

The Federal Reserve's Exit Strategy: Looming Inflation or Controllable Overhang?

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Jeffrey Rogers Hummel. "The Federal Reserve's Exit Strategy: Looming Inflation or Controllable Overhang?" *Mercatus Research, Mercatus Center at George Mason University, September 2014*, <http://mercatus.org/publication/federal-reserve-s-exit-strategy-looming-inflation-or-controllable-overhang>.

ABSTRACT

Many economists and economic commentators fear that the Federal Reserve does not have an adequate exit strategy from the quantitative easing that took place during the financial crisis. Its bloated balance sheet has allegedly left a looming monetary overhang that the Fed will not be able to manage once the economy returns to normal. Interest rates will rise, banks will increase their loans, reserve ratios will fall, and money multipliers will rise, all unleashing very high inflation. Caught off guard, the Fed will neither accurately foresee nor easily offset this process. I argue that this fear is exaggerated. The Fed has four new or expanded tools—loans from the Treasury, reverse repurchase agreements, interest on reserves, and term deposits—with which it can restrain inflation without resorting to traditional open market operations. Indeed, a greater danger is that the Fed's exit strategy will involve no significant reduction in its balance sheet.

JEL codes: E520, E580

Keywords: Fed, Federal Reserve, monetary policy, open market operations, interest on reserves, Treasury, term deposits, repurchase agreements, reverse repos, exit strategy, inflation, money multipliers

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Release: September 2014

The financial crisis of 2007–2008 witnessed substantial changes in the operations of the Federal Reserve (Fed). The Fed acquired and now holds financial assets whose total value is five times greater than their value before the crisis. Many economists and economic commentators fear that the Fed does not have an adequate exit strategy from an expansion that was meant to be a temporary expedient. The increase in Fed assets has entailed a concomitant increase in Fed-created money. But most of that money has piled up in bank reserves rather than inducing banks to make new loans that would have multiplied the total quantity of money circulating throughout the economy. This situation allegedly creates a looming monetary overhang that the Fed will be unable to manage. The concern is that once the economy gets back to normal with rising interest rates, banks will suddenly start making more loans, unleashing high inflation. Caught off guard, the Fed will neither accurately foresee nor easily offset this process.

This report explains why this fear is exaggerated. Central banking still poses potential hazards for the economy, but the sources and manifestations of those hazards have dramatically altered, and high inflation from a failed exit strategy is not likely to be one of them. Indeed, a greater danger is that the Fed's exit strategy will involve no significant reduction in its balance sheet.

BACKGROUND

Beginning in September 2008, the Federal Reserve under Ben Bernanke responded to the financial crisis with an unprecedented expansion of its balance sheet. What has popularly become known as *quantitative easing* has increased the monetary base—the money stock that the Fed controls directly, consisting of bank reserves plus currency in circulation—from \$850 billion to more than \$4.1 trillion as of August 2014. The year-on-year annual growth rate of the base peaked at more than 110 percent in early 2009 and continues to grow at nearly 20 percent. The Fed has issued all this base money partly by buying

“Fed watchers, whether economists or the general public, tend to be caught in a mindset where they are fighting the last war.”

new types of securities that have never before been major components of its assets. Thus, it has moved from dealing primarily with short-term Treasury securities to holding large quantities of mortgage-backed securities and long-term Treasury debt.¹

Normally such an explosion in the monetary base would have caused broader measures of the money stock (M1, M2, and MZM) that include bank deposits to likewise explode, setting off high rates of price inflation. Yet this has not occurred because banks have allowed reserves to accumulate, instead of loaning them out to acquire other assets. The narrowest of the broad monetary aggregates, M1, which adds to currency in circulation only checking accounts, now has well over 100 percent reserves behind it, an increase from about 13 percent before expansion of the base. The reserve ratios of the more inclusive measures of the total money stock, M2 and MZM, have also risen, bringing down all the money multipliers (the factor by which these broader aggregates multiply the monetary base): for example, the M2 multiplier fell from 9 to less than 4. As a result, inflation has remained in the modest range of approximately 2 percent annually.

Fed watchers, whether economists or the general public, tend to be caught in a mindset where they are fighting the last war. They fear that full economic recovery could suddenly, before the Fed reacts, lower bank reserve ratios and drive the money multipliers back up. Yet the

1. All monetary base and money stock figures (except MZM) come from the Federal Reserve Board of Governors Statistical Releases H.3 (Aggregate Reserves of Depository Institutions and the Monetary Base) or H.6 (Money Stock Measures) at <http://www.federalreserve.gov/econresdata/statistics/data.htm>. The St. Louis Federal Reserve provides convenient time series from these releases at the FRED website (<http://research.stlouisfed.org/fred2/>), which also reports MZM. Unless otherwise stated, I use only figures that are *not* seasonally adjusted. Money multipliers are my own calculations based on these figures. For the monetary base, I use Board of Governors Monetary Base (monthly and not seasonally adjusted), Not Adjusted for Changes in Reserve Requirements: FRED series BOGUMBNS. The Fed discontinued this series in July 2013, when it simplified its reserves administration, but virtually identical numbers are continued in the Board of Governors Monetary Base, Total: FRED series BOGMBASE.

financial crisis has created a major change in the nature of central banking. Uncontrolled inflation from discretionary monetary policy no longer poses the danger it once did. The Fed has instituted several new tools, including paying interest on reserves and such arcane instruments as the Term Deposit Facility and reverse repurchase agreements, that permit it to prevent any sudden expansion of the broader monetary measures. The Fed also monitors banks so closely and regularly that it is unlikely to be caught unawares by even a sudden fall in reserve ratios and rise in the money multipliers. Finally, implicit inflation targeting has become such a dominant, even obsessive, goal of those who manage the Fed that they will use these tools to keep inflation in check. Only a major fiscal crisis, emanating not from the Fed but from a growing shortfall between federal expenditures and revenues, could potentially undermine the Fed's ability to keep inflation in check.

