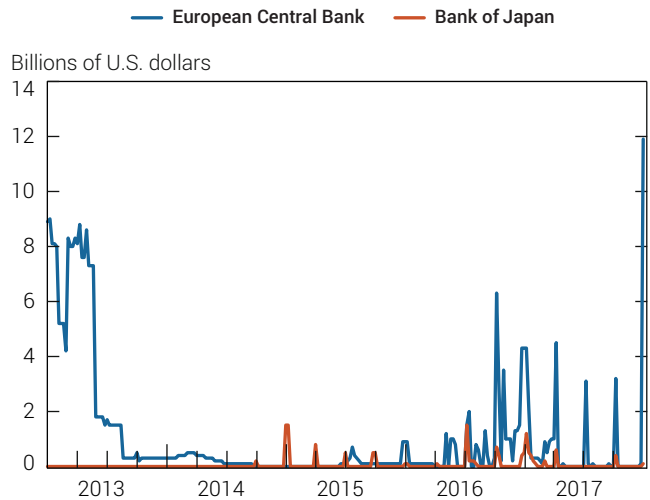
The Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank currently hold weekly dollar liquidity-providing operations according to a schedule approved by the Chairman of the FOMC. When these operations are utilized, the foreign central bank requests a draw on the U.S. dollar liquidity swap arrangements.

OPERATIONAL RESULTS

Total dollar volume of liquidity swap transactions fell 18 percent from 2016 to 2017. During most of 2017, foreign exchange swap basis spreads were narrower than the levels prevalent in the second half of 2016, resulting in smaller draws on the swap lines in 2017 outside of quarter-ends. In particular, following slightly higher demand in the first quarter, dollar liquidity swap draws generally remained at low levels over non-quarter-end periods, with European Central Bank draws ranging from \$35 million to \$85 million, and Bank of Japan draws rising no higher than \$3 million.

Chart 15

Foreign Exchange Liquidity Swaps Outstanding



Source: Federal Reserve Bank of New York.

Note: Figures are weekly.

Outstanding swaps increased to \$12 billion at year-end 2017, well above the \$6 billion seen at the end of 2016. Banks' cautious balance sheet management around key reporting dates, and especially at year-end, contributed to a temporarily reduced supply of U.S. dollar funding in private markets—a dynamic similar to that observed in domestic money markets. This reduction in supply placed upward pressure on the implied cost of borrowing U.S. dollars offshore through the foreign exchange market and thereby made dollar borrowing through foreign central banks' liquidity swap operations relatively attractive. During 2017, the European Central Bank swap line draws increased to between \$3.1 billion and \$4.5 billion around the March, June, and September quarter-ends, with some banks seeking alternative sources of dollar liquidity as average dollar funding costs through the foreign exchange swap market increased over these reporting periods (**Chart 15**). The Bank of Canada, Bank of England, and Swiss National Bank did not utilize their central bank liquidity swap lines; similarly, the Federal Reserve did not draw on its foreign currency liquidity swap lines in 2017.

OPEN MARKET OPERATIONS DURING 2017

Operational Flexibility and Resiliency

In 2017, the Desk continued to enhance its operational flexibility and resiliency by maintaining a robust and geographically dispersed network of counterparties and Desk operations, and by undertaking operational readiness exercises.

Counterparties

The Desk relies on a robust network of trading counterparties to supply the necessary operational capacity to execute domestic and foreign open market operations and to provide insight on global financial market developments that can help inform monetary policy formulation and execution. The Desk seeks to maintain a diverse and geographically dispersed network of counterparties to ensure that it can continue to conduct open market operations in a range of scenarios.

PRIMARY DEALERS

Primary dealers are trading counterparties of the New York Fed in its implementation of monetary policy, and are expected to participate consistently and competitively in open market operations. They are also expected to make markets for the New York Fed on behalf of its official account holders as needed, and to bid on a pro rata basis in all Treasury auctions 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. There were twenty-three primary dealers in 2017.

REVERSE REPURCHASE AGREEMENT COUNTERPARTIES

To enhance its ability to support the monetary policy objectives of the FOMC, the New York Fed, in addition to its trading

relationship with primary dealers, 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, 2017, there were 130 RRP counterparties, comprising 100 money market funds from 30 investment managers, 14 government-sponsored enterprises, and 16 banks.

FOREIGN EXCHANGE COUNTERPARTIES

Foreign exchange counterparties are trading counterparties of the New York Fed in its foreign exchange operations on behalf of the Federal Reserve and the U.S. Treasury. They are also expected to make reasonable markets for Desk transactions that relate to the currency needs of the New York Fed's official account holders and agencies of the U.S. government. The Desk also relies on its foreign exchange counterparties for ongoing insight into global financial market developments as it conducts daily market monitoring activities to support the formulation and implementation of policy by U.S. monetary authorities. Foreign exchange counterparties are expected to provide competitive two-way pricing, as needed, to support the Desk's periodic foreign exchange operations. There were twenty-one foreign exchange counterparties in 2017.

FOREIGN RESERVES MANAGEMENT COUNTERPARTIES

The New York Fed transacts with foreign reserves management counterparties to invest the foreign currency reserves of the Federal Reserve and the U.S. Treasury. These counterparties are expected to participate consistently and competitively in the

OPEN MARKET OPERATIONS DURING 2017

Table 3

Small-Value Exercise Results in 2017: Domestic Operations

Operation Type	Operation Date	Maximum Amount (Millions of U.S. Dollars)	Operation Amount (Millions of U.S. Dollars)	Additional Information
Repurchase agreements	May 10	75	62	Term tenor; multi-tranche (Treasury, agency, and agency MBS)
	May 24	75	62	Overnight tenor; multi-tranche (Treasury, agency, and agency MBS)
	November 8	75	65	Term tenor; multi-tranche (Treasury, agency, and agency MBS)
	November 20	75	66	Overnight tenor; multi-tranche (Treasury, agency, and agency MBS)
Reverse repurchase agreements	May 16	175	112	Term tenor; Treasury collateral
	May 22	25	21	Overnight tenor; agency MBS collateral
	November 13	175	109	Term tenor; Treasury collateral
	November 16	25	22	Overnight tenor; agency MBS collateral
Treasury outright purchases	March 22	200	200	20–30 year sector
	September 6	200	200	7–10 year sector
Treasury outright sales	May 11	200	200	4–6 year sector
	December 6	200	200	20–30 year sector
Agency MBS outright sales	April 18	90	68	3 specified pools
	April 20	90	76	3 specified pools
	April 25	20	12	1 basket of 13 specified pools
	November 28	90	84	3 specified pools
	November 29	90	84	3 specified pools
Agency MBS coupon swaps			5	Sell Fannie Mae 30-year 3.5% Buy Fannie Mae 30-year 4.0%
	May 23-24	{20}	5	Sell Ginnie Mae II 30-year 4.0% Buy Fannie Mae 30-year 3.5%
			5	Sell Fannie Mae 15-year 2.5% Buy Fannie Mae 15-year 3.0%
			5	Sell Freddie Mac 30-year 4.0% Buy Freddie Mac 30-year 3.5%
	October 24-25	{20}	5	Sell Fannie Mae 30-year 4.0% Buy Fannie Mae 30-year 3.0%
			5	Sell Freddie Mac 30-year 3.5% Buy Freddie Mac 30-year 4.0%
			5	Sell Freddie Mac 15-year 2.5% Buy Freddie Mac 15-year 3.0%
			5	Sell Ginnie Mae II 30-year 4.0% Buy Ginnie Mae II 30-year 3.5%

Source: Federal Reserve Bank of New York.

Notes: Figures may be rounded. Because of technical difficulties, the August 10, 2017, securities lending small-value exercise was canceled.

OPEN MARKET OPERATIONS DURING 2017

Desk's periodic investment operations. There were twenty-two foreign reserves management counterparties in 2017.

Operational Readiness

Over the course of 2017, the Desk conducted small-value exercises in both domestic and foreign financial markets for the purpose of testing operational readiness. Small-value exercises involve end-to-end processes, from trading execution through settlement, and are relatively modest in size. The purpose of these exercises is to maintain the technical capability to execute a range of policy implementation operations. Small-value exercises are not executed to fulfill a policy directive, and thus the selection of an operation for testing should not be interpreted as a signal about the future timing or direction of changes in policy.

Consistent with the limits in the Authorization for Domestic Open Market Operations approved by the FOMC, the aggregate par value

of domestic outright operations conducted for the purpose of testing operational readiness did not exceed \$5 billion per calendar year, and the outstanding amount of repo and reverse repo transactions conducted for this purpose did not exceed \$5 billion at any given time. Domestic small-value exercises were announced in advance and results were posted on the New York Fed's website (**Table 3**).

Consistent with the limit in the Authorization for Foreign Currency Operations approved by the FOMC, the aggregate amount of foreign currency operations conducted for the purpose of testing operational readiness did not exceed \$2.5 billion per calendar year (**Table 4**). The results of small-value liquidity swap transactions were posted on the New York Fed's website, and information about small-value foreign currency operations was included in the *Treasury and Federal Reserve Foreign Exchange Operations* quarterly reports.

In addition, the Federal Reserve Board periodically tested the Term Deposit Facility (TDF), through which it offers interest-bearing

Table 4

Small-Value Exercise Results in 2017: Foreign Operations

Operation Type	Operation Date	Operation Amount	Additional Information
Repurchase agreements	February 15	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
	April 18	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
	July 11	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
	October 10	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
Reverse repurchase agreements	May 9	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
	November 7	€1 million	Overnight tenor; euro-denominated sovereign debt obligations
Sovereign debt sales	March 27	€1 million	Sale of euro-denominated sovereign debt obligations
	June 18	¥100 million	Sale of yen-denominated sovereign debt obligations
Liquidity swaps	March 22	CAD 51,000	Liquidity swap with the Bank of Canada
	March 27	€51,000	Liquidity swap with the European Central Bank
	April 20	CHF 51,000	Liquidity swap with the Swiss National Bank
	November 13	¥51,000	Liquidity swap with the Bank of Japan
	November 16	\$51,000 each	Liquidity swaps with the Bank of Canada, Bank of England, European Central Bank, and Swiss National Bank
	November 28	£51,000	Liquidity swap with the Bank of England

Source: Federal Reserve Bank of New York.

Note: Figures may be rounded.

OPEN MARKET OPERATIONS DURING 2017

Table 5

Term Deposit Facility Operation Results in 2017

Operation Date	Maturity Date	Term (Days)	Rate (Basis Points)	Maximum Award Amount (Billions of U.S. Dollars)	Total Amount Awarded (Billions of U.S. Dollars)	Number of Participants
Feb 23	Mar 02	7	IOER + 1 (76)	1.0	16.6	30
May 18	May 25	7	IOER + 1 (101)	1.0	16.3	33
Aug 10	Aug 17	7	IOER + 1 (126)	1.0	14.7	28
Oct 19	Oct 26	7	IOER + 1 (126)	1.0	14.1	28

Source: Board of Governors of the Federal Reserve System.

Note: Awarded amount figures are rounded.

term deposits to depository institutions (Table 5). The TDF was developed as a supplementary tool that could be used to help control the federal funds rate. Quarterly testing helps to maintain operational readiness and provides eligible institutions with an opportunity to keep up their familiarity with term deposit procedures.

Geographic Resiliency

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 and settlement activities. In 2017, the Desk reinforced its operational flexibility and

resiliency with a robust, geographically dispersed network of counterparties and Desk operations.

To maintain the resiliency of the Desk's operations, the New York Fed continued to operate alternative sites for trading and settlement of open market operations in other Reserve Bank locations throughout the System. These arrangements ensure that the Desk would have the resources needed to carry out critical operational and analytical activities should a contingency scenario affect the greater New York area. During the year, the Desk seamlessly executed numerous open market operations under this arrangement. Similarly, all primary dealers established geographically dispersed primary and secondary locations to ensure that robust end-to-end participation in open market operations would occur amid any disruption.

OPEN MARKET OPERATIONS DURING 2017

Selected Balance Sheet Developments

The overall size of the Federal Reserve's balance sheet remained stable through the first three quarters of 2017 before declining slightly in the fourth quarter of 2017 once the FOMC began the process of normalizing the size of its balance sheet (see **Box 1, p.4**).²³ The composition of the Federal Reserve's liabilities fluctuated over the course of the year, largely as a result of variation in the Treasury General Account and participation in ON RRP operations.

While the portfolio continued to contribute to elevated levels of Federal Reserve income in 2017, net income was lower than in 2016, driven largely by higher interest expense. Remittances to the Treasury fell in line with the decrease in net income. 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 current 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 Federal Reserve also provides short-term credit to depository institutions through the primary credit facility, which is not part of the SOMA.

All else equal, an increase (decrease) in a particular asset leads to a corresponding increase (decrease) in reserve balances or other liability categories.

