The Fed's Ample Reserves Monetary Policy Operating Framework: It Isn't as Simple as It Looks

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Introduction

I appreciate the opportunity to participate in this conference marking the 50th anniversary of the Shadow Open Market Committee (SOMC). Over its history, the SOMC has been very successful at fostering the active exchange of ideas about the economy and monetary policy. Through its efforts, SOMC has exposed policymakers to new ways of thinking about policy challenges and solutions, thereby offering them some protection against the scourge of group-think. Aside from the value of the ideas themselves, SOMC has set a significant example of how to discuss different views in a productive way, with the goal of achieving better policy outcomes. I feel honored to be here to celebrate the SOMC's success.

In my panel remarks, I will discuss the Fed's current ample-reserves monetary policy operating framework and make one simple point, namely, that the framework is not as simple as the theory suggests.

Monetary Policy Operating Frameworks

A monetary policy operating framework is the method by which a central bank ensures that the policy rate stays within the target range set by the central bank. It concerns how the central bank implements policy not what the policy is.

In selecting an operating framework, the primary criterion is that the framework allow for effective control of a policy rate that is sufficiently tied to other market rates to allow for reliable transmission of monetary policy throughout the economy. The Fed communicates its policy choice by setting a target range for the federal funds rate, a market-driven rate, determined as the average rate at which banks lend reserves held in their Fed master accounts to one another overnight.

Another desirable attribute of an operating framework is that it be robust to different economic situations, e.g., when policy rates need to move quickly or when the policy rate has been reduced to its effective

lower bound. It is also desirable that the operating framework not exacerbate financial stability problems when they arise, and ideally, it should be adaptable to actions that might be taken to address such issues.

Since the time of the Global Financial Crisis (GFC) of 2007-2008, the Fed and many other central banks have been implementing monetary policy in a framework that involves a high level of bank reserves, the funds that banks hold in accounts at the central bank. In January 2019, the FOMC announced that it intends to continue to implement monetary policy in an ample-reserves regime, also known as a floor system, in which the Fed achieves its fed funds rate target mainly through setting its administered interest rates, the interest on reserves balances (IORB) rate, and the interest rate on overnight reverse repurchase agreements (ON RRP).[1] The FOMC also affirmed that it would continue to target the federal funds rate as its primary way of adjusting the stance of monetary policy.

This operating framework differs from the one the Fed used before the GFC. Back then the Fed operated in a scarce-reserves operating regime, also known as a so-called corridor system, in which the FOMC actively managed the supply of reserves in order to achieve its fed funds rate target.[2]

Both the scarce reserves and ample reserves operating frameworks have proven to be effective during the periods in which they have been used. So, one might ask, why did the Fed change its operating framework after the GFC? This change was necessitated by economic circumstances and the policy choices made in response to those circumstances.

The Evolution of the Fed's Balance Sheet

In January 2007, the Fed was holding less than $900 billion on the asset side of its balance sheet. On the

[1] Federal Open Market Committee (2019).

[2] Nelson (2016) and Keister (2012) present excellent discussions of corridor and floor operating regimes.

liability side, banks were holding about $20 billion in reserve accounts at the Fed.[3] With reserves this scarce, the FOMC could affect the fed funds rate by making small changes in the supply of reserves via open market operations involving buying or selling short-term Treasuries. This, coupled with estimates of the demand for reserves, allowed the FOMC to ensure that the fed funds rate, was maintained at the FOMC's target.

During the GFC and Great Recession, the Fed began lending to banks and other nonbank entities to shore up the economy and financial markets. (See **Figures 1a-1d**.) Once the fed funds rate was brought down to essentially zero, the FOMC began purchasing longer-term assets in order to put downward pressure on longer-term interest rates and thereby add further monetary accommodation.[4] As a result of these purchases, the assets on the Fed's balance sheet swelled. Assets rose to over $4.5 trillion in January 2015, their peak during this period, which was a five-fold increase from before the GFC. Reserves, currency, and the U.S. Treasury's account at the Fed (the Treasury General Account (TGA)) were the main liabilities on the Fed's balance sheet. As assets rose, so did reserves. During this period, reserves peaked at $2.8 trillion in November 2014.

At such high levels of reserves, small changes in the supply of reserves have little effect on the fed funds rate, so the Fed could no longer use a corridor system to control its policy rate. In October 2008, Congress gave the Fed the authority to begin paying interest on the reserve balances that banks and other depository institutions hold at the Fed.[5] And this allowed the FOMC to implement monetary policy in a new way. To keep the fed funds rate within its target range, the FOMC used its administered rates, the IORB rate and the ON RRP rate.

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[3] In these figures, reserves includes deposits of depository institutions and term deposits held by depository institutions.

[4] Many studies have found that that the Fed's various asset purchase programs lowered longer-term yields, although the estimated magnitudes differ across studies and across Fed programs. For a recent study see Kim, Laubach, and Wei (2023).

[5] The Federal Reserve Banks were authorized by the Financial Services Regulatory Relief Act of 2006 to pay interest on reserves held by eligible institutions at the Fed, effective October 1, 2011. This date was accelerated to October 1, 2008 by the Emergency Economic Stabilization Act of 2008. (See Board of Governors, 2024.)

In October 2017, the Fed began gradually reducing the size of its balance sheet by allowing assets to begin to runoff according to the plan announced in June 2017. In March 2019, reserve levels began to approach the level that the FOMC considered likely to be the level necessary to efficiently and effectively implement monetary policy. Accordingly, the FOMC announced that it would begin reducing the pace at which assets were running off starting in May 2019.