NEW FED TOOLS

The traditional way that central banks impose monetary restraint and dampen inflation is by selling off assets or, equivalently, calling in and not rolling over loans. These actions pull base money out of circulation. Those who fear future uncontrolled inflation worry that the Fed's bloated balance sheet cannot be reduced quickly enough without causing a major disruption of credit markets and the economy. Currently the Fed is holding no short-term Treasury bills at all and only about \$10 billion worth of securities with remaining maturities of one year or less. Thus, if M1 were to return to its traditional reserve ratio of 13 percent, the Fed would have to sell off in the neighborhood of two trillion dollars of its mortgage-backed securities and long-term Treasuries to keep inflation within current levels. Moreover, if this sell-off were to occur in a period of rising interest rates, as seems likely, the result would be significant capital losses for the Fed, with the falling price of these securities being driven down further by Fed sales.

But the Fed no longer has to rely entirely on dumping assets and shrinking its balance sheet to impose monetary restraint. Emblematic of new ways to manipulate the money stock was a proposal that Fed officials floated early in 2008, before quantitative easing. The proposal was to allow the Fed to purchase assets not by creating base money, but by borrowing money from the public through the sale of its own debt securities. This activity would have permitted an increase in the Fed's total assets without affecting the base. Its borrowings would have simply pulled money out of the economy on one end of its balance sheet, and that money could have been put back in on the other end through loans to favored firms and purchases of favored instruments. In other words,

the Fed could engage in pure intermediation, similar to the borrowing behavior of large government-sponsored agencies like Freddie Mac or Fannie Mae, with no significant impact on the money stock.²

The Fed has yet to gain direct authorization from Congress to borrow by issuing its own securities, and without such an act its authority to do so is dubious. Despite this, it has four other ways to accomplish the same goal using new tools or considerably expanding the use of older tools that were previously of minor importance. These four tools are Treasury loans, reverse repurchase agreements, interest on reserves, and the Term Deposit Facility.

1. Treasury Loans

By November 12, 2008, when the monetary base had climbed to \$1.44 trillion, total assets on the Fed's balance sheet had soared to \$2.22 trillion. Normally these two amounts are fairly close. What explains the huge, three-quarters-of-a-trillion-dollar difference? It was primarily the result of a Supplementary Financing Account (SFA) created at the Fed's request by the Treasury Department. The Treasury has always deposited modest amounts of money in its General Account at the Fed between receiving and disbursing government funds. But using the SFA, the Treasury had issued nearly \$560 billion worth of securities *not* for the purpose of financing government expenditures; instead the money simply sat in the form of deposits at the Fed. In essence, the Treasury was borrowing money from the general public and lending it to the Fed, which then lent it again, specifically to foreign central banks in liquidity swaps coordinated with the Treasury's Exchange Stabilization Fund. (Liquidity swaps are when the Fed exchanges dollars for foreign currencies at a fixed exchange rate.) The Treasury, by depositing its borrowings at the Fed, withdrew the borrowed money from circulation, while the Fed's purchase of

2. Greg Ip, "Fed Weighs Its Options in Easing Crunch," *Wall Street Journal*, April 9, 2008, A1, <http://online.wsj.com/article/SB120768896446099091.html>; Ip, "What Could the Fed Do?," *Real Time Economics* (blog), *Wall Street Journal*, April 9, 2008, <http://blogs.wsj.com/economics/2008/04/09/what-could-the-fed-do/?mod=WSJBlog>; and Janet Yellen, "The Uncertain Economic Outlook and the Policy Responses," presentation to the Forecasters Club of New York, Federal Reserve Bank of San Francisco, March 25, 2009, <http://www.frbsf.org/news/speeches/2009/0325.html>. Milton Friedman, in *A Program for Monetary Stability* (New York: Fordham University, 1960), 34, 52–57, also once suggested that the Fed be granted the "power to issue its own securities," *not* for the purpose of buying other securities on the market, but instead as a means of reducing the money stock in case the Fed ran out of government securities to sell. Concerned about the impact that the Treasury had on the money stock either through issuing its own base money (as with coins) or through issuing securities and then depositing the proceeds at the Fed, which Friedman recognized would contract base money, his ultimate *economic* solution was to merge the Treasury and the Fed, eliminating Fed independence.

foreign currencies put the money back in circulation. The foreign currencies acquired as assets therefore showed up on the Fed's balance sheet without making any net contribution to the monetary base.³