SOMA DOMESTIC SECURITIES HOLDINGS PORTFOLIO SIZE AND COMPOSITION

The vast majority of the SOMA is composed of domestic securities holdings. The size of the SOMA's domestic securities portfolio, which consists of Treasury and agency securities held on an outright basis, decreased slightly from \$4.26 trillion at year-end 2016 to \$4.24 trillion at year-end 2017. In October, the FOMC began the process of reducing the Federal Reserve's holdings of securities, which had expanded as a result of large-scale asset purchase programs and been maintained at sizable levels through full reinvestments since 2014. The decline over the year reflected decreases of roughly \$9 billion in Treasury securities holdings and nearly \$12 billion in agency debt holdings, and a roughly \$7 billion increase in agency MBS holdings. As of year-end 2017, the domestic SOMA portfolio was composed of Treasury securities (58 percent) totaling \$2.45 trillion, agency MBS (42 percent) totaling \$1.78 trillion, and agency debt (less than 1 percent) totaling \$4 billion (**Chart 16**).²⁴

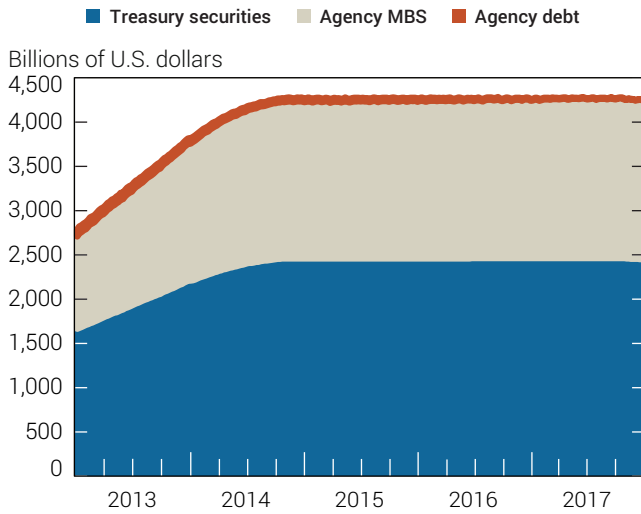
Treasury Holdings

For most of 2017, rollovers of maturing Treasury securities kept the size of the Treasury portfolio steady; however, the start of the FOMC's balance sheet normalization program in October resulted in a roughly \$9 billion decline in the portfolio to about \$2.45 trillion. Because the decline in the portfolio corresponding to Treasury securities that matured at the end of December was not recorded until January 2, 2018, the decrease in Treasury securities holdings was less than the \$18 billion of reductions implied by the caps in the fourth quarter.²⁵

The share of the Treasury portfolio held in nominal coupon securities with less than three years to maturity increased from

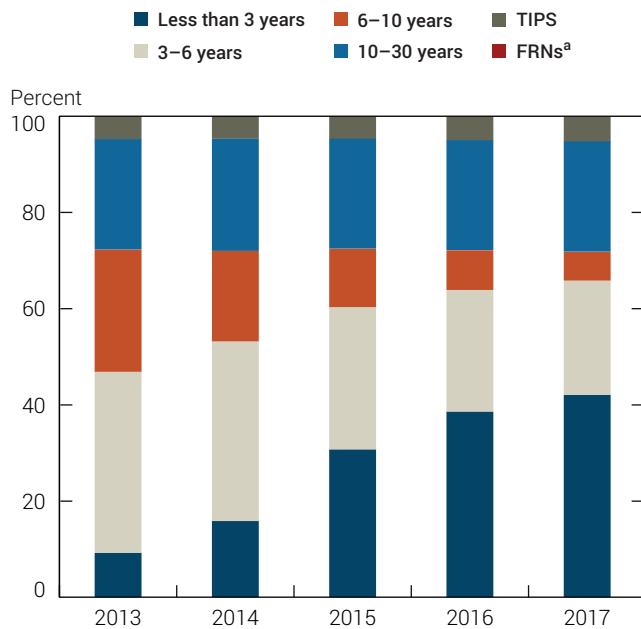
OPEN MARKET OPERATIONS DURING 2017

Chart 16
Composition of SOMA Domestic Securities Holdings



Source: Board of Governors of the Federal Reserve System.
 Note: Figures are weekly and include unsettled holdings.

Chart 17
Distribution of SOMA Treasury Holdings



Source: Federal Reserve Bank of New York.
 Note: Figures are as of year-end.
^aFloating Rate Notes (FRNs) represented less than 1 percent of holdings in 2014, 2015, 2016, and 2017 and were not held in the SOMA in 2013.

39 percent to 42 percent, while the shares held in the three- to six-year and six- to ten-year sectors declined; the shares held in longer-term securities, Floating Rate Notes, and Treasury Inflation-Protected Securities were little changed (Chart 17). The weighted average maturity of the portfolio declined from 8.1 years to 7.7 years as the portfolio continued to age, although rollovers of maturing securities into new securities across the maturity spectrum offset part of this effect.

SOMA holdings of Treasury securities as a share of the outstanding Treasury market decreased slightly over the course of the year from 18 percent to 17 percent. This change primarily reflected an increase of roughly \$560 billion in Treasury marketable debt held by the public (inclusive of SOMA holdings).²⁶ The SOMA continued to hold a sizable share of securities with ten to thirty years to maturity as a result of the Federal Reserve’s earlier large-scale asset purchase programs. Roughly 32 percent of outstanding Treasury securities with ten to thirty years remaining until maturity were held in the SOMA as of year-end, compared with 22 percent of outstanding Treasury coupon securities with up to three years remaining until maturity (Chart 18). Consistent with the SOMA’s concentrated holdings in longer-term securities, at the end of 2017 the weighted average maturity of the SOMA Treasury portfolio was greater than that of the outstanding stock of Treasury debt—7.7 years, as compared with 5.8 years.

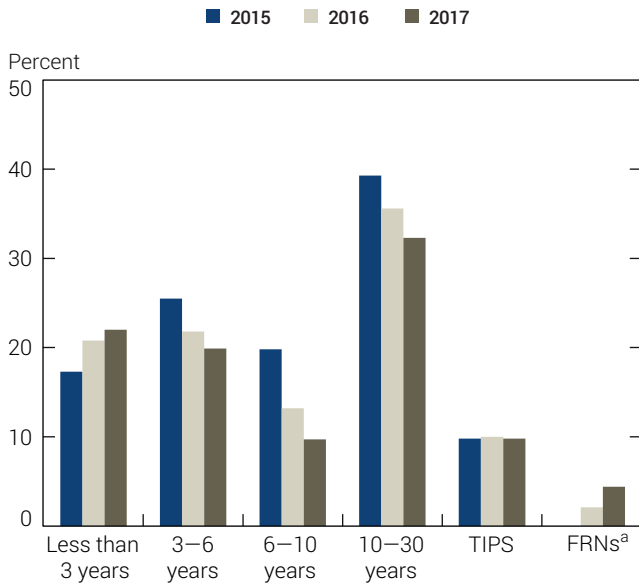
Agency MBS Holdings

The size of the agency MBS portfolio increased \$7 billion during 2017. The increase came despite the \$12 billion of reductions implied by the caps in the fourth quarter, and stemmed from the reinvestment of maturing agency debt into agency MBS over the year as well as market settlement and trading conventions that can obscure the longer-term trends in agency MBS holdings. In particular, because of the Desk’s mid-month to mid-month reinvestment cycle, declines generally occur on a lag after the month in which the principal payments are initially received and the cap is applied.²⁷

The characteristics of the agency MBS portfolio are broadly consistent with those of the outstanding agency MBS market since purchases were concentrated in newly produced fifteen- and thirty-year coupon securities in the TBA market, which are closely linked to new primary issuance. Changes in the composition of the

OPEN MARKET OPERATIONS DURING 2017

Chart 18
SOMA Treasury Holdings as a Share of Outstanding Treasury Supply



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

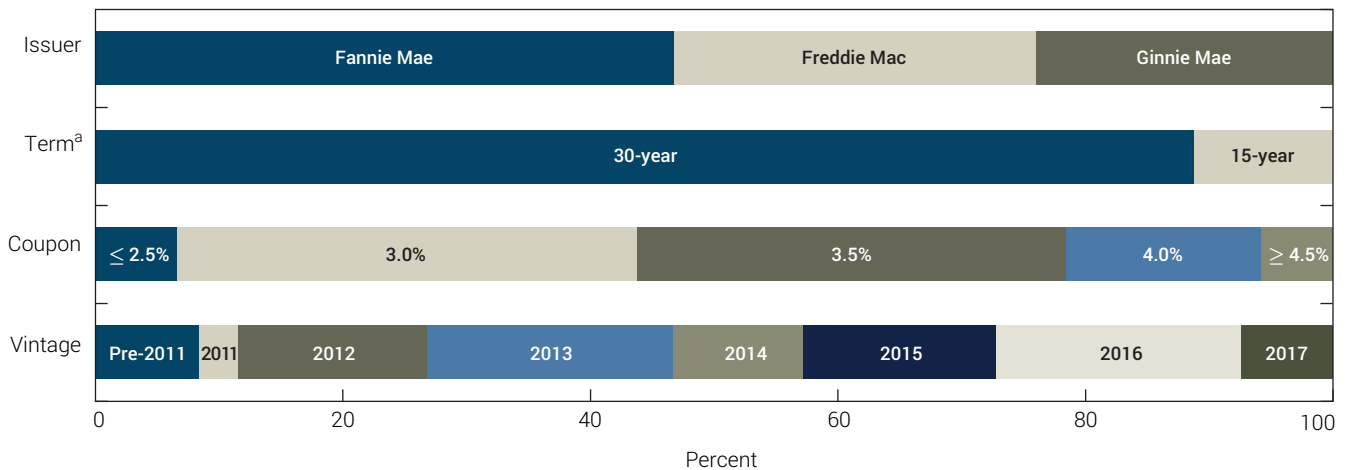
Note: Figures are as of year-end and consist of coupon securities only.

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

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. As of year-end, 43 percent of the securities held in the portfolio were originated in the past three years. Forty-seven percent of the settled agency MBS portfolio was held in MBS guaranteed by Fannie Mae, 29 percent in MBS guaranteed by Freddie Mac, and 24 percent in MBS guaranteed by Ginnie Mae (Chart 19). Almost 90 percent of the portfolio was held in thirty-year MBS, with the remainder in fifteen-year MBS.²⁸ As of the end of 2017, the weighted average life of the SOMA's settled agency MBS portfolio was 6.9 years.²⁹ The share of the settled agency MBS portfolio held in securities with 3.0 and 3.5 percent coupons remained steady at roughly 70 percent. The weighted average coupon of the agency MBS held in the SOMA portfolio was steady as well, remaining at 3.4 percent at the end of 2017.

SOMA holdings of agency MBS as a share of the outstanding stock of fixed-rate agency MBS declined slightly over the past year, from 29 percent to 28 percent, as the size of the agency MBS portfolio remained largely steady while the outstanding stock of

Chart 19
Distribution of SOMA Agency MBS Holdings



Source: Federal Reserve Bank of New York.

Notes: Figures are as of December 29, 2017. Holdings total \$1.76 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.

OPEN MARKET OPERATIONS DURING 2017

agency MBS increased by roughly \$370 billion. The characteristics of the SOMA holdings largely mirror those of the broader market, and differences reflect the Desk's practice of purchasing newly issued securities. 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. Similarly, the weighted average age of loans held by the SOMA was forty-four months, while the weighted average age of loans in the broader market was forty-three months.

Agency Debt Holdings

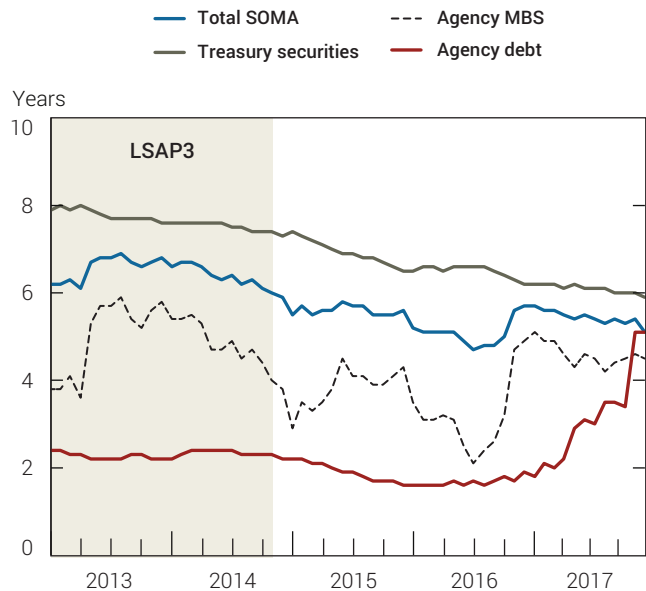
Nearly \$12 billion in agency debt securities matured in 2017, leaving the SOMA with agency debt securities totaling roughly \$4 billion in face value at the end of the year—the remainder of the \$172 billion of direct obligations of the housing-related government-sponsored enterprises acquired by the Federal Reserve between 2008 and 2010 as part of its first asset purchase program. About half of the remaining agency debt securities will mature in 2018 and half between 2019 and 2032 in sporadic, small increments.

