

Projections for the SOMA Portfolio and Net Income

*An update to projections presented in the “Report on Domestic
Open Market Operations during 2016”*

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Federal Reserve Bank of New York

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In its June 14, 2017, [policy statement](#), the Federal Open Market Committee (FOMC or Committee) provided guidance that it expects to begin implementing a balance sheet normalization program this year, provided that the economy evolves broadly as anticipated. This program would gradually reduce the Federal Reserve's securities holdings by decreasing the reinvestment of principal payments from securities held in the System Open Market Account (SOMA). In an accompanying addendum to its [Policy Normalization Principles and Plans](#) (PNP&P), the FOMC provided additional details regarding the approach it intends to use to reduce securities holdings once the balance sheet normalization process begins.

This report provides an updated set of projections for the path of the SOMA's domestic securities portfolio and its associated net income. These projections update those presented in the most recent [Report on Domestic Open Market Operations](#) (2016 SOMA Annual Report) by incorporating the new information on balance sheet normalization released by the FOMC and the latest market expectations regarding interest rates and the long-run size of the Federal Reserve's balance sheet. Both the long-run size of the securities portfolio and the time it will take to reach that size will depend on numerous variables, including the level of reserves that the Federal Reserve considers appropriate for efficient and effective monetary policy implementation and future levels of non-reserve liabilities. Given uncertainty attending these factors, we consider several scenarios that vary in their assumptions about the long-run levels of Federal Reserve liabilities. Underlying data for the charts shown in this report and related scenarios are provided on the Federal Reserve Bank of New York's (New York Fed) [website](#).

Summary of Assumptions

Assumptions underlying these projections are based on publicly-available, survey-based interest rate forecasts and expectations for monetary policy and the Federal Reserve's balance sheet, as well as the FOMC's communications about monetary policy normalization. Specifically, we draw assumed paths of the target federal funds rate and longer-term interest rates from a combined set of responses, where available, to the [Survey of Primary Dealers](#) and [Survey of Market Participants](#) conducted by the New York Fed ahead of the June 2017 FOMC meeting (the June Desk surveys). The June Desk surveys also asked respondents to provide a probability distribution on the expected timing of a change to the FOMC's reinvestment policy and expectations for the size and composition of the Federal Reserve's balance sheet, on average, in 2025. Using the distribution of responses for the expected level of reserve balances and other liabilities and capital, we develop three illustrative scenarios for the Federal Reserve's long-run balance sheet size: A median scenario (based on the 50th percentile of survey responses for each line item), a smaller liabilities scenario (based on the 25th percentiles), and a larger liabilities

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scenario (based on the 75th percentiles).¹ These three scenarios highlight the degree to which the long-run size of the Federal Reserve’s domestic securities portfolio will be influenced by choices regarding the future level of reserve balances and the evolution of non-reserve liabilities, some of which are exogenously determined.

Federal Reserve Assets

We start with portfolio holdings as of May 31, 2017, and assume that full reinvestment of principal payments from the Federal Reserve’s holdings of Treasury securities, agency debt, and agency mortgage-backed securities (MBS) continues according to existing policy until such time that the FOMC begins implementing a balance sheet normalization program. Once the normalization process begins, we assume that securities are allowed to mature or pay down without reinvestment—subject to the caps described below—until the size of the securities portfolio reaches a “normal” level. A normal portfolio size is defined as one associated with the quantity of reserves the FOMC deems appropriate for its long-run policy implementation framework, in addition to other liabilities and capital. After the normalized size of the balance sheet is realized, we assume that the balance sheet grows again as a result of trend growth of currency and capital. At this point, we assume that rollovers of maturing Treasury securities resume and 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.² We assume that all other assets remain at current levels over the projection horizon.