This indirect Fed borrowing from the Treasury declined to \$5 billion in early 2010 but peaked again at just below \$200 billion at the end of that year. Liquidity swaps with foreign central banks had fallen from a peak of \$580 billion to close to zero, so this more recent borrowing was presumably designed to support the Fed's portfolio of mortgage-backed securities. As economist James Hamilton pointed out at the time, "The SFP [Supplementary Financing Program] represents an alternative device by which the Fed could reabsorb the reserves it created. . . . The Fed intends not to retire reserves but instead to expand its balance sheet without increasing reserves, that is, [to] use the funds to make new asset purchases or loans with the SFP sterilizing the operations." (*Sterilize* is central-bank terminology for when one operation counteracts any impact on the monetary base of another operation.)⁴

The Treasury depleted and discontinued using the SFA in July 2011, in part because of concerns about exceeding its debt ceiling. But the Treasury can always reactivate this account. Moreover, it can accomplish the same goal simply by increasing the operating deposits in its General Account at the Fed. Before the financial crisis, these balances hovered between \$4 billion and \$10 billion and never exceeded \$25 billion, but in 2008 and again in 2010 and 2011 they temporarily exceeded \$100 billion, offering the Fed another major source of loans to finance its balance sheet without affecting the money stock. As of August 2014, these deposits were down to \$69 billion, but in May 2013 they stood at \$157 billion. *Reuters* reports one unnamed Treasury official as stating, "We're committed to working with the Federal Reserve to ensure they have the flexibility to manage their balance sheet." The major constraint the Treasury would face is Congress's refusal to raise the debt limit high enough to permit this excess government borrowing. And any such an increase would by itself possibly drive up the interest rate on Treasuries.⁵ Table 1 shows a simplified version of the Fed's balance sheet.

3. Details about the Fed's balance sheet are available in the Federal Reserve Board of Governors' weekly H.4.1 Statistical Release (Factors Affecting Reserve Balances), which the St. Louis Fed's FRED website also converts into time series.

4. James Hamilton, "Treasury Supplementary Financing Program (SFP)," *Econbrowser* (blog), February 23, 2010, http://www.econbrowser.com/archives/2010/02/treasury_supple.html.

5. Robin Harding, "Suspension of the SFP and the Fed," *Money Supply* (blog), *Financial Times*, February 27, 2011, <http://blogs.ft.com/money-supply/2011/01/27/suspension-of-the-sfp-and-the-fed/>; Nancy Waitz and Pedro da Costa, "U.S. Treasury Resumes Loans Aimed at Helping Fed," *Reuters*, February 24, 2010, <http://in.reuters.com/article/2010/02/23/idINN2311120820100223>.

TABLE 1. FEDERAL RESERVE SYSTEM SIMPLIFIED BALANCE SHEET

ASSETS	LIABILITIES AND NET WORTH
Securities held outright US Treasury securities (short-term) US Treasury securities (long-term) mortgage-backed securities federal agency debt securities securities denominated in foreign currencies	Federal Reserve notes in circulation outside banks Reserves of banks and other depositories vault cash deposits at the Federal Reserve
Repurchase agreements	Federal Reserve borrowing Treasury deposits (General Account and SFA)
Loans to banks and other institutions	reverse repurchase agreements bank term deposits
Liquidity swaps with foreign central banks	Misc. liabilities
Bank premises and misc. assets	Capital account (from shares of member banks)
Total	= Total

The **monetary base** consists solely of Federal Reserve notes in circulation outside banks and bank reserves, *plus* coins in circulation, which are issued by the US Treasury rather than by the Fed. But Treasury coins currently are only about 1 percent of the total monetary base.

The Federal Reserve's **miscellaneous assets** include claims to US gold holdings (valued at historical prices), claims to the Special Drawing Rights issued by the International Monetary Fund, a small amount of Treasury coin held by the Fed, items in the process of collection that arise from the Fed's clearinghouse activities, and accounts receivable.

A primary difference between the Fed assets of **securities denominated in foreign currencies** and **liquidity swaps with foreign central banks** is that the former entail exchange-rate risk as the dollar's exchange rate with foreign currencies changes over time, whereas liquidity swaps, only used under special circumstances, fix the dollar-foreign currency exchange rate for the duration of the swap.

The Federal Reserve's **miscellaneous liabilities** include deposits of foreign and international institutions and certain domestic institutions (such as government-sponsored enterprises), deferred availability cash items that arise from the Fed's clearinghouse activities, the liabilities of certain Fed subsidiaries (such as the Maiden Lane LLC), and accrued earnings.

The Federal Reserve's **capital account** arises from the requirement that Fed member banks (which does not include all banks and depositories) must subscribe 6 percent of their own capital in shares of the Federal Reserve. Half of this amount must be paid-in; the other half is on call. The paid-in half earns the member banks a guaranteed 6 percent return.

This simplified balance sheet is derived from the weekly H.4.1 Release (Factors Affecting Reserve Balances) of the Fed's Board of Governors. I have rearranged and consolidated items to clarify points made in the report.

2. Reverse Repos

Even without explicit authorization to issue its own securities, the Fed has been borrowing directly through reverse repurchase agreements.

An old monetarist complaint about the Fed's purchases and sales of securities, in what are termed *open-market operations*, is that they involved a lot of unnecessary churning. In other words, the Fed constantly sold securities it had recently bought, or vice versa, with no permanent impact on the total amount it held. This churning was conducted mostly through repurchase agreements (repos). A repo involves the Fed's purchase of a security with an agreement to buy it back within a short period, usually overnight and almost never longer than within two weeks. Well before the financial crisis, the Fed had eased up on its churning, although it continued to use repos by simply rolling them over.