PORTFOLIO RISK METRICS

The duration of the total SOMA domestic securities portfolio declined modestly over the year. A gradual decrease in both the duration of the Treasury securities portfolio and the effective duration of the agency MBS portfolio prompted a slight decline in the total portfolio's par-weighted average duration from 5.7 years at the end of 2016 to 5.3 years at the end of 2017 (**Chart 20**).³⁰ The duration of the agency debt holdings increased as a large share of the remaining agency debt portfolio matured; since the share of agency debt holdings is small, this development had little impact on the average duration of the total portfolio. Duration measures the sensitivity of a security's price to changes in interest rates, and may be thought of as the weighted average time 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 6.2 years to 5.9 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

Chart 20
Average Duration of SOMA Domestic Securities Holdings



Source: Federal Reserve Bank of New York.

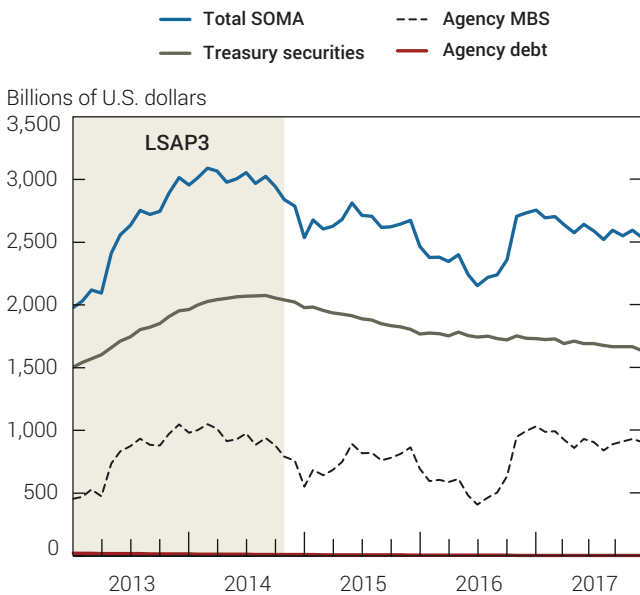
Notes: Figures are as of month-end. Calculations are par-weighted. Purchases of agency MBS under the third large-scale asset purchase program (LSAP3) began in September 2012.

securities into newly issued securities across the maturity spectrum. The effective duration of the SOMA's holdings of agency MBS declined from 4.9 years to 4.5 years, prompted by a slight decline in primary mortgage rates over the year.³¹ 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 declined slightly in 2017. 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 needed to match the duration risk of the portfolio. The SOMA portfolio's ten-year equivalent measure declined slightly from \$2.73 trillion at the end of 2016 to \$2.54 trillion at the end of 2017 (**Chart 21**), driven by the declining average duration of holdings in combination with the small decline in portfolio size.

OPEN MARKET OPERATIONS DURING 2017

Chart 21
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. Purchases of agency MBS under the third large-scale asset purchase program (LSAP3) began in September 2012.

SOMA FOREIGN CURRENCY-DENOMINATED HOLDINGS

The Federal Reserve holds foreign currency-denominated assets, which are invested to ensure adequate liquidity to meet anticipated foreign exchange intervention needs. (For more details, see the “Foreign Open Market Operations” section of this report.)

As of year-end 2017, the SOMA foreign currency portfolio totaled \$21.3 billion, composed of \$13.0 billion of euro-denominated assets and \$8.3 billion of yen-denominated assets. The portfolio increased \$1.9 billion in U.S. dollar terms from 2016, primarily owing to the 14 percent appreciation of the euro against the dollar and the approximately 4 percent appreciation of the Japanese yen against the dollar over the year. In both the euro- and yen-denominated portfolios, the share of government debt obligations decreased, while the share of cash held on deposit at official institutions increased (Chart 22).

The duration of the SOMA holdings of euro-denominated assets fell from 28.2 months at year-end 2016 to 24.8 months at year-end

2017; the duration of SOMA holdings of yen-denominated assets declined from 7.9 months at year-end 2016 to 4.4 months at year-end 2017.

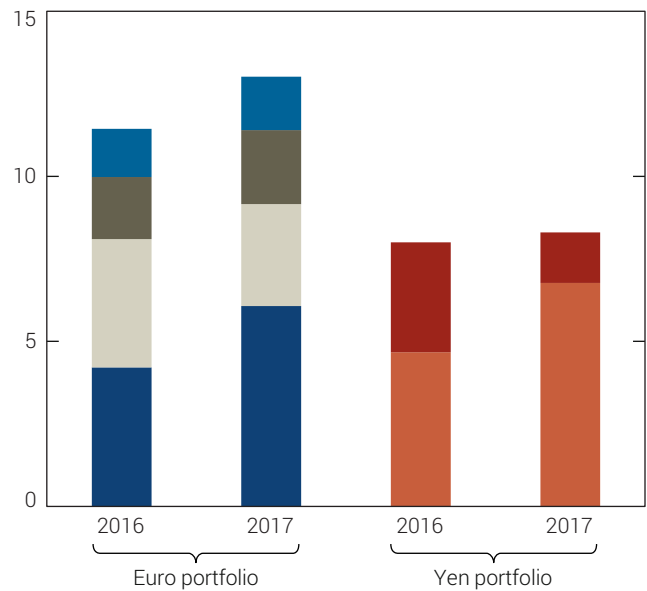
**SHORT-TERM LIQUIDITY PROVISION
 PRIMARY CREDIT FACILITY**

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.³² Loans are generally limited to overnight maturities and are initiated by depository institutions and approved by Reserve Banks. In 2017, the interest rate on primary credit loans began the year at 1.25 percent and was raised in conjunction with the FOMC’s decisions to raise the federal funds

Chart 22
Distribution of SOMA Foreign Currency Portfolio Holdings



Billions of U.S. dollars



Source: Federal Reserve Bank of New York.

OPEN MARKET OPERATIONS DURING 2017

target range: the Board of Governors approved 25 basis point increases in March, June, and December, resulting in a discount rate of 2.00 percent by the end of the year.³³ 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 2017 amid high levels of excess reserves and benign market funding conditions. The total number of primary credit loans originated in 2017 held relatively steady at 2,495 loans, while the average daily loan balance declined from \$18 million in 2016 to \$14 million during 2017. As has been the case in recent years, a large share of the primary credit loan balance was originated by banks as operational tests.

CENTRAL BANK LIQUIDITY SWAPS

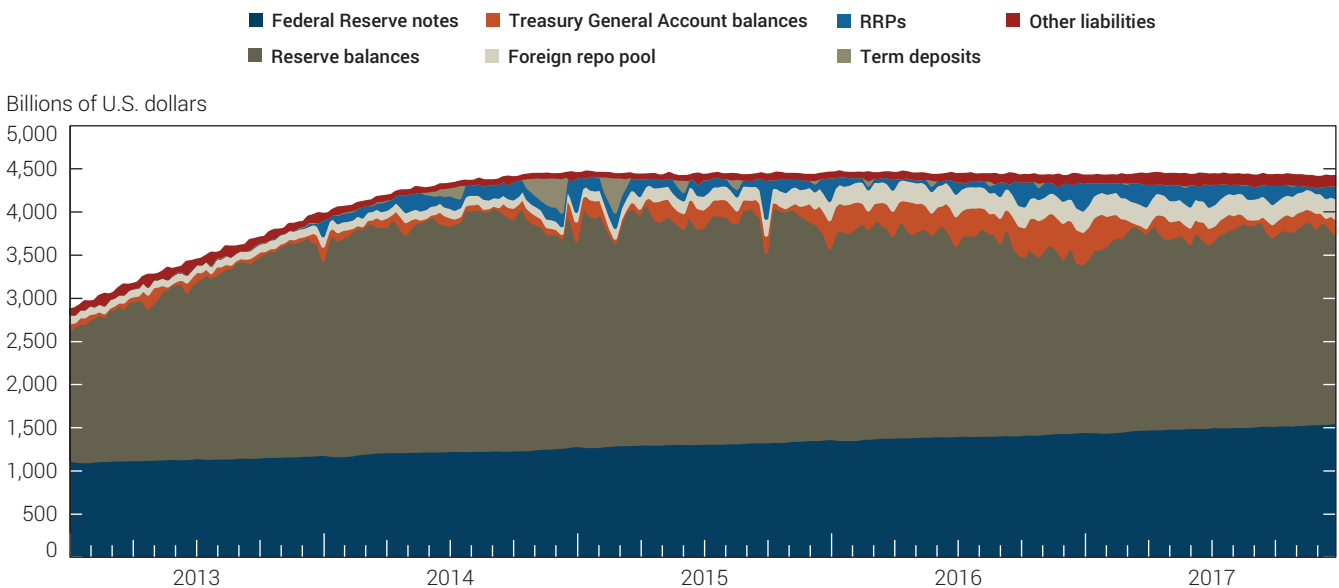
The Federal Reserve maintains standing dollar and foreign currency swap lines with a network of five other major central

banks—the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, and Swiss National Bank. In 2017, outstanding swap draws reached about \$12 billion for a brief period, but on average, outstanding draws totaled about \$840 million. (For more information, see the “Foreign Open Market Operations” section of this report.)

Selected Liabilities

The Federal Reserve’s assets are funded by a variety of liabilities, the composition of which shifted slightly over the course of 2017 (Chart 23). All else equal, changes in the composition of the Federal Reserve’s liabilities do not change the overall size of the Federal Reserve’s balance sheet; an increase (decrease) in non-reserve liabilities results in a corresponding decrease (increase) in reserve balances. In 2017, the total level of liabilities in excess of currency—a central bank’s traditional liability—remained at historically elevated levels.

Chart 23
Federal Reserve Liabilities



Source: Board of Governors of the Federal Reserve System.

Note: Figures are weekly.

OPEN MARKET OPERATIONS DURING 2017

RESERVE BALANCES

Reserve balances, which are deposits held by depository institutions at the Federal Reserve, represented the Federal Reserve's largest liability.³⁴ Reserve balances outstanding totaled \$2.12 trillion as of December 27, up from \$1.94 trillion in December 2016 but below their October 2014 peak of \$2.80 trillion. Reserve balances are composed of balances held by banks to fulfill reserve requirements as well as reserves held in excess of these requirements. 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.

Reserve balance requirements rose from \$109 billion at year-end 2016 to \$130 billion at year-end 2017 owing primarily to the growth of transaction deposits against which depository institutions are required to hold reserves.³⁵ These transaction deposits increased by 5 percent during 2017, a rise that was consistent with the annual rates of growth observed since 2009.

Reserve balances held in excess of requirements fluctuated throughout 2017, ending the year \$204 billion higher than at year-end 2016. While the gradual reduction in the Federal Reserve's securities holdings will eventually result in a declining amount of excess reserves, the relatively small portfolio reduction in 2017 did not have a material effect. Instead, the increase in reserve balances since the end of last year primarily reflects lower balances in the Treasury General Account and lower participation in the ON RRP operations, partially offset by ongoing growth of Federal Reserve notes and a slight decrease in SOMA securities holdings. Fluctuations in reserve balances, which ranged from roughly \$2.00 trillion to about \$2.37 trillion in 2017, were largely driven by fluctuations in other liability categories, in particular, the Treasury General Account and participation in the ON RRP.

FEDERAL RESERVE NOTES

Federal Reserve notes, more commonly known as U.S. dollar paper currency, remained an important liability in 2017, totaling \$1.57 trillion at year-end.³⁶ Federal Reserve notes currently make up about one-third of the Federal Reserve's balance sheet, a much lower percentage than in the years prior to the crisis, when they represented an average of about 90 percent of all liabilities.

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 2017, Federal Reserve notes outstanding increased by \$108 billion, representing an annual growth rate of roughly 7 percent, in line with the annual pace over the last five years.

REVERSE REPURCHASE AGREEMENTS OPEN MARKET OPERATIONS

Throughout 2017, the Federal Reserve conducted overnight reverse repurchase agreements to support the implementation of monetary policy. In 2017, average daily amounts outstanding, excluding quarter-end dates, were \$141 billion, above the \$101 billion level seen the previous year. (For more information on these operations and their results, see the "Short-Term Interest Rate Management" section of this report.)

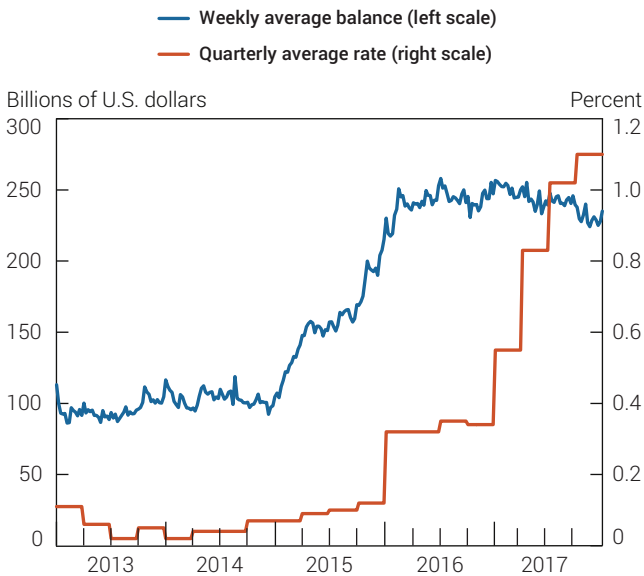
FOREIGN REPO POOL

The New York Fed has long offered its foreign official and international account holders an overnight repo investment service, 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.³⁷ Upon maturity on the following business day, the securities are repurchased by the SOMA at a price that reflects a rate of return tied to comparable market-based Treasury repo rates. While the foreign repo pool is not used as a means of implementing monetary policy, a change in the size of the pool affects the availability of reserves in the U.S. banking system.

