

INTEREST ON RESERVES AND THE FED'S BALANCE SHEET

John B. Taylor

The Federal Reserve's balance sheet has expanded dramatically after three rounds of quantitative easing (QE). Consequently, the monetary base (reserves plus currency) has gone from less than \$800 billion before the financial crisis to nearly \$4 trillion today. Because reserves are a very large part of the Fed's balance sheet, I will start with the balance sheet and then consider the issue of the Fed paying interest on those reserves.

Changes in the Fed's Balance Sheet

The best way to understand what has happened to the Fed's balance sheet in recent years is to look at the actual balance sheet—the consolidated statement of assets and liabilities of all Federal Reserve Banks. Table 1 gives two snap shots of the Fed's balance sheet, one taken in 2016 and the other in 2006.

Table 1 focuses on the Fed's major assets and liabilities, lumping everything else into “other liabilities” and “other assets” categories. The two points in time—the week ending May 11, 2016, and the corresponding week ending May 10, 2006—give before and after

Cato Journal, Vol. 36, No. 3 (Fall 2016). Copyright © Cato Institute. All rights reserved.

John B. Taylor is the Mary and Robert Raymond Professor of Economics at Stanford University and George P. Shultz Senior Fellow in Economics at Stanford's Hoover Institution. From 2001 to 2005, he served as Under Secretary of Treasury for International Affairs. This article is based on his testimony before the Subcommittee on Monetary Policy and Trade, Committee on Financial Services, U.S. House of Representatives, May 17, 2016.

TABLE 1
FED'S BALANCE SHEET (BILLIONS OF DOLLARS)

May 11, 2016			
Assets		Liabilities	
Securities Held Outright	4,234	Federal Reserve Notes	1,407
Other	244	Reserve Balances	2,410
		Other	621
Total Assets	4,478	Total Liabilities	4,438
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: Federal Reserve Statistical Release H.4.1, May 12, 2016, May 11, 2006, selected items.

pictures of the major changes in size and composition of the Fed's balance sheet.

It is striking how the size of the balance sheet—measured by total assets—has expanded during the last decade: from \$842 billion to \$4,478 billion. There are two major reasons for the increase. First, currency (Federal Reserve Notes) increased from \$758 billion to \$1,407 billion, an average annual growth rate of about 6 percent. There is nothing very unusual about this increase in currency; the annual growth rate was in this range in prior decades.

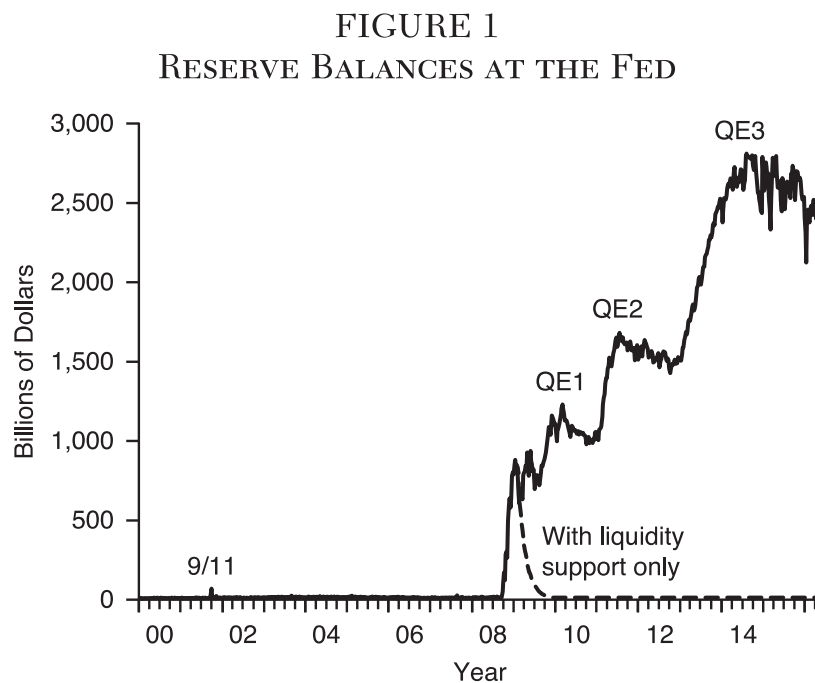
The second reason is much more unusual: securities held outright by the Fed jumped from \$760 billion to \$4,234 billion as the Fed engaged in three bouts of large-scale purchases of Treasury securities and mortgage-backed securities—actions commonly called “unconventional” monetary policy or QE.¹

