Economics

Economic Indicator — July 26, 2022

The Fed's Balance Sheet: Your Questions Answered Part I: The Nuts and Bolts of the Balance Sheet

Summary

- In this first installment of a three-part series on the balance sheet of the Federal Reserve, we discuss the major assets and liabilities of the nation's central bank.
- Historically, Treasury securities comprised the vast majority of the Fed's assets. Treasury bills, notes and bonds still account for more than half of the central bank's assets, but holdings of mortgage-backed securities (MBS) ballooned in the immediate aftermath of the financial crisis and again during the COVID-19 pandemic.
- Prior to the era of quantitative easing (QE) that began in late 2008, Federal Reserve notes (i.e., paper money) represented the Fed's largest liability. But the Federal Reserve has financed its QE purchases of Treasury securities and MBS via the creation of reserves that commercial banks hold at the central bank. Consequently, the amount of bank reserves has mushroomed since 2008.
- The deposits that the U.S. Treasury holds at the central bank and reverse repurchase agreements (i.e., reverse repos) are the other two major liabilities of the Federal Reserve.
- In order to control the federal funds rate during the QE era, the Fed has paid interest on the reserves that banks hold at the central bank. Reverse repos also help the Federal Reserve control the federal funds rate.
- The Federal Reserve is once again passively shrinking its balance sheet by allowing maturing Treasury securities and paid-up MBS to roll off its balance sheet. Balance sheet reduction is also known as quantitative tightening. The Fed could potentially undertake active sales of MBS and/or Treasury securities, but we expect that it will not do so in the foreseeable future.
- In the final two installments of this series, we will discuss the effects that quantitative tightening have on financial conditions and the real economy. We also ask whether the Fed's balance sheet will ever return to a "normal" size.

Economist(s)

Jay H. Bryson, Ph.D.

Chief Economist | Wells Fargo Economics Jay.Bryson@wellsfargo.com | 704-410-3274

Michael Pugliese

Economist | Wells Fargo Economics Michael.D.Pugliese@wellsfargo.com | 212-214-5058

Karl Vesely

Economic Analyst | Wells Fargo Economics Karl.Vesely@wellsfargo.com | 704-410-2911



Treasury securities represent the

majority of the Fed's assets.

Your Guide to the Federal Reserve's Balance Sheet

The Federal Reserve's balance sheet has ballooned since the COVID-19 pandemic began, growing from \$4.2 trillion at the end of 2019 to \$8.9 trillion today. On May 4, the Federal Open Market Committee (FOMC) <u>announced</u> that in June it would begin the process of shrinking its balance sheet. We have outlined the details of this balance sheet runoff plan <u>elsewhere</u>. In this report, which is the first installment of a three-part series, we aim to help our readers understand the Fed's balance sheet at a more fundamental level. In Part I, we start by answering some of the more basic questions about the Fed's balance sheet, such as what are its main assets and liabilities and what makes them grow/shrink. In Parts II and III, we discuss more difficult-to-answer questions, such as what is the true "equilibrium" size of the Fed's balance sheet and how quantitative easing (QE) and quantitative tightening (QT) affect financial conditions and the real economy.

What Are the Main Assets on the Fed's Balance Sheet?

The Federal Reserve's largest asset is its holdings of U.S. Treasury securities. Historically, Treasury securities comprised the lion's share of the Fed's assets. In December 2007, prior to the 2008-2009 financial crisis, the Federal Reserve held about \$780 billion of Treasury securities, which accounted for 85% of the central bank's total assets (Figure 1). Starting in 2008, the Federal Reserve began holding agency mortgage-backed securities (MBS) in addition to Treasury securities. Several asset purchase programs over the past 15 years have pushed the Fed's MBS holdings to \$2.7 trillion, making it easily the second-largest asset on the central bank's balance sheet (Figure 2). At present, Treasury securities and MBS comprise 95% of the Federal Reserve's asset holdings.

Beyond Treasury securities and MBS, there are a variety of other, smaller assets that come and go from the central bank's balance sheet. One of the Federal Reserve's primary responsibilities is to serve as a "lender of last resort" for the financial system. As a result, the asset side of the Fed's balance sheet periodically has expanded to include loans made in times of economic and financial market stress. These include discount window loans, central bank liquidity swaps, repurchase agreements and the long list of emergency lending programs created during the 2008-2009 financial crisis and the early phases of the COVID-19 pandemic.¹ Other, much smaller asset holdings include foreign exchange reserves and gold.