Reinvestment Policy

As outlined in the FOMC’s June 2017 addendum to its PNP&P, 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 SOMA. Specifically, such payments will be reinvested only to the extent that they exceed gradually rising caps, which are anticipated to be adjusted at three-month intervals over a period of twelve months. For Treasury securities, the cap will be \$6 billion per month initially and will increase in steps of \$6 billion every three months until it reaches \$30 billion per month; the cap for agency debt and MBS will be \$4 billion per month initially and will increase in steps of \$4 billion every three months until it reaches \$20 billion per month (Table 1). The caps will remain in place at their maximum levels until the Committee judges that the Federal Reserve is holding no more securities than necessary to implement monetary policy efficiently and effectively.

¹ This approach differs from that used in the projections in the 2016 SOMA Annual Report, which, in the absence of comprehensive survey data, employed simplifying staff assumptions for most liability items.

² Consistent with guidance in the PNP&P, we assume that the FOMC will not sell agency MBS as part of the normalization process.

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Table 1

Schedule of Portfolio Runoff Caps

Billions of U.S. Dollars, per month

	Months 1-3	Months 4-6	Months 7-9	Months 10-12	Terminal Cap
U.S. Treasuries	6	12	18	24	30
Agency Debt and MBS	4	8	12	16	20

Source: Federal Open Market Committee.

Based on results from the June Desk surveys, the projections presented here assume a change in reinvestment policy is announced at the December 2017 FOMC meeting, with the initial cap applied to reinvestments in January 2018.³ Consistent with the FOMC's guidance, caps are phased in over a twelve-month period. In the 2016 SOMA Annual Report, based in part on median results from the December 2016 Desk surveys, we assumed that reinvestments would be phased out linearly, without the use of caps, over a twelve-month period commencing in mid-2018—roughly two quarters later than in the current projections—after which all securities were assumed to mature without reinvestment.

Federal Reserve Liabilities and Capital

The size of the Federal Reserve's normalized balance sheet is likely to be driven by the future supply of and demand for a variety of Federal Reserve liabilities.⁴ Table 2 summarizes the median, 25th, and 75th percentiles from a combined set of responses to the June Desk survey question on the expected average level of liabilities in 2025. These inputs were used to develop the three updated balance sheet scenarios. For comparison, staff assumptions on liabilities from the baseline projection scenario in the 2016 SOMA Annual Report are also shown.

Federal Reserve Notes

Federal Reserve notes—that is, U.S. dollar paper currency—have historically been the Federal Reserve's largest liability. Demand for Federal Reserve notes generally increases from year to year. A simple assumption is that demand for Federal Reserve notes will grow in line with nominal U.S. gross domestic product growth. This was the assumption used by staff in the 2016

³ In the June Desk surveys, respondents attached a similar, but slightly lower average probability to a change in reinvestment policy being announced at the September 2017 FOMC meeting (and assigned very low probabilities to a change being announced at other meeting dates). Pulling forward the start time for balance sheet normalization by three months to October leads to roughly similar projected portfolio and income trajectories, with the portfolio normalizing one quarter earlier than in the scenarios shown in this report. Results for scenarios assuming an October implementation date are included in the data file accompanying this report.

⁴ For more discussion about Federal Reserve liabilities and the balance sheet, see Lorie K. Logan, "[Implementing Monetary Policy: Perspective from the Open Market Trading Desk](#)," remarks presented at the Money Marketeters of New York University, New York City, May 18, 2017.

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SOMA Annual Report’s projections, where notes were assumed to grow at an average annual rate of around 4 percent—a pace roughly consistent with [FOMC participants’ longer-run economic forecasts as of year-end](#). In actuality, demand for currency appears to vary not only with the pace of economic growth and the rate of inflation, but also changes in the demand for U.S. currency as a store of value, including significant foreign demand.⁵ Since 2014, for example, Federal Reserve notes outstanding have grown by almost 7 percent per year, considerably faster than nominal GDP growth. June Desk survey responses imply expectations for currency to grow at average annual rates between 1.5 percent and 5.5 percent through 2025.

