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Affected?**

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How does the Fed adjust its Securities Holdings and Who is Affected?

Jane Ihrig, Larry Mize, and Gretchen C. Weinbach*

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Abstract

The Federal Open Market Committee indicated in its September 2017 post-meeting statement that it will initiate in October a balance sheet normalization program to gradually reduce its securities holdings. This action will put in place a policy of reinvesting and redeeming portions of the principal payments received by the Federal Reserve from its holdings of Treasury and agency securities. How are these adjustments to the Federal Reserve's securities holdings transacted and who is affected? This paper provides a primer regarding how the Federal Reserve accounts for these securities transactions. It also illustrates the numerous ways that the Federal Reserve's actions can play out across other sectors of the economy, including those that engage directly with the Federal Reserve and those that are involved indirectly as funds change hands.

Keywords: Federal Reserve, FOMC, balance sheet policy, balance sheet management, securities reinvestment, securities redemption, monetary policy normalization

JEL Classifications: E52, E58, M41

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1. Introduction

Since September 2010, the Federal Reserve has had a policy of reinvesting all principal payments it receives from its holdings of Treasury securities, agency debt, and federal agency and government-sponsored enterprise (GSE) mortgage-backed securities (agency MBS) to maintain the large size of its balance sheet. Such a policy has maintained accommodative financial conditions to foster maximum employment and price stability in the wake of the severe financial crisis and subsequent Great Recession. With the progress of economic recovery to date and with the target range for the federal funds rate now well under way to a more normal level, in September 2017 the FOMC announced a change in its securities reinvestment policy, effective October 2017.¹ The new program puts in place a policy of reinvesting and redeeming portions of maturing and repaying securities that has implications not only for the Fed but for other sectors of the economy as well.

In this paper, we answer the following questions:

- How does the Fed adjust its securities holdings?
- Who is affected by the Fed's actions?

We answer these questions by looking at the accounting framework for the Federal Reserve's securities transactions, describing the nuts and bolts of these transactions and their effects on the balance sheets of the Federal Reserve (the Fed) and others. In so doing, we describe the flow of funds among the Fed, the Treasury, and the private sector, including both banks and nonbanks. Before turning to this discussion, we provide a short review of the types of securities operations that the Fed has conducted in recent years.

2. Why does the Fed adjust its security holdings?

One does not need to look back in history too far to find a variety of examples of the Fed's adjustments to its securities holdings—purchases, reinvestments, sales, and redemptions. Why do these adjustments occur? Here we review the evolution of these operations over the past decade or so.

Prior to the financial crisis, the Federal Reserve's securities portfolio comprised mainly Treasury securities, of which roughly one-third were Treasury bills and two-thirds were Treasury coupon securities, at a size of about \$780 billion in total.² As shown in Figure 1, the Federal Reserve's portfolio of Treasury securities was its largest asset, matched on the liabilities side primarily by the stock of U.S. currency—that is, Federal Reserve notes—in circulation, which grows over time.

¹ See the FOMC's September 20, 2017 post-meeting statement, available on the Board's website here: <https://www.federalreserve.gov/newsevents/pressreleases/monetary20170920a.htm>.

² From 1971 to 1981, the Federal Reserve purchased limited quantities of agency debt securities; the last of these securities matured in the early 2000s, and none was purchased until 2008.

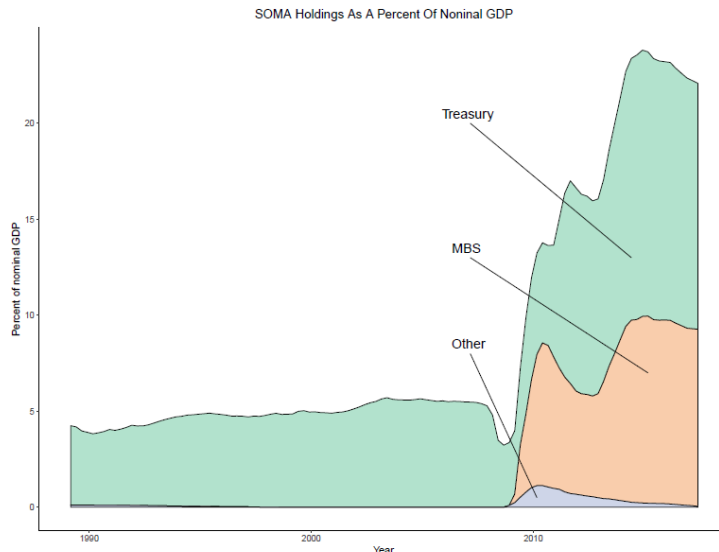
Figure 1
Simplified Federal Reserve balance sheet, end-2006
(\$ billions, rounded)

Assets		Liabilities	
Securities held outright	779	Federal Reserve notes	783
Other assets	97	Deposits of DIs	13
		Other liabilities	49
		<i>Memo: Capital</i>	31

Source: Federal Reserve Board *Factors Affecting Reserve Balances of Depository Institutions and Condition Statement of Federal Reserve Banks* (H.4.1) statistical release; "DIs" is depository institutions (banks).

Growth in currency in circulation has direct implications for the size and management of the Federal Reserve’s securities holdings; see Box 1 for a discussion of this link. On average, the stock of U.S. currency in circulation has expanded roughly in line with growth in the nominal size of the U.S. economy. Thus, as can be seen in figure 2, before the financial crisis hit, growth in the Federal Reserve’s securities holdings was in line with growth in nominal GDP. In particular, between 1990 and 2007, the Federal Reserve’s securities holdings totaled a fairly steady share—about 5 percent—of nominal GDP.

Figure 2
The Federal Reserve’s securities holdings as a share of nominal GDP



Source: Securities holdings, Federal Reserve Board *Factors Affecting Reserve Balances of Depository Institutions and Condition Statement of Federal Reserve Banks* (H.4.1) statistical release; GDP, Bureau of Economic Analysis.

Box 1: How are currency in circulation and the Fed’s securities holdings linked?

Growth in currency and circulation has direct implications for the size and management of the Federal Reserve’s securities holdings; here we explain this linkage. Currency in circulation is the currency in the hands of the public—that is, Federal Reserve notes issued and outstanding. It includes currency held by households and businesses and in the vaults of commercial banks. It does not include currency that has been created but not yet issued (circulated); that is, it does not include currency held by the Federal Reserve or currency at the Bureau of Engraving and Printing (BEP). The BEP is an agency within the Treasury that prints notes on behalf of the Federal Reserve. The Federal Reserve—specifically, the twelve Federal Reserve Banks—issues currency to the public, as demanded, via depository institutions (banks).

To meet the public’s demand for currency, individual commercial banks replenish their currency holdings by ordering a shipment of currency from their Federal Reserve Bank. When a Federal Reserve Bank ships currency to a bank, it debits (decreases) the bank’s reserve account held at the Federal Reserve Bank as payment, thereby reducing the aggregate amount of reserve balances in the banking system. If a bank acquires more currency than it wishes to hold, it returns the excess currency to its Federal Reserve Bank and receives a credit (increase) to its reserve account, increasing the aggregate amount of reserve balances in the banking system. Because, on balance, the stock of currency demanded by the public generally increases over time, aggregate reserve balances would fall if the Federal Reserve did nothing to account for growth in currency. To keep a stable supply of reserve balances in the banking system, the Federal Reserve would engage in open market purchases of securities, a step which results in credits to the reserve accounts of the banks that serve as counterparties to those purchases, thereby replenishing aggregate reserves.¹

1. Other factors affect the Federal Reserve’s aggregate supply of reserve balances and would also have to be taken into account in making decisions about the nature and size of such open market operations. See Meulendyke (1998) for further discussion.