The weekly average size of the foreign repo pool fluctuated between \$224 billion and \$257 billion during 2017, declining slightly in the second half of the year as account holders shifted funds to longer-term, higher-yielding assets (**Chart 24**) but remaining at levels similar to those in 2016. The rise in balances in recent years reflects central banks' preference to maintain robust dollar liquidity buffers, the reduced availability of alternative investments with private counterparties, and the New York Fed's removal over time of constraints on customers' ability to vary the size of their investments. The rate of return on the pool moved in

OPEN MARKET OPERATIONS DURING 2017

Chart 24
Foreign Repo Pool



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

line with other market-based Treasury repo rates throughout 2017, and generally rose in tandem with increases in the target range for the federal funds rate during the year.

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. 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.

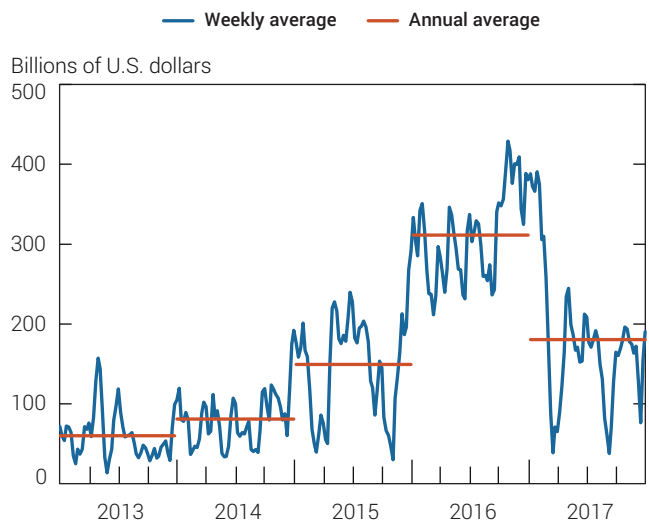
To help protect against an interruption in market access, the Treasury aims to hold in the Treasury General Account a level of cash generally sufficient to cover one week of outflows, subject to a minimum balance objective of roughly \$150 billion. The average weekly TGA balance declined from \$311 billion

in 2016 to \$180 billion in 2017. The weekly TGA balance was more variable than in prior years, fluctuating within a wider range—from a low of \$23 billion to a high of \$402 billion during the year. However, the weekly average TGA balance equaled or exceeded the Treasury’s objective nearly three-fourths of the weeks in 2017 (Chart 25). The decline in the weekly average TGA balance below its objective generally reflected a reduction in bill supply and associated cash balances amid debt limit-related borrowing constraints.

FOREIGN OFFICIAL AND OTHER DEPOSITS

Deposits of foreign official institutions remained steady in 2017, averaging \$5 billion. Other deposits, which 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, averaged \$74 billion during 2017, almost doubling from average 2016 levels.³⁸ This increase was primarily driven by the buildup of DFMU balances. Deposits held by DFMUs may be remunerated at the rate paid on balances maintained by depository institutions

Chart 25
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.

OPEN MARKET OPERATIONS DURING 2017

Table 6
SOMA Net Income
 Billions of U.S. Dollars

	2017	2016
Interest income		
Treasury securities	64.3	63.8
Agency debt	0.4	1.0
Agency MBS	48.9	46.3
Other	—	—
	113.6	111.1
Interest expense		
Reverse repurchase agreements		
Overnight and term RRP	(1.2)	(0.3)
Foreign repo pool	(2.2)	(0.8)
Other	—	—
	(3.4)	(1.1)
Non-interest income (loss)		
Foreign currency translation gains (losses)	1.9	(0.1)
Other	0.1	0.0
	2.0	(0.1)
SOMA income	112.2	109.9
Assumed funding cost	(25.9)	(12.0)
SOMA net income	86.3	97.9

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 \$25.9 billion for 2017 and \$12.0 billion for 2016. These liabilities fund non-SOMA assets of the Federal Reserve in addition to SOMA net assets.

or another rate determined by the Board from time to time, not to exceed the general level of short-term interest rates.

TERM DEPOSITS

The Federal Reserve periodically conducted small-value exercises to test the Term Deposit Facility (TDF), through which it offers

interest-bearing term deposits to depository institutions. TDF amounts outstanding ranged from \$14 billion to \$17 billion across four seven-day periods over the course of the year. (For more details, see the “Operational Flexibility and Resiliency” section of this report.)

Financial Results

The expansion of the Federal Reserve’s balance sheet since the crisis was designed to advance 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 relatively low funding costs.³⁹

SOMA INCOME

In 2017, total SOMA income was \$112 billion, primarily derived from interest income on domestic securities holdings.⁴⁰ SOMA net income, which takes into account the costs of funding the portfolio, was \$86 billion in 2017, down from \$98 billion in 2016 (Table 6).⁴¹ The \$12 billion decline stemmed primarily from the higher funding costs associated with rising short-term 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 2017 continued to generate portfolio income well in excess of pre-crisis levels.

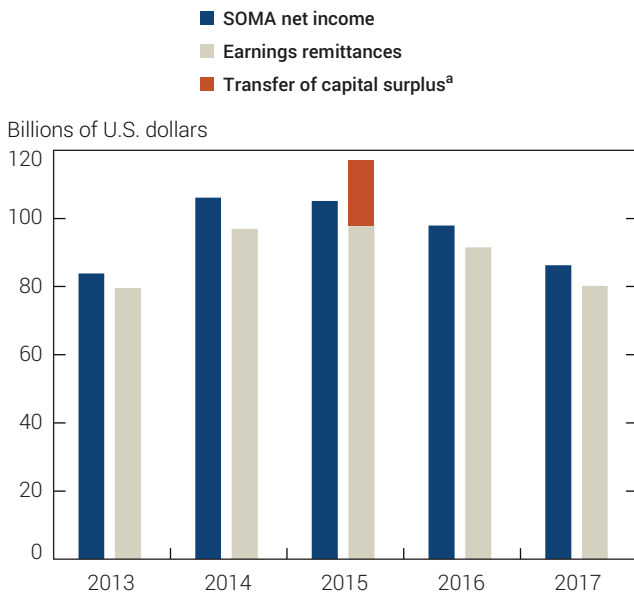
FEDERAL RESERVE REMITTANCES

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 up to a specified limit, which remained at \$10 billion throughout 2017. Remittances to the Treasury are made on a weekly basis. In 2017, the Federal Reserve remitted a total of \$80 billion to the Treasury. The nearly \$12 billion decline in SOMA net income contributed to the decline in remittances in 2017 (Chart 26).

OPEN MARKET OPERATIONS DURING 2017

Chart 26

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



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

^aTransfer of capital to reduce the aggregate Reserve Bank surplus to the \$10 billion limit required by the Fixing America's Surface Transportation Act (FAST Act), which amended the Federal Reserve Act.

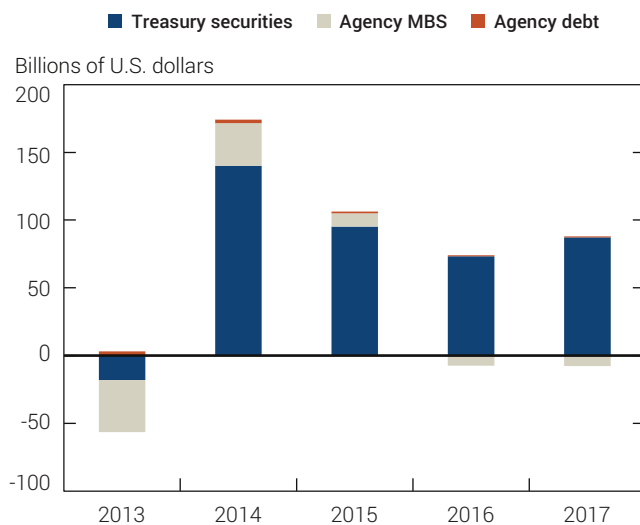
SOMA UNREALIZED GAINS AND LOSSES

The market value of the SOMA's securities portfolio fluctuates with changes in the prevailing level of interest rates. In 2017, a decrease in longer-term interest rates contributed to an increase in the portfolio's unrealized gain. Unrealized gains on the domestic portfolio, calculated as the difference between the market value of the portfolio and its book value (which reflects amortized cost), increased to \$80 billion at the end of 2017 from \$67 billion at the end of 2016 (Chart 27). Year over year, the agency MBS portfolio's unrealized loss was steady at about \$8 billion and the Treasury portfolio's unrealized gain increased from \$73 billion in 2016 to \$87 billion in 2017. Unrealized gains on the foreign portfolio decreased to \$32 million at the end of 2017 from \$68 million at the end of 2016.

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. Similarly, unrealized gains and losses have no effect on the conduct of monetary policy.

Chart 27

SOMA Domestic Portfolio Unrealized Gains and Losses



Source: Federal Reserve System.

Note: Figures are as of year-end.

Projections for the Domestic SOMA Portfolio and Net Income

In 2017, the FOMC took a further step toward normalizing the stance of monetary policy by initiating a reduction in the Federal Reserve's securities holdings using the approach outlined in its June 2017 Addendum to the Policy Normalization Principles and Plans (see Box 1, p. 4). While the document details this approach, considerable uncertainty remains about both the long-run size of the securities portfolio and the time required to reach that size. The reason for this uncertainty is that the size of the normalized balance sheet over the long term will depend on numerous variables, including the level of reserves that the Federal Reserve considers appropriate for efficient and effective monetary policy implementation as well as future levels of non-reserve liabilities. Given the uncertainty attending these factors, the projections presented here consider several scenarios that vary in their assumptions about the long-run levels of the Federal Reserve

OPEN MARKET OPERATIONS DURING 2017

liabilities.⁴² The accompanying discussion examines the effect of these assumptions on the evolution of the Federal Reserve's portfolio and associated income as the Federal Reserve continues to normalize short-term interest rates and its balance sheet. It also examines the impact of an interest rate shock on the agency MBS portfolio and on net income associated with SOMA securities holdings. Assumptions underlying these projections are based on publicly available, survey-based interest rate forecasts and expectations for the level and composition of Federal Reserve liabilities, as well as the FOMC's communications about monetary policy normalization.

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 the securities portfolio and how to implement monetary policy most efficiently and effectively, as well as interest rate, economic, and exogenous balance sheet developments. This section reviews the assumptions about these factors that are used to develop the projections; a complete list of key assumptions can be found in Appendix 7.

BALANCE SHEET

The Survey of Primary Dealers and Survey of Market Participants conducted by the New York Fed ahead of the December 2017 FOMC meeting (the December Desk surveys) asked respondents to provide expectations for the size and composition of the Federal Reserve's balance sheet, on average, in 2025. Drawing from the distribution of these responses, a median liabilities scenario (based on the 50th percentile of survey responses for each line item), a smaller liabilities scenario (based on the 25th percentile), and a larger liabilities scenario (based on the 75th percentile) are constructed, holding all other assumptions fixed. Using these results as a proxy for different potential outcomes for the Federal Reserve's balance sheet in the long run, the three scenarios highlight the degree to which the long-run size of the Federal Reserve's domestic securities portfolio will be influenced by choices about the future level of reserve balances and the evolution of non-reserve liabilities, which are primarily exogenously determined.

Table 7 summarizes the assumptions for Federal Reserve liabilities and capital that are used in the three scenarios constructed from the responses to the December Desk surveys.⁴³ Federal Reserve notes—that is, U.S. dollar paper currency—have historically been

Table 7

Liability and Capital Assumptions

	Billions of U.S. Dollars			
	Median Liabilities Scenario	Smaller Liabilities Scenario	Larger Liabilities Scenario	Year-End 2017
Federal Reserve notes	2,200	1,900	2,400	1,569
Reserve balances	600	412	750	2,176
Deposits in Treasury General Account (TGA)	300	200	365	186
Reverse repos with private counterparties	100	58	150	148
Reverse repos with foreign official accounts	200	120	250	239
Other deposits	75	50	100	82
All other liabilities and capital	50	50	57	48
Total	3,525	2,790	4,072	4,448

Sources: Federal Reserve Bank of New York, December 2017 Survey of Primary Dealers and Survey of Market Participants.

Note: The table is based on the December 2017 Desk surveys, which asked respondents to provide expectations for the size and composition of the Federal Reserve's balance sheet, on average, in 2025.