Reserves continued to decline and had fallen to about $1.4 trillion when repo rates and other short-term money market rates began to spike in mid-September 2019. The market disruption led the Fed to conclude that the level of reserves had fallen below the level consistent with ample reserves and the Fed began to allow reserve balances to rise again.

When the COVID-19 pandemic hit in March 2020, the Fed again began purchasing Treasury securities and agency mortgage-back securities, at first to address market dysfunction in the Treasury market and then to add monetary policy accommodation after the fed funds rate had been brought down to its effective lower bound. By June 2022, the balance sheet grew to nearly $9 trillion in assets, about double its asset-size before the pandemic, or about 35 percent as a share of GDP. There was over $3 trillion in reserves (or about 12 percent as a share of GDP) and about $2.5 trillion in ON RRPs (or about 10 percent as a share of GDP).

In June 2022, the Fed began the second normalization of its balance sheet, which is still underway. Since that time, assets have fallen by about $1.8 trillion. ON RRPs are down about $1.7 trillion, but reserves have actually risen a bit (by $22 billion). The Fed's stated intention is to bring reserves down to the minimum level needed to effectively and efficiently implement monetary policy under an ample-reserves operating framework where policy rate control is managed primarily by setting the Fed's administered rates.

Simplicity of the Ample Reserves Framework

One of the purported benefits of the ample-reserves framework is that it is simple. And it is, at least on paper. In a world without frictions, banks that need reserves would not want to pay a rate higher than what they could get from borrowing directly from the Fed at its discount window, and banks that have funds to lend would not lend them at a rate lower than the IORB rate, the rate they could get by leaving the funds in their account at the Fed. These arbitrage conditions help nail down the rate at which the demand curve for reserves intersects the supply curve of reserves, the fed funds rate.

When reserves are scarce, banks' demand curve for reserves is relatively steep: banks are willing to hold more reserves as the opportunity cost of holding reserves, i.e., the fed funds rate, falls and they are willing to hold less reserves as the fed funds rate rises. (See the left panel of **Figure 2**.) With a steep demand curve, the fed funds rate will change with only small changes in the supply of reserves. In a scarce-reserves system, the Fed estimates the daily demand for reserves and supplies the amount of reserves needed to hit the fed funds rate target.

In contrast, the ample-reserves system does not require the FOMC to actively manage the supply of reserves based on estimates of reserve demand. (See the right panel of **Figure 2**.) When the supply of reserves is ample enough, banks are satiated with reserves. Because they have more reserves than they need for liquidity management and payment services, banks are willing to invest these surplus reserves in other high-quality assets if the market rate is higher than the IORB rate and they are willing to lend them if they can earn a rate very near the IORB rate. This means the demand curve for reserves flattens out at these high reserve levels. There is no need for the Fed to estimate reserve demand to control interest rates because at these high levels, small changes in the supply of reserves do not affect the fed funds rate. Instead, the Fed controls the fed funds rate by setting the IORB rate, an administered rate, and typical reserve fluctuations do not result in changes in short-term market rates.

In recent years, the U.S. Treasury's cash management practices have led to swings in their account balances at the Fed, which in turn has led to swings in reserve balances. This type of volatility complicates operating a scarce-reserve framework but not an ample-reserves framework. When balances in the TGA increase, say because the Treasury is issuing Treasury debt, or tax receipts are rising, or the Treasury is building up precautionary cash reserves before a looming government shutdown, the level of reserves in the banking system falls as investors' funds are moved from their bank accounts to the TGA. The simplicity and efficiency of not having to estimate reserve demand on a daily basis in an ample-reserves regime is appealing. I seem to recall that when the Fed was first discussing the longer-run operating framework, there was even talk that such a framework could save on resources because the Fed wouldn't have to employ so many people to estimate reserve demand each day.

Another simplification offered by the ample-reserves system is that it maintains control of short-term interest rates regardless of economic circumstances and in various market conditions. In particular, the ample-reserves system would continue to work when the policy rate has been reduced to its effective lower bound or if the Fed had to provide large volumes of liquidity to alleviate financial system stresses. In these circumstances, the Fed wouldn't have to change its implementation regime to maintain effective control of the policy rate.

But It Isn't as Simple as It Looks

As is often the case, the theory is compelling, but the real world does not always cooperate. The complexity and segmentation of U.S. money markets, as well as differential regulations applied to different financial entities in the money market imply that the arbitrage assumed in the theory of an ample-reserves system is not seamless. There are frictions. The floor offered by the IORB is made of cork, not marble so the Fed has had to augment the "simple" ample-reserves framework and still needs to expend resources to monitor reserve demand conditions.

One reason that reality is more complicated than theory is because not every entity transacting in short-term money markets is authorized to earn interest on reserves. Another reason is that banks have shown reluctance to borrow at the discount window when they are in need of funds. The discount window has been stigmatized. This reluctance was most recently shown during the banking stresses in March 2023, when Silicon Valley Bank, First Republic Bank, and Signature Bank failed.[6] This reality led the Fed to augment its ample-reserves framework with two additional facilities, the ON RRP facility and the standing repo facility (SRF).

