

QE May Raise Deposits at Banks Immediately, but Not Permanently

Bill Nelson | April 6, 2021

The demand for bank deposits skyrocketed last spring, because elevated uncertainty about the economic outlook led investors worldwide to sell securities. They preferred the safety and liquidity of cash in a bank account. Over the last year, demand for bank deposits remained high, in part because precautionary savings remained elevated. In addition, the interest rates on alternative to bank deposits such as Treasury bills and reverse repurchase agreements were near or below zero. At the same time, and in reaction to the same “dash for cash,” the Federal Reserve purchased massive volumes of Treasury securities and agency Mortgage-Backed Securities (MBS) in the spring to prevent investor sales from overwhelming the market, and then in an ongoing quantitative easing (QE) program to support the economy.

As this note describes, while Fed asset purchases were coincident with the rise in bank deposits, and Fed purchases in many cases create bank deposits, QE does not leave bank deposits permanently elevated. Countless types of transactions create bank deposits, including when the Fed buys a security from a nonbank. But those deposits are not stuck in the banking system, because countless types of other transactions destroy deposits. Instead, the aggregate level of bank deposits is determined by the public’s demand for deposits and the banks’ willingness to supply them.

INTRODUCTION

When the Fed purchases a Treasury or any other security from a nonbank, that transaction initially increases the aggregate amount of commercial bank deposits. The Fed pays for the purchase by crediting the reserve account of the nonbank’s commercial bank at the Fed (a/k/a “reserve balance”). The commercial bank in turn credits the nonbank’s deposit account there.

The question is, what happens next? The deposit is not stuck in the banking system. The nonbank that sold the Treasury can either leave that money on deposit at its bank, or else use it immediately. Some uses maintain the aggregate level of commercial bank deposits—buying a security from another nonbank, for instance, which just raises the deposit account of the seller. Other transactions reduce the amount of commercial bank deposits—repaying a loan, buying a security from a bank or investing the money, either directly or indirectly, in a bank liability other than deposits (commercial paper, for instance).

Ultimately, the aggregate level of bank deposits depends on the public’s demand for deposits and commercial banks’ appetite to supply them. Supply and demand in turn depend on the constellation of available interest rates and, in the case of supply, on the capital and liquidity implications of maintaining deposits.

To be sure, during times that the Fed is engaged in QE, the public’s demand for deposits tends to be high. As will be discussed, in March 2020, when the public’s demand for deposits skyrocketed during the “dash for cash,” investors shed securities for the liquidity of reserve balances at the Fed or deposits in commercial banks. The Fed purchased a massive amount of the securities that were being sold to keep markets from being overwhelmed.

More generally, the Fed only engages in QE when short-term rates are at zero.¹ When this happens, deposit rates and the interest rates on alternatives like Treasury bills are also essentially zero. Businesses and consumers then have low opportunity costs from leaving funds on deposits at their bank, rather than chasing higher yields that amount to only an additional basis point or two. Consequently, their demand for deposits is strong. Also, banks are extremely reluctant to push deposits away, both for business relationship reasons and because deposits are normally an attractive source of funding, so they may remain awash in deposits.

That willingness of the public (including nonbank financial institutions) to leave funds in their deposit accounts applies to deposits created when the Fed buys assets from nonbanks. But it applies to deposits created when banks buy assets from or make loans to nonbanks, or when banks issue non-deposit liabilities. There is nothing inherently special about deposits created by QE.

It may seem as if it can't matter much whether (1) the overabundant bank deposits are created by QE, or (2) deposit growth and QE happen *at the same time* in response to some other factor, such as short-term interest rates being zero. But it does. It is important to understand causes so we can reliably predict consequences.

If QE were the primary cause of commercial bank deposits, then deposit growth would more or less come to a dead stop when QE stops, and subsequently would turn negative when assets and reserves start to shrink. Relatedly, when the Fed eventually raises interest rates, it will most likely keep its securities portfolio and the corresponding level of reserve balances elevated, at least for a while. If the deposits temporarily created by QE were imprisoned in the banking system, they should remain when interest rates rise and when the precautionary demand for deposits falls. If, on the other hand, deposit levels reflect zero market interest rates and demand-side factors such as economic uncertainty and government income support programs, the deposits may leave the banking system when interest rates rise, and the economic outlook becomes more certain.