To accommodate its issuance of currency to the public over time, the Federal Reserve not only typically reinvested maturing Treasury securities into newly-issued securities (at auction) to prevent the size of its balance sheet from shrinking, it also routinely purchased additional securities in the secondary market to accommodate growth in currency in circulation. In this context, the Federal Reserve has had a policy of purchasing Treasury securities and reinvesting maturing Treasury securities for decades.

When conducting these purchases and reinvestments, the Federal Reserve is performing what is termed “open market operations.” Open market operations refers to adjustments to the Federal Reserve’s quantity or composition of its securities holdings, conducted in the open

market.³ The FOMC has selected the Federal Reserve Bank of New York (FRBNY) to execute open market operations on behalf of the Federal Reserve. System staff at the financial markets “Desk” of the FRBNY executes such operations in a manner that is consistent with the FOMC’s authorization and directives.⁴ The securities are held in a portfolio known as the System Open Market Account (SOMA). Though the operations are conducted by the FRBNY, Box 2 describes how the Federal Reserve’s securities portfolio is distributed across all twelve Federal Reserve Banks.

When the financial crisis hit, the Federal Reserve established several facilities to provide liquidity directly to borrowers and investors in key credit markets. During this early stage of the crisis, the FOMC chose to sterilize these credit injections by redeeming Treasury bills.⁵ Then, with the target federal funds rate at its effective lower bound, the focus of the Committee's policy was to support the functioning of financial markets and stimulate the economy through open market operations and other measures that expanded the size and changed the composition of the Federal Reserve’s balance sheet. In particular, the Federal Reserve engaged in a series of large-scale asset purchases and related programs. Between December 2008 and October 2014, the FOMC purchased not only large quantities of longer-term Treasury securities but also agency MBS and some agency debt (collectively, “agency” securities).⁶ One of the programs, the Maturity Extension Program, was structured so that the Federal sold shorter-dated Treasury securities and used the proceeds to purchase longer-dated Treasury securities. This particular program changed the composition of the Federal Reserve’s balance sheet but not its size. At the conclusion of the Federal Reserve’s series of large-scale asset purchase programs, its securities portfolio comprised about \$4.2 trillion of securities, of which nearly \$2.5 trillion were Treasury securities, \$1.7 trillion were agency MBS, and \$39 billion were agency debt.

³ See Ihrig, Meade, and Weinbach (2015) for a primer on how monetary policy was implemented pre-crisis as well as in the current environment with a superabundant quantity of reserves in the banking system.

⁴ The FOMC’s annual “Authorization for Domestic Open Market Operations,” which describes the acceptable activities of the Desk, takes effect each January; the 2017 authorization may be found here:

https://www.federalreserve.gov/monetarypolicy/files/FOMC_DomesticAuthorization.pdf.

At the conclusion of each FOMC meeting, the FOMC provides an intermeeting domestic policy directive to the Desk. Each directive is included in the FOMC’s post-meeting “Implementation Note;” these notes are logged on the Board’s website along with other FOMC meeting information, here:

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

⁵ As the performance of financial markets improved, the Federal Reserve wound down most of these programs.

⁶ Agency MBS are securities that are a direct obligation of the U.S. government and are collateralized by a discrete pool of household mortgage loans. The Federal Reserve purchases 15- and 30-year MBS issued by Ginnie Mae, Freddie Mac, and Fannie Mae. The FOMC’s November 2007 announcement of its first purchases of agency debt and MBS may be found here: <https://www.federalreserve.gov/newsevents/press/monetary/20081125b.htm>.

Box 2: How are the Fed’s securities held across the Reserve Banks?

The Federal Reserve’s securities holdings, investments denominated in foreign currencies, and commitments to buy or sell related securities together comprise what is known as the System Open Market Account (SOMA). Detailed information about the SOMA, along with the Federal Reserve’s entire balance sheet, is publically reported each Wednesday on the [H.4.1 statistical release](#) “Factors Affecting Reserve Balances of Depository Institutions and Condition Statement of Federal Reserve Banks.” As shown in that release, the Federal Reserve’s securities holdings are participated across each of the twelve Federal Reserve Banks, and that participated interest is reflected on each Reserve Bank’s individual balance sheet. In particular, Table 5 of that release reports the Federal Reserve’s securities holdings, by type, on a consolidated basis; that is, in amounts that have been aggregated across all twelve Federal Reserve Banks. Table 6 reports the same information on an unconsolidated basis, with amounts held by each Reserve Bank reported separately. As shown in the table below (based in part on Table 6), the Federal Reserve Bank of New York holds a bit more than half of the Federal Reserve’s securities, while the other eleven Reserve Banks each have smaller shares. This raises the question: How is the SOMA participated across the twelve Reserve Banks?

Each Reserve Bank’s participated interest in the SOMA is calculated on a percentage basis which is adjusted annually. Activity in the SOMA during the year, including purchases, maturities, and earnings, is allocated to each Reserve Bank on a daily basis according to its predetermined annual percentage basis.¹ The following table illustrates the participated interest of each Reserve Bank in the Federal Reserve’s securities holdings.

SOMA Securities Holdings are based on Participated Interest

Federal Reserve Bank	Participated Interest	Securities Holdings (\$, millions)
1 Boston	2%	82,656
2 New York	56%	2,388,805
3 Philadelphia	3%	109,534
4 Cleveland	3%	123,023
5 Richmond	6%	248,558
6 Atlanta	6%	249,717
7 Chicago	4%	178,426
8 St. Louis	1%	56,570
9 Minneapolis	1%	33,075
10 Kansas City	1%	60,166
11 Dallas	4%	169,832
12 San Francisco	13%	541,938
Total	100%	4,242,301

Source: Federal Reserve Board’s *Factors Affecting Reserve Balances of Depository Institutions and Condition Statement of Federal Reserve Banks* (H.4.1) statistical release; as of August 3, 2017.

1. Additional information about the computation of Federal Reserve Banks’ participated interests in the SOMA can be found in the Financial Accounting Manual for Federal Reserve Banks, Section 40.70, available on the Federal Reserve Boards’ website: <https://www.federalreserve.gov/aboutthefed/files/BSTfinaccountingmanual.pdf>.

Over time, the Treasury securities that had been purchased as part of the large-scale asset purchase programs began to mature.⁷ In addition, the agency MBS securities began to repay (a phenomenon discussed in more detail below). The FOMC directed that maturing Treasury securities were to be reinvested as per usual practice prior to the financial crisis, and repayments of agency securities were initially redeemed. To continue to support the economy as it recovered only very gradually from the effects of the financial crisis, the FOMC subsequently decided to not only continue its reinvestment of maturing Treasury securities, but to begin reinvesting principal payments received from agency securities holdings. In August 2010, the FOMC began reinvesting all of the proceeds of principal payments from its holdings of agency securities into Treasury securities.⁸ Then, in September 2011, with the housing market still underperforming, the FOMC decided to redirect such receipts into agency MBS.⁹

This reinvestment policy was in place through the summer of 2017. With the economic recovery and normalization of the level of the federal funds rate well under way, the FOMC decided in September 2017 that beginning in October it would gradually reduce the Federal Reserve's securities holdings by decreasing its reinvestments of those securities; the program details were described in a June 2017 Addendum to the FOMC's Policy Normalization Principles and Plans.¹⁰ This balance sheet program follows a predictable monthly schedule for the maximum amount of securities that will be redeemed—that is, allowed to roll off of the Federal Reserve's balance sheet—each month, with the remaining amount of maturing or repaying securities continuing to be reinvested.

With this backdrop, we turn to the details of how these operations are transacted and who is affected. We describe each of the more standard operations mentioned so far—securities purchases, reinvestments, and redemptions—in turn, focusing separately on how such operations involving Treasuries and MBS work. We review the particulars of how these operations are conducted, including the specific line items on the Federal Reserve's balance sheet that are affected and how the Federal Reserve interacts with other agents in the

⁷ Table 2 of the H.4.1 statistical release reports the maturity distribution of the Federal Reserve's securities holdings. This table shows that nearly half of the \$2.5 trillion in Treasury securities currently held by the Federal Reserve have maturities of more than 1 but less than 5 years, with the maturities of the remaining Treasury securities ranging from within 15 days to over 10 years.