Although technically classified as open-market operations, repos occupy a hazy borderland between genuine open-market operations (involving the outright purchase and sale of securities) and discounts (i.e., loans to banks and other financial institutions). Another way to look at repos is as short-term Fed lending, with the underlying security pledged as collateral. The recipients of these loans are primary dealers, a category that includes major investment banks. Thus, repos have long served as a way for the Fed to give what are in essence discount loans to some institutions not otherwise usually eligible. Alan Greenspan used repos to flood the financial sector with liquidity after the 1987 stock market crash and again during the Y2K fear that computer programs were unequipped to handle the transition to the year 2000. Bernanke used them even more assiduously during the early days of the financial crisis, to the tune of \$134 billion at their height, although since 2009 the Fed has ceased using them, at least temporarily.⁶

Just as Fed repos constitute lending, *reverse repurchase agreements* constitute borrowing, in which the Fed sells a security from its portfolio with an agreement to buy it back. In the past, the Fed conducted reverse repos almost exclusively with foreign central banks, with net amounts that reached as high as \$20 billion. But by late 2008, the Fed owed a total of \$25 billion *domestically* to primary dealers through reverse repos, and as it repaid those loans, it went into debt for up to \$90 billion to foreign central banks. So this borrowing was another factor contributing to the divergence between the Fed's total assets and the monetary base. The Fed's borrowing

6. Thus the Cleveland Fed in its interactive "Credit Easing Policy Tools" chart includes Fed repos with discounts rather than with purchases of Treasury securities; see http://www.clevelandfed.org/research/data/credit_easing/index.cfm#. The New York Fed lists primary dealers at http://www.newyorkfed.org/markets/pridealers_current.html.

through reverse repos has remained high ever since, standing at about \$250 billion in August 2014.⁷

In March 2010, Bernanke made clear the Fed's intention to use reverse repos liberally, if necessary, to reduce the monetary base without having to sell off any assets. "The Federal Reserve has also been developing a number of additional tools it will be able to use to reduce the large quantity of reserves currently held by the banking system," he reported to Congress. "Notably, to build the capability to drain large quantities of reserves, the Federal Reserve has been working to expand its range of counterparties for reverse repurchase operations beyond the primary dealers and to develop the infrastructure necessary to use agency MBS [mortgage-backed securities] as collateral in such transactions." As a result, the list of counterparties who can earn interest by lending money to the Fed through reverse repos has expanded from primary dealers to include government-sponsored enterprises, such as Fannie Mae and Freddie Mac, and money-market funds.⁸

3. Interest on Reserves

The most important way that the Fed began borrowing and continues to do so is indirect: by paying interest to banks on their reserves. The Fed was originally scheduled to gain this power in 2011, but on May 13, 2008, Bernanke sent a letter to House Speaker Nancy Pelosi asking for an immediate authorization. Permission was therefore included in the Troubled Asset Relief Program (TARP), and the Fed implemented the power within days. To be

7. Before December 2002, the Fed's H.4.1 Release treated its reverse repurchase agreements as "matched-sale purchase agreements," and so netted them out from the balance sheet, subtracting the amount from the asset side rather than adding it to liability side. Thus, instead of increasing the balance sheet's size, the amounts involved were listed in a footnote. This choice disguised any consequent gap between the total value of Fed assets and the size of the monetary base. Commercial banks, investment banks, and other private institutions also widely use repos and reverse repos. But the terminology is confusingly the exact opposite. For banks or other private institutions, the repurchase agreement is a liability through which money is borrowed, and the reverse repurchase agreement is an asset through which money is lent; for the Federal Reserve, a repurchase agreement is an asset, and a reverse repurchase agreement is a liability.

8. Ben S. Bernanke, "Federal Reserve's Exit Strategy," Testimony Before the House Committee on Financial Services, March 25, 2010, <http://www.federalreserve.gov/newsevents/testimony/bernanke/20100325a.htm>. Sheila Bair, former chair of the Federal Deposit Insurance Corporation, criticizes the Fed's expanded use of reverse repos in "The Federal Reserve's Risky Reverse Repurchase Scheme," *Wall Street Journal*, July 24, 2014, <http://online.wsj.com/articles/shelia-bair-the-federal-reserves-risky-reverse-repurchase-scheme-1406243228>. For a critique of Bair's article, see John Cochrane, "Bair and Reserves and All," *The Grumpy Economist* (blog), July 27, 2014, <http://johnhcochrane.blogspot.com/2014/07/blair-and-reserves-for-all.html#more>.

sure, other central banks, including the European Central Bank, were already paying interest on reserves to help them hit their interest-rate targets, and even Milton Friedman once advocated this step, to facilitate the imposition of a 100 percent reserve requirement on banks. Potential justifications for this policy are several.⁹

Nonetheless, interest-earning reserves have been one important incentive encouraging banks to raise their reserve ratios rather than expand their loans to the private sector. This tool thus constitutes a flexible substitute for minimum reserve requirements. The rate that the Fed pays started out as high as 1.40 percent on required reserves and 1.00 percent on excess reserves but is now low on both: 0.25 percent. Yet the higher-yielding alternatives available to banks are also at all-time lows, especially after adjusting for risk. The gap between these rates determines the incentive for individual banks to hold on to reserves. The interest on three-month Treasury bills remains lower than the interest paid on reserves, and both T-bills and reserves are assets that impose no legally mandated capital requirements on banks.