To be clear, the *reserve balances* of commercial banks that QE creates *do* get stuck in the banking system. Financial transactions move reserve balances from one bank to another, but no bank transaction changes the overall quantity. That "conservation of reserve balances" principle means that when reserve balances rise, as they have done in a spectacular fashion over the past 13 months, the balance sheets of banks need to find space. Either bank liabilities and capital must rise too, or other bank assets must fall, or both.

The dash for cash

None of this is to say that banks did not receive a massive inflow of deposits last year, largely driven by developments outside the banking sector. As noted above, during the "dash for cash" that started in mid-March 2020, investors worldwide sharply revised their preferences toward holding cash (that is, bank deposits) rather than securities, including even Treasury securities. Over the five weeks ending on April 15, 2020, commercial bank deposits grew \$1.2 trillion.² The Fed responded to the same developments in part by purchasing a massive amount of Treasury securities and agency MBS. Over the same five-week period, the Fed purchased \$1.4 trillion in securities. As a consequence, a significant quantity of investor demand for cash rather than securities was no doubt realized by a sale of a security to the Fed and an increase in the investor's deposit at a commercial bank. Note that the transactions reflected a sharp increase in investor demand for deposits, so the increase in deposits would be expected to be durable.

¹ The purpose of QE is to push down long-term rates. If short-term rates are not at zero, the Fed would just reduce short-term rates rather than engaging in QE.

² The statistics on bank deposits refer to line 36 of page 5 of the Federal Reserve's H.8 statistical release "Assets and Liabilities of Commercial Banks in the United States." The specific line item is non-seasonally adjusted "other deposits," defined as deposits excluding large-time deposits. The Fed - Assets and Liabilities of Commercial Banks in the United States - H.8 - Release Dates, April 2, 2021 (federalreserve.gov).

While some of the immediate rise in deposits resulted from bank business customers drawing down lines of credit, an underlying increase in investor demand for bank deposits has persisted long after those lines of credit have been repaid. Between February 2021 and February 2020, commercial bank deposits grew \$3.2 trillion. By comparison, deposits grew less than \$800 billion over the previous 12-month period. Because this growth of deposits has taken place during a period of weak loan demand, banks have invested the inflows to the extent possible in securities, with the remainder increasing reserve balances.

The Fed recognized the impact on bank balance sheets of both the increase in its own balance sheet and the inflow of deposits of commercial banks caused by the abrupt change in investor preferences by temporarily excluding reserve balances and Treasury securities from the denominator of banks' supplementary leverage ratios (SLRs). The Fed stated that it excluded the assets for two reasons:

In response to volatility and market strains in recent weeks, the Federal Reserve has taken several actions to support market functioning and the flow of credit to the economy. The response to COVID-19 has notably increased the size of the Federal Reserve's balance sheet and resulted in a large increase in the amount of reserves in the banking system. The Federal Reserve's balance sheet will continue to expand in the near term, as asset purchases continue and recently announced facilities to support the flow of credit to households and business begin operations. *In addition, market participants have liquidated a high volume of assets and deposited the cash proceeds with banking organizations in recent weeks, further increasing the size of banking organizations' balance sheets [emphasis added].*³

The amount of reserve balances in the banking system continues to grow rapidly. It increased nearly \$600 billion over the eight weeks ending on March 25, 2021. As noted, investor demand for deposits remains extremely elevated. That is, both the reasons the Fed gave for the SLR exclusion remain: elevated (and growing) reserve balances and elevated investor demand for bank deposits both continue to put downward pressure on bank SLRs. Nevertheless, the Fed ended its temporary exclusions from the SLR on March 31, 2020.

If loan demand were strong, banks would be more able to invest deposit inflows in loans and maintain higher capital to satisfy risk-based capital requirements. But, with loan demand weak, banks are investing elevated deposits in Treasury securities, agency MBS and reserve balances, which have low risk-based capital requirements. As a result, SLR ratios are becoming more binding than risk-based capital ratios so banks' incentive to become smaller has increased, which may well mean that they ramp up their efforts to shed deposits over coming weeks.

If loan demand were strong, it would be profitable for banks to invest deposit inflows in loans and raise capital to satisfy risk-based capital requirements. But with loan demand being weak, banks are investing elevated deposits in Treasury securities, agency MBS and reserve balances. Because the SLR requires banks to fund those low-yielding investments in part with capital, they are significantly less profitable than loans. As a result, banks' incentives to shrink have increased, and banks may well ramp up their efforts to shed deposits over coming weeks.