Table 2

Liability and Capital Assumptions

Billions of U.S. Dollars

	Median Scenario	Smaller Liabilities Scenario	Larger Liabilities Scenario	Memo: 2016 SOMA Annual Report Baseline Scenario*
Federal Reserve notes	1,968	1,700	2,303	2,128
Reserve balances	613	406	1,000	500
Treasury General Account (TGA)	300	221	400	150
Reverse repos with private counterparties	100	50	121	0
Reverse repos with foreign official accounts	200	125	250	250
Other deposits	40	30	85	105
All other liabilities and capital	50	41	60	55
Total	3,271	2,573	4,219	3,188

*The 2016 SOMA Annual Report also considered alternative scenarios with long-run levels of reserve balances of \$100 billion and \$1 trillion.

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

Reserve Balances

As noted in the PNP&P addendum, gradually reducing the Federal Reserve’s securities holdings will result in a [declining supply of reserve balances](#). The FOMC currently anticipates reducing the quantity of reserve balances (which currently fluctuate in a wide range, mostly above \$2 trillion), over time, to a level appreciably below that seen in recent years but larger than before the financial crisis. This level will reflect the banking system’s demand for reserve balances and the Committee’s decisions about how to implement monetary policy most efficiently and effectively in the future. The long-run level of reserve balances is assumed to range from about \$400 billion to \$1 trillion across our current scenarios. The baseline scenario in the 2016 SOMA

⁵ See Ayelen Banegas et al, “[International Dollar Flows](#),” Board of Governors of the Federal Reserve System International Finance Discussion Papers, no. 1144, September 2015; and Ruth Judson, “[Crisis and Calm: Demand for U.S. Currency and Home and Abroad from the Fall of the Berlin Wall to 2011](#),” Board of Governors of the Federal Reserve System International Finance Discussion Papers, no. 1058, November 2012.

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Annual Report assumed a long-run level of reserve balances of \$500 billion, but also considered scenarios with \$100 billion and \$1 trillion in reserve balances.

Treasury General Account

The U.S. Treasury holds cash balances at the Federal Reserve in the Treasury General Account (TGA), which is the Treasury's primary "checking account" for managing incoming and outgoing cash flows. The level of the TGA varies over time as a result of seasonal variation in expenses and tax receipts, as well as the settlement of Treasury securities auctions. The Treasury currently aims to hold a level of cash that is generally sufficient to cover one week of outflows in the TGA, subject to a minimum balance of roughly \$150 billion, to help protect against an interruption in market access.⁶ The 2016 SOMA Annual Report assumed a long-run level of TGA balances at the Treasury's stated minimum of \$150 billion, but since the Treasury announced its new cash balance policy, TGA balances have averaged around \$245 billion, with occasional dips below the targeted minimum balance in the face of periodic debt ceiling constraints. In projections presented here, we assume a steady TGA balance within each scenario, at levels ranging from roughly \$220 billion to \$400 billion.

Reverse Repurchase Agreements

The Federal Reserve arranges reverse repurchase agreements (RRPs) for two purposes. One purpose is to support monetary policy implementation (currently, such RRP are conducted with eligible private counterparties through the overnight RRP facility). The other purpose is as an investment (known as the foreign repo pool) that is offered as part of a range of services for foreign official and international account holders of New York Fed.⁷ Over the past twelve months, overnight RRP have averaged \$155 billion, while weekly average balances in the foreign repo pool were \$245 billion. In the 2016 SOMA Annual Report, we assumed that the foreign repo pool was maintained at year-end 2016 levels and that ON RRP usage was determined by survey inputs through 2019 but subsequently declined to zero over the course of the balance sheet normalization process. In this projection exercise, we assume that participation in each RRP program is constant over the course of the projection horizon, at levels consistent with the distribution of survey results. The assumed levels of RRP with private counterparties range from \$50 billion to \$120 billion across the three scenarios, and assumed levels of RRP with foreign official accounts range from \$125 billion to \$250 billion.

⁶ See the Treasury Department's [quarterly refunding statement](#), May 6, 2015. Markets Group staff estimate that, since May 2015, five business days of outflows have averaged about \$166 billion, varying from \$2 billion to \$406 billion. In a [May 2017 presentation to the Treasury Borrowing Advisory Committee](#) reviewing the cash balance policy, the Treasury Department reported that, since May 2015, on average, it would have a cash surplus of \$86 billion if market access had been lost for five days.