The Federal Home Loan Banks do much of the lending in the fed funds market but they are not eligible to earn interest on their reserve balances at the Fed.[7] (See the left panel of **Figure 3**.) So they are willing to lend fed funds at any rate above zero, which puts downward pressure on the fed funds rate. Similarly, money market mutual funds do not earn interest on reserves, but their lending in the money markets can influence trading in the fed funds market. To ensure that the fed funds rate stays within its target range, the Fed has adjusted the IORB rate so that it lies slightly below the lower bound of the target range of the fed funds rate. In addition, the Fed set up the ON RRP facility in December 2015, to ensure it would be able to raise interest rates off of the effective lower bound after the Great Recession. This facility allows a broad set of money market entities, including money market mutual funds, to lend funds to the Fed overnight against eligible Treasury and agency securities, and agency mortgaged-backed securities (MBS). By controlling the ON RRP rate, in addition to the IORB rate, the Fed can effectively put a firmer floor under overnight interest rates.[8]

[6] Since then, many more banks have taken steps to put legal agreements in place and pledged collateral so that they are better prepared to use the discount window. See Barr (2024).

[7] According to Afonso, et al. (2023), the FHLBs represent about 90 percent of the total daily lending volume in the fed funds market and U.S. branches and agencies of foreign banks represent between 65 and 95 percent of the total daily borrowing volume in the fed funds market. (See the right panel of **Figure 3**.) See also Anderson and Na (2024), which is the source of Figure 3.

[8] As of September 18, 2024, the target range for the funds rate is 4.75 to 5.0 percent, the IORB rate is 4.9 percent, and the ON RRP rate is 4.8 percent.

In July 2021, the Fed again added to its implementation framework by establishing the SRF.[9] Upward pressure in repo markets, as experienced in September 2019 and March 2020, puts upward pressure on the fed funds rate. The SRF limits this pressure by allowing eligible counterparties, including primary dealers and banks, to obtain funds from the Fed against Treasury and agency securities and agency MBS, at a rate that is set at the top of the FOMC's fed funds target range. This backstop facility provides an alternative to the stigmatized discount window and helps to keep the fed funds rate below the top of the target range. Note that by increasing the substitutability of Treasury securities for reserves in banks' liquidity management, the SRF has the potential to allow the Fed to operate in an ample-reserves framework at a lower level of reserves than it otherwise would.

Practice has shown that another complication with ample reserves is knowing when reserves are ample and not becoming scarce. While not having to estimate reserve demand each day is a benefit of the ample-reserves framework, the Fed does need to understand banks' demand for reserves. It needs to have estimates of the point at which banks' demand for reserves is satiated to ensure that it is maintaining reserve levels sufficiently large to stay in the ample portion of the aggregate reserve demand curve and not allow reserves to fall into scare territory. This is not necessarily easy since the demand curve for reserves can shift around.

The spike in repo rates and other short-term money market rates in September 2019 showed that the aggregate level of reserves is not a sufficient statistic for understanding when reserves are getting scarce; the distribution of reserves across banks also matters. Banks' preferred level of reserve balances can vary by bank size, business model, and liquidity management considerations. In addition, the regulatory burden of maintaining high levels of reserves also varies across institutions, e.g., FDIC assessment fees differ across banks and likely affect their preferred level of reserves. Even if reserve levels are high, if reserves are scarce relative to preferred levels at some banks and ample at others, arbitrage will not

[9] See Afonso, et al. (2022) for further discussion of the standing repo facility. As of September 18, 2024, the SRF rate is 5.0 percent.

necessarily bring the fed funds rate down toward the IORB rate. Moreover, a bank's desired reserve level may change over time, e.g., some banks that are more risk averse may want to hold higher precautionary reserve levels in stressed market conditions. Roberto Perli, manager of the Federal Reserve System Open Market Account, recently pointed out that frictions in the repo market may also be adversely affecting the redistribution of funding throughout the money markets.[10] In particular, as the repo market has become more concentrated, counterparty risk limits may have become more binding, making it harder for the repo market to work as effectively as it once did to redistribute liquidity. This manifests itself in some ON RRP counterparties utilizing the Fed's facility even when repo rates are higher in the market, since their own counterparties may not be willing to transact with them, having reached their counterparty limit.

As a result of these types of frictions, the Fed has had to monitor conditions in the money markets to ensure that it is maintaining ample-reserve levels as it is allowing assets to run off to reduce the size of its balance sheet. Rather than focusing only on the quantity of reserves, the Fed has been monitoring a set of indicators on reserve conditions that can give some indication if reserves are approaching a scarce level.[11] These indicators include: the stability of the fed funds rate relative to the IORB rate, the sensitivity of the fed funds rate to changes in the supply of reserves, the share of domestic bank borrowing in the fed funds market, the share of payments made late in the day, the average level of daylight overdrafts, and the share of repo trades made at rates above the IORB rate. According to Perli (2024b), aside from the repo market indicator, which has risen noticeably since the spring, all indicators suggest reserves remain abundant.

The Financial Stability Benefit May Be Elusive

Another purported benefit of the ample-reserves system is that it enhances financial stability. In theory, under ample reserves, reserves pay the market rate of interest, so there is no opportunity cost to banks of holding reserves. Therefore, there is little incentive for banks to minimize their reserves holdings in an

[10] See Perli (2024b).