Figure 1



Source: Federal Reserve Board and Wells Fargo Economics

Figure 2



Source: Federal Reserve Board and Wells Fargo Economics

What Are the Fed's Main Liabilities?

Like a traditional private bank, the Federal Reserve's assets equal its liabilities plus its capital. Historically, the Fed's main liabilities have been Federal Reserve notes and bank reserves. Federal Reserve notes are physical paper money. If you pull out a dollar bill from your wallet you might notice that it says "Federal Reserve Note" at the top. As the entity in charge of issuing paper currency in the United States, Federal Reserve notes are a liability of the central bank. At present, there is about \$2.2 trillion of paper currency in circulation, roughly half of which is held abroad.² Currency in circulation

\$4.5

\$4.0 \$3.5

\$3.0

\$2.5

\$2.0

\$1.5

\$1.0

\$0.5

\$0.0

19 20 21 22

tends to grow at a fairly linear pace over time, similar to nominal GDP (Figure 3). It is important to note that the amount of paper currency in circulation is mostly determined by end-user demand. When a depository institution needs more currency to meet its customers' needs, it asks a Federal Reserve Bank to send it more notes. The depository institution then pays for this currency using its reserve account held at the central bank.

Bank reserves are another major liability on the central bank's balance sheet, and they play a critical role in the financial system and monetary policy implementation. More than 5,000 depository institutions (primarily commercial banks) maintain accounts at the Federal Reserve (Figure 4).³ This is somewhat akin to how a household might hold some cash on deposit at a bank. For the household, the money in the account is an asset, while for the bank the deposits are a liability. Similarly, bank reserves are an asset to depository institutions and a liability to the Federal Reserve. Banks use these accounts for making and receiving payments within the financial system. In addition, reserves held at the central bank are interest-bearing, ultra safe and highly liquid, making reserves a solid option for banks' rainyday funds. Compared to paper currency in circulation, the Federal Reserve plays a much more heavyhanded role in determining the amount of bank reserves in the financial system. We will return to this idea shortly.

Reserves held by banks at the Fed are a liability on the central bank's balance sheet.

Figure 3



Figure 4

The two biggest remaining liabilities on the Fed's balance sheet are deposits of the U.S. Treasury and reverse repurchase agreements (RRP). Like depository institutions, the federal government maintains an account at the Federal Reserve. This account, called the U.S. Treasury's General Account (TGA), serves as the federal government's de facto checking account (Figure 5). Like a household or business, the federal government has money coming in and out on a daily basis. The Federal Reserve helps manage these flows in its role as the fiscal agent for the federal government.

Finally, reverse repurchase agreements (Figure 6) are an operational tool utilized by the Federal Reserve to help keep the federal funds rate in the target range established by the FOMC. Non-bank financial institutions (e.g., money market funds) generally do not maintain interest-bearing reserve accounts at the Federal Reserve. To establish a firm "floor" under short-term interest rates, the Federal Reserve allows RRP counterparties to park their cash overnight at the Fed via reverse repurchase agreements while receiving an interest rate that is modestly below what is paid on bank reserves. In the next section, we explore this framework in more detail.



How Does the Balance Sheet Help Control the Federal Funds Rate?

The Fed's primary policy rate is the federal funds rate. This rate is the interest rate at which depository institutions lend and borrow reserves from each other on an overnight basis. The federal funds rate plays a key role in influencing many other short-term interest rates, such as the Secured Overnight Financing Rate (SOFR). At one time, commercial banks needed to hold reserves at the central bank in order to meet their required reserve ratios.⁴ Reserves held in excess of this requirement were frequently called "excess reserves." Because the Federal Reserve did not pay interest on reserves before 2008, banks did not have much of an incentive to hold excess reserves. Indeed, excess reserves accounted for only a small proportion of the total reserves that banks held before 2008 (Figure 7).