⁸ The FOMC's [August 10, 2010](#) post-meeting statement included this information: "To help support the economic recovery in a context of price stability, the Committee will keep constant the Federal Reserve's holdings of securities at their current level by reinvesting principal payments from agency debt and agency mortgage-backed securities in longer-term Treasury securities."

⁹ The FOMC's [September 21, 2011](#) post-meeting statement included this information: "To help support conditions in mortgage markets, the Committee will now reinvest principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities. In addition, the Committee will maintain its existing policy of rolling over maturing Treasury securities at auction."

¹⁰ For a review of the FOMC's key statements regarding this change to its reinvestment policy, see the Appendix. For more information on the FOMC's plans for the normalization of monetary policy, see the Board's website: <https://www.federalreserve.gov/monetarypolicy/policy-normalization.htm>.

economy.¹¹ Though we discuss each operation independently, multiple types of operations can occur at the same time. For example, during the period of large-scale asset purchases, the Fed was both purchasing and reinvesting securities. And when the Fed implements its program to begin to reduce its securities holdings, it will be positioned to both reinvest and redeem securities for some time.

3. Securities purchases

When the Federal Reserve purchases a security it is recorded on an amortized cost basis; that is, according to the price that the Federal Reserve paid at the time of purchase. This cost is recorded on the balance sheet in parts, consisting of the par—or face—value of the securities and an adjustment for any discount or premium that was paid at the time of the purchase, where the discount or premium reflects the difference between the par value of the security and the market price the Federal Reserve paid for the security.¹² The amount of the discount or premium is then amortized over the life of the purchased securities as an adjustment to the amount of recorded earnings on the securities over time. In terms of the timing of these accounting entries, securities are recorded on the Federal Reserve’s balance sheet on a settlement-date basis; that is, according to the date at which the Federal Reserve makes or receives payment for the securities purchases or redemptions (or sales), respectively.

3.1 Purchases of Treasury securities

When the Federal Reserve purchases a Treasury security, it goes to the open market and purchases the security from a primary dealer, who may have obtained it from a bank or nonbank entity that had been holding the security.¹³ For illustration, suppose the Federal Reserve purchases \$100 par value of Treasury securities that had been held by a nonbank entity, such as a nonfinancial business. And, suppose it pays \$99 for those securities. Figure 3 shows the specific balance sheet line items that would be affected by this transaction. The nonbank entity sells the securities and, in the course of clearing and settling that transaction through the banking sector, receives \$99—the sale price—of deposits in return. These steps leave the size of the nonbank’s balance sheet unchanged—it received cash for Treasury securities.

As a bank is the intermediary for the transaction, it receives payment from the Federal Reserve in its reserve account (the bank’s asset), and credits this payment to the nonbank’s deposit account (the bank’s liability). Meanwhile, the Federal Reserve ends up with the desired additional securities on its balance sheet and a larger reserves liability, as desired. Note that the Federal Reserve adjusts two asset-side line items on its balance sheet: (1) the Federal

¹¹ See Liberty Street Economics blog pieces by Leonard et al. (2017) for a high-level discussion of how the Fed changes the size of its balance sheet.

¹² The par value and unamortized premiums and discounts are reported on separate lines on Tables 1, 5, and 6 of the Federal Reserve Board’s weekly H.4.1 statistical release. Summing these three line items gives the amortized cost of the securities the Federal Reserve holds outright.

¹³ Information about, and the list of, the Fed’s primary dealers may be found on the FRBNY’s website here: <https://www.newyorkfed.org/markets/primarydealers>.

Reserve’s holdings of U.S. Treasury securities increase by the par value of the purchased security, \$100, and; (2) unamortized discounts on securities held is adjusted by –\$1. The sum of these two line items—\$99—is the amount paid for the securities. On the liability side of the Federal Reserve’s balance sheet, reserves in the banking system increase by the amount paid for the securities, matching the sum of the two entries on the asset side of the balance sheet. Meanwhile, the nonbank seller of the securities could realize a gain or loss on the sale, but that outcome depends on the basis at which it had been carrying the securities, a point that we do not illustrate here.

Figure 3
Federal Reserve purchase of Treasury securities from nonbank sector

Assets		Liabilities	
Federal Reserve: Purchased Treasury securities			
U.S. Treasury securities holdings	+ 100	Reserve balances	+ 99
Unamortized discounts on securities	– 1		
Banking sector: Cleared the transaction			
Reserve balances	+ 99	Bank deposits	+ 99
Nonbank sector (businesses, etc.): Sold Treasury securities			
U.S. Treasury securities holdings	– 99		
Bank deposits	+ 99		

If instead the seller of the Treasury securities is a bank, the transactions would be slightly different for the banking sector, as illustrated in figure 4. In this case, the size of the banking sector’s balance sheet would be unchanged—it would have received cash (reserve balances) for Treasury securities; the composition of its assets would change, but not the size of its balance sheet. The effects on the Federal Reserve’s balance sheet would be same as those described above—the Fed would end up with a bigger balance sheet, holding more of both securities and reserves.

Figure 4
Federal Reserve purchase of Treasury securities from banking sector

Assets		Liabilities	
Federal Reserve: Purchased Treasury securities			
U.S. Treasury securities holdings	+ 100	Reserve balances	+ 99
Unamortized discounts on securities	– 1		
Banking sector: Sold Treasury securities			
U.S. Treasury securities holdings	– 99		
Reserve balances	+ 99		

3.2 Purchases of agency MBS

An open market purchase of agency MBS works differently than that of a Treasury security. The FRBNY, on behalf of SOMA, purchases to-be-announced (“TBA”) MBS, which are commitments to purchase securities composed of unspecified pools of household mortgage loans at the date of the TBA agreement. Forty-eight hours before the scheduled settlement date, the FRBNY is notified of the specific MBS individual security identifiers that will be delivered, and the MBS are subsequently recorded by the FRBNY on the contractual settlement date; the FRBNY does not record any transactions in advance of settlement. JPMorgan Chase acts as the custodian and recordkeeper for agency MBS securities purchased by the Federal Reserve.¹⁴

Transactions related to the Federal Reserve’s purchases of agency MBS are illustrated in Figure 5. In this and most other figures that follow, balance sheet line items are shown in black, and colored entries are used to represent legs of the transactions that result in increases or decreases in a given line item. Here we illustrate the transactions associated with the Fed’s funding of its purchase in green, and the transactions associated with the actual purchase in blue.

Figure 5
Federal Reserve purchase of agency MBS

Assets	Liabilities
Federal Reserve: Purchased MBS	
SOMA	
Cash and cash equivalents ¹⁵	Reserve balances
Funding of purchase + 1020	Funding of purchase + 1020
Purchase of agency MBS – 1020	Purchase of agency MBS + 0
Agency MBS holdings	
Purchase of agency MBS + 1000	
Purchase premium + 20	
The Fed’s MBS custodian	
Reserve balances	Bank deposits
Funding of purchase + 1020	Funding of purchase + 1020
Purchase of agency MBS – 1020	Purchase of agency MBS – 1020

¹⁴ Because the operational and financial characteristics of agency MBS are complex, the FRBNY conducted a competitive procurement process to identify a third-party custodian and recordkeeper with the capacity to effectively account for the Federal Reserve’s agency MBS holdings. JPMorgan Chase was selected as the MBS custodian and recordkeeper and, in that capacity, holds agency MBS securities on behalf of the SOMA and acts the FRBNY’s clearing bank for purposes of receipt of MBS payments and disbursement of funds for reinvestments in MBS. For more information, see the FAQ on the FRBNY’s website: https://www.newyorkfed.org/markets/mbs_faq.html.