[11] See Perli (2024a, 2024b).

ample-reserves system. Their willingness to hold higher reserve levels has the potential to reduce liquidity risk in the financial system and foster financial stability.[12]

But as Acharya, et al. (2022) and Acharya and Rajan (2023) discuss, an increase in reserves may not increase liquidity because banks with surplus reserves may hoard those reserves in stressed market conditions.[13] This is because banks may have made commitments on their surplus reserves and so are reluctant to give those reserves up.[14] In particular, the authors' research suggests that the expansion of the Fed's balance sheet through asset purchases during the GFC and Great Recession (quantitative easing (QE)) and subsequent shrinkage of the balance sheet (quantitative tightening (QT)) left the banking sector more vulnerable in the face of liquidity shocks and so more dependent on injections of liquidity by the Fed.

They find that when bank reserves expand, banks, in the aggregate and individually, increase demandable deposits and credit lines and decrease time deposits (which are less runnable). But when the central bank begins to shrink its balance sheet via QT, banks do not reverse the increase in demandable claims they took on during QE. (See **Figures 4a and 4b**.) Instead, the ratio of demandable claims to reserves increases for quite a while. This could be because there is inertia within the bank, or it could be because banks have become accustomed to the Fed stepping in and providing liquidity when stresses arise. Whatever the cause, this asymmetric behavior, which the authors call liquidity dependence, in which banks increase demandable claims when reserves increase but do not decrease them when reserves decline, makes the banking system more vulnerable to liquidity stresses and more dependent on central

[12] See Nelson (2018), Zobel (2022), and Logan (2023) for more extensive discussions of the benefits of the ample-reserves operating framework.

[13] See, also, Lopez-Salido and Vissing-Jorgensen (2023).

[14] This has been called the "ratchet effect": the supply of liquidity generates its own demand and as supply increases, so does demand. See Borio (2023).

bank interventions. In the authors' view this could have been the deeper cause of the market stresses seen in September 2019 and March 2020, both of which occurred after the Fed had commenced QT.[15]

These results have important policy implications. In particular, if a higher supply of reserves induces greater demand for reserves, it will be more difficult for the central bank to reduce the size of its balance sheet without accepting a greater risk of financial instability. This can be even more problematic if banks have become laxer in their approach to liquidity management because they have become accustomed to relying on reserves that are usually in ample supply. Banks may have less contingency funding in place precisely in the stressed market conditions when they need it. At the very least, policymakers using the ample-reserves regime need to know not only where the satiation point is on a static reserves demand curve, but also that the demand curve for reserves can move around depending on where the central bank is on its balance sheet expansion-contraction cycle. This means that the satiation point for reserves could move abruptly when market conditions change and what looked like more-than-ample reserves may turn out not to be. It also suggests that banks' liquidity claims should be added to the list of indicators the central bank should monitor to ensure that reserves remain ample.[16]

Ample Reserves and the Overnight Bank Funding Market

Borio (2023) also points to some drawbacks of the ample-reserve framework from the viewpoint of financial stability and the overnight bank funding market. The ample-reserve framework entails central banks playing a more significant role in interbank funding markets. Borio argues the fact that the distribution of reserves, and not just their aggregate volume, matters is a symptom of the fact that banks are much less active in overnight funding markets. The need for reserves to circulate in market stress

[15] As Acharya and Rajan (2023) also point out, banks' shortening the maturity of their liabilities during QE makes it more difficult for banks to finance longer-term assets, thereby undermining the potential beneficial macroeconomic effect of QE.

[16] The research also suggests that bank supervisors and regulators may want to consider more state-contingent monitoring, where the "state" is determined by whether the central bank is in a QT or QE phase. For example, during periods of QT, supervisors might want to assume higher levels of deposit-runoff and greater utilization of credit lines in stress tests.

events, and the possibility they will not necessarily do so, raises the probability that the central bank will be required to inject liquidity more often to calm markets. Norges Bank (the Central Bank of Norway) and the Swiss National Bank, which once used the floor system, have implemented a tiered approach, paying a lower rate as the quantity of a bank's reserves rises, as a way to give the banks some incentive to participate in the overnight bank funding market.[17] The European Central Bank (ECB) also recently reviewed its operational framework and changed from a supply-driven floor system to a demand-driven system, which will limit the ECB's footprint in financial markets and determine the amount of liquidity the central bank provides based on bank demand.[18]

Shrinkage in the overnight bank funding market also has implications for what interest rate the central bank should be targeting. Even though the Fed is using an ample-reserves framework, it continues to communicate its target in terms of the fed funds rate. However, the limited trading in the fed funds market and resulting increase in volatility in that market led the FOMC to discuss alternative potential target rates at their meeting in November 2018.[19] Several Fed policymakers found some merit in considering shifting to the overnight bank funding rate, a more robust unsecured overnight bank funding rate that includes not only fed funds transactions but also certain Eurodollar and certain domestic deposit transactions. In the end, though, the FOMC opted to stay with the fed funds rate as their main way to communicate policy since it was well understood by the public and market participants.

Political Economy Costs of an Ample-Reserves Framework

In principle, a floor-type operating system does not place a limit of the size of the central bank's balance sheet to implement monetary policy. Plosser (2017) discusses a number of political economy costs if the

[17] Norges Bank explained that the purpose of switching from the floor system to what they call a quota-based system was to "limit bank demand for central bank reserves and to provide a stronger incentive for banks to redistribute liquidity in the interbank market." See Norges Bank (2014), p. 2. The Swiss National Bank also cites support for activity in the Swiss interbank money market, which provides a more robust basis for calculating its policy reference rate, as a benefit of its tiered approach. See Maechler and Moser (2022).