⁷ The foreign repo pool works as follows: 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. Upon maturity on the following business day, the SOMA repurchases the securities at a price that reflects a rate of return tied to comparable market-based Treasury repo rates.

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Other Deposits

Several other types of financial institutions—including government-sponsored enterprises (GSEs), financial market utilities that are designated as systemically important (DFMUs), and international and multilateral organizations—are authorized to hold cash deposits at Federal Reserve Banks.⁸ GSE balances are often a source of week-to-week variability in this category. In addition, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 allowed DFMUs to establish and hold cash deposits in Reserve Bank accounts. The buildup of DFMU balances in recent years has driven other deposits up to a weekly average value of approximately \$60 billion over the past year. In these projections, other deposits are assumed to be constant at levels ranging from \$30 billion to \$85 billion, somewhat lower than the 2016 SOMA Annual Report's assumption of \$100 billion in the long run.⁹

Other Liabilities and Capital

Other liabilities of the Federal Reserve include earnings remittances due to the Treasury Department (which are paid on a weekly basis), accrued dividends, and deferred availability cash items. In these projections, other liabilities and capital are assumed to reach levels ranging from about \$40 billion to \$60 billion at the end of the projection horizon, compared to an assumed level of about \$55 billion in the 2016 SOMA Annual Report. Most of this figure likely represents capital, as the current level of Federal Reserve capital is about \$41 billion.

Interest Rates

The assumed paths of the target federal funds rate and longer-term interest rates are taken from the June Desk surveys; assumed interest rates are substantially similar to those in the December 2016 surveys used in the 2016 SOMA Annual Report. The median respondent expects the federal funds target rate to rise gradually from its current range to 2.75 percent in the long run. The median dealer expects the ten-year Treasury yield and thirty-year fixed primary mortgage rate to rise to approximately 3.2 percent and 5.1 percent, respectively, in the long run. In line with guidance in the PNP&P and current practice, we assume that the rate of interest on excess reserves is set at the top, and the overnight RRP rate is set at the bottom, of a 25-basis-point wide target range centered on the target federal funds rate.

Portfolio Path Results

Under the assumptions described above, the size of the SOMA portfolio is projected to remain largely unchanged at its current level of approximately \$4.2 trillion through the fourth quarter of

⁸ DFMUs are multilateral systems that provide the infrastructure for transferring, clearing, and settling payments, securities, and other financial transactions among financial institutions or between financial institutions and the utility.

⁹ Foreign official institutions also maintain deposits in Federal Reserve accounts, which are reported on the Federal Reserve's balance sheet as a separate line item. The June Desk surveys did not specify where to report these deposits, which have averaged around \$5 billion over the past year.

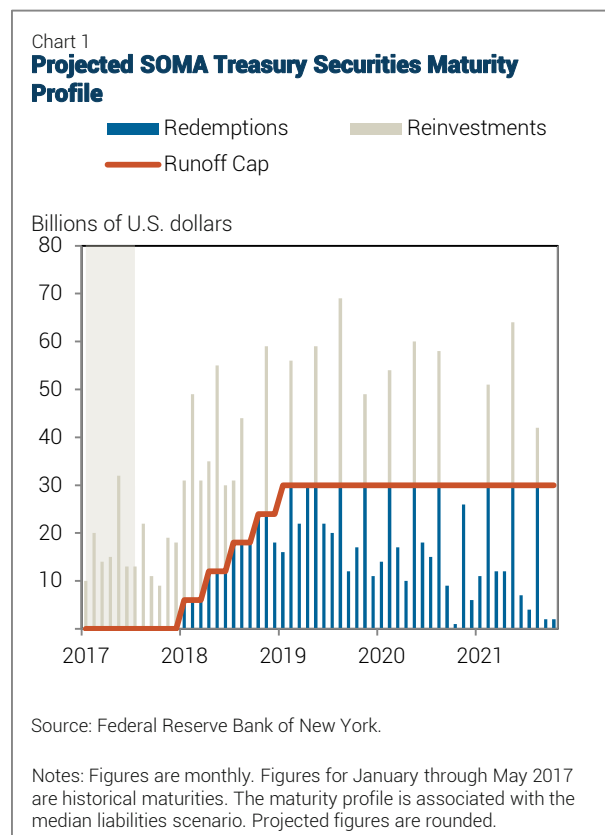
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2017, while full reinvestments are assumed to continue. The portfolio starts to decline as the caps on redemptions are gradually phased in over the course of 2018. Thereafter, securities pay down without reinvestment, subject to the maximum caps, until the Committee judges that the Federal Reserve is holding no more securities than necessary to implement policy efficiently and effectively. We consider the portfolio to have reached its normalized size when reserve balances reach the long-run levels assumed in each scenario, while also taking into account expected levels of non-reserve liabilities.