WHAT HAPPENS WHEN THE FED BUYS A SECURITY?

In general, the mechanics of monetary policy are best understood at the balance sheet level, rather than the transaction level. Considering the mechanics at the transaction level doesn't foster helpful intuition and can often promote false insight. True insight comes from considering the balance sheets of the parties involved and the configuration of interest rates necessary to leave them content with those balance sheets.

³ "Temporary Exclusion of U.S. Treasury Securities and Deposits at Federal Reserve Banks from the Supplementary Leverage Ratio," *Federal Register*, April 14, 2020; <https://www.federalregister.gov/d/2020-07345/p-30>

In this instance, however, it is necessary to explain the operations at the transaction level to help illuminate where the idea that QE creates durable deposits comes from.⁴ Considering only the initial impact of the purchase can, in some cases, lead to the false conclusion that deposits are permanently boosted. But that increase may or may not be durable: it depends on interest rates and balance sheets.

The examples below illustrate various hypothetical transactions and their sectoral, balance-sheet implications. In these examples, the balance sheets of the banking sector, the nonbank financial sector, and the public (nonfinancial businesses and households) represent the entire sector, not some individual entity in the sector. The distinction is important. If Sally buys a used lawnmower from Ted, Sally’s bank deposit goes down, but Ted’s goes up—the deposits in the banking system are not changed. In addition, the T-account analysis below uses massively simplified balance sheets and only illustrates the changes (not the levels) that occur when there is a transaction. In each case, balance sheets must balance; so, for example, if an asset goes up, either a liability must also go up or another asset must go down.

Of course, the examples are intended to illustrate what is possible, not what is likely. What is likely will depend on broader circumstances. For example, currently, if banks lose deposits, they may be unlikely to replace the funding with commercial paper, perhaps preferring instead to sell securities.

While these examples are meant to illustrate that deposits in the banking system can be created and destroyed, they also illuminate the durability of reserve balances. Note that whenever reserve balances are increased by the Fed purchasing a security, the increase persists regardless of the subsequent transactions. In addition, unless the subsequent transactions involve cash balances in bank deposits being used to repay a loan, or being used to purchase a security from a bank, the increase in reserve balances pushes down banks’ SLRs.

Case 1: The Fed buys a \$1 Treasury from a bank.

In the first case, consider the consequences when the Fed purchases a Treasury security from a bank. As shown in the T-accounts, the Fed’s holdings of Treasuries go up \$1, and the reserve balances of banks go up \$1. There is no impact on deposits.

Federal Reserve		Banking Sector	
Assets	Liabilities	Assets	Liabilities
Treasury securities +\$1	Reserves held by banks +\$1 Cash held by the Treasury	Treasury Securities -\$1 Reserve balances at the Fed +\$1 Loans to the public	Deposits Commercial paper

Nonbank Financial Sector		Public	
Assets	Liabilities	Assets	Liabilities
Treasury securities Bank commercial paper	Investments by public	Deposits Treasury securities Investments in nonbanks	Wealth Loans from banks

⁴ This discussion draws heavily from “How the Fed Changes the Size of Its Balance Sheet,” *Liberty Street Economics*, Deborah Leonard, Antoine Martin, and Simon Potter, July 10, 2017. <https://libertystreeteconomics.newyorkfed.org/2017/07/how-the-fed-changes-the-size-of-its-balance-sheet.html>

Case 2: The Fed buys a \$1 Treasury from the public.

When the Fed buys a Treasury from the public, deposits go up, but the increase could be transitory. The Fed increases its holdings of Treasuries and the reserve balance of the public’s bank. The bank, in turn, increases the deposit account of the public. The public’s stock of Treasuries goes down, and deposits go up \$1.