[18] See Schnabel (2024).

[19] See Federal Open Market Committee (November 7-8, 2018).

central bank's balance sheet can grow to any size, including the potential that Congress or the administration could use the central bank's balance sheet to fund fiscal policy initiatives.[20] Other costs include that potential appearance issue generated from large interest-on-reserve payments going to large banks and to foreign banks; the appearance that the Fed was not able to fully unwind the QE it put into place in the GFC and pandemic, which might lead some to question its use in the future; and the fact the Fed's remittances to the Treasury have been negative since September 2022, which may generate criticism. Such costs are difficult to quantify, but they could create risk to the Fed's reputation and independence.

Fed policymakers have noted such costs. For example, at the December 2018 FOMC meeting discussion of the long-run operating framework, Chair Jay Powell emphasized the importance of abiding by the agreed-to normalization principle that the balance sheet would be no larger than that which is needed to implement monetary policy effectively and efficiently, given the chosen framework:

> "I do see this as a high-profile commitment that we need to honor; and doing so, in my view, would do much to support the legitimacy of future large-scale asset purchases – by showing that QE is not just a one-way street to an ever-larger Federal Reserve balance sheet relative to GDP…."[21]
>
> "…I do think it's necessary to do what we can to be seen to have worked hard to get to a smaller balance sheet. It's not just that we get down to scarce reserves, it's that we be seen to work hard to do it – that we take the commitment seriously."[22]

The switch in calling the regime "ample" reserves from "abundant" reserves was meant to communicate that the Fed will not be allowing reserves to rise without limit, but instead will be seeking the minimum

[20] This is not an ill-founded concern. In light of the two major hurricanes that have hit Florida in the past month, Nathan Tankus, in a recent opinion column in the *Financial Times*, recommended that the Federal Reserve set up a 13(3) emergency facility to lend directly to municipalities that have been declared in a state of emergency due to natural disasters, such as hurricanes. This disaster relief facility would be similar to the Municipal Liquidity Facility, which the Fed set established in April 2020 to help state and local governments address the cash flow problems they were facing during the pandemic. Tankus indicates that the new facility would alleviate the potential funding issue caused by the Federal Emergency Management Agency's (FEMA) funding being subject to the federal appropriations process. See Tankus (2024).

[21] See Federal Open Market Committee (December 18-19, 2028), p. 43.

[22] See Federal Open Market Committee (December 18-19, 2019), p. 44.

level of reserves that allows the Fed to exercise control over the fed funds rate and other short-term interest rates by setting the Fed's administered rates. This would entail a level of reserves that would include a buffer above the point of scarcity, but not abundantly above that.[23]

Conclusion

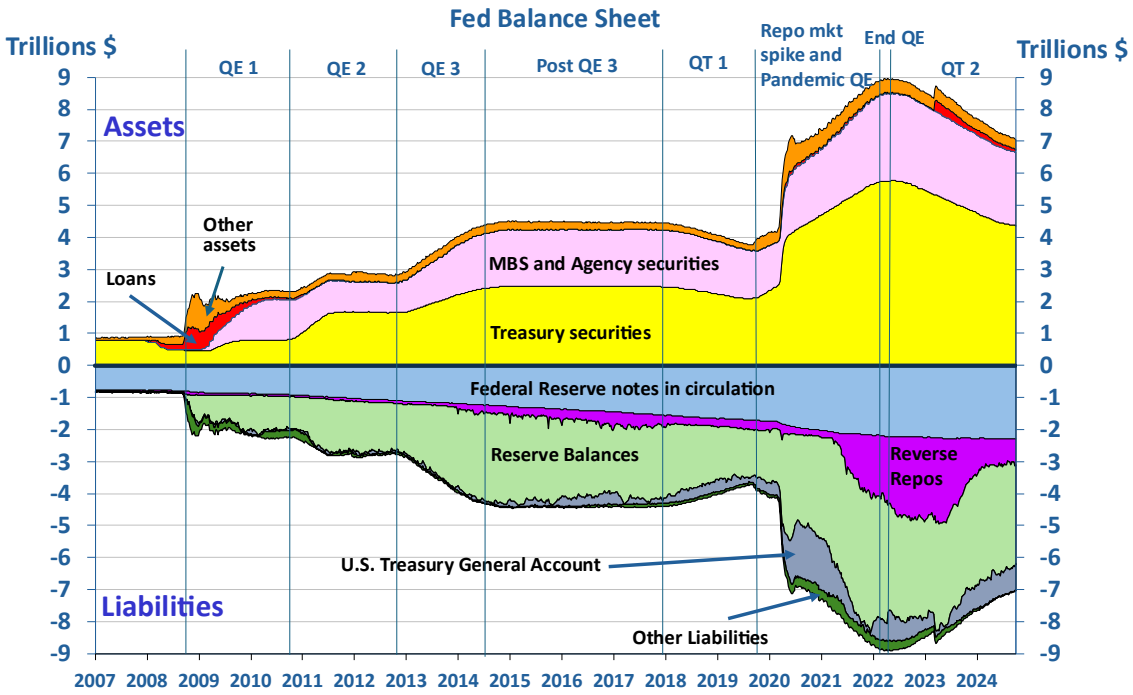
My discussion of the Fed's current ample-reserves operating framework is not meant to say that the scarce-reserves framework is necessarily preferrable or that the Fed should go back. For one thing, I think the transition costs of returning to a scarce-reserves system would not be insignificant given the current size of the balance sheet, the current limited transactions in the fed funds market, and the way in which banks have been managing their reserves. Still, I believe it is important to be realistic about the current system. It takes care and feeding. It reflects a choice about the size of the Fed's footprint in financial markets, with the potential that a larger Fed footprint distorts private-sector liquidity risk management practices in a way that is detrimental to financial stability.[24] It has implications for whether the fed funds rate should remain the Fed's reference rate. This suggests that certain features, like tiering, which have been implemented at other central banks that are operating ample-reserves regimes or a hybrid system like the ECB's, should be seriously considered and evaluated in the U.S. context.