Redemptions and Reinvestments

Once the FOMC commences a reduction in reinvestments, the pace of the SOMA portfolio's decline will be driven largely by the pace of principal receipts from SOMA 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 pay-downs associated with agency MBS are model-based estimates that are subject to considerable uncertainty because of the embedded

prepayment option in the underlying mortgages. The actual pay-down path will depend on a variety of factors, including the path of interest rates, changes in housing prices, credit conditions, and any other factors that influence the behavior of underlying mortgage holders.¹⁰

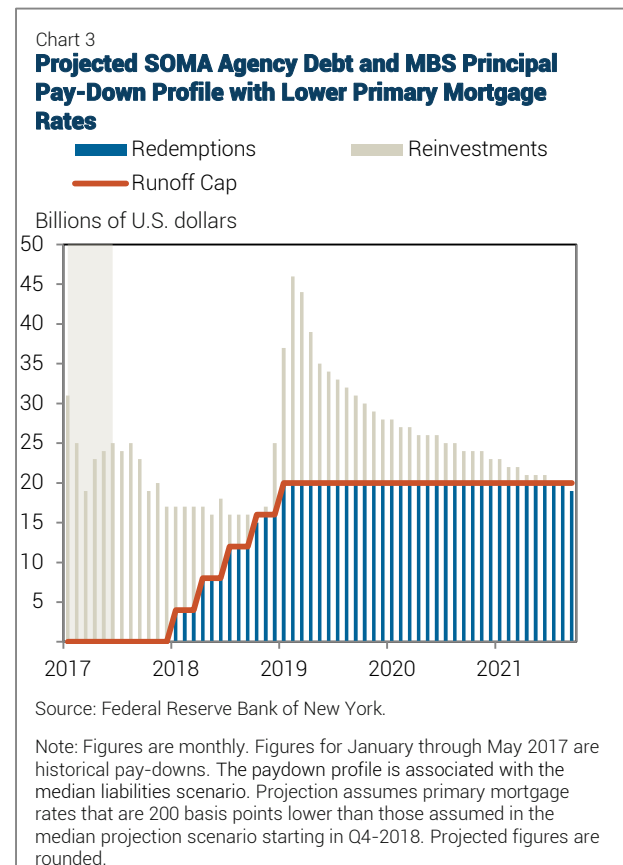
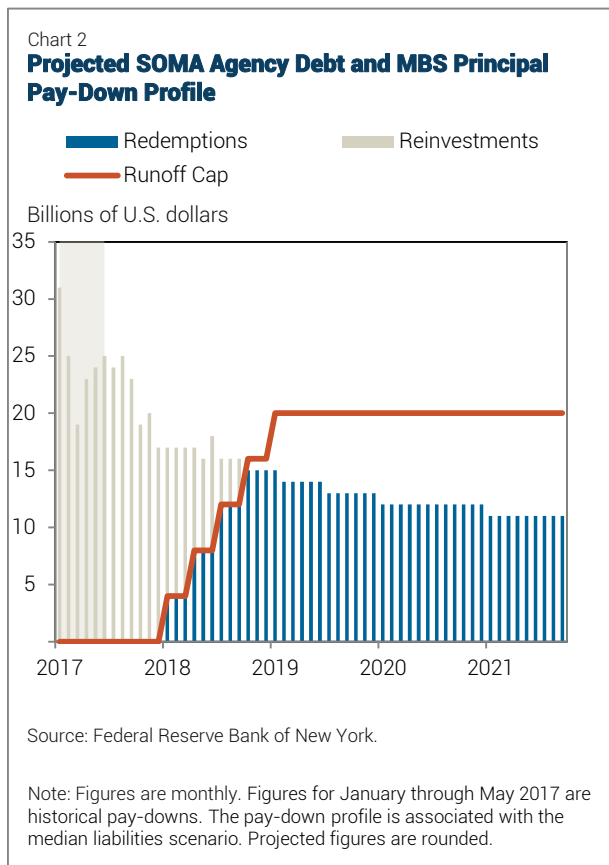


