

operating regime based on a smaller footprint, where the balance sheet is more directly linked to the conduct of monetary policy.

Political independence is an essential element of sound monetary policy decision making. But with that independence must come constraints on broad discretionary authorities that could be subject to political abuse and interference. For example, the Fed should not be allowed to engage in fiscal policy actions that rightly belong to the fiscal authorities. Without carefully established constraints on the size and composition of the Fed's balance sheet, credit allocation and off-budget fiscal policy represent discretionary opportunities ripe for abuses that would undermine the case for political independence. Such authorities are likely to prove detrimental to our institutions and the economy.

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SECTION TWO

Alternatives for Reserve Balances and the Fed's Balance Sheet in the Future

John B. Taylor

Since this is a chapter on the Fed's balance sheet, I begin by looking at the Fed's balance sheet today and reviewing how it has changed in the years since the global financial crisis. I then discuss alternative balance sheet sizes and configurations for reserve balances in the future, and consider alternative ways to get there. I explain why a balance sheet size and configuration for reserve balances in which the short-term interest rate is determined by market forces should be considered for the future as an alternative to one in which the short-term interest rate is administered through the interest payments on excess reserves.

THE BALANCE SHEET TODAY AND HOW WE GOT HERE

The upper panel in Table 1.2.1 shows the balance sheet of the Fed today. The lower panel shows the balance sheet as it was on a date before the financial crisis in May 2006—eleven years ago. The numbers are exactly those reported for these dates in the Fed’s Consolidated Statement of All Federal Reserve Banks, but I have aggregated the assets and liabilities into key categories to focus on the central developments.

The “size” of the balance sheet usually refers to total assets, and you can see in the left column that the size of the balance sheet has exploded from \$842 billion to \$4,470 billion in these eleven years. The reason for that explosion is that the Fed engaged in large-scale asset purchases, sometimes called quantitative easing, in an attempt to drive down long-term interest rates. These purchases are shown

TABLE 1.2.1. Fed’s balance sheet (billions of dollars)

Fed's Balance Sheet (Billions of Dollars)			
April 26, 2017			
Assets		Liabilities	
Securities Held Outright	4,246	Federal Reserve Notes	1,496
Other	224	Reserve Balances	2,201
		Other	733
Total Assets	4,470	Total Liabilities	4,430
May 10, 2006			
Assets		Liabilities	
Securities Held Outright	760	Federal Reserve Notes	758
Other	82	Reserve Balances	14
		Other	41
Total Assets	842	Total Liabilities	813

Source: Consolidated Statement of All Federal Reserve Banks, Federal Reserve Statistical Release H.4.1, Table 5, April 26, 2017; Table 2, May 11, 2006, Selected Items

as “Securities Held Outright.” The holdings grew from \$760 billion to \$4,246 billion over the same span of time as the Fed bought both mortgage-backed securities and Treasury securities.

To finance these purchases, the Fed borrowed from banks in the form of reserve balances, or bank deposits at the Fed on which the Fed pays interest. You can see these reserve balances in the right-hand “Liabilities” column. Before quantitative easing began, reserve balances were \$14 billion, an amazingly small number for the balance sheet these days. They’re now equal to \$2,201 billion. This explosion of reserve balances has important implications for monetary policy, as I explain below.

Also shown on the balance sheet are Federal Reserve notes (currency). These have increased from \$758 billion to \$1,496 billion, which is about a 6 percent average annual growth over this period of time. That rate of growth is not that unusual. The demand for currency grows steadily as the economy grows, and the Fed supplies currency to meet this demand. What is unusual is the explosion of reserve balances to finance the purchases of securities.

Figure 1.2.1 is a plot of these reserve balances from 2000 to the present. The graph shows a small jump at the time of the 9/11 attacks and the resulting damage on Wall Street (it was considered a big \$60 billion jump at the time). It shows a bigger jump during the panic in the fall of 2008 as lender of last resort loans were made domestically and internationally by the Fed. The part of the graph labeled “with liquidity support only” is what I estimate would have happened had this liquidity support been the only intervention, as it was at the time of 9/11. The liquidity facilities automatically phased away when the need for them disappeared.