¹⁵ SOMA cash and cash equivalents are recorded in “Other assets” on the Federal Reserve Board’s H.4.1 statistical release.

Banking sector: Cleared the transaction	
Reserve balances	Bank deposits
Purchase of agency MBS + 1020	Purchase of agency MBS + 1020
Nonbank sector: Sold MBS ¹⁶	
Bank deposits	
Purchase of agency MBS + 1020	
Agency MBS holdings	
Purchase of agency MBS – 1020	

In this case, the FRBNY deposits to an account at the Fed’s MBS custodian the expected amount of funds required to settle the MBS purchases (the green entries), which in this example is \$1,000 in par value and \$20 in a premium, and, assuming for simplicity that settlement is immediate, also records an increase to its holdings of agency MBS. The deposit account at the custodian represents cash and cash equivalents that are assets of the Federal Reserve held at the custodian. When the MBS are delivered (the blue entries), the custodian “withdraws” funds from the Federal Reserve’s deposit account and advances the funds to the seller (also shown in blue).¹⁷ Simultaneously, the seller of the MBS records the receipt of the funds, which is likely cleared through a banking institution on behalf of the seller, and reduces its holdings of agency MBS. As a result of these transactions, the Federal Reserve’s balance sheet is increased and reserves in the banking system are increased. Of course, the additional deposits in the banking system that immediately result from these transactions do not necessarily stay parked there; investors are likely to deploy that cash into riskier assets or into other investments, as we discuss below.

4. Securities reinvestments

As noted in section 2, the Fed has been reinvesting receipts of principal from its holdings of Treasury securities for decades. And for the past several years, the Fed has been reinvesting such receipts from its holdings of agency securities as well. In describing the transactions associated with reinvestments, it is helpful to think about them in two steps: First, the Federal Reserve receives principal payments when Treasury securities mature, and, in the case of agency MBS, at scheduled repayment dates; and, second, the Fed actively reinvests those funds. Below we describe the transactions involved with securities reinvestments for each of these two steps, highlighting the impact across all economic agents. Note that the Federal Reserve also receives interest payments during the period that it holds securities. Transactions related to the Fed’s receipt of interest payments on Treasury securities are described in detail

¹⁶ Assumes that the seller’s basis in the MBS is the same as the Federal Reserve’s purchase price. If the seller had a different basis, the seller would realize a gain or loss on the transaction.

¹⁷ The FRBNY records MBS on the contractual settlement date, which can be in advance of the delivery date. If a seller fails to deliver securities, the MBS remains recorded by the FRBNY as an asset but payment is not advanced to the seller; the FRBNY records a fails liability, reflecting its obligation to pay for the securities when delivered.

in Box 3, at the end of next subsection; we describe the receipt of interest on agency MBS in subsection 4.2.

4.1 Reinvestment of maturing Treasury securities

Step 1: Treasury securities mature. Each Treasury security has a fixed maturity and so the Federal Reserve—as well as the public—knows with certainty when such securities are scheduled to mature.¹⁸ When a Treasury security matures, the amount that the Federal Reserve receives is equal to the par value of the Treasury security. This is because the Federal Reserve has held this security to its maturity date, has recorded all coupon interest payments up to the maturity date, and has fully amortized any premium or discount paid for the security at the time of purchase. As shown in figure 6, at maturity of \$100 of Treasury securities, the Federal Reserve’s securities holdings (asset) are reduced and the Treasury’s cash balance at the Federal Reserve (liability) is reduced by an equal amount. Importantly, the Federal Reserve does not receive cash for the maturing Treasury securities; instead, the Treasury’s claim on the Treasury General Account (TGA), a liability of the Fed, is decreased.¹⁹

Figure 6
Maturing Treasury securities held by Federal Reserve

Assets		Liabilities	
Federal Reserve			
SOMA			
U.S. Treasury securities holdings		Treasury General Account	
Maturing securities	– 100	Maturing securities	– 100
Treasury			
Treasury General Account		Treasury debt	
Maturing securities	– 100	Maturing securities	– 100

Step 2: Reinvestment into Treasury securities. In general, when a Treasury security is about to mature and the Fed intends to roll over the proceeds, the Desk places a noncompetitive bid at the Treasury’s regularly scheduled auction in an amount equivalent to the par value of the maturing securities.²⁰ The awarded securities, which settle on the same day as the maturing

¹⁸ A detailed listing of the securities that the Federal Reserve holds—by their individual security identifier numbers—is available on the Federal Reserve Bank of New York’s SOMA holdings [website](#).

¹⁹ The Federal Reserve Act provides that the Treasury may deposit funds in the Reserve Banks and, when required by the Secretary of the Treasury, the Reserve Banks shall act as fiscal agents of the United States. The Treasury has established an account held at the Federal Reserve Bank of New York—called the Treasury General Account—which serves as the primary operational account of the Treasury. Funds regularly flow into and out of this account on a daily basis. The Reserve Banks act as fiscal agent in processing receipts and disbursements to and from the Treasury General Account, including those related to the issuance and redemption of Treasury securities.

²⁰ If there are multiple Treasury auctions on the same day, the Federal Reserve’s \$100 worth of securities are allocated across the types of securities being auctioned in proportion to the amount of each type of security

securities, are priced at the auction stop-out rate—the price that resulted from the competitive bids that were made at the Treasury auction; that is, the Federal Reserve pays the market price for the securities it acquires. All of the Federal Reserve’s reinvestment-related acquisitions of Treasury securities are reported by the Treasury in its publically-available auction results as an add-on to a given auction size.²¹ The securities newly-acquired by the Fed replace the maturing securities, keeping the (par) value of its holdings of Treasury securities constant.

Figure 7 provides the details of how the reinvestment transactions unfold. Continuing with the assumption that \$100 in par value of the Federal Reserve’s Treasury securities matured (the blue entries in the figure, reproduced from figure 6 and discussed above), the reinvestment actions are illustrated by the green entries. The FOMC has instructed the Desk to “roll over” maturing Treasury securities at auction; that is, these replacement securities are not purchased on the open market. Because the price of the acquired Treasury securities is determined based on a competitive Treasury auction, the price the Fed paid for the securities is likely to be very close to their par value. Overall, the Fed’s purchase results in an increase to its SOMA holdings of U.S. Treasury securities. The balance of the Treasury General Account also increases, reflecting the amount the Fed paid for the securities, the market price.

Figure 7
Reinvestment of maturing Treasury securities

Assets	Liabilities
Federal Reserve	
SOMA	
U.S. Treasury security holdings	Treasury General Account
Maturing Treasury securities – 100	Maturing Treasury securities – 100
Acquired Treasury securities + 100	Acquired Treasury securities + 100
Treasury	
Treasury General Account	Treasury debt
Maturing Treasury securities – 100	Maturing Treasury securities – 100
Auction of Treasury securities + 100	Auction of Treasury securities + 100

When the securities reinvestment operation is complete—that is, when both the maturing Treasury securities and the reinvestment of those proceeds into new Treasury securities has been transacted—the size of the Federal Reserve’s balance sheet is roughly unchanged: The amount of securities held by the Federal Reserve, recorded at par value, is unchanged. There is no change in reserve balances. There could be a small net change, not shown in our example, to the SOMA and to the Treasury General Account to reflect any net discount or premium associated with the newly-acquired securities. Overall, one can think of the Federal Reserve’s

offered by the Treasury that day. More information about how the Federal Reserve participates in the Treasury’s noncompetitive tenders may be found on the [Federal Reserve Bank of New York’s website](#).
²¹ See the Treasury’s website for a report of the Federal Reserve’s rollovers of Treasury securities in the Treasury’s auction results: <https://www.treasurydirect.gov/instit/annceresult/press/press.htm>.

reinvestments of Treasury securities as involving interaction of the Federal Reserve with the Treasury to exchange the Fed’s maturing Treasury securities for newly-issued securities at current market prices.