Federal Reserve		Banking Sector	
Assets	Liabilities	Assets	Liabilities
Treasury securities +\$1	Reserves held by banks +\$1 Cash held by the Treasury	Treasury securities	Deposits +\$1
		Reserves at the Fed +\$1 Loans to the public	Commercial paper
Nonbank Financial Sector		Public	
Assets	Liabilities	Assets	Liabilities
Treasury securities Bank commercial paper	Investments by public	Deposits +\$1 Treasury securities -\$1 Investments in nonbanks	Wealth Loans from banks

There is no reason to think the consequences stop there, however. Rather than maintain a now-higher deposit account at the bank—presumably higher than they want if they were happy before—the public could transfer the money to a prime money fund in the nonbank financial sector, and the money fund could buy \$1 of bank commercial paper.

The public uses a deposit to invest in a prime money fund that purchases bank commercial paper.

Federal Reserve		Banking Sector	
Assets	Liabilities	Assets	Liabilities
Treasury securities	Reserves held by banks Cash held by the Treasury	Treasury securities Reserves at the Fed Loans to the public	Deposits -\$1 Commercial paper +\$1
Nonbank Financial Sector		Public	
Assets	Liabilities	Assets	Liabilities
Treasury securities Commercial paper +\$1	Investments by public +\$1	Deposits -\$1 Treasury securities Investments in nonbanks +\$1	Wealth Loans from banks

In that case, bank deposits have returned to where they began; the bank is now funding its increased reserve balances with commercial paper. Moreover, that is just one of an essentially infinite number of possibilities. Suppose, for example, the public decided to use the added funds in its deposit account to repay a draw on a bank line of credit.

The public uses a deposit to repay a bank line of credit.

Federal Reserve	
Assets	Liabilities
Treasury securities	Reserves held by banks
	Cash held by the Treasury

Banking Sector	
Assets	Liabilities
Treasury securities	Deposits -\$1
Reserves at the Fed	Commercial paper
Loans to the public -\$1	

Nonbank Financial Sector	
Assets	Liabilities
Treasury securities	Investments by public
Bank commercial paper	

Public	
Assets	Liabilities
Deposits -\$1	Wealth
Treasury securities	Loans from banks
Investments in nonbanks	-\$1

In that case, again, the level of deposits ends up unchanged. The bank has room on its balance sheet for the higher level of reserve balances, because its loans to the public have fallen.

Case 3: The Fed buys \$1 Treasury from the nonbank financial sector.

Suppose the Fed buys the Treasury from a prime money fund. The Fed credits the reserve account of the bank of the fund, and the bank credits the account of the fund. But the fund needs a new asset, so it uses the proceeds to buy commercial paper of the bank, and the bank debits the deposit account of the fund. Suppressing the intermediate step for simplicity, this is the end result:

Federal Reserve	
Assets	Liabilities
Treasury securities +\$1	Reserves held by banks +\$1
	Cash held by the Treasury

Banking Sector	
Assets	Liabilities
Treasury securities	Deposits
Reserves at the Fed +\$1	Commercial paper +\$1
Loans to the public	

Nonbank Financial Sector	
Assets	Liabilities
Treasury securities -\$1	Investments by public
Bank commercial paper +\$1	

Public	
Assets	Liabilities
Deposits	Wealth
Treasury securities	Loans from banks
Investments in nonbanks	

So again, no deposit is created. Instead, the prime money fund replaces the Treasury with commercial paper, and the bank funds its higher level of reserve balances with commercial paper.

Case 4: Banks buy \$1 Treasury from the public.

It is worth noting that the banking sector has been adding to their holdings of Treasury and agency securities over the past year, not running them down. Treasury and agency securities held by commercial banks and U.S. branches and agencies of foreign banks increased by nearly \$900 billion over the 12 months ending January 2021. If banks are buying the securities from the public, those purchases too would initially add to bank deposits. Indeed, banks buy securities from nonbanks all the time. Moreover, a bank deposit is created when a bank buys anything from, or makes a loan to, a nonbank. Just as the banking system is not stuck with the deposits created when banks buy a security, banks are also not stuck with deposits when the Fed does so.

Federal Reserve		Banking Sector	
Assets	Liabilities	Assets	Liabilities
Treasury securities	Reserves held by banks	Treasury securities +\$1	Deposits +\$1
	Cash held by the Treasury	Reserves at the Fed	Commercial paper
		Loans to the public	

Nonbank Financial Sector		Public	
Assets	Liabilities	Assets	Liabilities
Treasury securities	Investments by public	Deposits +\$1	Wealth
Bank commercial paper		Treasury securities -\$1	Loans from banks
		Investments in nonbanks	

Of course, the deposit created when the public sells a Treasury security to a bank can also be durable, or it could disappear immediately if the public would rather invest the funds elsewhere or repay an obligation. In the end, it depends on the underlying demand and supply of deposits, not the transaction.