The current ample-reserves system is meeting the prime directive – ensuring the Fed has very good interest rate control. But it is good to keep in mind the complexities that the "simple" ample-reserves system entails.

[23] Afonso, et al. (2024) define the level of "ample" reserves as the level that satiates banks' demand for reserves (where the demand curve for reserves is gently negatively sloped) and "abundant" reserves as levels beyond this where the demand curve is perfectly flat. "Scarce" reserves are levels below the satiation point, where the demand curve is steeply negatively sloped.

[24] See Borio (2023).

Figure 1a. The size and composition of the Fed's balance -sheet assets and liabilities have changed significantly since the Global Financial Crisis



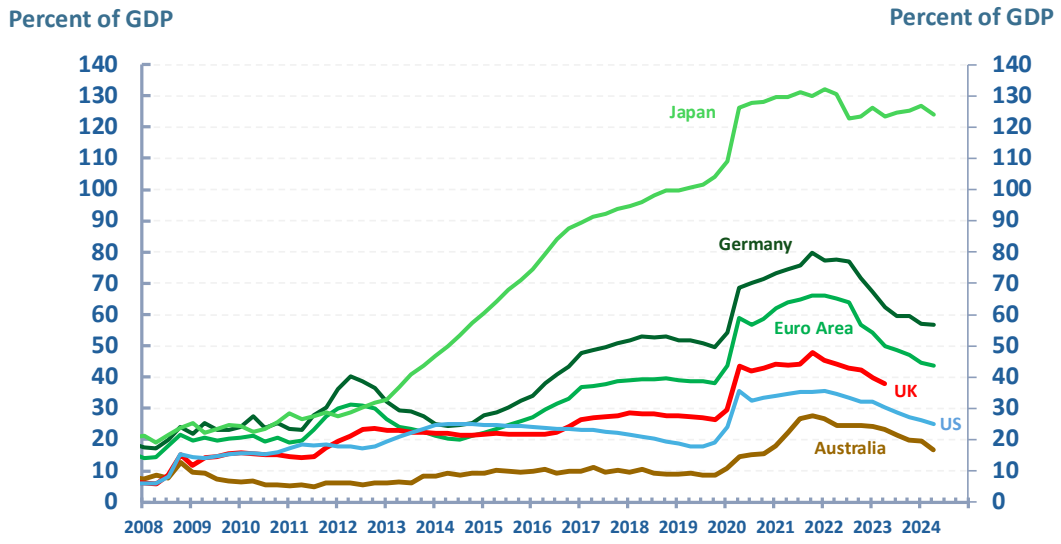
Source: Federal Reserve Board via Haver Analytics
Weekly data: Last point plotted is Oct 2, 2024

Figure 1b. The Fed's balance sheet has changed in size and composition

Assets (Billions of Dollars)			Liabilities and Capital (Billions of Dollars)		
	Jan 4, 2007	Oct 3, 2024		Jan 4, 2007	Oct 3,2024
Treasury securities	778.9	4,364.4	Currency	781.3	2,301.7
Agency and agency MBS	0.0	2,284.4	Reserves held by depository insts	20.0	3,097.2
Loans to depository insts	1.3	75.5	Reserve repos	29.7	799.3
Other assets	94.4	322.6	U.S. Treasury general account	6.2	823.4
			Other liabilities	6.8	-18.1
			Capital	30.6	43.4
Total	874.6	7,046.9	Total	874.6	7,046.9

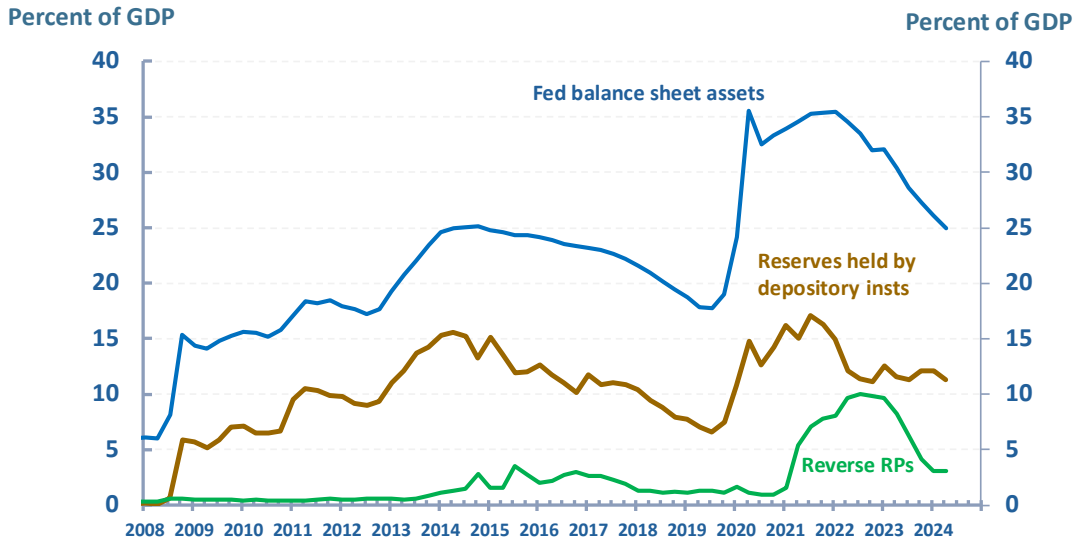
Source: Federal Reserve Board via Haver Analytics
Monthly data