Banks that did have excess reserves could lend them on an overnight basis in the federal funds market to banks that needed them to meet their required ratios or for other needs. On any given day, the demand for excess reserves could exceed the supply of excess reserves in the federal funds market. If so, the fed funds rate would tend to rise on that day. Conversely, the supply could exceed the demand on another day, which would put downward pressure on the fed funds rate. Because the Federal Reserve wanted to keep the fed funds rate more or less stable (other than meeting days when it was hiking/cutting its target for the rate), it generally would use open market operations to add reserves on days in which demand exceeded supply, and it would drain reserves on days in which demand fell short of supply.

All that changed with the 2008-2009 financial crisis. As the economy went into freefall in late 2008, the FOMC slashed the fed funds rate to essentially 0%. The incipient downturn was so deep that the FOMC determined the economy needed even more monetary support, but the "effective lower bound" of 0% constrained the ability of the Federal Reserve to administer further conventional policy support. So the Committee turned to asset purchase programs, frequently called quantitative easing (QE), in which the Fed purchased Treasury securities and MBS. The purchases of Treasury securities and MBS, which are assets of the Federal Reserve, were financed by crediting the reserve balances that banks hold at the central bank (a liability of the Fed) by an equal amount. Because the amount of the banking system's required reserves did not change much, the jump in total reserves showed up as a sharp increase in excess reserves (Figure 8).

The Fed financed its QE purchases of assets via creation of bank reserves.

Figure 7





Source: Federal Reserve Board and Wells Fargo Economics

The problem the Fed faced with its asset purchases was that the supply of excess reserves in the federal funds market now vastly exceeded the demand for reserves on a continual basis. This chronic excess supply of reserves kept the fed funds rate pinned against its effective lower bound of 0%. This was not necessarily a big issue when the economy was weak and the FOMC wanted the fed funds rate to be essentially 0%. But it would pose a problem when the Committee wanted to eventually tighten monetary policy. With a chronic excess supply of reserves, the Federal Reserve would not be able to lift the fed funds rate from 0% using its pre-2008 operational framework.

So the Federal Reserve solved this problem, which required enabling legislation from Congress, by paying interest to banks on their reserves.⁵ Because banks were now being paid interest to essentially make a risk-free overnight "loan" to the central bank, they did not have much incentive to loan excess reserves to each other below the rate they could earn from the Fed. When the FOMC wanted to tighten policy, it would raise the interest rate that it paid to banks on their reserves, putting a "floor" under short-term interest rates. Overnight reverse repurchase agreements also helped to put a floor under short-term interest rates by offering some non-bank cash holders, such as money market funds, a guaranteed rate on overnight loans made to the central bank.⁶ This new operational framework, which can be seen in the following illustration, allowed the Committee to increase the fed funds rate and, by extension, other market-determined short-term interest rates.

Figure 9



Source: Federal Reserve Bank of New York and Wells Fargo Economics

The Fed now pays interest on reserves to help it control the fed funds rate.

Figure 8

Why Does the Fed's Balance Sheet Grow/Shrink?

It is normal for the Federal Reserve's balance sheet to grow over time. Refer back to Figure 1 to see that the central bank's balance sheet climbed from roughly \$300 billion in 1990 to \$900 billion in 2007 with an average annual growth rate of 6.2%. Even before the widespread use of QE, the Fed's balance sheet would typically grow each year, much like GDP or private bank balance sheets. As demand for the Fed's main liabilities (currency and reserves) grew, so too would its asset holdings.

Of course, average annual growth in the Fed's balance sheet of 6% or so is much smaller than the supercharged growth seen in some years since 2007. For example, in 2008 the Fed's balance sheet exploded by 151% amid quantitative easing and a slew of emergency lending programs. The central bank's balance sheet increased by 77% in 2020 for similar reasons. As discussed previously, this growth is achieved primarily through the creation of bank reserves. The Federal Reserve creates reserves and uses them to purchase securities (QE) and/or make loans. These asset purchases and lending programs are usually designed to provide monetary policy accommodation and ease stresses in the financial system.

Similarly, the Fed's balance sheet has shrunk at times in recent years when the FOMC wanted to tighten policy. This process is sometimes called quantitative tightening (QT), in contrast to its accommodative sibling, QE. For example, the Federal Reserve's balance sheet shrank by 8.4% in 2018 amid a period of QT, and it likely will shrink again this year and next amid the QT that began in June.

How Does QT Work Mechanically?