An equally valid way to think about paying interest on reserves is that, by doing so, the Fed has made itself the preferred destination for a lot of bank lending. Bernanke's Fed in effect created money and then borrowed it back from the banks by paying them interest. The banks in turn partly financed their implicit loans to the Fed by reducing loans to the public. The result was a wash, with a shuffling of assets from the private sector to the Fed.¹⁰

9. Greg Ip, "Bernanke Asks Congress to Accelerate Authority to Pay Interest," *Real Time Economics* (blog), *Wall Street Journal*, May 16, 2008, <http://blogs.wsj.com/economics/2008/05/16/bernanke-asks-congress-to-accelerate-authority-to-pay-interest/>; Jeffrey Rogers Hummel, "Interest on Bank Reserves and the Recent Crisis," *Liberty and Power* (blog), *History News Network*, October 13, 2008, <http://hnn.us/blogs/entries/55621.html>; Hummel, "Paradoxes of Paying Interest on Reserves," *Liberty and Power* (blog), *History News Network*, December 10, 2008, <http://hnn.us/blogs/entries/58090.html>; George Selgin, "Wholesale Payments: Questioning the Market-Failure Hypothesis," *International Review of Law and Economics* 24, no. 3 (2004): 333–50; Friedman, *A Program for Monetary Stability*, 69–75.

10. This decline in bank lending, evident in the Fed's quarterly release, *Z.1 Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts* (<http://www.federalreserve.gov/releases/z1/default.htm>), is for the commercial banking sector only and does not include savings institutions. It is based on totals for mortgages, consumer credit, security credit, and loans not elsewhere classified. It does not include bank holdings of securities, including securitized mortgages, which remained roughly constant anyway. For a virtual admission that the Fed's goal was not a liquidity injection, see Todd Keister and James J. McAndrews, "Why Are Banks Holding So Many Excess Reserves?," *Current Issues in Economics and Finance* 15, no. 8 (December 2009), http://www.newyorkfed.org/research/current_issues/ci15-8.html. Steve H. Hanke, "Basel's Capital Curse," *Globe Asia* (January 2013), reprinted at <http://www.cato.org/publications/commentary/basels-capital-curse>, emphasizes the contributing role of capital requirements in the decision of banks to replace loans with reserves.

Not all bank reserves earn interest—only those reserves held as deposits at the Fed. A bank’s vault cash earns nothing, but vault cash currently amounts to a little less than \$70 billion, about the same as *total* reserves before Bernanke’s Fed began quantitative easing. In effect, the payment of interest on reserves was tantamount to borrowing back from depositories the full \$800 billion increase in reserves, and more. No wonder the impact of the base explosion on the broader monetary measures was so muted. Should market rates begin to increase, raising the prospect of increased bank lending and inflation, the Fed has the power to increase the interest rate it pays, *pari passu*, locking up bank reserves and keeping reserve ratios high. Again, quoting Bernanke’s congressional testimony, “by increasing the interest rate on banks’ reserves, the Federal Reserve will be able to put significant upward pressure on all short-term interest rates, as banks will not supply short-term funds to the money markets at rates significantly below what they can earn by holding reserves at the Federal Reserve Banks.”¹¹

Nothing inhibits the Fed from doing so except for the potential negative effect on Fed earnings and its remittances of excess earnings to the Treasury. In fact, the Congressional Budget Office has projected that Fed remittances to the Treasury (which are officially and somewhat misleadingly labeled as “interest on Federal Reserve notes”) will decline to zero between 2018 and 2020 for this very reason. Yet the same thing will happen if the Fed instead sells off its assets with capital losses. And those remittances have historically been only 0.2 percent of GDP, rising to 0.5 percent as a result of the Fed tripling the amount of its total assets.¹²

4. Term Deposit Facility

On April 30, 2010, the Fed announced the creation of the Term Deposit Facility (TDF). This is a mechanism through which banks can convert their reserve deposits at the Fed (which are like Fed-provided, interest-earning checking accounts for banks) into deposits of fixed maturity at higher interest rates set by auction (making them like Fed-provided certificates of deposit for banks).

11. Bernanke, “Federal Reserve’s Exit Strategy.”

12. Figures on vault cash are available from the Fed’s weekly H.3 Release; Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2013 to 2023* (Washington, DC: CBO, February 5, 2013), 22, <http://www.cbo.gov/publication/43907>. The CBO’s estimates of future Fed earnings are consistent with and may be based on Seth B. Carpenter et al., “The Federal Reserve’s Balance Sheet and Earnings: A Primer and Projections” (staff working paper, Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, DC, January 2013), <http://www.federalreserve.gov/pubs/feds/2013/201301/201301pap.pdf>.

Although the Fed so far has only tested term deposits, which briefly peaked at over \$150 billion in July 2014, with maturities ranging from 14 to 84 days, term deposits make the Fed's borrowing more explicit. As the Board of Governors website reveals, "These small-value operations are designed to ensure the operational readiness of the TDF and to provide eligible institutions with an opportunity to gain familiarity with term deposit procedures." In Bernanke's July 2010 testimony before Congress, he confided that the TDF (along with reverse repos) was one of "two tools for draining reserves from the system" that "are being developed and tested and will be ready when needed."¹³

Interplay of the Four Tools

These four tools combined make it theoretically possible for the Fed to prevent any expansion of the broader monetary measures without selling a single asset from its balance sheet. The Fed may supplement these tools with some asset sales, but any sales are unlikely to be large at the outset. Interest on reserves will probably be the dominant exit tool: Treasury deposits may not become significant again, given the national government's ongoing fiscal problems. Use of reverse repos could be somewhat constrained by Fed concerns about the solvency of primary dealers and any other counterparties it borrows from. And term deposits are just a modified way of paying interest to banks.