In the median scenario, \$174 billion of Treasury securities are projected to be redeemed and \$252 billion to be reinvested in 2018 (Chart 1). The \$30 billion maximum cap on Treasury redemptions implies some degree of ongoing Treasury reinvestments until the size of the portfolio normalizes, with the maximum cap typically expected to bind only in the U.S. Treasury's mid-quarter refunding months. From January 2019, when the runoff cap is fully phased in, until the time that the size of the portfolio normalizes, we project a total of \$262 billion of Treasury rollovers.

¹⁰ For more insight on the drivers of pay-downs, see Brian Bonis, John Kandrak, and Luke Pardue, "[Principal Payments on the Federal Reserve's Securities Holdings](#)," Board of Governors of the Federal Reserve System FEDS Notes, June 16, 2017.

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The amount of principal pay-downs on agency MBS is expected to decline as interest rates rise and the portfolio shrinks (Chart 2). In the median scenario, the staff's prepayment model suggests that roughly \$117 billion of agency debt and agency MBS are projected to pay down and \$78 billion to be reinvested in 2018.¹¹ Under current interest rate assumptions, the cap is expected to stop binding before it is fully phased in. That is, principal payments on agency debt and agency MBS are likely not to exceed the cap before it reaches its maximum level, resulting in reinvestments ending within the first year of portfolio reductions. The gap between projected pay-downs and the maximum cap as balance sheet normalization proceeds suggests some margin for error in these projections given the inherent uncertainty and model risk associated with forecasting agency MBS pay-downs, which, as noted above, are sensitive to changes in interest rates and other factors.



A substantial downward shock in mortgage rates, however, could trigger a wave of refinancing and mortgage prepayments, prompting higher-than-projected principal payments on agency MBS such that the caps would bind. As shown in Chart 3, under a 200-basis-point downward shock to the primary mortgage rate that occurs in the fourth quarter of 2018, roughly \$263 billion of

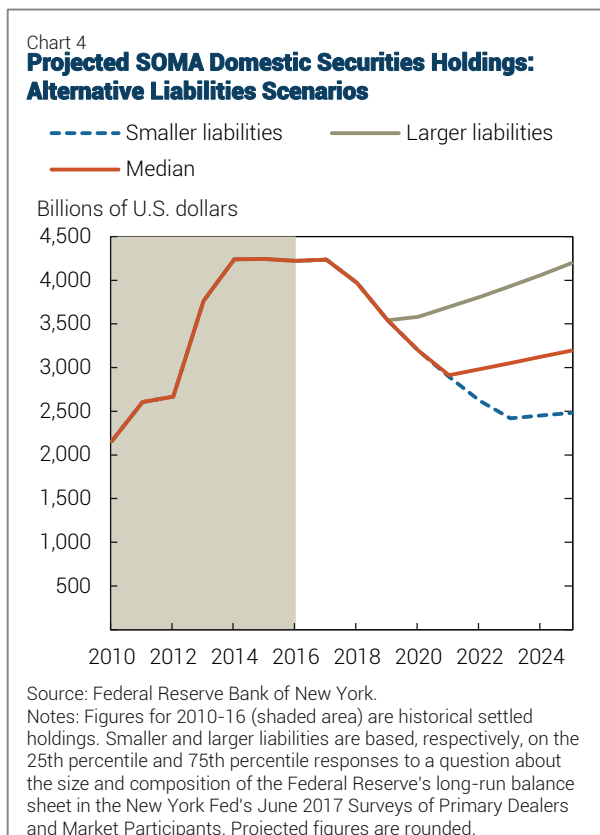
¹¹ Agency debt maturities generate just \$2 billion of the cash flows in 2018.