But then quantitative easing (QE) began in earnest in 2009. You can see the impact of the three big bouts of QE1, QE2, and QE3 on reserve balances as these were used to finance the asset purchases. As each QE ended, the jump in reserve balances also ended, and then reserve balances gradually declined over time as currency

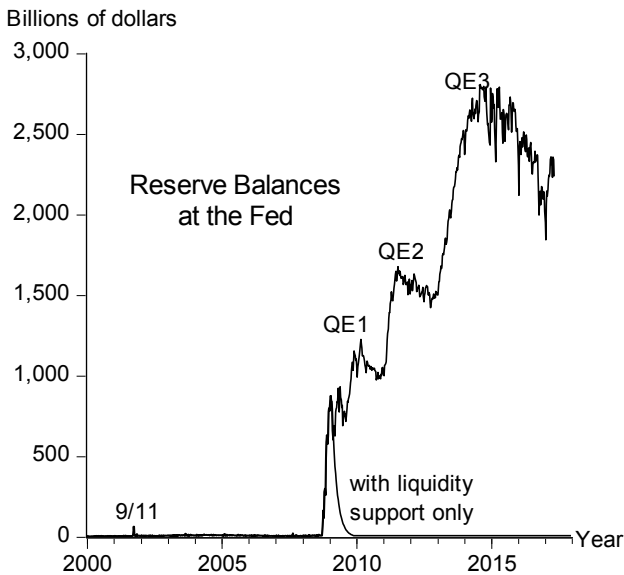


FIGURE 1.2.1. Reserve balances at the Fed

increased and the need for reserve balances to finance the stock of securities thereby diminished.

Some of the volatility in reserve balances during these downward trajectories is due to changes in Treasury balances at the Fed or to the use of overnight reserve repurchase (ON RRP) agreements. When the Fed conducts an ON RRP, it sells a security to a counterparty and simultaneously agrees to buy the security back the next day. As explained in “Overnight Reverse Repurchase Agreement Facility” on the Fed’s website, “There is a reduction in reserve balances on the liability side of the Federal Reserve’s balance sheet and a corresponding increase in reverse repo obligations while the trade is outstanding.” When the trade is over, reserve balances return to where they were. This decline and the reversal are quite noticeable on the right-hand side of the chart after QE3, when ON RRPs were used frequently. There is no functional difference between reserve balances and ON RRP as a means of financing

securities held or purchased. The Fed used ON RRP because they can be sold to government-sponsored enterprises and mutual funds. Some argue that this gives the Fed a wider reach into the financial markets for better interest rate control. Others argue that this expansion is not appropriate for the Fed and has been used sparingly.

To be sure, the recent short-run ups and downs in reserve balances from month to month are not a reflection of the stance of monetary policy. The fact that the supply of reserves is so much greater than demand is what is important. And that will continue for at least a while. Demand is now probably a bit greater than the amount of reserve balances supplied before the explosion, but nowhere near the more than \$2 trillion now supplied. Without changes in the amount of securities held, reserve balances will decline very slowly as currency demand increases, as illustrated by the downward trend since the end of QE3. If the size of the securities held declines, reserve balances will decline more quickly.

But as long as reserve balances are this high, there is no choice other than to use interest on excess reserves (IOER) to move the short-term interest rate up or down. Without IOER, the federal funds rate would drop to zero. One can understand this by looking at what happened in 2008, when the supply of reserves started growing rapidly. Figure 1.2.2 (from Taylor 2009a) shows how the federal funds rate moved in the last part of 2008 as the supply of reserve balances exploded well above the demand.

SHRINKING THE BALANCE SHEET IN PREDICTABLE AND STRATEGIC WAYS

Getting back to a balance sheet with reserves close to the normal level observed before the financial crisis will require that the Fed substantially reduce its securities holdings. If it waits the long period required for currency growth to create the normalization, the transition period will be so long that a high level of reserves