Another issue that could affect the exact mix is how these different tools affect Fed income. Paradoxically, Treasury deposits are the only exit tool that cannot reduce Fed earnings. The Fed pays no interest on Treasury deposits directly, so the Treasury would bear the cost of rising market interest rates if it engaged in extra borrowing on behalf of the Fed. This cost would be offset only partly by the Fed's remittances to the Treasury. On the other hand, paying higher interest on reserves, on reverse repos, and on term deposits would all directly curtail earnings, and any large sale of Fed assets could involve capital losses. Although resulting financial difficulties for the Fed would be minimal, as will be discussed below, the political consequences might be more problematic.

13. For the Fed press release announcing the Term Deposit Facility, see Board of Governors of the Federal Reserve System, press release, April 30, 2010, <http://www.federalreserve.gov/newsevents/press/monetary/20100430a.htm>; for general details about the facility, see Board of Governors of the Federal Reserve System, "Term Deposit Facility," <http://www.federalreserve.gov/monetarypolicy/tdf.htm>. Also see Testimony of Chairman Ben S. Bernanke, Semiannual Monetary Policy Report to the Congress before the Committee on Banking, Housing, and Urban Affairs, US Senate, Washington, DC, July 21, 2010, <http://www.federalreserve.gov/newsevents/testimony/bernanke20100721a.htm>.

“With all these data at its disposal, it would be utterly astonishing if the Fed missed any substantial hike in these growth rates for even a week.”

FED REACTION TIME

Even if the Fed can instantaneously drain bank reserves through increased borrowing or lock them up by paying higher interest rates to the banks, will it have sufficient information to deploy these tools rapidly enough? Or could the Fed be caught by surprise if an expansion of bank loans increases the money multipliers and unleashes inflation before the Fed has a chance to act? Since total reserves are a Fed liability on its balance sheet, the Fed has no problem monitoring that magnitude on a daily basis. But a sudden expansion of bank loans need not affect that magnitude at all, because banks in the aggregate will just be expanding their loans and deposits on top of their existing reserves. The one related signal the Fed might receive would be a possible increase in the gross check clearings it handles, as an expansion of loans generates greater use of checks.

Nonetheless, the Fed has several other ways it regularly and closely monitors the balance sheets of banks and other depository institutions. To begin with, the Fed still imposes reserve requirements on all transaction deposits (the technical term for checking accounts). Although the current high level of bank reserves, well in excess of these requirements, has made reserve requirements a dead letter as far as bank behavior is concerned, all major depository institutions still have to report on a weekly basis not only their transaction accounts, but also their time and savings deposits.

The only institutions exempt from weekly reporting are those with total deposits or transaction accounts below certain regularly adjusted, fairly low cutoffs. Most recently, if total deposits are below \$306.7 million, then such depositories are required to report only quarterly. If a depository's total checking accounts are below \$13.3 million, then it has no reserve requirement and reports only annually. And if the total of all of its deposits, including time and savings deposits, are below \$13.3 million, the depository does not have to report at all.¹⁴

14. These requirements fall under the Fed's Regulation D. For the first two categories of depositories, the reporting form is FR 2900; for the third

In other words, the Fed knows every week what is happening to most of the bank liabilities that constitute M1 (which as of August 2014 totals \$2.8 trillion). Only trivial amounts in very small banks and other depositories, plus the even less significant amount of traveler's checks of nonbank issuers (currently \$3.2 million), escape its weekly attention. And the only major item in M2 (which as of August 2014 totals \$11.4 trillion) unreported directly to the Fed is retail money-market mutual fund shares. But the Fed gets money market totals indirectly on a weekly basis from the Investment Company Institute. To top it off, the Fed also gets weekly reports on selected assets and liabilities of a randomized sample of 875 banks, so it can fairly closely monitor both sides of bank balance sheets.

These reports are the basis for the Fed's weekly H.6 Release on the monetary aggregates and its weekly H.8 Release on the assets and liabilities of commercial banks. Of course, like all economic aggregates, the weekly estimates of M1 and M2 undergo subsequent revision. Yet these revisions have almost never involved more than a percent change in monthly reported annual growth rates. With all these data at its disposal, it would be utterly astonishing if the Fed missed any substantial hike in these growth rates for even a week. There is a question, admittedly, about whether the Fed currently pays enough attention to these monetary measures, given its primary focus on interest rates and the inflation rate as the best indicators of monetary policy. Even so, any resulting lag should not be great.¹⁵

FED COMMITMENT TO LOW INFLATION

Given that the Fed cannot be caught napping, there remains the question of whether it will in fact use these tools to keep inflation in check. Bernanke throughout his career—both before arriving at the Fed and during his tenure, first as a member of the Federal Reserve Board beginning in 2002 and then as Fed chair beginning in 2006—made clear his firm commitment to inflation targeting. Back in 1997 he coauthored an article advocating this policy with Frederic S. Mishkin, a member of the Fed's Board of Governors from

category, it is FR2910A. For details, see Board of Governors of the Federal Reserve System, "Reserve Maintenance Manual," http://www.federalreserve.gov/monetarypolicy/rmm/Chapter_2_Reporting_Requirements.htm, and Federal Reserve Bank of New York, "Reporting Form FR 2900 (Commercial Banks) Report of Transaction Accounts, Other Deposits and Vault Cash," [http://www.newyorkfed.org/banking/reportingforms/FR_2900_\(Commercial_Banks\).html](http://www.newyorkfed.org/banking/reportingforms/FR_2900_(Commercial_Banks).html).