¹Another term is “credit easing” because the securities purchases or loans are in part aimed at easing credit conditions in certain sectors, such as housing. I have also used the term “mondustral policy” because such sector-specific policies are a combination of monetary policy and industrial policy (Taylor 2009).

To get the funds to purchase these securities, which increased by much more than the increase in currency, the Fed credited banks with deposits on itself, and for this reason reserve balances—the deposits that banks hold at the Fed—have exploded from only \$14 billion to \$2,410 billion as shown in Table 1. This large increase in reserve balances is very important because it is on these reserve balances that the Fed is paying interest today. Figure 1 provides some important details about the increase in bank reserves held at the Fed and illustrates how unusual that growth has been.

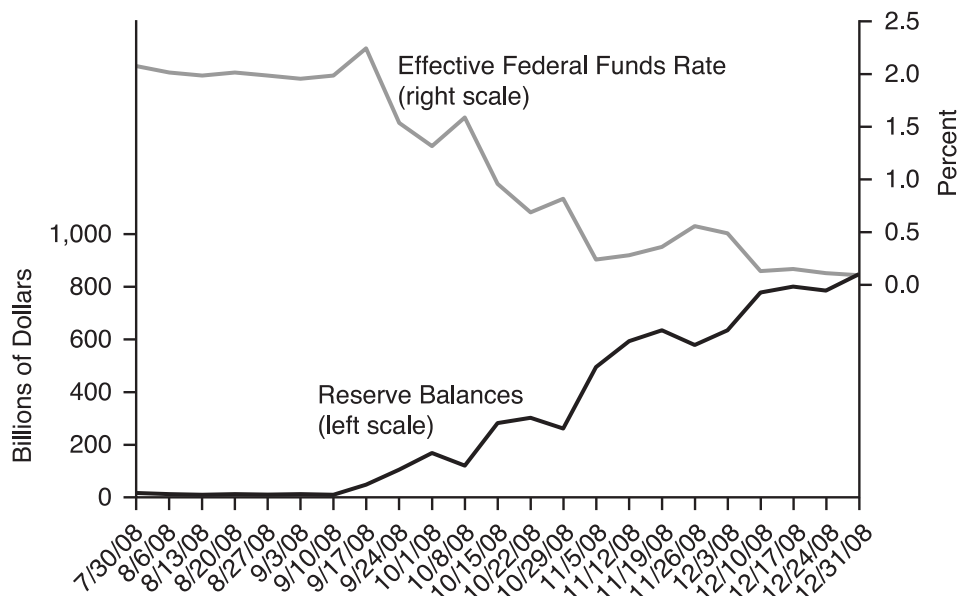
Reserve balances rose sharply at the times of QE1, QE2, and QE3 as the Fed ramped up its purchases of securities and financed them by creating reserve balances for the banks at the Fed, effectively borrowing the funds from banks. Reserve balances tend to drift down after each of these surges as currency creation continues its upward march and reduces the Fed's need to create reserve balances.

The increase in reserve balances began before the onset of quantitative easing when the Fed set up liquidity facilities to provide



SOURCE: Federal Reserve Statistical Release, H.4.1, and author.