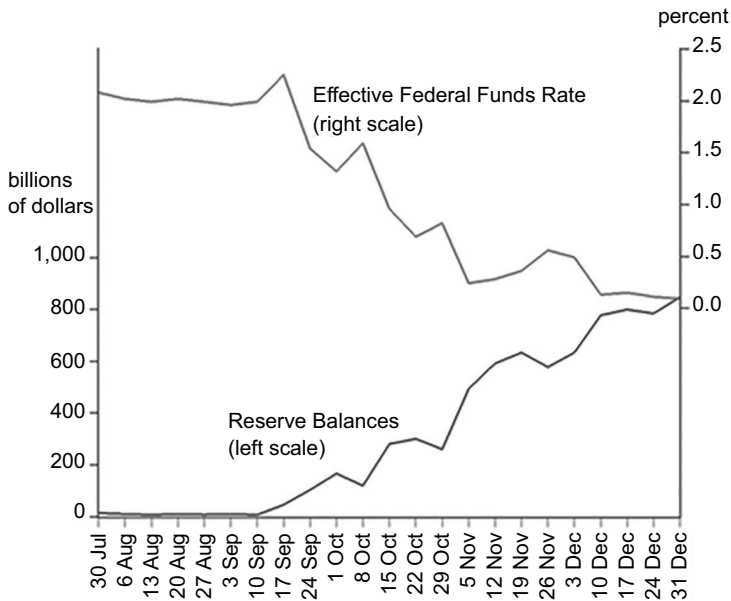


FIGURE 1.2.2. Reserve balances and the federal funds rate in 2008. Source: Taylor 2009a.

will seem permanent. It is therefore essential that the Fed reduce its holding of securities, and as argued in Taylor (2009b), this reduction should be conducted in a predictable and strategic way so as not to cause market turbulence. It should not be sudden or surprising. That was the lesson learned from the “taper tantrum” in 2013, when Ben Bernanke indicated it might be in “the next few meetings” that the size of the purchases of securities would diminish, and the markets went all over the place. As soon as the tapering became more strategic and the amount of tapering was more predictable, the markets digested it easily.

The Fed’s statement in its September 2014 “Policy Normalization Principles and Plans,” which said that the FOMC “intends to reduce the Federal Reserve’s securities holdings in a gradual and predictable manner,” was consistent with this approach and provided an improvement over vaguer statements, such as that the

Fed will keep “the size of the Federal Reserve’s balance sheet at a high level for some time,” as stated in the FOMC Minutes from the meeting of January 27–28, 2009.

The “Addendum to the Policy Normalization Principles and Plans,” issued on June 14, 2017, provided useful details. The FOMC said it intends to gradually reduce the Fed’s securities holdings by decreasing its reinvestment of principal payments to the extent that they exceed gradually rising caps:

For payments of principal that the Federal Reserve receives from maturing Treasury securities, the Committee anticipates that the cap will be \$6 billion per month initially and will increase in steps of \$6 billion at three-month intervals over 12 months until it reaches \$30 billion per month. For payments of principal that the Federal Reserve receives from its holdings of agency debt and mortgage-backed securities, the Committee anticipates that the cap will be \$4 billion per month initially and will increase in steps of \$4 billion at three-month intervals over 12 months until it reaches \$20 billion per month. The Committee also anticipates that the caps will remain in place once they reach their respective maximums so that the Federal Reserve’s securities holdings will continue to decline in a gradual and predictable manner until the Committee judges that the Federal Reserve is holding no more securities than necessary to implement monetary policy efficiently and effectively. Gradually reducing the Federal Reserve’s securities holdings will result in a declining supply of reserve balances.

A BALANCE SHEET FOR THE FUTURE

While a statement that the supply of reserve balances will decline by set amounts reduces uncertainty and lowers the chances of market disruption, there is still a great deal of uncertainty about what kind of balance sheet the Fed is aiming for. As stated in the Adden-

dum, the “Committee currently anticipates reducing the quantity of reserve balances, over time, to a level appreciably below that seen in recent years but larger than before the financial crisis; the level will reflect the banking system’s demand for reserve balances and the Committee’s decisions about how to implement monetary policy most efficiently and effectively in the future. The Committee expects to learn more about the underlying demand for reserves during the process of balance sheet normalization.”

The Fed could be more specific about the eventual size and configuration of the balance sheet, as the range of uncertainty is still very large. There are different views about this, as explained by Powell (2017). One approach is for the Fed to say it is aiming for an eventual balance sheet and level of reserve balances in which the interest rate is determined by the demand and supply of reserves—in other words, by market forces—rather than by an administered rate under IOER. Conceptually this means the Fed would be operating under a framework with a balance sheet, as it did in the years before the crisis—for example, around 2006 and in the decades before. Most likely the level of reserve balances will be greater than the \$14 billion observed in 2006 and will depend on liquidity regulations, but the defining concept of a market-determined interest rate is what is important.

I think the case can be made for such a framework. Peter Fisher ran the trading desk at the New York Fed for many years and knows well how these markets work. His assessment, as stated in the “General Discussion” below, is that such a framework would work: “We could go back and manage it with quantities; it’s not impossible. We could just reengineer the system and go back to the way we were.” I spent time in the markets for federal funds, watching how they operated in those days, and I wrote up an institutional description of how good, experienced people traded in these markets and developed a model showing how the market worked (Taylor 2001).