15. The Fed form for selected assets and liabilities of banks is FR 2644, <http://www.federalreserve.gov/apps/reportforms/reportdetail.aspx?sOoYJ+5BzDa9jexXCdkUSw==>.

2006 to 2008 who has written one of the most popular money and banking textbooks.¹⁶

Indeed, it has been suggested that commitment to low inflation made the Fed's initial response to the financial crisis too tight. Although beginning in mid-2007 Bernanke created new Fed facilities to lend to financial institutions and engaged in targeted bailouts, most prominently that of Bear Stearns, he simultaneously pulled base money out of the economy through the sale of Treasury securities. Consequently, during the calendar year ending in August 2008, before quantitative easing commenced, the monetary base had increased by less than \$20 billion, a mere 2.24 percent, which was well below its average annual growth rate of 7.54 percent during Greenspan's 19 years in charge. And nearly all of the increase was in the form of currency in circulation. Total reserves during the first year of the crisis had risen from \$72.4 billion to \$73.0 billion, less than 1 percent. The monetary historian Michael Bordo, at the annual symposium of the Kansas City Fed in Jackson Hole, Wyoming, during late August 2008, pointed out that "the oddest part" of Bernanke's early liquidity injections "is that they are sterilized."¹⁷

By September 2008, just before Bernanke initiated quantitative easing, the Fed was running out of Treasury securities that it could sell to sterilize its targeted bailouts. Its holdings (not counting those acquired through repos) had dropped from \$790.6 billion on July 12, 2007, constituting 90 percent of its balance sheet, to \$479.8 billion on September 11, 2008, constituting 52 percent of its balance sheet. Moreover, \$118 billion of the remainder was tied up in loans to dealers in exchange for other securities. Then, the massive expansion of the monetary base that commenced, normally a highly inflationary step, was accompanied by paying interest on reserves, an offsetting, deflationary step.¹⁸

16. Ben S. Bernanke and Frederic S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy?," *Journal of Economic Perspectives* 11, no. 2 (Spring 1997): 97–116, <http://web.uconn.edu/ahking/BernankeMishkin97.pdf>.

17. Michael D. Bordo, "Commentary: The Subprime Turmoil: What's Old, What's New and What's Next," remarks for the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, Symposium, August 21–23, 2008, reprinted in Federal Reserve Bank of Kansas City, *Maintaining Stability in a Changing Financial System* (Kansas City: Federal Reserve Bank of Kansas City, 2009), 118. See also Bordo, "The Crisis of 2007: The Same Old Story, Only the Players Have Changed," remarks prepared for the Federal Reserve Bank of Chicago and International Monetary Fund Conference: Globalization and Systemic Risk, Chicago, September 28, 2007, available to download at <http://sites.google.com/site/michaelbordo/home32>.

18. Jeffrey Rogers Hummel, "Ben Bernanke versus Milton Friedman: The Federal Reserve's Emergence as the U.S. Economy's Central Planner," *Independent Review* 15, no. 4 (Spring 2011): 485–518, <http://www.independent.org/publications/tir/article.asp?a=824>; reprinted in David Beckworth, ed., *Boom and Bust Banking: The Causes and Cures of the Great Recession* (Oakland, CA: Independent Institute, 2012), 165–210.

Inflation targeting as implicit Fed policy dates back as far as the mid-1980s, well before Bernanke's appointment as chair and his making 2 percent inflation an explicit objective. When Janet Yellen replaced Bernanke, many expressed fear that she would take less of a hard line against inflation. Yet in early September 2008, while she was still president of the San Francisco Fed, she endorsed Bernanke's extreme sensitivity to inflation in his early crisis response. Even her reported early willingness to allow inflation to exceed 2 percent is a far cry from permitting a runaway inflation when the Fed has both the tools and the knowledge to prevent it. And since she has become chair, her public pronouncements have generally adhered to the 2 percent target.¹⁹

IMPACT OF FED EARNINGS ON THE TREASURY

The Fed has conducted extensive discussions with detailed projections about its exit strategy, or what it alternatively refers to as “normalizing” its policy and portfolio. The Federal Open Market Committee (FOMC) solidified its “exit strategy principles” in its June 2011 meeting, and Bernanke reiterated and slightly modified these principles in his press conference following the FOMC's June 2013 meeting. A 2013 staff working paper in the Fed's Finance and Economics Discussion Series provides additional details.²⁰

One concern is that as the Fed either increases the interest rate on reserves and its other forms of borrowing or sells off securities before they mature, its remittances to the Treasury will probably fall to zero. Depending on how high interest rates rise, a Fed staff study has estimated that the lapse in remittances could last as long as six and a half years. Yet this lapse will pose no financial problem for the Fed. According to the study's most pessimistic assumptions—with the federal funds rate rising to 6 percent, the 10-year Treasury rate rising to nearly 7 percent, and capital losses on early sales of mortgage-backed securities—the *average* value of the Fed's remittances for the

19. Janet L. Yellen, “The U.S. Economic Situation and the Challenges for Monetary Policy,” Federal Reserve Bank of San Francisco, *Economic Letter* no. 2008-28-29, September 19, 2008, <http://www.frbsf.org/our-district/press/presidents-speeches/yellen-speeches/2008/september/yellen-us-economic-situation-challenge-monetary-policy-salt-lake-city/>.