FIGURE 2
RESERVE BALANCES AND THE
EFFECTIVE FEDERAL FUNDS RATE, 2008



SOURCE: Federal Reserve Statistical Releases, H.4.1 and H.15.

lender of last resort loans during the panic in September 2008.² However, the need for that liquidity support was temporary, and it dissipated soon after the panic, as illustrated in Figure 1 by the dashed line for reserve balances “with liquidity support only.” That line represents a path for reserves that could have occurred if none of the bouts of QE had taken place. Clearly QE is the cause of the large amount of existing reserves.

Interest on Reserves

Such a large increase in the supply of reserves with no increase in the demand for reserves has clear implications for market interest rates: the increase in supply would be expected to drive down the federal funds rate, which is the rate banks charge each other for the overnight use of the reserves. In fact, this is exactly what happened, as shown in Figure 2 for the weeks in fall of 2008.

²The story that the policy of increasing reserves by large amounts started when the Fed’s interest rate target hit zero is incorrect. The explosion of reserves started on September 17, 2008, when the federal funds rate target was 2 percent. The Fed’s interest rate target declined from 2 percent to near 0 percent over the following months.

As the supply of reserves increased, the federal funds rate was driven down. This decline in the interest rate preceded the later decisions of the Federal Open Market Committee (FOMC) to lower the federal funds target during this period. Of course, with the supply of reserves now many times greater than demand, the market interest rate would remain near zero, unless the Fed took some other action, and this is where the policy of paying interest on reserves enters the picture. In order to raise the short-term interest rate when the supply of reserves is many times greater than demand, the Fed has to pay an interest rate on reserves to the banks that is close to the Fed's objective for the short-term interest rate. That way the banks will bid up the federal funds rate (and other short-term interest rates) as they see a profit opportunity in the difference between the federal funds rate and the interest rate on reserves. The federal funds rate will thereby move up close to the interest rate paid on reserves.

Recent events illustrate how this is supposed to work: when the Fed decided to raise the short-term interest rate by 0.25 percentage points at the FOMC meeting in December 2015, it did so by raising the interest rate it pays on reserves (required and excess) by 0.25 percentage points effective December 17, 2015. The effective daily federal funds rate promptly moved up from 0.15 percent on December 16 to 0.37 percent on December 17. Looking at monthly averages, the rate moved from 0.12 percent in November 2015 to 0.37 in April 2016. This change is consistent with the Fed's "Policy Normalization Principles and Plans" released in September 2014 stating that "During normalization, the Federal Reserve intends to move the federal funds rate into the target range set by the FOMC primarily by adjusting the interest rate it pays on excess reserve balances."³

The Financial Services Regulatory Relief Act of 2006 authorized the Fed to pay interest on required reserves (the IORR rate) and also the interest rate on excess reserves (IOER rate) as determined by the

³The federal funds rate deviated significantly below the interest rate on reserves in late 2008, and, for this and other reasons, the Fed developed backup procedures including overnight reverse repurchase agreements to help it control the federal funds rate. However, it appears thus far that the increase in interest on reserves may have been enough to move the federal funds rate as the Fed intended. In its "Policy Normalization Principles and Plans," the FOMC (2014) said that it "will use an overnight reverse repurchase agreement facility only to the extent necessary [to help control the federal funds rate] and will phase it out when it is no longer needed to help control the federal funds rate."

Board of Governors of the Fed. The original effective date was October 1, 2011, but that date was changed to October 1, 2008, by the Emergency Economic Stabilization Act of 2008, so it was available to be used for the purposes described here.

The Road Ahead: Normalization

For many years, including the period of good economic performance during the Great Moderation of the 1980s and 1990s in the United States, the Fed did not pay interest on reserves. The interest rate was determined by the supply and demand for reserves. Thus, there was a direct connection between reserves supplied by the Fed and the interest rate. The short-term interest rate was market determined once the Fed set the amount of reserves.⁴

In contrast, under the current procedures, the short-term interest rate is not market determined. Rather, it is administered by the Fed as it makes its decision about what interest rate it will pay on reserves. The interest rate on reserves can be moved around by the Fed largely independently of the supply of reserves or the size of the balance sheet. The Fed could decide to purchase securities or make loans to a certain sector and finance these by increasing reserve balances, while not moving the interest rate at all or moving it in a countervailing direction.