And since sometimes the confusion concerns an increase in reserve balances rather than the purchase of securities, consider the case where the Treasury mails out \$1 in stimulus checks to the public. In this case, the Treasury’s account at the Fed goes down \$1, the deposits of the public at banks goes up \$1, and the reserve balances of banks at the Fed goes up \$1.

Federal Reserve		Banking Sector	
Assets	Liabilities	Assets	Liabilities
Treasury securities	Reserves held by banks +\$1	Treasury securities	Deposits +\$1
	Cash held by the Treasury -\$1	Reserves at the Fed +\$1	Commercial paper
		Loans to the public	

Nonbank Financial Sector		Public	
Assets	Liabilities	Assets	Liabilities
Treasury securities	Investments by public	Deposits +\$1	Wealth +\$1
Bank commercial paper		Treasury securities	Loans from banks
		Investments in nonbanks	

But, just as in the case when the Fed bought a security from the public, that will not be the end of the story. While the public might be content to keep its new wealth in the form of a deposit at a bank, it might instead buy a Treasury security from the bank with the amount. It could also put the amount in a prime money fund that buys a Treasury security from the bank, use the money to pay down a loan, or invest in the prime money funds that buy commercial paper. After all those possible second steps, bank deposits are back to where they began.

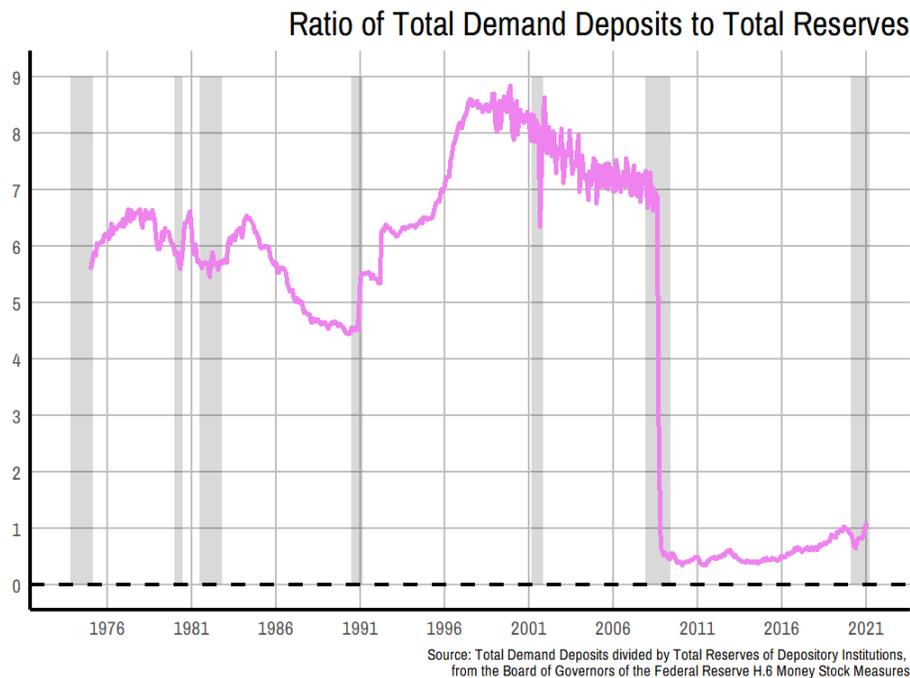
The point is that the initial transaction itself generally tells us nothing about what will eventually happen. Nor, for that matter, does the second transaction. In reality, large banks and financial institutions engage in thousands upon thousands of offsetting transactions each day. There isn't any particular correspondence between the initial balance sheet impact of any one transaction and where a financial institution's assets and liabilities will be shortly thereafter.

WHY THE CONFUSION?

The misconception that the Fed's QE purchases durably boost deposits may have three reinforcing sources: outdated views about the relationship between reserves and deposits, a false syllogism between reserve balances and commercial bank deposits, and a misleading empirical regularity.