If we went back to that framework, there would not be any need for interest on excess reserves. If the Fed wanted to change the short-term interest rate, it would just adjust the supply of reserves. The amount of reserves would be set so that the supply and demand for reserves determine the interest rate.

The Fed could also provide liquidity support if it needed to do so in that framework. One way to see how this would work is to consider the example of 9/11. That little blip, which you can hardly see now in Figure 1.2.1, was viewed as gigantic back in 2001. It was so huge that Don Kohn came over from the Fed to the Treasury, where I was working, to tell me about it. So you can have that kind of liquidity support if you wanted to in such a regime.

In contrast, under a system where the supply of reserves remains above the demand, the interest rate must be administered through interest on excess reserves. It's not market determined. The method is sometimes called a "floor," as recently discussed by Powell (2017). But the federal funds rate is always below the floor, so it is not really a floor. In my view, we would be better off with a corridor or band with a lower interest rate on deposits at the bottom of the band, a higher interest rate on borrowing from the Fed at the top of the band, and most important, a market-determined interest rate above the floor and below the ceiling. Unlike current Fed policy, there would be a real floor because the actual rate would be market determined. If there was a corridor, the rate would be inside it. The interest rate at the top of the corridor would be the discount rate. See Kahn (2010) for a comparison of floor and corridor systems.

We want to create a connect, not a disconnect, between the interest rate that the Fed sets and the amount of reserves or the amount of money that's in the system. Because the Fed is responsible for the reserves and money, that connection is important. Without that connection, you raise the chances of the Fed being a multipurpose institution. In chapter 1, Plosser gives some scary examples of what

that means. The Fed has already been involved in credit allocation with respect to mortgage-backed securities purchases in QE1, and it could do more than that. Hence that disconnect is problematic.

I think it does raise questions, at least for some people, about the Fed's independence. Why do you need an independent agency to do all these things? Independent agencies should have limited purposes. And indeed, it may be more appropriate for the Treasury, if we want such interventions, with Congress also approving in some cases.

There are other views, and the Fed needs to figure out what to do. Some analysts, for example Keister (2016), argue that we need a level of reserves greater than the amount needed to determine the interest rate for liquidity purposes. They say the payment system doesn't function right with a small amount of reserves. In the past, there were large daylight overdrafts, but with the right reforms, one could limit the size of the overdrafts, perhaps as a percentage of collateral. There also may be some regulatory changes that would reduce the mandated demand for liquidity.

Another view is that with a large balance sheet the Fed could provide depository services to regular people, just like it provides depository services to banks. But the Treasury could just as easily do that without interfering in the Fed's operations (see Cochrane 2014). And perhaps there is another way the service could be provided that prevents the disconnect between the interest rate and reserves.

Yet another view is that a permanently large balance sheet with a large amount of reserves would allow quantitative easing to be used regularly. I don't think quantitative easing has been that effective, and because there is uncertainty about its impact, it is hard to conduct a rules-based monetary policy with such interventions. Moreover, the way quantitative easing has spread to other central banks adds turbulence to exchange rates and the international financial system.

CONCLUSION

For all the reasons stated here, I think this proposal for the eventual size of reserve balances and the balance sheet makes sense. The key concept is that economic forces in the market for reserves, and for money more broadly, would determine the interest rate. We should not only be thinking about how to reduce the size of the balance sheet in a predictable, strategic way; we should be thinking about where we're going with reserve balances and the balance sheet. I would say that after this normalization period, after this transition is finished, interest rates should again be determined by market forces.

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SECTION THREE

The Size of the Fed's Balance Sheet

Arvind Krishnamurthy

My comments are focused on the size of the Fed's balance sheet. For this discussion, I assume that the Fed holds only Treasuries. I will argue in favor of a large balance sheet. There is a related but separate discussion about the composition of the balance sheet. In the interest of time, I do not discuss composition, although it is obviously also an important issue.

The question is, How large should a Treasuries-only balance sheet be?

I will make the case for a large balance sheet, around \$2.5 trillion. I offer two sets of arguments, the first related to monetary policy pass-through and the second to financial stability.

Before the crisis, the Fed held reserve balances in the neighborhood of \$50 billion and steered money market rates by altering the scarcity of reserves. Since the crisis, banks have had large excess reserves. Reserve balances are currently in excess of \$2 trillion, and