Box 3: How does the Fed record interest payments on its Treasury holdings?

Over time, the Federal Reserve earns income on its securities holdings, just as a private holder of the same securities would. The total amount of income recorded by the Federal Reserve on its securities holdings includes the interest as well as an amount equal to the amortization of any premiums or discounts recorded at initial purchase; in so doing, the total earnings recorded during the time the security is held reflects its effective yield. Here we review how the Fed records coupon interest payments on its holdings of Treasury securities; we review the Fed’s handling of interest on agency MBS in section 4.2. Regardless of the source of the interest payment, the Fed ultimately remits its net income to the Treasury.¹

Longer-term Treasury securities have a coupon rate of interest, which is paid to the holders of the securities at scheduled dates. In the figure below we illustrate this accounting, supposing the Federal Reserve receives \$0.25 coupon interest on its U.S. Treasury security holdings (we abstract from the amortization of any premiums or discounts recorded at the time of purchase). To reflect the income earned (the green entries in the figure), the Federal Reserve accrues the expected amount of interest earnings on a daily basis by increasing the asset line item “accrued interest receivable” and increasing the line item “interest income accrual.” From the Treasury’s perspective, it books accrued interest payable; its associated entries are also shown in green. When the Treasury makes the payment for interest on the scheduled date (the blue entries), the Federal Reserve reduces the accrued interest receivable asset and reduces the Treasury’s account at the Federal Reserve to reflect the payment.²

Fed’s receipt of interest on Treasury securities

Assets		Liabilities	
Federal Reserve			
SOMA			
Accrued interest receivable		Interest income accrual	
Interest income earned	+ 0.25	Interest income earned	+ 0.25
Interest payment	- 0.25		
		Treasury General Account	
		Interest payment	- 0.25
Treasury			
Interest Expense		Accrued interest payable	
Interest expense accrual	+ 0.25	Interest expense accrual	+ 0.25
Treasury General Account		Interest payment	- 0.25
Interest payment	- 0.25		

Note that the Federal Reserve’s balance sheet would be affected by the Treasury’s payment of coupon interest even if the private sector were the sole holder of Treasury securities for which interest was paid. This is because the Federal Reserve serves as the Treasury’s fiscal agent and processes all payments from and receipts of the Treasury. All flows of funds to and from the Treasury are functioned via the Treasury General Account at the Federal Reserve Bank of New York—that is, essentially, through the Treasury’s checking account at the Federal Reserve.

1. For example, [this press release](#) describes the Federal Reserve’s transfer of net income to the Treasury for 2016.
2. The Treasury’s balance sheet may be found [here](#).

4.2 Reinvestments of agency MBS payments

Step 1: Agency MBS payment received. The Federal Reserve’s holdings of agency MBS generate payments of principal and interest that reflect two factors. First, because agency MBS are backed by fully amortizing mortgage loans that are paid off according to an amortization schedule over the life of the loan, MBS holders receive regular payments consisting of scheduled principal repayments and interest payments. Second, MBS principal payments include an unscheduled component that largely reflects homeowners exercising their option to prepay part or all of their remaining principal balance at their discretion. The scheduled amortization payments associated with each MBS security can be calculated using a standard formula that depends upon the security’s coupon rate, term of underlying mortgages, and remaining principal balance of the MBS. However, unscheduled principal prepayments introduce cash flow uncertainty for MBS holders, which can make total receipts of principal—both in the current period and in future periods—difficult to project.²²

The issuer or seller of agency MBS, such as a government-sponsored enterprise (GSE), collects payments of principal and interest generated from the mortgages underlying the MBS throughout the period between scheduled payment dates, and aggregates such payments for eventual remittance to the holders of agency MBS. Prepayments of principal on the underlying mortgages are handled in a similar way.

Remittance of these payments to the holders of the agency MBS occurs on one of three specific settlement days each month corresponding to different profiles of the existing securities; these days are known as Class A, Class B, and Class C settlement days.²³ On scheduled payment dates, holders of agency MBS receive payments that include principal—both scheduled repayments of principal and any unscheduled prepayments of principal—plus interest. When scheduled repayments or unscheduled prepayments of agency MBS principal are received by the securities holder, the holder reduces the recorded value of the related agency MBS, but also immediately recognizes a portion of the premium or discount paid on purchase, resulting in an offsetting loss or gain on the prepayment transaction. Thus, at purchase, the Federal

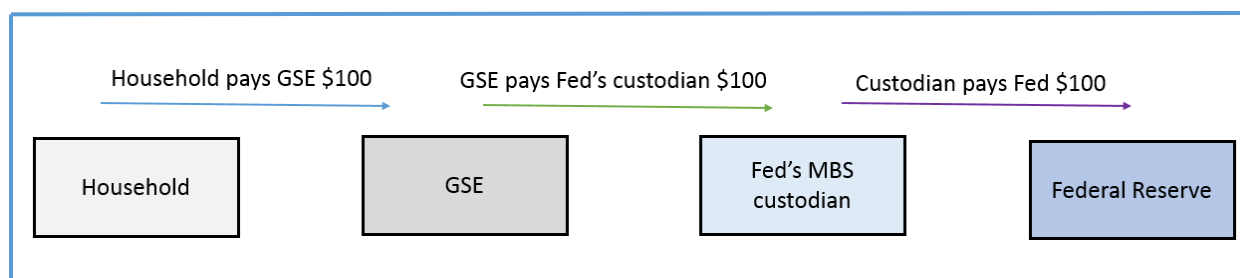
²² See Bonis, Kandrac and Pardue (2017) for more discussion of factors affecting prepayments of agency MBS.

²³ The Securities Industry and Financial Markets Association (SIFMA) releases a monthly schedule that indicates specific days that settlement is expected to occur.

Reserve treats any premiums and discounts associated with its agency MBS holdings as it does its Treasury purchases—agency MBS premiums and discounts are amortized over the term of the security’s stated maturity—but the amortization of any premiums and discounts on agency MBS is accelerated when any unscheduled principal payments are received.

Figure 8 illustrates the linkage between a household, who took out a mortgage and made a principal payment, and the Federal Reserve, who holds the agency MBS backed by the mortgage.²⁴ Starting from the left of the figure, we assume the household makes a payment of \$100. This payment may be composed of a regularly-scheduled payment of principal and interest, a prepayment of remaining principal, or both. This payment first goes to the holder of the mortgage, which for purposes of this illustration we assume is one of the GSEs.²⁵ The GSE then passes the household’s \$100 payment on to the holder of the agency MBS that contains this mortgage.²⁶ In the Federal Reserve’s case, its MBS custodian receives the funds on behalf of the Federal Reserve, and passes the funds to the Fed.

Figure 8
Agency MBS payment: Funds flow from household to Federal Reserve



The specific financial accounting entries associated with payments on agency MBS held by the Fed are as follows, illustrated in figure 9. Here we assume that the household’s mortgage payment, the blue entries, consists of \$95 of mortgage principal and \$5 of mortgage interest, labeled “P&I.”²⁷ The household’s payment first goes to the GSE/servicer of the MBS, passing through the household’s bank. Then, as shown with the green entries, the GSE distributes the payment to the holders of the MBS. In this case, the Fed’s custodian receives the cash on behalf of the Fed, at which point the Fed’s agency MBS holdings are decreased. Assuming that

²⁴ For simplicity, we assume the Federal Reserve is the only holder of the agency MBS that is backed by the household’s underlying mortgage. If instead the Federal Reserve owned a share of the agency MBS backed by the household’s mortgage, then the Federal Reserve would receive a pro rata share of the household’s \$100 principal payment.

²⁵ More typically a mortgagee may remit payments directly to a mortgage servicer, such as a bank. For simplicity we ignore this step, which amounts to assuming that the mortgage servicer and holder—a GSE in our scenario—are one and the same.