During QT, the Federal Reserve receives principal payments from MBS paydowns and maturing Treasury securities, and instead of reinvesting the proceeds, it allows the securities to "roll off" its balance sheet. To illustrate, imagine a maturing Treasury security on the Fed's balance sheet during QT. When the security comes due, the U.S. Treasury makes a principal payment to the Federal Reserve. This reduces both the Fed's assets (it no longer holds a Treasury security) and its liabilities (Treasury's deposits held at the Fed decline). The U.S. Treasury then re-issues this matured security to the public, and primary dealers (banks) purchase the security at auction. These dealers then pay for this security using their reserve accounts at the Fed, which reduces total bank reserves in the financial system.^Z At the end of the process, the Federal Reserve's balance sheet has shrunk, the banking sector holds a Treasury security rather than reserves, and the Treasury's balance sheet is unchanged, with the only change for the latter being who holds its debt. The following tables illustrate this simplified example.

Figure 10

How Quantitative Tightening Works

Federal Reserve		Treasury			Banking Sec		
Assets	Liabilities	Assets	Liabilities]	Assets		
Treasury securities -\$1	Reserves held by banks -\$1	Cash held at the Fed	Treasury securities		Treasury securities	\$1	Deposit
	Cash held by the Treasury				Reserves at the Fed \cdot	-\$1	

Source: Federal Reserve Bank of New York and Wells Fargo Economics

What about Outright Asset Sales?

This is the second time the Federal Reserve has undertaken QT, and both times policymakers have adopted a passive runoff approach whereby principal payments are not reinvested into new securities. Of course, the FOMC could adopt active asset sales at some point. But like many other areas of policymaking, passive runoff and active sales each come with their own respective pros and cons. Writing for the Brookings Institution in 2017, former Fed Chair Ben Bernanke argued that "By allowing the balance sheet to shrink passively over a number of years, without active selling, the FOMC aims to maximize predictability and minimize potential market disruption."[®] Passive runoff keeps markets and the public focused on the federal funds rate, which the FOMC has made clear is its primary monetary policy tool.

Passive runoff also prevents the Federal Reserve from realizing significant losses on its bonds. For example, during 2020 the Federal Reserve bought large quantities of bonds at very low interest rates. Interest rates have subsequently risen significantly, and prices of bonds fall when interest rates rise. As a result, some bonds on the Fed's balance sheet are currently valued for less than 100 cents on the dollar. As of March 31, the Federal Reserve's security portfolio had a cumulative unrealized loss

Quantitative tightening causes the Fed's balance sheet to shrink.

t**or** Liabilities of \$330 billion. Interest rates rose further in the second quarter, and as a result, the unrealized losses likely have grown even larger.⁹

However, it is important to remember that these are paper losses. If held to maturity, the bonds will eventually return their full par value to the owner. Passive QT largely ensures that this is the case, but active asset sales could result in the Fed realizing a sizable amount of these losses. Importantly, if these losses were realized it would not directly impact the Federal Reserve's ability to meet its financial obligations. The central bank has accounting maneuvers it can use to continue operations as usual.¹⁰ In a recent testimony before Congress, Chair Powell stated that these potential losses would not play a part in the central bank's decision-making. That said, that this question is coming up during Congressional testimonies suggests it is politically sensitive, and <u>media reports</u> already have begun to draw attention to it.

Active sales have some advantages over passive runoff. Outright sales could permit more proactive management of the yield curve, perhaps by focusing sales on longer-dated securities to steepen the curve. Sales could also help in months when the amount of maturing Treasury securities or MBS do not hit the monthly caps. This is especially true for MBS in the current environment. Current projections put the pace of MBS runoff at just \$15B-\$25B per month (Figure 11), below the \$35B cap the FOMC intends to adopt in September. Active MBS sales could help fill this gap and serve as an additional tool for cooling inflation broadly and the housing market specifically. The minutes from the May FOMC meeting suggested that once balance sheet runoff is "well under way, it would be appropriate for the Committee to consider sales of agency MBS." Given that public scrutiny on the Federal Reserve is already unusually high due to elevated inflation, and given that asset sales would involve the deployment of a somewhat new tool, we suspect the central bank will tread carefully in this area.

Figure 11



Projected Mortgage-Backed Security Rolloff

Why Should We Care?