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principal pay-downs on agency MBS would exceed the cap from October 2018 through mid-2021. These cash flows would therefore be reinvested.

Portfolio Normalization

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. In scenarios with larger long-run levels of liabilities, the size of the portfolio normalizes sooner, while lower levels of liabilities correspond to a later normalization date. All else equal, increases in non-reserve liability items result in corresponding decreases in



the quantity of reserve balances. As such, growth of non-reserve liabilities (such as currency) could augment reductions in reserves associated with declining securities holdings in the process of normalizing the size of the balance sheet.

Under the three scenarios presented here, the portfolio normalizes sometime between 2020 and 2023, depending on the long-run balance sheet size (Chart 4). In the median scenario, the portfolio normalizes in the fourth quarter of 2021, similar to the baseline scenario in the 2016 SOMA Annual Report (not shown). At that time, the domestic securities portfolio is estimated to be about \$2.9 trillion.¹² The normalization date is pulled forward to the first quarter of 2020 in the larger liabilities scenario, with a portfolio size of \$3.5 trillion at that time. The date is pushed out to the third quarter of 2023 in the smaller liabilities scenario, with a portfolio size of \$2.4 trillion.

The PNP&P indicate that in the longer run, the Committee intends for the Federal Reserve to hold primarily Treasury securities. The path toward that objective—from a current composition of the domestic securities portfolio that is approximately 58 percent Treasury securities and 42 percent agency MBS—will depend on the amounts and timing of security redemptions as well as

¹² The similarity of the results reflects offsetting effects of new scenario assumptions. A slightly larger long-run balance sheet size and a sooner start to portfolio reductions in the current median scenario compared to assumptions used in the 2016 SOMA Annual Report baseline scenario would suggest a faster arrival at a normalized balance sheet size. However, the application of the FOMC's newly announced program of gradually increasing runoff caps causes the portfolio to decline at a relatively slower pace than in prior projections.

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the FOMC's future portfolio management decisions. The portfolio's composition will likely be driven by differences in the size of the Treasury portfolio, which will be influenced by the time it takes to normalize the size of the balance sheet in each scenario.¹³ In the median scenario, the portfolio share of Treasury securities at the time of normalization is slightly lower than the current share, but it rises to roughly 75 percent by the end of 2025. In the smaller liabilities scenario, as a result of the longer period of Treasury securities redemptions associated with a longer time to reach normalization, Treasury securities make up about 67 percent of the domestic securities portfolio by 2025. Conversely, the larger liabilities scenario, with a shorter time needed to normalize the size of the balance sheet, results in a portfolio composed of relatively more Treasury securities—roughly 80 percent—in 2025.