²⁶ Here we ignore any processing or service fees. In actuality, the GSE takes a service fee, so that the full \$100 does not get passed on to the holder of the agency MBS.

²⁷ For simplicity, this illustration does not also show the accrual of interest income on the agency MBS and amortization of any premium or discount realized at the time the agency MBS was purchased by the Fed.

the Fed does not immediately reinvest the proceeds from the payment, it would recall its cash from its custodian, as shown with the purple entries, which reduces the amount of the cash and cash equivalents (an asset) and reserve balances (a liability) on the Fed's books, completing the payment flow. At the end of these transactions, the Fed's agency MBS holdings have declined by \$95 and reserves in the banking sector have declined by \$100.

Figure 9
Payment received by Fed on agency MBS

Assets	Liabilities
Household: Made mortgage P&I payment	
Bank deposits	Mortgage (both P&I owed)
P&I payment by household - 100	P&I payment by household - 100
Banking sector: Cleared household's payment	
Reserve balances	Bank deposits
P&I payment by household - 100	P&I payment by household - 100
GSE/Seller: Received payment, sends to agency MBS holders	
Reserve balances	Agency MBS obligation
P&I payment by household + 100	MBS payment to custodian - 95
MBS payment to custodian - 100	Accrued interest payable
Mortgage P&I receivable	MBS payment to custodian - 5
P&I payment by household - 100	
The Fed's MBS custodian	
Reserve balances	Bank deposits (of the Fed)
MBS payment to custodian + 100	MBS payment to custodian + 100
MBS payment to Fed - 100	MBS payment to Fed - 100
Federal Reserve	
SOMA	Reserve balances
Cash and cash equivalents	P&I payment by household + 0
MBS payment to custodian + 100	MBS payment to custodian + 0
MBS payment to Fed - 100	MBS payment to Fed - 100
Agency MBS holdings	
MBS payment to custodian - 95	
Accrued Interest receivable	
MBS payment to custodian - 5	

If the Fed takes no further action, it would have redeemed these agency MBS. However, the Fed has the option to reinvest the cash proceeds into newly-issued agency MBS to push the

level of its MBS holdings back to their original par value. That is, with reinvestment, the Fed will push \$95 of cash back to its custodian to purchase MBS (or the Fed may simply have left this cash at its custodian for immediate reinvestment) so that the par value of its agency MBS holdings moves back up to its original value prior to the household’s payment. We discuss this next leg of the reinvestment transaction in step 2.

Step 2: Reinvestment into agency MBS. The Desk conducts agency MBS reinvestment-related purchases throughout the month. The Desk reports to the public anticipated principal payments of agency MBS to the Federal Reserve, and hence the monthly total amount of reinvestments that it expects to undertake each month. In particular, on or around the eighth business day of each month, the Desk announces its planned agency MBS purchases for the next 30 days, based on information about projected principal payments of agency MBS. Then, twice a month the Desk publishes a daily operational schedule of its reinvestment-related purchases of agency MBS.²⁸

Figure 10 illustrates the reinvestment of a principal payment received on agency MBS, building from the transactions shown in step 1. When the Federal Reserve reinvests in agency MBS, the cash it received from *principal* payments on its agency MBS securities holdings—\$95 in our example—goes toward the purchase of newly-issued agency MBS (all interest received is remitted to the Treasury). We assume that the new agency MBS is purchased at par (that is, no premiums or discounts were realized at purchase); we do not illustrate the detailed entries representing the Fed’s prefunding of the transaction with its custodian (figure 5 shows these details).

Figure 10
Reinvestment of principal payment on agency MBS securities

Assets		Liabilities	
Federal Reserve			
SOMA		Reserve balances	+ 95
Cash and cash equivalents	+ 0		
Agency MBS holdings	+ 95		
The Fed’s MBS custodian: Purchased MBS from GSE on behalf of Fed			
Reserve balances	+ 0	Bank deposits	+ 0
GSE/Seller: Issued agency MBS			
Reserve balances	+ 95	Agency MBS obligation	+ 95

²⁸ For information on the Desk’s anticipated agency MBS payments and reinvestment-related purchases, see the Federal Reserve Bank of New York’s website: https://www.newyorkfed.org/markets/ambs/ambs_schedule.html. An FAQ on the Desk’s agency MBS purchases may be found here: <https://www.newyorkfed.org/markets/ambs-treasury-faq.html>.

The reinvestment transaction constitutes a purchase of securities, as described in section 3. The entries for the Federal Reserve reflect: (1) the Fed sending cash to its custodian, which is immediately deployed by the custodian to purchase the agency MBS, leaving a net change of zero to the Fed's cash and cash equivalents; (2) an increase in agency MBS holdings; and (3) an increase in reserve balances (of GSEs) by the amount of the MBS purchase.

Combining both steps, after reinvestment, the total par value of the Federal Reserve's agency MBS holdings is unchanged, but the number of agency MBS individual security identifiers has increased. That is, the par value of the Fed's holdings of, say, Fannie 3.5 with maturity 2045 will decline over time as this security repays, but the cash proceeds will be reinvested in newly-issued Fannie, Freddie, or Ginnie Mae securities with final maturities that are 15 or 30 years from the reinvestment date. Reserve balances are roughly unchanged, recording a small decline that reflects the household's interest payment (\$5 in our example) that was passed through to the Fed.

5. Securities redemptions

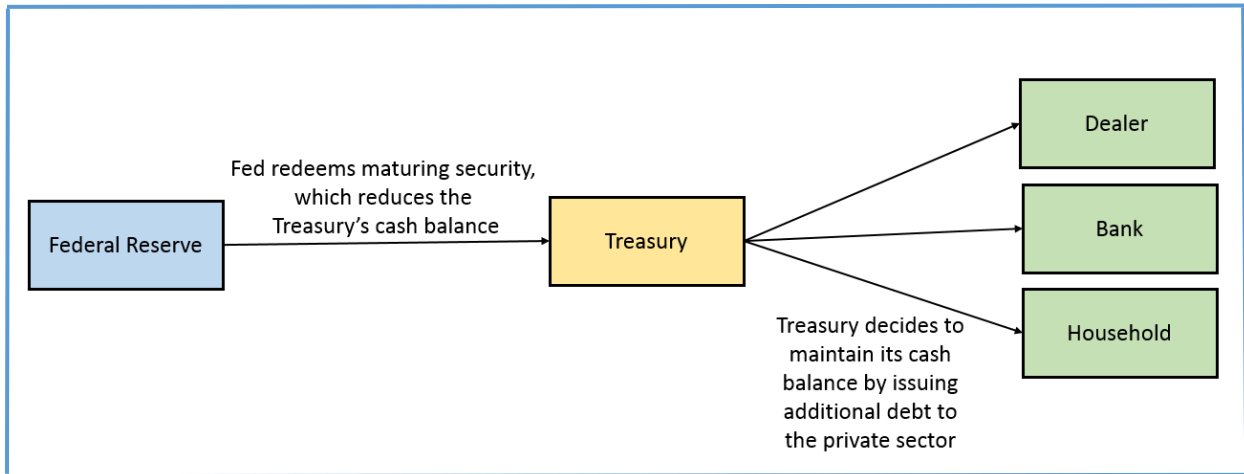
As discussed in section 2, the FOMC has stated that it will reduce its securities holdings by allowing an increasing amount of securities to roll off its portfolio over time—that is, to gradually increase its redemptions of securities. In this section we describe how the Fed redeems Treasury securities (section 5.1) and agency MBS (section 5.2).

5.1 Redemptions of Treasury securities

In section 4.1 we described how the Federal Reserve accounts for maturing Treasury securities; with no further action on the part of the Fed, this is equivalent to the act of redeeming the securities. As we showed in Figure 6, at maturity, the Federal Reserve's holdings of Treasury securities (asset) and the balance of the Treasury General Account (TGA; liability) both decline, and reserves in the banking system are unaffected. If the Federal Reserve determines that it will not reinvest the proceeds from the maturing securities—a securities redemption—the balances that result from the maturing securities illustrated in figure 6 would constitute the end of this transaction.