Many of us were taught in our college money and banking course that deposits and reserve balances are linked by a constant *money multiplier*. The idea was that when a bank received a deposit, it loaned out all the money it wasn't required to hold as reserves. Those funds, in turn, came back to the bank (or another bank) as deposits, and the process continued. In the end, the total amount of deposits created ended up being the amount of reserve balances divided by the reserve requirement.

The problem is that there has been no such regular relationship between reserve balances and deposits for many decades, as can be seen in the line graph, which plots the ratio of deposits to reserves. And, of course, the last nail in the coffin of the money multiplier was hammered home in March 2020, when the Fed set reserve requirements on all deposits to zero, where they will likely remain.



The confusion may also stem in part from the fact that the *aggregate level of reserve balances*, which are the deposits of commercial banks at Federal Reserve Banks, aren't changed by the transactions of financial institutions, but only by actions of the Federal Reserve itself. If the Fed creates reserve balances by purchasing a security, the banking system really does have to absorb those reserve balances (see [When the Fed Buys a Treasury Security, the Debt Does Not Go Away - Bank Policy Institute \(bpi.com\)](#) and [If the Treasury Issues Debt and the Fed Buys It, Should Bank Capital Requirements Go Up? - Bank Policy Institute \(bpi.com\)](#)). That is, each bank has to voluntarily hold reserve balances in an amount that, when added up across all banks, equals the aggregate level of reserves determined by the Fed's balance sheet. To accomplish that miraculous outcome, interest rates and bank balance sheets have to adjust to leave banks content.

The false parallel between reserve balances (which really are stuck in the banking system) and deposits may be perpetuated by the fact that, as noted among the previous examples, the overall level of deposits in the banking system really is unaffected by many types of transactions. Nevertheless, that is not a necessary outcome. Even though an asset purchased by the Fed might create a bank deposit in the first instance, unlike the corresponding *reserve balance*, the increase in bank deposits need only exist for an instant.

And finally, deposits have tended to rise when the Federal Reserve has been engaged in QE. That empirical regularity, however, may occur because the Fed only engages in QE when short-term rates are already at essentially zero. Normally, deposit rates are a bit below market rates, reflecting the ancillary services from a deposit account. But because banks are extremely reluctant to charge negative interest rates on deposit accounts, as market rates approach zero, deposit rates and market rates get squeezed together. As a result, deposits become relatively attractive compared with other options, such as money funds or direct holdings of money market instruments. Under those circumstances, businesses and households opt to simply leave their money in deposits.

The correspondence in 2020 between QE and deposits is admittedly tight. Between January 2020 and January 2021, deposits grew by \$3.3 trillion, while the Fed's holdings of securities grew by \$3.0 trillion. As we discussed, the dash for cash in March and April led to a coincident sharp rise in both bank deposits and Fed securities holdings. Ongoing Fed purchases for QE are also boosting deposits when the purchase occurs—the question is why those deposits are sticking around. It is nearly impossible to evaluate whether QE-created deposits are permanent for some reason, or high deposits and persistent levels reflect relatively attractive deposit rates (compared with market rates), because the Fed dropped interest rates to zero and started purchasing massive amounts of securities at essentially the same time.

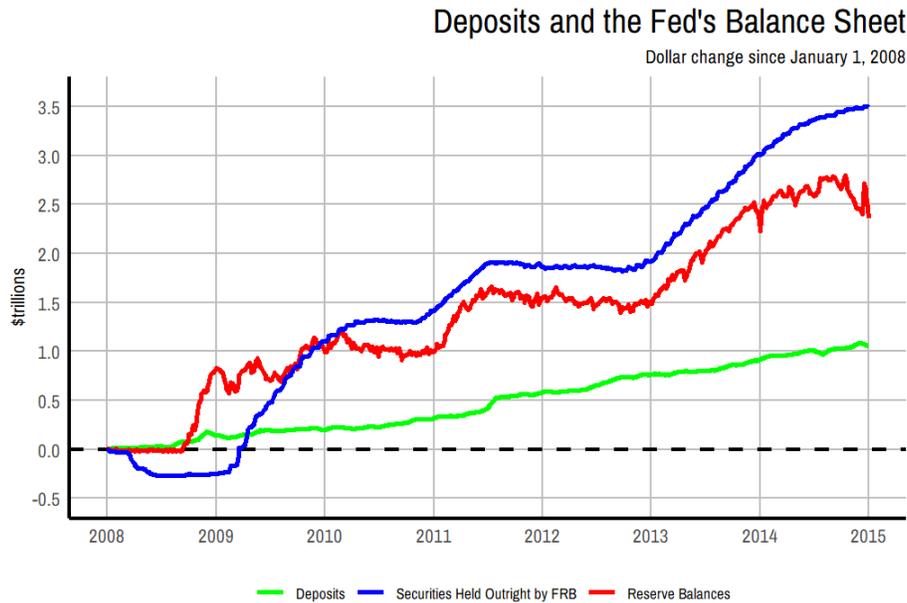
However, a deeper look at the deposit growth suggests many factors have played a role, and the tight link between QE and deposits may be coincidence. Because the Fed's purchases of Treasury securities are almost entirely from financial institutions, if the deposits created by the purchases were driving deposit growth, that growth should be concentrated in wholesale deposits. But the growth was equally divided between retail and non-retail deposits.