In Part I of this series, we walked through some of the most common questions regarding how the Federal Reserve's balance sheet works. Like a traditional private bank, the Fed has assets (mostly Treasury securities and MBS) as well as liabilities (mostly paper currency, bank reserves, and reverse repurchase agreements). The central bank's balance sheet plays a key role in monetary policy through operationally setting the federal funds rate and opening the door to other policy tools, such as QE or emergency lending programs. In Parts II and III, we turn to a different set of questions. Why should we care about the Fed's balance sheet? What impact do QE and QT have on financial conditions and the real economy? And will the Fed's balance sheet ever return to a "normal" size?

The Fed could realize significant losses if it actively sells part of its bond portfolio.

Endnotes

¹ For more information on the facilities created during the financial crisis, please see <u>"Other lending</u> <u>facilities, Credit and Liquidity Programs and the Balance Sheet</u>". For more inflation on the facilities created during the Federal Reserve response to the COVID-19 pandemic, please see "<u>Funding, Credit,</u> <u>Liquidity, and Loan Facilities</u>" and "<u>A Look at the Fed's Emergency Lending Programs</u>." (Return)

² Federal Reserve Board. November 15, 2021 "<u>Credit and Liquidity Programs and the Balance Sheet</u>" Federal Reserve Board. (<u>Return</u>)

³ Bertaut, Carol; von Beschwitz, Bastian; Curcuru, Stephanie. October 6, 2021 "<u>The International Role of the U.S. Dollar</u>" FEDS Notes, Board of Governors of the Federal Reserve System. (<u>Return</u>)

⁴ Reserve requirements were a more important tool in monetary policy prior to the adoption of the Federal Reserve's current monetary policy framework. At the <u>March 15, 2020 emergency meeting</u> the reserve requirement was set to 0% as part of the Fed's actions to sustain credit during the onset of COVID-19. (<u>Return</u>)

⁵ The Emergency Economic Stabilization Act of 2008 allowed the Federal Reserve to begin paying interest on depository institution's reserve balances held at the Fed on <u>October 1, 2008</u>. (<u>Return</u>)

⁶ At the end of the last tightening cycle in 2018, interest that the Fed paid to banks totaled more than \$38 billion. Last year, the Fed paid only \$5.3 billion in interest even though the amount of reserves nearly doubled between the end of 2018 and the end of last year. Meanwhile, the income that the Fed earns on its asset holdings ballooned to \$122 billion in 2021. These "profits" that the Fed earns are transferred to the U.S. Treasury net of operating costs. (Return)

⁷ For further information on this topic, please see "<u>How the Fed Changes the Size of Its Balance Sheet</u>" on the New York Federal Reserve's Liberty Street Economics blog. (<u>Return</u>)

⁸ Bernanke, Ben. January 26, 2017. "<u>Shrinking the Fed's balance sheet</u>" The Hutchins Center on Fiscal and Monetary Policy, Brookings Institute (<u>Return</u>)

⁹ Table 3 "Domestic SOMA portfolio holdings" of "<u>Federal Reserve Banks Combined Quarterly</u> <u>Financial Report</u>," Board of Governors of the Federal Reserve System (<u>Return</u>)

¹⁰ If the Federal Reserve realized big enough losses that it incurred an overall net income loss, remittances to the Treasury would be suspended and a deferred asset would be recorded on the Federal Reserve's balance sheet, representing a claim on future net earnings that the Reserve Banks would need to realize before remittances to the Treasury would resume. For further reading, see "SOMA's Unrealized Loss: What does it mean?" (Return)