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the Federal Reserve's largest liability. Demand for Federal Reserve notes generally increases from year to year, at a rate that varies with the pace of economic growth and the rate of inflation, as well as with changes in the demand for U.S. currency as a store of value, including foreign demand. December Desk survey responses indicate that currency is expected to grow at average annual rates between 2.6 percent (based on the 25th percentile) and 5.8 percent (based on the 75th percentile) through 2025, with the median respondent expecting a 4.6 percent annual growth rate, a deceleration from the actual average annual growth rate of roughly 7 percent over the past five years. Survey expectations for the total amount of non-reserve liabilities, including Federal Reserve notes, range between \$2.38 trillion (based on the 25th percentile) and \$3.32 trillion (based on the 75th percentile), with the median respondent expecting a level of \$2.93 trillion.

For reserve balances, the average 2025 level implied by the December Desk survey responses ranges from \$412 billion (based on the 25th percentile) to \$750 billion (based on the 75th percentile), with the median respondent expecting a level of \$600 billion. This range is well below the year-end 2017 level of \$2.18 trillion and is consistent with the Committee's statement in the June 2017 Addendum to the Policy Normalization Principles and Plans that it currently anticipates reducing the quantity of reserve balances over time to a level appreciably below that seen in recent years but above the level observed before the financial crisis. Survey responses for non-reserve and reserve liabilities indicate that the total size of the Federal Reserve's balance sheet is expected to be between \$2.79 trillion and \$4.07 trillion on average in 2025, with the median respondent expecting it to be \$3.53 trillion.⁴⁴

With respect to Federal Reserve assets, domestic securities holdings are assumed to decline over time as only that portion of principal payments that exceeds gradually rising caps is reinvested, in accordance with the FOMC's directive. Portfolio reductions continue, and the caps—once they have reached their maximum level—are assumed to remain in place until the Committee judges that the Federal Reserve is holding no more securities than necessary to implement monetary policy efficiently and effectively. The portfolio reduction process is assumed to proceed without a material deterioration in the economic outlook that would warrant a resumption of reinvestments or large-scale asset purchases.

After the balance sheet reaches a normalized size, it is assumed to grow again as a result of the trend growth of currency and capital, at paces implied by the survey responses. At this point, the projections assume that additional purchases of Treasury securities are conducted to offset the ongoing runoff of agency debt and MBS holdings and to support trend balance sheet growth, and that rollovers of maturing Treasury securities resume. All other assets, including foreign currency reserves, are assumed to remain at current levels over the projection horizon.

INTEREST RATES

The paths of the target federal funds rate and longer-term interest rates are drawn from the combined set of responses to the December Desk surveys. The median expected level of the federal funds target gradually rises from its year-end level to a long-run level of 2¼ percent, and the median expected levels of the ten-year Treasury yield and thirty-year fixed primary mortgage rate rise to approximately 3 percent and 4.68 percent in the long run, respectively.

Consistent with the FOMC's September 2014 statement on Policy Normalization Principles and Plans, the projections also assume that the Federal Reserve uses interest on excess reserves as its primary tool for controlling the level of the federal funds rate, with supplementary support from the rate it sets on overnight reverse repos. 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.

PROJECTED PORTFOLIO PATH PROJECTED REDEMPTIONS AND REINVESTMENTS

The analysis of changes in the Federal Reserve's securities holdings and SOMA net income starts with the SOMA domestic securities portfolio as of December 29, 2017, and the assumptions described above. Under the balance sheet normalization program that was outlined by the FOMC in its June 2017 Addendum to the Policy Normalization Principles and Plans and that commenced in October 2017, the pace of the SOMA portfolio's decline will be driven by the amount of monthly principal receipts from SOMA

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Box 3

Agency MBS Prepayment Uncertainty

One key driver of uncertainty for the timing and pace of balance sheet normalization is the path of principal payments on SOMA agency MBS holdings. In general, a portion of agency MBS principal payments are known, because they are based on an amortization schedule; however, principal payments in excess of this amount, known among mortgage investors as prepayments, are not known in advance.

Prepayments can occur for several reasons. Mortgage borrowers may prepay their mortgages when a decline in interest rates makes it economically advantageous to pay off an existing mortgage and take out a new mortgage at a lower rate (“rate refinancing”).

A prepayment can also occur when a borrower sells a home and pays off the associated mortgage, or when a borrower falls seriously delinquent or defaults and the mortgage guarantor—for example, one of the government-sponsored enterprises—assumes the associated losses and pays the full principal amount back to the agency MBS investor. Finally, a borrower can choose at any time to make additional payments toward the principal on a mortgage in order to reduce the outstanding loan balance (referred to as a “curtailment”).

Rate refinancing is the most common and most volatile source of prepayments. Since U.S. residential mortgage borrowers have the option to

prepay at any time without penalty, many borrowers will seek to lower their mortgage payment when the prevailing market rate is lower than their current mortgage rate. As a result, refinancing activity depends, importantly, on the level of interest rates and tends to be negatively correlated with changes in interest rates. Different borrowers may have different motivations to refinance based on their individual situations, a complication that makes it difficult to estimate the refinancing reaction to interest rate changes.

Since prepayments are generally difficult to predict with a high level of certainty, SOMA agency MBS paydowns are as well. However, the schedule of

caps on SOMA agency MBS redemptions helps to reduce the uncertainty. The caps help to credibly assure market participants that the balance sheet will decline gradually in a way that avoids an overly fast pace of runoff. This gradualism limits the potential for market disruption that might arise if the amount of securities that had to be absorbed by private markets increased sharply. The caps also help to provide more predictability about the path of SOMA agency MBS redemptions. For example, the caps prevent the more rapid declines in SOMA agency MBS holdings that could otherwise occur during negative macroeconomic shocks, which have generally been associated with sharp falls in longer-term interest rates and could result in faster agency MBS prepayments.

securities holdings and the schedule of caps. The timing of principal payments from maturing Treasury securities and agency debt securities is known with a relatively high degree of certainty since maturity dates are fixed. In contrast, projected principal paydowns associated with agency MBS are model-based estimates that are subject to considerable uncertainty because of the embedded prepayment option in the underlying mortgages (Box 3).

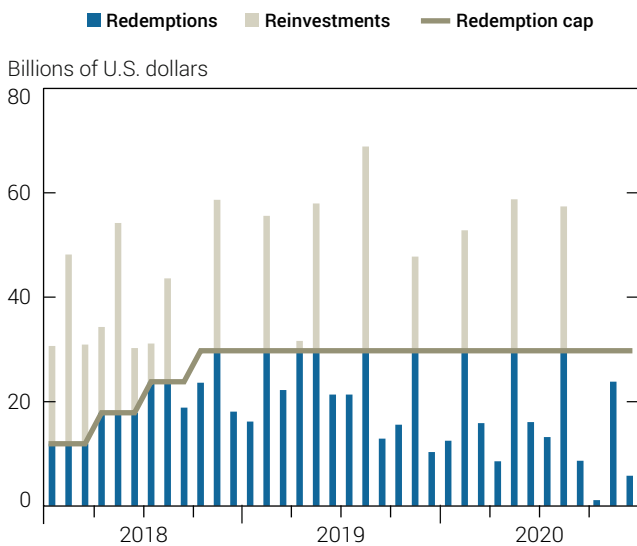
Nearly \$230 billion of Treasury securities are projected to be redeemed and nearly \$200 billion to be reinvested in 2018 (Chart 28). The \$30 billion maximum cap on Treasury redemptions implies some degree of ongoing Treasury reinvestments until the size of the portfolio normalizes, with the maximum cap typically expected to bind only in the U.S. Treasury’s midquarter refunding months. From October 2018, when the caps are fully phased in, until the time that the size of the portfolio normalizes under

the median liabilities scenario, a total of roughly \$220 billion of Treasury securities is projected to be rolled over.

The amount of principal paydowns on agency MBS is expected to decline as interest rates rise and the portfolio shrinks (Chart 29). The staff projects that under the median liabilities scenario and the median path for the thirty-year fixed primary mortgage rate, roughly \$162 billion of agency debt and agency MBS will be redeemed and \$77 billion will be reinvested in 2018. The cap is projected to stop binding in October 2018, the same month in which it is fully phased in. That is, principal payments on agency debt and agency MBS are projected to be below the cap after it reaches its maximum level, resulting in the end of agency debt and MBS reinvestments after the first year of portfolio reductions. However, projected principal paydowns on agency MBS are model-based estimates that are subject to

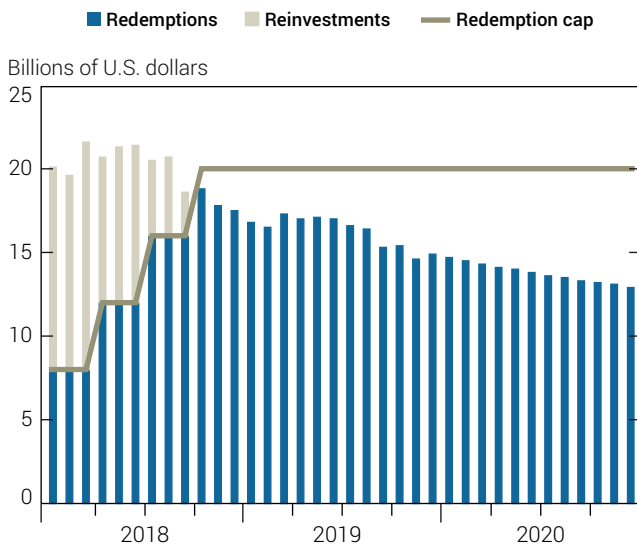
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Chart 28
Projected Maturity Profile of SOMA Treasury Securities



Source: Federal Reserve Bank of New York.
 Notes: Figures are monthly. The maturity profile reflects median expectations for the size and composition of the Federal Reserve's balance sheet. Projected figures are rounded.

Chart 29
Projected Paydown Profile of SOMA Agency Debt and MBS Principal



Source: Federal Reserve Bank of New York.
 Notes: Figures are monthly. The paydown profile reflects median expectations for the size and composition of the Federal Reserve's balance sheet and the path of interest rates. Projected figures are rounded.

considerable uncertainty, and as a result, estimates about the timing of full redemptions are also highly uncertain.

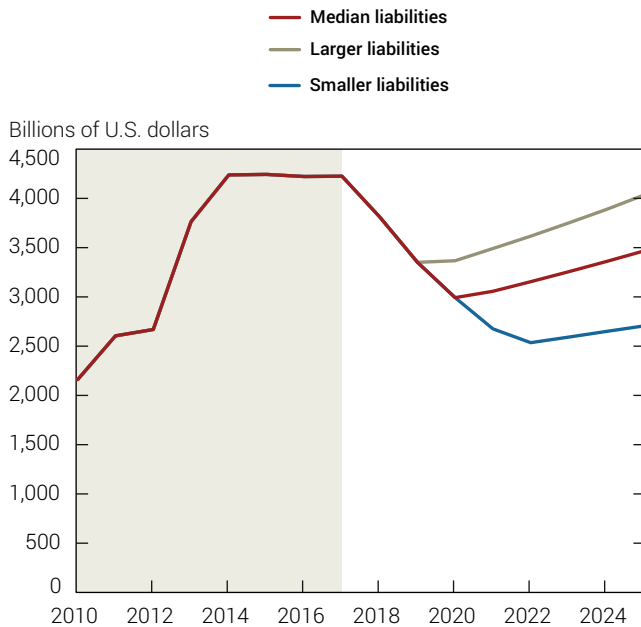
PROJECTED HOLDINGS

The point of normalization for the size of the portfolio—and the time it takes to reach it—will depend on the long-run level of Federal Reserve liabilities, including both reserve balances and non-reserve liabilities. The portfolio will continue to decrease in size as securities mature or are paid down, subject to the relevant monthly redemption caps. In scenarios with higher long-run levels of liabilities, the size of the portfolio normalizes sooner, while lower levels of liabilities correspond to a later normalization date. The portfolio normalizes sometime between 2020 and 2022 in the three balance sheet size scenarios presented here (Chart 30). In the median scenario, the portfolio normalizes in the first quarter of 2021, when the domestic securities portfolio has fallen to about \$3.0 trillion. The portfolio normalizes approximately one year earlier in the larger liabilities scenario, in the first quarter of 2020, when the portfolio is approximately \$3.3 trillion in size. In the smaller liabilities scenario, normalization occurs in the third quarter of 2022, when the portfolio is approximately \$2.5 trillion in size. After the balance sheet reaches its normalized size, the portfolio once again grows as Treasury securities are purchased to keep pace with growth in liabilities, mainly currency.

In the Policy Normalization Principles and Plans, the FOMC notes that it intends for the Federal Reserve to hold primarily Treasury securities in the longer run. The portfolio's composition in the longer run will depend on the time that it takes to reach a normalized size and the level of Treasury securities holdings when normalization occurs, as well as the pace at which Treasury securities grow thereafter. At the normalization date for each scenario, the share of the portfolio held in Treasury securities is approximately 60 percent. However, that share begins to diverge across the three scenarios after the portfolio has normalized in size. In the median liabilities scenario, the share of the portfolio held in Treasury securities rises to roughly 81 percent by the end of 2025; under the smaller liabilities scenario, Treasury securities make up 76 percent of the portfolio, and under the larger liabilities scenario, they constitute 84 percent (Chart 31).