For the reasons explained above, such a disconnect is unavoidable during the current period of “normalization,” as the Fed calls it. The normalization period is essentially a transition period between the discretionary era of zero interest rates with quantitative easing and a normal period when the interest rate is determined in a more rule-like fashion as it was during the 1980s and 1990s.

Getting back to a normal balance sheet will require that the Fed reduce its securities holdings substantially, unless it waits the long time period required for currency growth to create a normalization

⁴Milton Friedman (1960) recommended the payment of interest on required reserves. According to the Fed’s statement “Interest on Required Balances and Excess Balances,” the interest rate on required reserves is “intended to eliminate effectively the implicit tax that reserve requirements used to impose on depository institutions,” which is in keeping with Friedman’s rationale. In contrast, the interest rate on excess reserves, according to the Fed, “gives the Federal Reserve an additional tool for the conduct of monetary policy.”

in which case the transition period will be so long it will seem permanent. In its September 2014 “Policy Normalization Principles and Plans,” the FOMC said it “intends to reduce the Federal Reserve’s securities holdings in a gradual and predictable manner,” a statement which is an apparent reaction to the taper tantrum of the previous year when the Fed was much less clear about its exit strategy. This is an improvement over previous vague 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 January 27–28, 2009 meeting, but it could clarify the exit strategy more specifically. For example, the Fed could indicate that it will sell securities in the open market at a pace determined by the increases in the federal funds rate. I have suggested that the balance sheet be back to normal when the federal funds rate hits 2 percent. In any case, after normalization, when the Fed is back to a normal interest rate policy, the interest rate should be determined by the demand and supply of reserves in the money market—in other words, by market forces.

The Road Ahead: After Normalization

As a long-term policy, a disconnect between the short-term interest rate and the supply of reserves, the money supply, or even the size of the balance sheet is a mistake. It enables the Fed to be a multipurpose institution—helping one sector or another, taking on credit allocation, assuming fiscal policy roles the Constitution assigned to Congress—rather than the limited purpose institution it was designed to be.

If the United States is to have a selective credit policy with inherent credit risks, it is more appropriate for the Treasury or some other agency to take on the job with the approval of Congress with the purposes stated and debated. For the Fed to take on these responsibilities raises questions about its independence and its operations, as it may be called on to do such things as provide discretionary assistance to financial firms or to bolster the housing market or even the student loan market. The success of monetary policy during the Great Moderation period of long expansions and mild recessions was not due to a lot of discretion, but to following more predictable policies and guidelines.

The disconnect would be conducive to more bouts of QE. There is a great deal of uncertainty and disagreement about how effective QE has been, and it may have been counterproductive. I studied the impact of the mortgage-backed securities purchase program, which was part of QE1, in research with Johannes Stroebel. We found that the purchases were largely ineffective in changing mortgage interest rate spreads once credit and prepayment risks were taken into account (Taylor and Stroebel 2012). Others have found announcement effects of QE on long-term interest rates, but such studies cannot trace out reversals following the announcements (Gagnon et al. 2011; Krishnamurthy and Vissing-Jorgensen 2011). Finally, others have found that the effects are not lasting, unless QE signals future short-term interest rate policy and thus long-term rates through the expectations model of the term structure (Thornton 2014; Bauer and Rudebusch 2013).

A simple comparison of 1-year versus 10-year U.S. Treasury spreads does not show any impact: the spread was 1.3 percent from 2003 to 2008 before QE and 2.4 percent from 2009 to 2013 during QE, so other factors must be controlled for. At the least, there seems to be a wide consensus that the effect of QE has diminished over time. And there are other problems. QE is inherently discretionary rather than rule-like and much research indicates that this feature detracts from good economic performance (Taylor 2014). An administered rate can also distort price discovery in markets and prevent money markets from functioning normally (McKinnon 2013). There are also international ramifications as central banks tend to follow other's policies creating international impacts and currency fluctuations that can be destabilizing (Taylor 2016).