SOMA Net Income Results

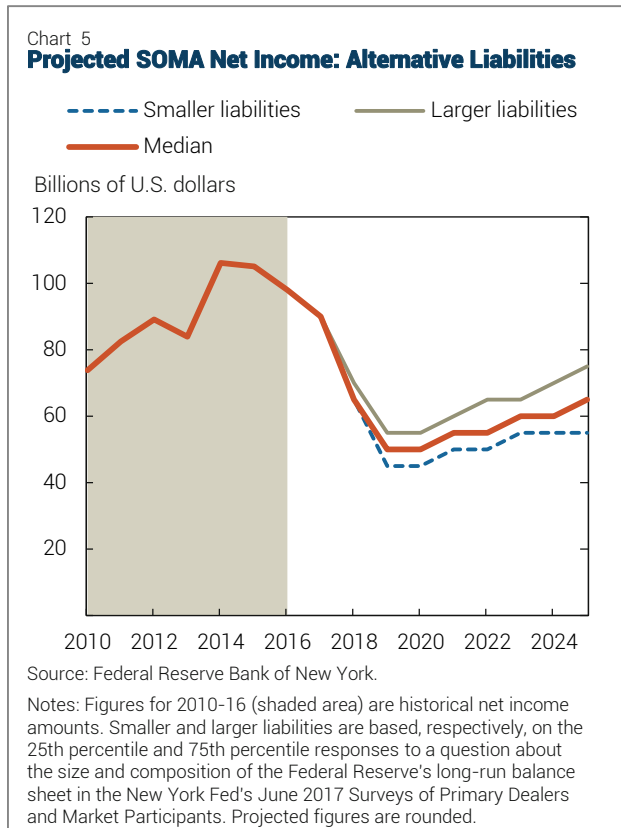
Under current assumptions, SOMA net income—a measure of income and expense that can be associated with the SOMA portfolio, including its assumed funding costs—is projected to decline as interest payments on reserve balances increase with rising interest rates amid still-elevated levels of reserve balances.¹⁴ Net income then falls more sharply as the amount of reinvestments declines, owing to reduced interest income from a shrinking SOMA securities portfolio and ongoing increases in interest expense from rising short-term interest rates.

In the median scenario, SOMA net income is projected to reach a trough of approximately \$50 billion in 2019, slightly less than the trough of about \$55 billion in the 2016 SOMA Annual Report scenario but considerably higher than a historical average of about \$30 billion in the years prior to the crisis (not shown). Portfolio net income is projected to rise thereafter as the level of reserve balances declines further to its long-run level. Once the size of the portfolio is normalized, purchases of Treasury securities resume at yields that exceed the costs associated with liabilities held against them, thereby supporting further net income growth (Chart 5). The portfolio's cumulative net income from 2017 to 2025 is projected to be \$550 billion, compared to \$723 billion from 2008 through 2016.

¹³ As modeled, the projected pay-down path for agency MBS is identical across all three scenarios. In actuality, different balance sheet sizes could be associated with different levels of long-term interest rates, which could contribute to different agency MBS pay-downs.

¹⁴ SOMA net income reflects interest income on SOMA assets, interest expense on SOMA liabilities, and non-interest income or loss associated with SOMA assets, less the interest expense of interest-bearing liabilities assumed to be associated with SOMA net assets in excess of Federal Reserve notes outstanding and the Treasury General Account balance held at the New York Fed. SOMA net income typically represents almost all of the Federal Reserve net income.

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SOMA net income across all three scenarios is projected to be roughly similar as the portfolio winds down, but the relative pace of net income growth widens somewhat after normalization is achieved. Divergences in the paths for net income are driven largely by differences in the relative composition of liabilities—particularly between interest- and non-interest-bearing liabilities—across each of the three assumed scenarios. Relative to the median scenario, the larger liabilities scenario is projected to have a more rapid pace of net income growth 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 liability scenario relative to the median scenario. The path of net income will also ultimately be sensitive to the shape of the yield curve.

Conclusion

As with prior exercises, these projections are merely illustrative. The actual portfolio path and future income will be influenced by a range of factors, including decisions the FOMC makes about its securities portfolio and its long-run operating framework, as well as interest rate, economic, and autonomous balance sheet developments.

To that end, the FOMC has said that it anticipates reducing the quantity of reserve balances, over time, to a level appreciably below that seen in recent years but larger than before the financial crisis. The long-run level will reflect the banking system's demand for reserve balances and the Committee's decisions about how to implement monetary policy most efficiently and effectively in the future. The Committee also said that it expects to learn more about the underlying demand for reserves during the process of balance sheet normalization. Future levels of non-reserve liabilities, about which market participants have dispersed views, may also influence the long-run size of the balance sheet. Therefore, the scenarios presented in this report demonstrate how the size and composition of the SOMA portfolio, and associated net income, could evolve under a range of balance sheet assumptions.