Figure 1c. Central bank assets as a percent of GDP rose in many advanced economies during the pandemic



Source: Japan Cabinet Office, Bundesbank, ECB, Bank of England, Federal Reserve, Reserve Bank of Australia, via Haver Analytics
Quarterly data: Last obs. 2023 Q2 for UK, 2024 Q2 for the others

Figure 1d. Fed balance sheet assets, reserves, and ON RRPs as a percent of GDP rose during the pandemic



Source: Federal Reserve via Haver Analytics
Quarterly data: Last obs. 2024 Q2

Figure 2. The ample reserves operating framework is conceptually simple

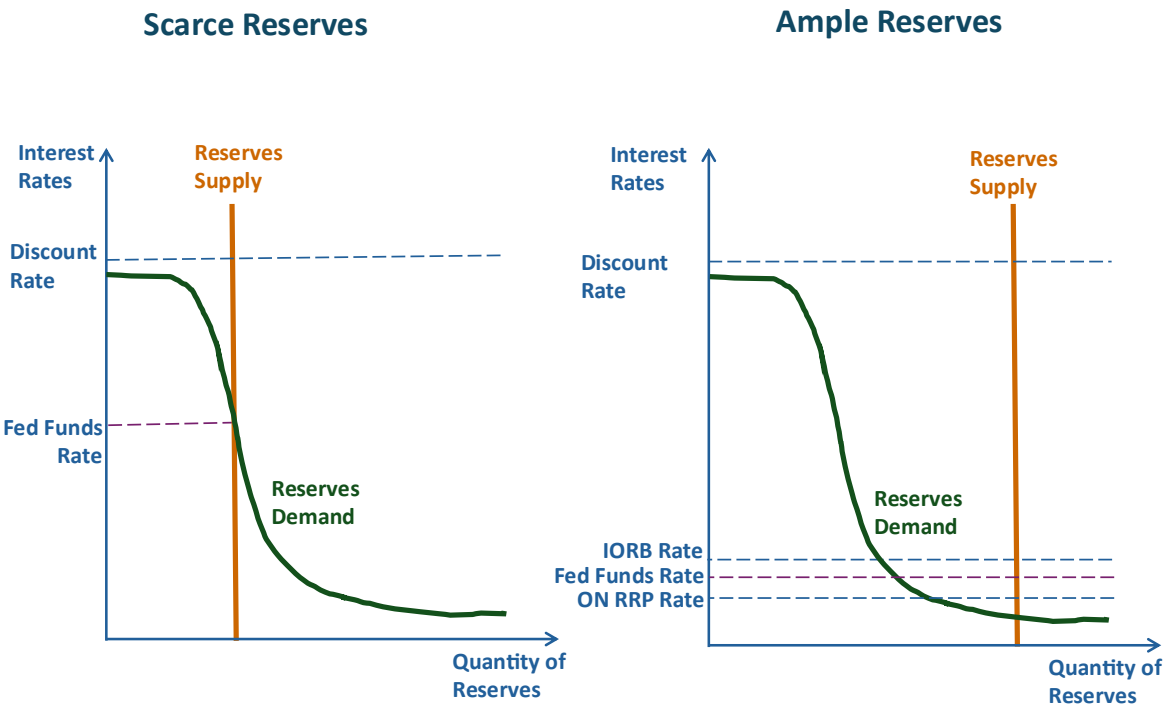
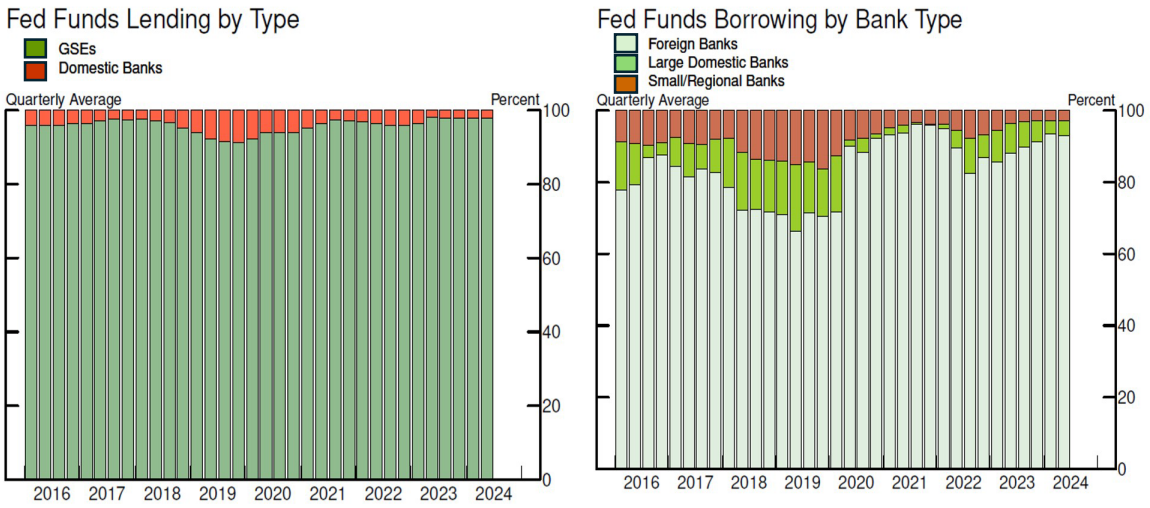