In fact, while non-retail deposits grew 21 percent, retail deposits grew 27 percent. This is what would be expected if the precautionary demand for deposits had shifted up from both types of depositors, and if both were responding to the desirability of holding deposits when the interest rates on alternative investments are all essentially zero percent.⁵

A look back at the Great Financial Crisis and Great Recession is even more revealing, because it is possible to distinguish between the impact of QE and that of near-zero interest rates. The FOMC's target range for the federal

⁵ All items are drawn from the FFIEC 031/041 Call Reports. Retail deposits is the sum of items 6.a, 6.b, 7.a.1, and 7.b.1 in RC-E Part I. Total deposits is the sum of columns A and C under item 7 in RC-E Part 1. Non-retail deposits is the difference between total deposits and retail deposits. Growth is calculated as the change from the fourth quarter of 2019 to the fourth quarter of 2020 using only banks that are present in both quarters. Banks are merger-adjusted using the FFIEC's Transformations data set.

funds was at essentially zero from December 2008 through December 2015, while the Fed was only engaged in QE intermittently over that period. As can be seen in the multiline graph, deposits (the green line) grew steadily over the period, but not by more when the Fed was expanding its balance sheet (the period when the blue or red line was rising).



Source: "Deposits" is the difference between M1 Money Stock and Currency, both from H.6 Money Stock Measures. "Securities held outright" is the sum of Treasury and Agency securities and Agency MBS from H.4.1 Factors Affecting Reserve Balances

CONCLUSION

QE does not determine the level of bank deposits. The deposits of the banking system as a whole ultimately depend on banks' appetite for supplying deposits and the public's demand for them, and the deposit rates that equilibrate that supply and demand. Nevertheless, in current circumstances, where banks' counterparties are content with leaving funds in the bank because deposit rates and market rates are all zero, banks are awash in deposits. While growth in deposits is usually beneficial to banks, with loan demand being weak and banks forced by the SLR to fund riskless but low-yielding investments in part with capital, the excess deposits are driving the SLR to become more binding than risk-based capital requirements.

QE does, however, create reserve balances that banks *are* stuck with. Banks do not automatically get funding for the reserve balance in the form of durably increased customer deposits. Currently, banks are flush with deposits. But once the FOMC starts raising interest rates, the public's demand for deposits will fall, and it will become more challenging for banks to fund those massive reserve balances. Note that even after excess deposits dissipate, the extraordinarily high level of reserve balances will continue to put downward pressure on bank SLRs. Since the banks are stuck with the reserve balances but not with the deposits, as the deposits return to more normal levels, the Fed will have to pay a high rate of interest on the balances for banks (individually and collectively) to be willing to hold them.

Given the importance of the outlook for deposits for both monetary policy and bank planning, further analysis of the determinants of the level of deposits and how that level relates to interest rates, economic activity, and QE is needed. Deposits are essentially equivalent to the money

supply, so a natural extension of the casual empiricism presented here would be to add information about the Fed's asset purchases to a standard, well-functioning, money-demand model. The classical money-demand model links the ratio of nominal GDP to a measure of the money stock (that is, the velocity of money) to a measure of the opportunity cost of holding money. Unfortunately, that model has not worked for decades, so the analysis may be challenging.

Disclaimer: The views expressed do not necessarily reflect those of the Bank Policy Institute's member banks, and are not intended to be, and should not be construed as, legal advice of any kind.