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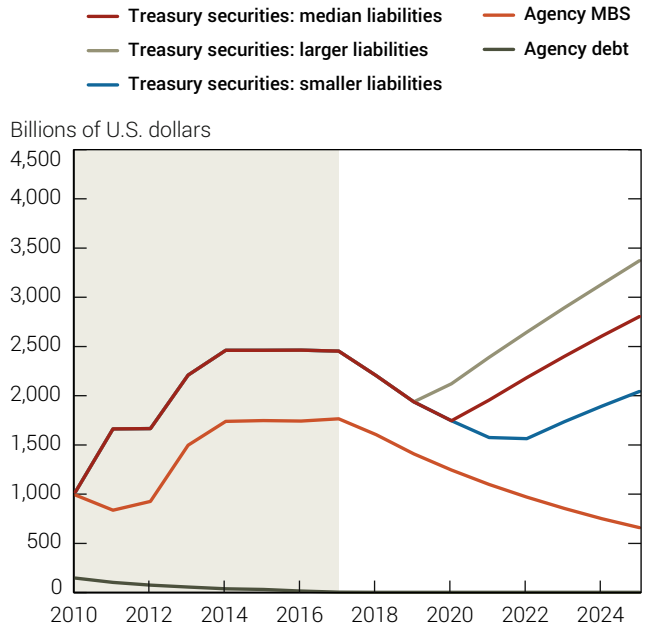
Chart 30
Projected SOMA Domestic Securities Holdings: Alternative Liabilities Scenarios



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-17 (shaded area) are historical settled holdings. Smaller and larger liabilities are based, respectively, on the 25th percentile and 75th percentile responses to a question about the size and composition of the Federal Reserve's long-run balance sheet in the Federal Reserve Bank of New York's December 2017 Survey of Primary Dealers and Survey of Market Participants. Projected figures are rounded.

Chart 31
Projected SOMA Domestic Securities Holdings: Alternative Liabilities Scenarios by Asset Class



Source: Federal Reserve Bank of New York.

Notes: Figures are as of year-end. Figures for 2010-17 (shaded area) are historical settled holdings. Smaller and larger liabilities are based, respectively, on the 25th percentile and 75th percentile responses to a question about the size and composition of the Federal Reserve's long-run balance sheet in the Federal Reserve Bank of New York's December 2017 Survey of Primary Dealers and Survey of Market Participants. Projected figures are rounded.

INTEREST RATE SENSITIVITY AND THE PROJECTED AGENCY MBS PORTFOLIO PATH

The long-run size of the portfolio and the timing of normalization depend critically on the long-run levels of non-reserve liabilities and reserve balances, which will be driven, in part, by declines in SOMA securities holdings. As noted earlier, while the path of declines in the size of Treasury and agency debt holdings can be foreseen with some certainty, the path of agency MBS paydowns is inherently uncertain and will be driven by the future path of interest rates. All else equal, a portfolio experiencing a slower pace of agency MBS principal paydowns will exhibit a slower reduction in reserve balances and reach normalization at a later date than a portfolio experiencing a faster pace of agency MBS principal paydowns.

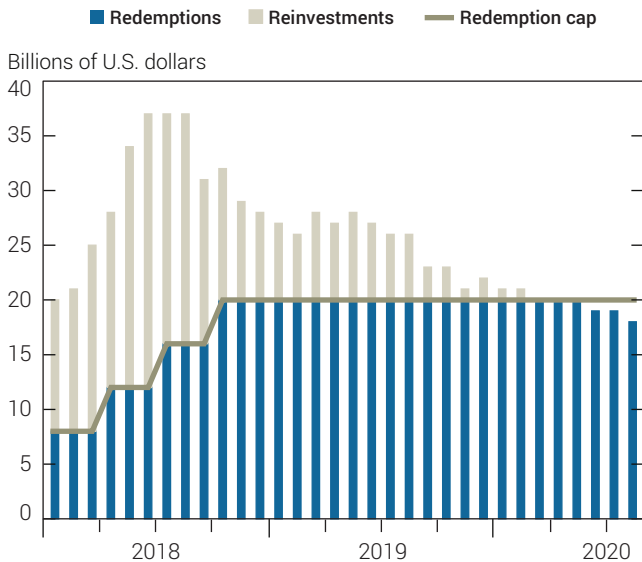
By holding the paths of non-reserve liabilities constant at the median level, analysis of an alternative interest rate shock scenario

illustrates both the sensitivity of agency MBS principal paydowns to a fall in interest rates and the effect of the caps. As described earlier, a baseline interest rate path was constructed from the median responses to the December Desk survey questions on the most likely path and the longer-run level for the federal funds rate, ten-year Treasury yield, and primary mortgage rate. Under these assumptions, agency MBS reinvestments cease by the fourth quarter of 2018, and the portfolio decreases by the amount of principal paydowns each month, reaching a normalized size in the first quarter of 2021. Downward shocks to interest rates, however, could prompt an acceleration in mortgage prepayments, leading to a rise in principal payments on agency MBS that might cause the cap to bind, limiting the extent of redemptions. As an illustrative example, we consider the impact of a 100 basis point downward shock to interest rates on the path of agency MBS paydowns, reinvestments, and redemptions (Chart 32). In this scenario, the

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Chart 32

Projected Paydown Profile of SOMA Agency Debt and MBS Principal with Lower Primary Mortgage Rates



Source: Federal Reserve Bank of New York.

Notes: Figures are monthly. The paydown profile reflects median expectations for the size and composition of the Federal Reserve's balance sheet and the path of interest rates (the median liabilities scenario). The projection assumes primary mortgage rates that are 100 basis points lower than those assumed in the median liabilities scenario starting in 2018:Q2. Projected figures are rounded.

caps bind immediately, the portfolio declines each month by the amount of the cap, and the size of the portfolio normalizes a quarter earlier, in the fourth quarter of 2020.

PROJECTED SOMA NET INCOME

SOMA net income—a measure that reflects income and expenses associated with the SOMA portfolio, including its assumed funding costs—is projected to continue to decline as interest payments on reserve balances increase with rising interest rates amid still-elevated levels of reserve balances (**Chart 33**). Before the portfolio normalizes in size, net income continues to fall, owing to reduced interest income from a shrinking SOMA securities portfolio and to the ongoing increases in interest expense from rising short-term interest rates. The lowest projected value for net income over the projection horizon ranges from \$47 billion (in 2020) in the smaller liabilities scenario to \$55 billion (in 2020) in the larger

liabilities scenario. After reaching a trough, net income is projected to rise as the level of reserve balances declines further to its long-run level. Once the size of the portfolio normalizes, purchases of Treasury securities resume at yields that exceed the costs associated with liabilities held against them, thereby supporting further net income growth.

SOMA net income across all three liability scenarios is projected to be roughly similar as the portfolio declines in size, but the relative pace of net income growth in the three scenarios diverges somewhat after the portfolio size normalizes. Net income is projected to grow more rapidly in the larger liabilities scenario because higher interest income associated with the larger domestic securities portfolio is funded in part by non-interest-bearing liabilities. Conversely, net income grows at a slower pace in the smaller liabilities scenario than in the median scenario.

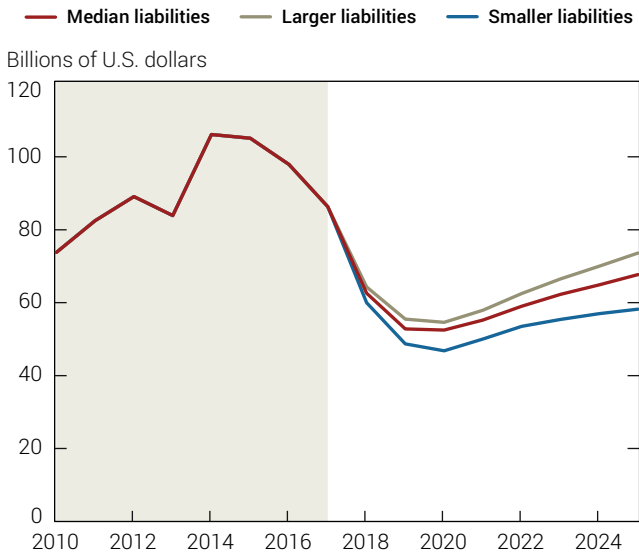
INTEREST RATE SENSITIVITY AND SOMA NET INCOME

Interest rates are an important variable in projections of SOMA net income because they affect the portfolio's coupon income and funding costs. A set of interest rate shocks illustrates the sensitivity of SOMA net income to alternative interest rate paths. As explained earlier, SOMA net income is projected to decline as interest income decreases with the shrinking of the securities portfolio and interest expense increases with rising interest rates. Net income reaches a trough of \$52 billion in 2020 in a scenario that assumes the baseline interest rate path and the median level of liabilities. In a higher interest rate shock scenario, net income is projected to decline at a faster pace than in the baseline scenario, driven by the higher interest rate expense. In a negative interest rate shock scenario, the decline in net income is not as sharp as in the baseline as a result of the lower interest rate expense. Assuming interest rate shocks of -100 basis points and +100 basis points from the baseline path (and assuming the median level for liabilities), the minimum projected value for net income ranges from \$39 billion (in 2019) in the higher interest rate scenario to \$53 billion (in 2024) in the lower interest rate scenario (**Chart 34**).⁴⁵

In the longer run, SOMA net income is projected to increase in all interest rate scenarios as the portfolio reaches a normalized

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Chart 33
Projected SOMA Net Income: Alternative Liabilities Scenarios



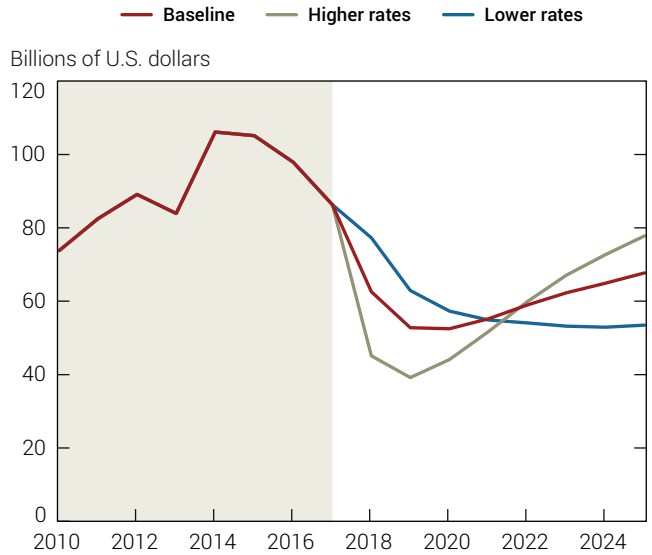
Source: Federal Reserve Bank of New York.
 Notes: Figures are as of year-end. Figures for 2010-17 (shaded area) are historical net income amounts. Smaller and larger liabilities are based, respectively, on the 25th percentile and 75th percentile responses to a question about the size and composition of the Federal Reserve's long-run balance sheet in the Federal Reserve Bank of New York's December 2017 Survey of Primary Dealers and Survey of Market Participants. Projected figures are rounded.

size and purchases of Treasury securities resume at higher yields. This supports a faster rate of net income growth in a higher rate scenario as Treasuries are purchased at higher market yields than in the baseline, and a slower rate of net income growth in a lower interest rate scenario when new Treasury securities are added to the portfolio at lower market yields.

REMITTANCES

Although SOMA net income was elevated in recent years, it has declined nearly 20 percent from its high of \$106 billion in 2014 and is likely to continue to decline as the policy normalization process

Chart 34
Projected SOMA Net Income: Alternative Interest Rate Paths



Source: Federal Reserve Bank of New York.
 Notes: Figures are as of year-end. Figures for 2010-17 (shaded area) are historical net income amounts. Projected figures are rounded.

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 continue to result in declines in the Federal Reserve's remittances to the U.S. Treasury. 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 advance its 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.

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Appendix 1: Authorization for Domestic Open Market Operations

On January 31, 2017, by unanimous vote, the FOMC voted to reaffirm without change the Authorization for Domestic Open Market Operations.

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
 - C. The outstanding amount of the transactions described in paragraph 1.A.ii shall not exceed \$5 billion at any given time.

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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

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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 2017.

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

In 2017, 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 March 15

The FOMC issued the following domestic policy directive on December 14, 2016, and February 1, 2017. This directive governed open market operations that were executed from January 1, 2017, through March 15, 2017.

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

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necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions.

Open Market Operations from March 16 to June 14

The FOMC issued the following domestic policy directive on March 15, 2017, and May 3, 2017. This directive governed open market operations that were executed from March 16, 2017, through June 14, 2017.

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 $\frac{3}{4}$ to 1 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 0.75 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 June 15 to September 20

The FOMC issued the following domestic policy directive on June 14, 2017, and July 26, 2017. This directive governed open market operations that were executed from June 15, 2017, through September 20, 2017.

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 1 to $1\frac{1}{4}$ 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 1.00 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 September 21 to November 1

The FOMC issued the following domestic policy directive on September 20, 2017. This directive governed open market operations that were executed from September 21, 2017, through November 1, 2017.

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 1 to $1\frac{1}{4}$ 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 1.00 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 at auction Treasury securities maturing during September, and to continue reinvesting in agency mortgage-backed securities the principal payments received through September from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities.