Given all these considerations, it is promising that the FOMC (2014) says in its "Policy Normalization Principles and Plans" that it "intends that the Federal Reserve will, in the longer run, hold no more securities than necessary to implement monetary policy efficiently and effectively, and that it will hold primarily Treasury securities, thereby minimizing the effect of Federal Reserve holdings on the allocation of credit across sectors of the economy." Nevertheless, more specificity about the meaning of "efficiently," "effectively," and "primarily" is warranted. In my view, a statement that in the longer run the Fed will pay interest only on required reserves and that the federal funds rate will be determined by the supply and demand for

reserves would help clarify the nature of monetary policy in the normal state following normalization.

Conclusion

This review of the Fed's balance sheet shows that the current high level of reserves is a legacy of QE in the years from 2009 to 2014. Given that the supply of reserves is now many times greater than the demand for reserves, the Fed now has no alternative other than to pay interest on reserves as it carries out its normalization process.

However, as a long-term matter, the size and composition of the balance sheet should be consistent with the interest rate being market determined rather than administratively determined by the Fed as it sets the interest rate on reserves. It is true—as the FOMC says—that paying interest on excess reserves gives the Fed an additional tool. However, this tool enables the Fed to be more like a discretionary multipurpose institution rather than the rule-like limited purpose institution that has delivered good policy in the past and that can deliver good policy in the future.

The transition, or normalization, period during which monetary policy returns to a more normal state should be as short as possible, and, in my view, shorter than currently implied by the Fed's "Policy Normalization Principles and Plans."

References

- Bauer, M. D., and Rudebusch, G. D. (2013) "The Signaling Channel for Federal Reserve Bond Purchases." Federal Reserve Bank of San Francisco, Working Paper No. 2011–21. Available at www.frbsf.org/publications/economics/papers/2011/wp11-21bk.pdf.
- FOMC (Federal Open Market Committee) (2014) "Policy Normalization Principles and Plans," as adopted effective September 16, 2014. Available at www.federalreserve.gov/monetarypolicy/files/FOMC_PolicyNormalization.pdf.
- Friedman, M. (1960) *A Program for Monetary Stability*. New York: Fordham University Press.
- Gagnon, J.; Raskin, M.; Remache, J.; Sack, B. (2011) "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases." *International Journal of Central Banking* 7 (1): 3–44.

- Krishnamurthy, A., and Vissing-Jorgensen, A. (2011) “The Effects of Quantitative Easing on Long-Term Interest Rates.” *Brookings Papers on Economic Activity* (Fall): 215–65.
- McKinnon, R. (2013) “The Near-Zero Interest Rate Trap.” *Wall Street Journal* (July 29).
- Taylor, J. B. (2009) “The Need to Return to a Monetary Framework.” *Business Economics* 44 (2): 63–72.
- _____ (2014) “Re-Normalize, Don’t New-Normalize Monetary Policy.” Monetary Authority of Singapore *Macroeconomic Review* 13 (October): 86–90.
- _____ (2016) “The Federal Reserve in a Globalized World Economy.” In M. Bordo and M. Wynne (eds.), *The Federal Reserve’s Role in the Global Economy: A Historical Perspective*. New York: Cambridge University Press.
- Taylor, J. B., and Stroebel, J. C. (2012) “Estimated Impact of the Federal Reserve’s Mortgage-Backed Securities Purchase Program.” *International Journal of Central Banking* 8 (2): 1–42.
- Thornton, D. L. (2014) “QE: Is There a Portfolio Balance Effect?” *Federal Reserve Bank of St. Louis Review* 96 (1): 55–72.