Figure 3. GSEs, especially the FHLBs, do the majority of lending and foreign banks do the majority of borrowing in the fed funds market

Lending and borrowing shares in the fed funds market



Source: Anderson and Na (2024)

Figure 4a. Reserves moved up with QE and down with QT. Bank deposits and credit lines did not move down during QT1 and rose again during the pandemic QE program.

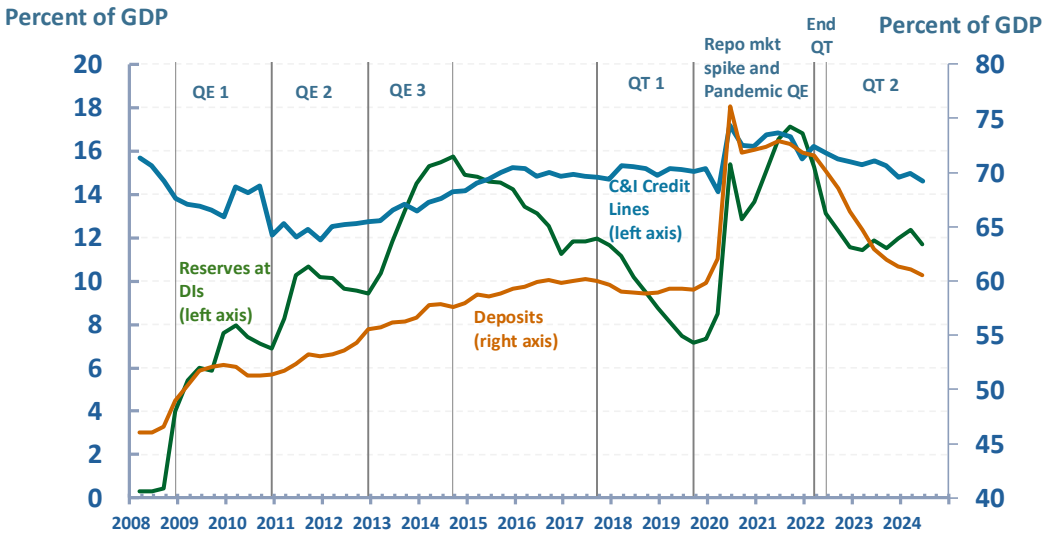


Figure is Mester update of Chart 1, Panel A in Acharya, Chauhan, Rajan, and Steffen (2022)
Source: Federal Reserve System and FDIC, via Haver Analytics
Quarterly data: Last obs. 2024 Q2

Figure 4b. Deposits and credit lines as a multiple of reserves dropped when reserves expanded during QE and rose during QT

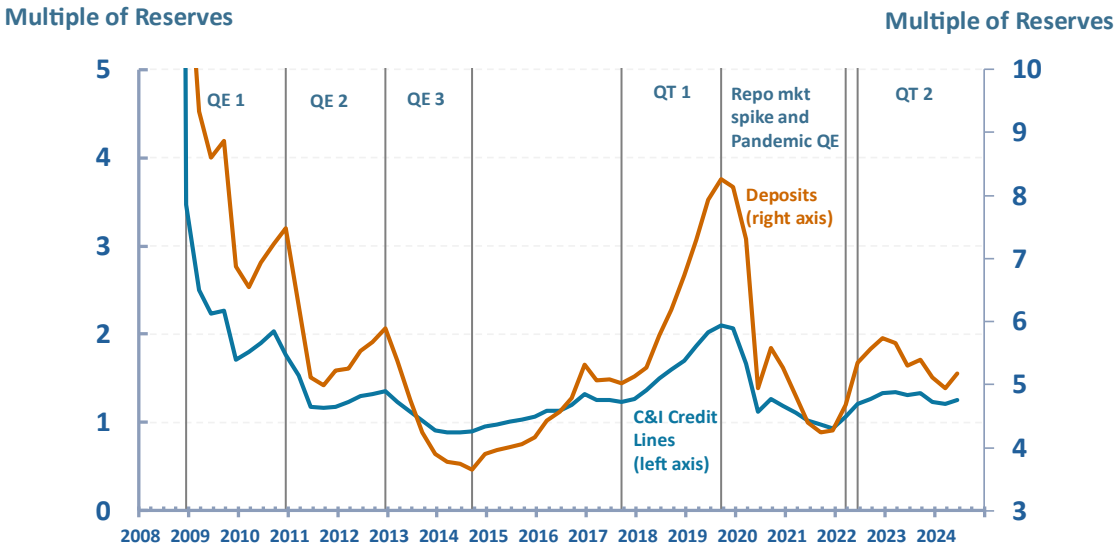


Figure is Mester update of Chart 1, Panel B in Acharya, Chauhan, Rajan, and Steffen (2022)
Source: Federal Reserve System and FDIC, via Haver Analytics
Quarterly data: Last obs. 2024 Q2

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