Without further action on the part of the Treasury, the outstanding amount of Treasury debt would also decline along with the cash in the Treasury's TGA. Of course, the Treasury uses the cash in its TGA to fund government expenditures; sizeable Fed redemptions would shrink that balance. At some point, the Treasury will most likely need to replace the Fed's redeemed securities by issuing new securities to the public to keep a manageable cash balance. At this point, the Federal Reserve's redemptions set in motion a chain of events that will affect the flow of funds of banks and other entities. In particular, as shown in figure 11, when the Treasury issues the new debt, the ultimate holder of the newly-issued Treasury securities may be primary dealers—banks and broker-dealers that trade in U.S. Treasuries with the New York Fed—banks, households, or nonfinancial businesses, or a combination thereof.

Figure 11
Sectors possibly affected by Federal Reserve's securities redemptions



As we will show below, no matter which sector of the economy ultimately holds the newly-issued Treasury securities, there will be an associated decline in reserve balances in the banking sector at the point in time when the newly-issued securities are purchased. Given that the Treasury typically rolls over maturing (that is, issues new) debt on the same day that it matures, the timing of SOMA redemptions and the decline in reserve balances will be matched. However, the Treasury may decide it does not need to immediately raise new debt, perhaps because it is flush with cash amid a tax season, or it may choose to prefund SOMA redemptions. In these cases, reserve balances may decline after or before the SOMA redemptions, respectively.

We now illustrate how each of the three possible sectors would be affected, describing the set of transactions that would occur for each if it held the Treasury's newly-issued securities instead of the Federal Reserve. In each figure we reproduce, in blue, the entries associated with the redemption of the Treasury security by the Fed (reproduced from Figure 6); the blue entries are the same in each case. The differences across the three cases, shown with the green entries, reflect how each sector would fund its securities purchase. The final effects of the Fed's redemptions are the combinations of the blue and green entries in each figure.

Case 1: Dealers add new Treasury securities to inventory

Primary dealers are the largest group of buyers at Treasury auctions, and they are also active in buying and selling U.S. government securities in the secondary market for such securities.²⁹ Continuing our example, here we assume that the Fed has redeemed \$100 in Treasury

²⁹ The Treasury auctions securities on a regular and predictable schedule. The securities are bought by primary government securities dealers, investment funds, foreign accounts, individual investors, and other investor classifications. To learn more about Treasury auctions, see this [link](#).

securities, Treasury has issued \$100 in new Treasury securities, and a primary dealer purchases the newly-issued securities to hold in inventory. As shown in green in figure 12, as is often the case with a dealer's Treasury purchase, the dealer can finance its purchase by engaging in a repurchase (repo) agreement with a bank.³⁰ In this circumstance, reserve balances held by banks would decline and bank repo financing would increase. Primary dealers would show an increase in Treasury holdings and an increase in repo liabilities to banks.

Figure 12

Case 1: Fed redeems Treasuries; primary dealer purchases newly-issued securities

Assets	Liabilities
Federal Reserve: Redeemed Treasury securities	
SOMA	
U.S. Treasury security holdings	Treasury General Account
Maturing Treasury securities - 100	Maturing Treasury securities - 100
	Newly-issued Treasury securities + 100
	Reserve balances
	Newly-issued Treasury securities - 100
Treasury: Issued new Treasury securities	
Treasury General Account	Treasury debt
Maturing Treasury securities - 100	Maturing Treasury securities - 100
Newly-issued Treasury securities + 100	Newly-issued Treasury securities + 100
Primary Dealer: Bought Treasury securities	
U.S. Treasury security holdings	Repo
Newly-issued Treasury securities + 100	Newly-issued Treasury securities + 100
Banking Sector: Provided funding for the transaction	
Reserve balances	
Newly-issued Treasury securities - 100	
Outstanding repo	
Newly-issued Treasury securities + 100	

Looking across both sets of transactions, the Treasury's debt outstanding is unchanged, as is its cash account at the Federal Reserve, the TGA. Dealers are holding the newly-issued security, which they funded with a repurchase agreement (repo) transaction.

Case 2: Bank purchases Treasury securities

In this scenario, we assume a bank buys the newly-issued Treasury securities. In so doing, it reduces its cash holdings and replaces this asset with the new securities. As shown in green in figure 13, the bank pays for the Treasury securities by reducing its reserve balances. This cash is

³⁰ The dealer uses repo to borrow cash from the banking sector to finance the purchase of the Treasury security.

shifted from the bank's reserve account at the Fed to the Treasury's account at the Fed, the TGA.

Figure 13
Case 2: Fed redeems Treasuries; bank purchases newly-issued securities

Assets	Liabilities
Federal Reserve: Redeemed Treasury securities	
SOMA	
U.S. Treasury security holdings	Treasury General Account
Maturing Treasury securities - 100	Maturing Treasury securities - 100
	Newly-issued Treasury securities + 100
	Reserve Balances
	Newly-issued Treasury securities - 100
Treasury: Issued new Treasury securities	
Treasury General Account	Treasury debt
Maturing Treasury securities - 100	Maturing Treasury securities - 100
Newly-issued Treasury securities + 100	Newly-issued Treasury securities + 100
Banking sector: Bought Treasury securities	
Reserve balances	
Newly-issued Treasury securities - 100	
U.S. Treasury securities holdings	
Newly-issued Treasury securities + 100	

Looking at the result of both steps of the Fed's redemption—the blue and green entries—together, as was the case above, the TGA is unchanged on net as is total Treasury debt outstanding. But unlike the case above, the banking sector is holding the newly-issued Treasury securities.

Case 3: Household purchases Treasury securities

In this case, we assume a household purchases the newly-issued Treasury securities by taking funds out of its deposit account at its bank. As shown in figure 14, this action reduces the bank's deposits and reserve balances. The household ends up with a change in the composition of its assets: an increase in Treasury securities and a decline in its bank deposits.

Figure 14
Case 3: Fed redeems Treasuries; household purchases newly-issued securities

Assets	Liabilities
Federal Reserve: Redeemed Treasury securities	
SOMA	
U.S. Treasury security holdings	Treasury General Account
Maturing Treasury securities – 100	Maturing Treasury securities – 100
	Newly-issued Treasury securities + 100
	Reserve balances
	Newly-issued Treasury securities – 100
Treasury: Issued new Treasury securities	
Treasury General Account	Treasury debt
Maturing Treasury securities – 100	Maturing Treasury securities – 100
Newly-issued Treasury securities + 100	Newly-issued Treasury securities + 100
Banking Sector: Cleared the transaction	
Reserve balances	Deposits
Newly-issued Treasury securities – 100	Newly-issued Treasury securities – 100
Household: Bought Treasury securities	
U.S. Treasury security holdings	
Newly-issued Treasury securities + 100	
Bank deposits	
Newly-issued Treasury securities – 100	

An alternative to the household reducing deposits would be for it to reduce its holdings of risky assets. Carpenter et al. (2015) examined data from the Financial Accounts of the United States and found that the household sector—which in this dataset includes sophisticated investors such as hedge funds—was the predominate *seller* of Treasury securities to the Federal Reserve during its large-scale asset purchase programs, and that the household sector rebalanced its portfolio toward corporate bonds, commercial paper, and municipal debt and loans.³¹ If we lean on their results and apply them in reverse—that is, reverse the actions that were found to occur during that earlier period so as to hypothetically mimic a period of Fed securities redemptions—then we would expect the household sector, as defined in this context, to rebalance its portfolio away from the riskier assets and back towards Treasury securities. We would then need to take a further step to consider how the riskier assets that had been held by

³¹ The Financial Accounts of the United States—the quarterly Z.1 statistical release—may be found on the Federal Reserve Board’s website here: <https://www.federalreserve.gov/releases/z1/>.

the household sector are subsequently placed and how such transactions may interact with the banking sector and its stock of reserve balances. We return to this topic below.