Effective in October 2017, the Committee directs the Desk to roll over at auction the amount of principal payments from the

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Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds \$6 billion, and to reinvest in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds \$4 billion. Small deviations from these amounts for operational reasons are acceptable.

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 November 2 to December 13

The FOMC issued the following domestic policy directive on November 1, 2017. This directive governed open market operations that were executed from November 2, 2017, through December 13, 2017.

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 1 to 1¼ 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 1.00 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 at auction the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds \$6 billion, and to continue reinvesting in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds \$4 billion. Small deviations from these amounts for operational reasons are acceptable.

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 14 to December 29

The FOMC issued the following domestic policy directive on December 13, 2017. This directive governed open market operations that were executed from December 14, 2017, through December 29, 2017.

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 1¼ to 1½ 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 1.25 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 at auction the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during December that exceeds \$6 billion, and to continue reinvesting in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during December that exceeds \$4 billion. Effective in January, the Committee directs the Desk to roll over at auction the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds \$12 billion, and to reinvest in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds \$8 billion. Small deviations from these amounts for operational reasons are acceptable.

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.

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Appendix 4: Authorization for Foreign Currency Operations

On January 31, 2017, by unanimous vote, the FOMC voted to reaffirm without change the Authorization for Foreign Currency Operations.

In General

1. The Federal Open Market Committee (the “Committee”) authorizes the Federal Reserve Bank selected by the Committee (the “Selected Bank”) to execute open market transactions for the System Open Market Account as provided in this Authorization, to the extent necessary to carry out any foreign currency directive of the Committee:
 - A. To purchase and sell foreign currencies (also known as cable transfers) at home and abroad in the open market, including with the United States Treasury, with foreign monetary authorities, with the Bank for International Settlements, and with other entities in the open market. This authorization to purchase and sell foreign currencies encompasses purchases and sales through standalone spot or forward transactions and through foreign exchange swap transactions. For purposes of this Authorization, foreign exchange swap transactions are: swap transactions with the United States Treasury (also known as warehousing transactions), swap transactions with other central banks under reciprocal currency arrangements, swap transactions with other central banks under standing dollar liquidity and foreign currency liquidity swap arrangements, and swap transactions with other entities in the open market.
 - B. To hold balances of, and to have outstanding forward contracts to receive or to deliver, foreign currencies.
2. All transactions in foreign currencies undertaken pursuant to paragraph 1 above shall, unless otherwise authorized by the Committee, be conducted:
 - A. In a manner consistent with the obligations regarding exchange arrangements under Article IV of the Articles of Agreement of the International Monetary Fund (IMF).⁴⁶
 - B. In close and continuous cooperation and consultation, as appropriate, with the United States Treasury.
 - C. In consultation, as appropriate, with foreign monetary authorities, foreign central banks, and international monetary institutions.
 - D. At prevailing market rates.

Standalone Spot and Forward Transactions

3. For any operation that involves standalone spot or forward transactions in foreign currencies:
 - A. Approval of such operation is required as follows:
 - i. The Committee must direct the Selected Bank in advance to execute the operation if it would result in the overall volume of standalone spot and forward transactions in foreign currencies, as defined in paragraph 3.C of this Authorization, exceeding \$5 billion since the close of the most recent regular meeting of the Committee. The Foreign Currency Subcommittee (the “Subcommittee”) must direct the Selected Bank in advance to execute the operation if the Subcommittee believes that consultation with the Committee is not feasible in the time available.

- ii. The Committee authorizes the Subcommittee to direct the Selected Bank in advance to execute the operation if it would result in the overall volume of standalone spot and forward transactions in foreign currencies, as defined in paragraph 3.C of this Authorization, totaling \$5 billion or less since the close of the most recent regular meeting of the Committee.

B. Such an operation also shall be:

- i. Generally directed at countering disorderly market conditions; or
- ii. Undertaken to adjust System balances in light of probable future needs for currencies; or
- iii. Conducted for such other purposes as may be determined by the Committee.

- C. For purposes of this Authorization, the overall volume of standalone spot and forward transactions in foreign currencies is defined as the sum (disregarding signs) of the dollar values of individual foreign currencies purchased and sold, valued at the time of the transaction.

Warehousing

4. The Committee authorizes the Selected Bank, with the prior approval of the Subcommittee and at the request of the United States Treasury, to conduct swap transactions with the United States Exchange Stabilization Fund established by section 10 of the Gold Reserve Act of 1934 under agreements in which the Selected Bank purchases foreign currencies from the Exchange Stabilization Fund and the Exchange Stabilization Fund repurchases the foreign currencies from the Selected Bank at a later date (such purchases and sales also known as warehousing).

Reciprocal Currency Arrangements, and Standing Dollar and Foreign Currency Liquidity Swaps

5. The Committee authorizes the Selected Bank to maintain reciprocal currency arrangements established under the North American Framework Agreement, standing dollar liquidity swap arrangements, and standing foreign currency liquidity swap arrangements as provided in this Authorization and to the extent necessary to carry out any foreign currency directive of the Committee.

- A. For reciprocal currency arrangements all drawings must be approved in advance by the Committee (or by the Subcommittee, if the Subcommittee believes that consultation with the Committee is not feasible in the time available).

- B. For standing dollar liquidity swap arrangements all drawings must be approved in advance by the Chairman. The Chairman may approve a schedule of potential drawings, and may delegate to the manager, System Open Market Account, the authority to approve individual drawings that occur according to the schedule approved by the Chairman.

- C. For standing foreign currency liquidity swap arrangements all drawings must be approved in advance by the Committee (or by the Subcommittee, if the Subcommittee believes that consultation with the Committee is not feasible in the time available).

- D. Operations involving standing dollar liquidity swap arrangements and standing foreign currency liquidity swap arrangements shall generally be directed at countering strains in financial markets in the United States or abroad, or reducing the risk that they could emerge, so as to mitigate their effects on economic and financial conditions in the United States.

- E. For reciprocal currency arrangements, standing dollar liquidity swap arrangements, and standing foreign currency liquidity swap arrangements:

- i. All arrangements are subject to annual review and approval by the Committee;
- ii. Any new arrangements must be approved by the Committee; and
- iii. Any changes in the terms of existing arrangements must be approved in advance by the Chairman. The Chairman shall keep the Committee informed of any changes in terms, and the terms shall be consistent with principles discussed with and guidance provided by the Committee.
- iv. To achieve such other objectives as may be authorized by the Committee.

B. The Selected Bank may manage such foreign currency holdings by:

- i. Purchasing and selling obligations of, or fully guaranteed as to principal and interest by, a foreign government or agency thereof (“Permitted Foreign Securities”) through outright purchases and sales;
- ii. Purchasing Permitted Foreign Securities under agreements for repurchase of such Permitted Foreign Securities and selling such securities under agreements for the resale of such securities; and
- iii. Managing balances in various time and other deposit accounts at foreign institutions approved by the Board of Governors under Regulation N.

Other Operations in Foreign Currencies

6. Any other operations in foreign currencies for which governance is not otherwise specified in this Authorization (such as foreign exchange swap transactions with private sector counterparties) must be authorized and directed in advance by the Committee.

Foreign Currency Holdings

7. The Committee authorizes the Selected Bank to hold foreign currencies for the System Open Market Account in accounts maintained at foreign central banks, the Bank for International Settlements, and such other foreign institutions as approved by the Board of Governors under Section 214.5 of Regulation N, to the extent necessary to carry out any foreign currency directive of the Committee.

A. The Selected Bank shall manage all holdings of foreign currencies for the System Open Market Account:

- i. Primarily, to ensure sufficient liquidity to enable the Selected Bank to conduct foreign currency operations as directed by the Committee;
- ii. Secondarily, to maintain a high degree of safety;
- iii. Subject to paragraphs 7.A.i and 7.A.ii, to provide the highest rate of return possible in each currency; and

C. The Subcommittee, in consultation with the Committee, may provide additional instructions to the Selected Bank regarding holdings of foreign currencies.

Additional Matters

8. The Committee authorizes the Chairman:

- A. With the prior approval of the Committee, to enter into any needed agreement or understanding with the Secretary of the United States Treasury about the division of responsibility for foreign currency operations between the System and the United States Treasury;
- B. To advise the Secretary of the United States Treasury concerning System foreign currency operations, and to consult with the Secretary on policy matters relating to foreign currency operations;
- C. To designate Federal Reserve System persons authorized to communicate with the United States Treasury concerning System Open Market Account foreign currency operations; and

- D. From time to time, to transmit appropriate reports and information to the National Advisory Council on International Monetary and Financial Policies.
9. The Committee authorizes the Selected Bank to undertake transactions of the type described in this Authorization, and foreign exchange and investment transactions that it may be otherwise authorized to undertake, from time to time for the purpose of testing operational readiness. The aggregate amount of such transactions shall not exceed \$2.5 billion per calendar year. These transactions shall be conducted with prior notice to the Committee.
10. All Federal Reserve banks shall participate in the foreign currency operations for System Open Market Account in accordance with paragraph 3G(1) of the Board of Governors' Statement of Procedure with Respect to Foreign Relationships of Federal Reserve Banks dated January 1, 1944.
11. Any authority of the Subcommittee pursuant to this Authorization may be exercised by the Chairman if the Chairman believes that consultation with the Subcommittee is not feasible in the time available. The Chairman shall promptly report to the Subcommittee any action approved by the Chairman pursuant to this paragraph.
12. The Committee authorizes the Chairman, in exceptional circumstances where it would not be feasible to convene the Committee, to foster the Committee's objectives by instructing the Selected Bank to engage in foreign currency operations not otherwise authorized pursuant to this Authorization. Any such action shall be made in the context of the Committee's discussion and decisions regarding foreign currency operations. The Chairman, whenever feasible, will consult with the Committee before making any instruction under this paragraph.

Appendix 5: Foreign Currency Directive

On January 31, 2017, by unanimous vote, the FOMC voted to reaffirm without change the Foreign Currency Directive.

1. The Committee directs the Federal Reserve Bank selected by the Committee (the "Selected Bank") to execute open market transactions, for the System Open Market Account, in accordance with the provisions of the Authorization for Foreign Currency Operations (the "Authorization") and subject to the limits in this Directive.
2. The Committee directs the Selected Bank to execute warehousing transactions, if so requested by the United States Treasury and if approved by the Foreign Currency Subcommittee (the "Subcommittee"), subject to the limitation that the outstanding

balance of United States dollars provided to the United States Treasury as a result of these transactions not at any time exceed \$5 billion.

3. The Committee directs the Selected Bank to maintain, for the System Open Market Account:
- A. Reciprocal currency arrangements with the following foreign central banks:

<i>Foreign central bank</i>	<i>Maximum amount (millions of dollars or equivalent)</i>
Bank of Canada	2,000
Banco de México	3,000

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B. Standing dollar liquidity swap arrangements with the following foreign central banks:

Bank of Canada
Bank of England
Bank of Japan
European Central Bank
Swiss National Bank

C. Standing foreign currency liquidity swap arrangements with the following foreign central banks:

Bank of Canada
Bank of England
Bank of Japan
European Central Bank
Swiss National Bank

4. The Committee directs the Selected Bank to hold and to invest foreign currencies in the portfolio in accordance with the provisions of paragraph 7 of the Authorization.

5. The Committee directs the Selected Bank to report to the Committee, at each regular meeting of the Committee, on transactions undertaken pursuant to paragraphs 1 and 6 of the Authorization. The Selected Bank is also directed to provide quarterly reports to the Committee regarding the management of the foreign currency holdings pursuant to paragraph 7 of the Authorization.

6. The Committee directs the Selected Bank to conduct testing of transactions for the purpose of operational readiness in accordance with the provisions of paragraph 9 of the Authorization.

Appendix 6: Operations Disclosures

The table below summarizes the types of information disclosed by the Desk about various SOMA operations. To access the data listed in the table, visit the Markets Data Dashboard on the

New York Fed's website, at <https://www.newyorkfed.org/markets/data-hub>. For U.S. Treasury data, see https://www.treasurydirect.gov/instit/annceresult/annceresult_query.htm.

Operation Type	Operation Schedule	Operation Results	Additional Operations Data ^a	Transaction Data ^b
Domestic open market operations				
Overnight RRP	^c	✓	✓	✓
Treasury rollovers		✓ ^d		
Agency MBS outright purchases	✓	✓	✓	✓
Agency MBS dollar rolls			✓	✓
Treasury securities lending	^c	✓	✓	✓
Foreign open market operations				
Foreign sovereign debt purchases				✓
Central bank liquidity swaps			✓ ^e	
Small-value exercises				
Term RRP	✓	✓	✓	✓
Overnight RRP (with MBS collateral)	✓	✓	✓	✓
Repos	✓	✓		✓
Treasury outright purchases and sales	✓	✓	✓	✓
Agency MBS outright sales	✓	✓	✓	✓
Agency MBS coupon swaps	✓	✓	✓	✓
Foreign sovereign debt sales				✓
Foreign currency repos				✓
Foreign currency reverse repos				✓
Central bank liquidity swaps			✓ ^f	

Source: Federal Reserve Bank of New York.