Subscription Information

To subscribe please visit: <u>www.wellsfargo.com/economicsemail</u>

Via The Bloomberg Professional Services at WFRE

Economics Group

Jay H. Bryson, Ph.D.	Chief Economist	704-410-3274	Jay.Bryson@wellsfargo.com
Mark Vitner	Senior Economist	704-410-3277	Mark.Vitner@wellsfargo.com
Sam Bullard	Senior Economist	704-410-3280	Sam.Bullard@wellsfargo.com
Nick Bennenbroek	International Economist	212-214-5636	Nicholas.Bennenbroek@wellsfargo.com
Tim Quinlan	Senior Economist	704-410-3283	Tim.Quinlan@wellsfargo.com
Sarah House	Senior Economist	704-410-3282	Sarah.House@wellsfargo.com
Azhar Iqbal	Econometrician	212-214-2029	Azhar.lqbal@wellsfargo.com
Charlie Dougherty	Economist	212-214-8984	Charles.Dougherty@wellsfargo.com
Michael Pugliese	Economist	212-214-5058	Michael.D.Pugliese@wellsfargo.com
Brendan McKenna	International Economist	212-214-5637	Brendan.Mckenna@wellsfargo.com
Shannon Seery	Economist	332-204-0693	Shannon.Seery@wellsfargo.com
Nicole Cervi	Economic Analyst	704-410-3059	Nicole.Cervi@wellsfargo.com
Jessica Guo	Economic Analyst	704-410-4405	Jessica.Guo@wellsfargo.com
Karl Vesely	Economic Analyst	704-410-2911	Karl.Vesely@wellsfargo.com
Patrick Barley	Economic Analyst	704-410-1232	Patrick.Barley@wellsfargo.com
Jeremiah Kohl	Economic Analyst	704-410-1437	Jeremiah.J.Kohl@wellsfargo.com
Coren Burton	Administrative Assistant	704-410-6010	Coren.Burton@wellsfargo.com

Required Disclosures

This report is produced by the Economics Group of Wells Fargo Bank, N.A. ("WFBNA"). This report is not a product of Wells Fargo Global Research and the information contained in this report is not financial research. This report should not be copied, distributed, published or reproduced, in whole or in part. WFBNA distributes this report directly and through affiliates including, but not limited to, Wells Fargo Securities, LLC, Wells Fargo & Company, Wells Fargo Clearing Services, LLC, Wells Fargo Securities International Limited, Wells Fargo Securities Europe S.A., and Wells Fargo Securities Canada, Ltd. Wells Fargo Securities, LLC is registered with the Commodity Futures Trading Commission as a futures commission merchant and is a member in good standing of the National Futures Association. WFBNA is registered with the Commodity Futures Trading Commission as a swap dealer and is a member in good standing of the National Futures Association. Wells Fargo Securities, LLC and WFBNA are generally engaged in the trading of futures and derivative products, any of which may be discussed within this report.

This publication has been prepared for informational purposes only and is not intended as a recommendation offer or solicitation with respect to the purchase or sale of any security or other financial product nor does it constitute professional advice. The information in this report has been obtained or derived from sources believed by WFBNA to be reliable, but has not been independently verified by WFBNA, may not be current, and WFBNA has no obligation to provide any updates or changes. All price references and market forecasts are as of the date of the report. The views and opinions expressed in this report are not necessarily those of WFBNA and may differ from the views and opinions of other departments or divisions of WFBNA and its affiliates. WFBNA is not providing any financial, economic, legal, accounting, or tax advice or recommendations in this report, neither WFBNA nor any of its affiliates makes any representation or warranty, express or implied, as to the accuracy or completeness of the statements or any information contained in this report and any liability therefore (including in respect of direct, indirect or consequential loss or damage) is expressly disclaimed. WFBNA is a separate legal entity and distinct from affiliated banks and is a wholly owned subsidiary of Wells Farqo & Company. © 2022 Wells Farqo Bank, N.A.

Important Information for Non-U.S. Recipients

For recipients in the United Kingdom, this report is distributed by Wells Fargo Securities International Limited ("WFSIL"). WFSIL is a U.K. incorporated investment firm authorized and regulated by the Financial Conduct Authority ("FCA"). For the purposes of Section 21 of the UK Financial Services and Markets Act 2000 ("the Act"), the content of this report has been approved by WFSIL, an authorized person under the Act. WFSIL does not deal with retail clients as defined in the Directive 2014/65/EU ("MiFID2"). The FCA rules made under the Financial Services and Markets Act 2000 for the protection of retail clients will therefore not apply, nor will the Financial Services Compensation Scheme be available. For recipients in the EFTA, this report is distributed by WFSIL. For recipients in the EU, it is distributed by Wells Fargo Securities Europe S.A. ("WFSE"). WFSE is a French incorporated investment firm authorized and regulated by the Autorité de contrôle prudentiel et de résolution and the Autorité des marchés financiers. WFSE does not deal with retail clients as defined in the Directive 2014/65/EU ("MiFID2"). This report is not deal with retail clients.

SECURITIES: NOT FDIC-INSURED - MAY LOSE VALUE - NO BANK GUARANTEE