5.2 Redemptions of agency MBS

Unlike a Treasury security that is redeemed at par value on the security's maturity date, the underlying mortgage principal associated with agency MBS is repaid by mortgagees over the life of the security. Thus, agency MBS "redemptions" occur on a flow basis, as households regularly make principal payments. We have described these transactions—how funds flow from a household making such a payment all the way to the Fed—in section 4.2, and presented the associated balance sheet transactions in figure 9. As we discussed there, if the Federal Reserve determines that it will not reinvest the proceeds it receives from principal payments of agency MBS, then, all else equal, the related balances will roll off the Federal Reserve's balance sheet. As a result, the Fed's agency MBS holdings decline by the par value of securities that the household repaid (\$95 in our example), and reserve balances decrease by the total amount of the household's payment (\$100; the household's payment included \$5 of interest).

Of course, lenders issue new mortgages on a flow basis, and the GSEs and other issuers routinely issue new agency MBS based on that flow of new mortgages. For example, some households that pay off their mortgage debt early do so because they move residences, and such households may take out a new mortgage in the process of securing their new residence. All else equal, the Federal Reserve's reduction in its holdings of agency MBS generally means that other investors will increase their holdings of these securities. Just as was the case with Treasury securities, there is a range of possible ultimate holders of the new agency MBS. Here we describe the transactions that will take place if the ultimate holder is a bank or a household, respectively.

In each case, we continue our example from above by assuming that after the Fed redeems \$95 of agency MBS, an investor purchases an additional \$95 of newly-issued agency MBS (we ignore any premiums or discounts realized at the time of purchase), and the investor settles its securities transactions through the banking sector. The green and blue entries are reproduced from figure 9; these items show the relevant payment-processing and redemption transactions that we described above. The new purple entries illustrate the transactions associated with the purchase of the GSE's newly-issued agency MBS by the private sector—by either a bank (figure 15) or household (figure 16), respectively.

In either case, the net effect on the GSE is the same: its agency MBS obligations are back to their original level but its reserve balances decline by \$5, reflecting the interest portion of the household's payment that the GSE passed on to the Fed via its custodian. Also, there is no net effect on the Fed's balance sheet from the GSE's issuance of agency MBS to the private sector; in either case, the GSE's issuance of new securities results in a decline in the reserve balances of banks while those of GSEs are commensurately increased.

At settlement of the bank's purchase of the newly-issued agency MBS, shown in figure 15, it holds additional agency MBS and a smaller reserve balance, with no change in its liabilities. If

instead a household buys the agency MBS, shown in figure 16, at settlement the household has additional agency MBS and fewer bank deposits. In this case, the banking sector, which cleared the transaction, ends up with fewer reserve balances and deposits.

Figure 15
Newly-issued agency MBS purchased by bank

Assets	Liabilities
Federal Reserve: Redeemed agency MBS	
SOMA	Reserve balances (of banks)
Cash and cash equivalents + 0	Redemption of MBS – 100
Agency MBS holdings	Newly-issued MBS – 95
MBS payment to holders – 95	GSE reserve balances
Accrued interest receivable	Newly-issued MBS + 95
MBS payment to holders – 5	
GSE/Seller: Issued agency MBS	
Reserve balances	Agency MBS obligation
MBS payment to holders – 100	MBS payment to holders – 95
Newly-issued MBS + 95	Newly-issued MBS + 95
	Accrued interest payable
	MBS payment to holders – 5
Banking sector: Purchased agency MBS	
Reserve balances	
Newly-issued MBS – 95	
MBS holdings	
Newly-issued MBS + 95	

Figure 16
Newly-issued agency MBS purchased by household

Assets	Liabilities
Federal Reserve: Redeemed agency MBS; GSE/Seller: Issued agency MBS	
<i>Same entries as above (figure 15)</i>	
Banking sector: Cleared the purchase transaction	
Reserve balances	Bank deposits
Newly-issued MBS – 95	Newly-issued MBS – 95
Household sector: Purchased agency MBS	
Bank deposits	
Newly-issued MBS – 95	
Agency MBS holdings	
Newly-issued MBS + 95	

Of course, as noted above, in the course of purchasing the agency MBS the household could choose to rebalance its portfolio of securities, reducing its holdings of riskier assets instead of reducing its deposits. If so, the ultimate effects on other economic agents of the Fed's securities redemption would depend on how the riskier assets that the household had shed were subsequently placed and how such transactions may interact with the banking sector and its stock of reserve balances. Thus, the overall effects of the Fed's redemptions of securities on other economic agents not only depends on who ultimately ends up holding the securities in place of the Fed, but also on the full range of portfolio adjustments that other economic agents ultimately make as a result.

7. Conclusion

In this paper we reviewed the financial flows associated with the Federal Reserve's securities reinvestment and redemption operations. In so doing, we provided a primer regarding how the Federal Reserve accounts for various securities transactions, discussed the details of the Federal Reserve's balance sheet operating policies, and illustrated how the Federal Reserve's actions play out across other sectors of the economy.

Appendix: The FOMC’s statements regarding its reinvestment policy

The FOMC’s previous reinvestment policy was implemented in September 2011. Under this policy, the Fed reinvested all principal payments received from maturing Treasury securities into additional Treasury securities and reinvested all principal payments of agency securities into agency MBS. The FOMC indicated for some time that it did not intend to maintain such a policy forever. For the purposes of prudent planning, the FOMC periodically discussed ways to normalize the size of the Fed’s balance sheet and has communicated its intentions to the public. The table below highlights several key statements by the FOMC in this regard.

First, in September 2014, the FOMC described in its “Policy Normalization Principles and Plans” that, when economic and financial conditions were appropriate, it would reduce the Federal Reserve’s holdings of securities in a gradual and predictable manner. At that time, the FOMC also stated that it intended to do so by adjusting its policy of securities reinvestments, either by ceasing them or phasing them out. More recently—as shown by the next two rows of the table—the FOMC said that, provided the economy evolves as anticipated, it expected to begin reducing the size of its balance sheet to a more normal level in 2017, and most recently, in July, the FOMC characterized the likely timing of a change to its reinvestment policy as being relatively soon. As shown in the final row of the table, in June 2017, the FOMC detailed its operational plan for gradually reducing the Federal Reserve’s securities holdings.

The FOMC’s statements regarding a change to its reinvestment policy

Release date	Key excerpts
September 16, 2014	<i>Policy Normalization Principles and Plans:</i> “The Committee intends to reduce the Federal Reserve’s securities holdings in a gradual and predictable manner primarily by ceasing to reinvest repayments of principal on securities held in the SOMA.” “The Committee expects to cease or commence phasing out reinvestments after it begins increasing the target range for the federal funds rate; the timing will depend on how economic and financial conditions and the economic outlook evolve.”
June 14, 2017	“The Committee currently expects to begin implementing a balance sheet normalization program this year, provided that the economy evolves broadly as anticipated. This program, which would gradually reduce the Federal Reserve’s securities holdings by decreasing reinvestment of principal payments from those securities, is described in the accompanying addendum to the Committee’s Policy Normalization Principles and Plans.”
July 26, 2017	“The Committee expects to begin implementing its balance sheet normalization program relatively soon, provided that the economy evolves broadly as anticipated; this program is described in the June 2017 Addendum to the Committee’s Policy Normalization Principles and Plans.”
June 14, 2017	<i>Addendum:</i> “The Committee intends to gradually reduce the Federal Reserve’s securities holdings by decreasing its reinvestment of the principal payments it receives from securities held in the System Open Market Account. Specifically, such payments will be reinvested only to the extent that they exceed gradually rising caps.”

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