^aAdditional data could include details about types of counterparties, pricing, and higher-frequency transaction data.

^bThe New York Fed discloses transaction data with market counterparties on a quarterly basis with a two-year lag, in accordance with the Dodd-Frank Act. Details include: the date and amount of the transaction; the counterparty to the transaction; the price, interest rate, or exchange rate at which the transaction was conducted; other relevant terms; and for certain types of transactions, information about the collateral.

^cSince overnight RRP and Treasury securities lending are daily facilities, a regular calendar is not released; schedule changes are typically announced at least one business day prior to the operation.

^dSOMA awards are released by the U.S. Treasury after each auction.

^eTransactions between the New York Fed and foreign central bank counterparties are reported weekly by the New York Fed; foreign central banks' operation results are reported immediately after the completion of their respective auctions.

^fTransactions between the New York Fed and foreign central bank counterparties are reported weekly by the New York Fed.

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Appendix 7: Summary of Projection Assumptions

The assumptions underlying the scenarios 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 the December 2017 FOMC meeting. The scenarios are also guided by the FOMC's September 2014 Policy Normalization Principles and Plans, as well as the March 2015 and June 2017 addendums to 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,
 - the ten-year Treasury yield, and
 - the thirty-year fixed primary mortgage rate.
- ◆ 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 29, 2017.

- ◆ Asset-related assumptions
 - Agency MBS prepayments are derived from a staff model.
 - Policy Normalization Principles and Plans guide the evolution of the SOMA portfolio.
 - Portfolio reductions will proceed as described in the June 2017 Addendum to the Policy Normalization Principles and Plans without interruption.
 - 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
 - Assumptions are based on responses to the Desk survey question on the composition of the balance sheet, on average, in 2025.
 - Median liabilities scenario: Reflects the median responses
 - Currency and capital projections assume the constant annual growth rates implied by the 2025 averages (approximately 5 percent and 3 percent, respectively).
 - Reserve balances decline until they reach \$600 billion.
 - All other liability line items are held constant at expected 2025 levels:
 1. Deposits in the TGA: \$300 billion
 2. Foreign repo pool: \$200 billion
 3. ON RRP: \$100 billion
 - Larger liabilities scenario: Reflects the 75th percentile responses
 - Currency and capital projections assume the constant annual growth rates implied by the 2025 averages (approximately 6 percent and 4 percent, respectively).
 - Reserve balances decline until they reach \$750 billion.
 - All other liability line items are held constant at expected 2025 levels:

1. Deposits in the TGA: \$365 billion
 2. Foreign repo pool: \$250 billion
 3. ON RRP usage: \$150 billion
- Smaller liabilities scenario: Reflects the 25th percentile responses
 - Currency and capital projections assume the constant annual growth rates implied by the 2025 averages (approximately 3 percent and 3 percent, respectively).
 - Reserve balances decline until they reach \$412 billion.
 - All other liability line items are held constant at expected 2025 levels:

1. Deposits in the TGA: \$200 billion
2. Foreign repo pool: \$120 billion
3. ON RRP usage: \$58 billion

Appendix 8: 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

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

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

<https://apps.newyorkfed.org/markets/autorates/temp>

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

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

<https://www.newyorkfed.org/markets/domestic-market-operations/monetary-policy-implementation/treasury-securities>

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

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

<https://www.newyorkfed.org/markets/domestic-market-operations/monetary-policy-implementation/securities-lending>

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/domestic-market-operations/monetary-policy-implementation/agency-mortgage-backed-securities>

<https://www.newyorkfed.org/markets/ambs/operations/results>

<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/international-market-operations/foreign-reserves-management>

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

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 2017

https://www.newyorkfed.org/markets/opolicy/operating_policy_170222

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>

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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.

²Unless otherwise stated, all dollar values of securities held in the foreign SOMA portfolio refer to amortized cost, and gains and losses resulting from any purchases or sales of securities are determined by specific issue based on average cost.

³Annual 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.

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 for normalizing the stance of monetary policy. The Committee provided additional details about its intended operational approach in its March 2015 meeting minutes.

⁵The 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.

⁶In determining the value of Treasury securities available for ON RRP operations, the Desk took several factors into account, including the need to hold back some of the SOMA's Treasury securities for the purposes of conducting reverse repurchase agreements with foreign official and international accounts,

supporting the Desk's securities lending operations, and serving as collateral for any outstanding term RRP operation.

⁷In the highly unlikely event that the value of propositions received had exceeded the amount of available securities, awards would have been made at the stop-out rate. The stop-out rate is the rate at which the total quantity of propositions, ranked in ascending order by submitted rate, equals the overall size limit. All propositions at rates below the stop-out rate would be awarded in full and all propositions at the rate equal to this rate would be awarded on a pro rata basis.

⁸ON 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.

⁹For further discussion of the impact of regulatory implementation on rates and quantities borrowed in the U.S. repo market, see James Egelhof, Antoine Martin, and Noah Zinsmeister, "Regulatory Incentives and Quarter-End Dynamics in the Repo Market," Liberty Street Economics (blog), August 7, 2017, <http://libertystreeteconomics.newyorkfed.org/2017/08/regulatory-incentives-and-quarter-end-dynamics-in-the-repo-market.html>.

¹⁰Prior to October 2017, this approach to rollovers meant that the value of Treasury securities held in the SOMA remained largely steady. However, there were some small fluctuations owing to changes in inflation compensation and the cost differential in the exchange of securities, since securities mature at par while new securities are purchased at market value (which reflects premiums or discounts that are amortized over time).

¹¹The value of maturing SOMA holdings of Treasury notes and 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.

¹²The 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, <https://www.newyorkfed.org/medialibrary/media/research/epr/2013/1212vick.pdf>.

¹³For example, consider that a given month’s cap is \$4 billion and that the principal payments to be received from agency debt are \$2 billion and the anticipated principal payments to be received from agency MBS are \$18 billion. To determine the amount of reinvestment purchases of agency MBS, the Desk will subtract the \$4 billion cap from the total principal payments of \$20 billion (\$2 billion from agency debt and \$18 billion anticipated from agency MBS). An announcement will be made on or around the ninth business day of that month indicating that the Desk will purchase \$16 billion of agency MBS, with operations taking place between the following business day and the ninth business day of the following month.

¹⁴A dollar roll sale is a transaction that involves the sale of agency MBS for delivery in one month with the simultaneous agreement to purchase substantially similar securities in a later month.

¹⁵The Desk was also directed to conduct coupon swaps as necessary to facilitate settlement of the Federal Reserve’s agency MBS transactions, but it did not execute any in 2017 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.

¹⁶CUSIPs are codes that identify financial securities, allowing for efficient clearing and settlement in capital markets. See <http://www.cusip.com>.

¹⁷Securities lending trades executed on Thursday, April 13, 2017, matured on Monday, April 17, 2017, as a result of the trading convention adopted for the holiday on Friday, April 14, 2017.

¹⁸The Foreign Open Market Operations section is a new addition to this year’s report that seeks to improve transparency surrounding open market operations by consolidating relevant information from the Treasury and Federal Reserve Foreign Exchange Operations reports, previous annual reports on open market operations, Federal Reserve Banks Combined Financial Statements, and the websites of the New York Fed and the Board of Governors of the Federal Reserve System.

¹⁹The New York Fed is authorized by the FOMC to intervene in the foreign exchange market by executing foreign exchange transactions for the SOMA as directed by the FOMC and, in its capacity as fiscal agency of the United States, for the Treasury’s Exchange Stabilization Fund (ESF). This report covers the SOMA’s foreign currency holdings.

²⁰Further details can be found in the New York Fed’s Treasury and Federal Reserve Foreign Exchange Operations quarterly reports. See <https://www.newyorkfed.org/markets/quarterly-reports.html>.

²¹The Desk also maintains reciprocal currency arrangements of \$2 billion with the Bank of Canada and \$3 billion with the Banco de México, which were established in 1994 under the North American Framework Agreement (NAFA) to promote orderly currency exchange markets.

²²For a more detailed discussion of the mechanics of a U.S. dollar liquidity swap, see https://www.federalreserve.gov/monetarypolicy/files/quarterly_balance_sheet_developments_report_201711.pdf.

²³For a detailed discussion of balance sheet mechanics, see Deborah Leonard, Antoine Martin, and Simon Potter, “How the Fed Changes the Size of Its Balance Sheet,” *Liberty Street Economics* (blog), July 10, 2017, <http://libertystreeteconomics.newyorkfed.org/2017/07/how-the-fed-changes-the-size-of-its-balance-sheet.html>, and Deborah Leonard, Antoine Martin, Simon Potter, and Brett Rose, “How the Fed Changes the Size of Its Balance Sheet: The Case of Mortgage-Backed Securities,” *Liberty Street Economics* (blog), July 11, 2017, <http://libertystreeteconomics.newyorkfed.org/2017/07/how-the-fed-changes-the-size-of-its-balance-sheet-the-case-of-mortgage-backed-securities.html>.

²⁴Because agency MBS purchases are conducted in the TBA market, a gap exists between the purchase date and the settlement date. Figures for portfolio size include unsettled purchase amounts, unless otherwise stated. As of the end of 2017, net unsettled commitments totaled \$19 billion.

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²⁵For the purposes of applying the cap, \$6 billion of the Treasury securities that matured on Sunday, December 31, 2017, were treated as part of the December redemptions; however, the cash flows associated with those maturities and the corresponding decline in Treasury securities holdings occurred on the next business day, January 2, 2018. Additionally, nearly \$3 billion in inflation compensation over the year partly offset the decline in the portfolio.

²⁶As of December 31, 2017, the U.S. Treasury had approximately \$14.46 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/2017/opds122017.pdf>.

²⁷For a detailed discussion of the difficulties in predicting the precise evolution of the size of the agency MBS portfolio, see Andreas Fuster, Brian Greene, and Brett Rose, “Balance Sheet Normalization: When Will Agency MBS Holdings Decline?” *Liberty Street Economics* (blog), January 8, 2018, <http://libertystreeteconomics.newyorkfed.org/2018/01/balance-sheet-normalization-when-will-agency-mbs-holdings-decline.html>.

²⁸These agency and maturity distributions are roughly similar to the outstanding stock of fixed-rate agency MBS.

²⁹The 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.

³⁰“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.

³¹Lower mortgage rates encourage homeowners to refinance their loans, thereby shortening the duration of the MBS securitizing these loans, while higher mortgage rates discourage homeowners from refinancing, thereby lengthening the duration of MBS.

³²Depository institutions also have access to secondary credit and seasonal credit through the discount window.

³³The Board of Governors approved requests submitted in March, June, and December by the Boards of Directors of the Federal Reserve Banks for 25 basis point increases in the primary credit rate.

³⁴Reserves may also be held as vault cash.

³⁵At the end of 2017, balances exceeding the upper bound of the penalty-free bands were \$13 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 Banks’ holdings. The Federal Reserve pays no interest on notes; however, 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 \$724 million in 2017.

³⁷Upon 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.

³⁸Financial market utilities (FMUs) 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 system. An FMU may be designated as systemically important by the Financial Stability Oversight Council (Council) under Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act). Title VIII of the Dodd-Frank Act also allows these designated financial market utilities (DFMUs) to establish and maintain Reserve Bank accounts.

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³⁹Even 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 pre-crisis levels.

⁴⁰Interest income on foreign currency–denominated holdings was negative \$17 million in 2017.

⁴¹SOMA income reflects (1) interest income on SOMA assets, including interest on domestic and foreign currency–denominated investments, (2) interest expense on SOMA liabilities, which is primarily interest on reverse repurchase agreements, and (3) non-interest income or loss associated with SOMA assets, which is principally composed of foreign currency translation gains and losses and any realized capital gains or losses, as reported in the Federal Reserve System's annual audited financial statements. SOMA net income, which includes the assumed cost of funding the SOMA portfolio, is calculated as SOMA income associated with SOMA assets less the interest expense on interest-bearing liabilities.

⁴²The projections follow the same methodology used in the July 2017 update to Domestic Open Market Operations during 2016.

⁴³For more information on Federal Reserve liabilities, see the “Selected Liabilities” section of this report. Also see Lorie Logan, “Implementing Monetary Policy: Perspective from the Open Market Trading Desk” (remarks before the Money Marketeers of New York University, New York City, May 18, 2017).

⁴⁴These figures represent the sum of the relevant distributional responses for each individual liability item for each scenario.

⁴⁵The higher and lower interest rate scenarios examined in Chart 34 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 the schedule of redemption caps 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 net income when the size of the portfolio remains elevated relative to its normalized size; net income rebounds once the size of the portfolio normalizes. Portfolio net income declines to near zero in the 300 basis point scenario.

⁴⁶In general, as specified in Article IV, each member of the IMF undertakes to collaborate with the IMF and other members to assure orderly exchange arrangements and to promote a stable system of exchange rates. These obligations include seeking to direct the member's economic and financial policies toward the objective of fostering orderly economic growth with reasonable price stability. These obligations also include avoiding manipulating exchange rates or the international monetary system in such a way that would impede effective balance of payments adjustment or to give an unfair competitive advantage over other members.

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



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