20. For the minutes of the June 2011 FOMC meeting, see Board of Governors of the Federal Reserve System, “Minutes of the Federal Open Market Committee, June 21–22, 2011”; for the transcript of the June 2013 FOMC press conference, see Board of Governors of the Federal Reserve System, “FOMC: Press Conference on June 19, 2013,” <http://www.federalreserve.gov/monetarypolicy/fomcpresconf20130619.htm>; Seth B. Carpenter et al., “The Federal Reserve's Balance Sheet and Earnings: A Primer and Projections,” Federal Reserve Board (revised September 2013); the earlier, more detailed version of the Carpenter et al. paper is cited in note 12.

entire span running from 2009 to 2025 still remains above the average for the period before the financial crisis. More severe losses might compel the Fed to create money to recapitalize its balance sheet. But given the small size of the Fed's capital account (which arises from the shares member banks are required to purchase from the Fed)—today only about \$56 million, or less than 1.3 percent of total assets—any such increases would have a negligible impact on the monetary base.²¹

Nonetheless, an interruption of regular Fed remittances to the Treasury may cause political problems. Congressman John Campbell, a California Republican who heads the monetary policy and trade subcommittee of the House Financial Services Committee, has warned that central bank losses are “a legitimate concern and something we will be watching,” and William C. Dudley, president of the New York Fed, worries that such concerns might threaten Fed independence. It would be truly ironic if congressional and popular hostility to the Fed induced enough pressure to force the Fed to create more money to keep Treasury remittances flowing, possibly contributing to the very inflation that so many Fed critics fear.²²

If the Fed's exit strategy should coincide with a Treasury fiscal crisis, all bets are off. A recent paper by David Greenlaw, James D. Hamilton, Peter Hooper, and Frederic S. Mishkin seriously considers this scenario. Any such crisis would cause Treasury rates to dramatically spike well above the Fed's upper-bound estimates and probably magnify potential Fed capital losses. This scenario raises the prospect that the net present value of future Fed remittances to the Treasury will drop to nearly zero. The fact that the Treasury has come to rely on continual Fed purchases to keep its borrowing rates low will aggravate pressure on the Fed to terminate its exit strategy and reignite quantitative easing.²³

Yet such a potential scenario would result not from Fed monetary policy but from Congress's and the president's fiscal policy. Although the higher

21. Carptenter et al., “The Federal Reserve's Balance Sheet,” September 2013. A corroborating, independent National Bureau of Economic Research study by Robert E. Hall and Ricardo Reis, “Maintaining Central-Bank Solvency under New-Style Central Banking,” February 18, 2013, <http://www.columbia.edu/~rr2572/papers/13-HallReis.pdf>, concludes that for both the Fed and European Central Bank, “risks to their solvency as of 2013 are remote.”

22. John Campbell is quoted in Caroline Salas Gage and Joshua Zumbun, “Fed Anxiety Rises as QE Increases Risk of Loss with Costs,” *Bloomberg*, November 8, 2013, <http://www.bloomberg.com/news/2013-11-08/fed-anxiety-rises-as-qe-raises-risk-of-loss-with-political-cost.html>; William C. Dudley, “Unconventional Monetary Policies and Central Bank Independence,” remarks at the Central Bank Independence Conference—Progress and Challenges in Mexico, Mexico City, Mexico, October 15, 2013, <http://www.newyorkfed.org/newsevents/speeches/2013/dud131015.html>.

23. David Greenlaw et al., “Crunch Time: Fiscal Crises and the Role of Monetary Policy” (NBER Working Paper No. 19297, Cambridge, MA, July 29, 2013), <http://www.nber.org/papers/w19297>.

interest rates associated with the economy's return to some kind of normalcy might simultaneously trigger a fiscal crisis, such a crisis is just as liable to occur quite independently. The national government's threatening fiscal shortfall is a distinct issue from the Fed's exit strategy. I have argued elsewhere that even a major fiscal crisis will more probably result in a Treasury default than in massive inflationary finance. But exploring this scenario in any detail requires a long, separate study.²⁴

CONCLUSION

The Fed's current situation is unparalleled. Its swollen asset portfolio consists largely of long-term securities, either Treasury- or mortgage-backed, that if sold before maturity will likely generate capital losses. Commercial bank balance sheets are bursting with reserves that constitute about 15 percent of their total assets. M1 is backed more than 100 percent by reserves, and the money multipliers of all monetary measures are historically low. Once a recovering economy brings rising interest rates, inflation could take off—but *only* if the Fed fails to respond.

On the other hand, the Fed has four tools that will permit it to respond effectively without selling a single asset from its balance sheet: Treasury deposits, reverse repos, the Term Deposit Facility, and the interest rate paid on reserves. The first three of these drain reserves from the monetary base. The fourth can induce banks to maintain their currently high reserve ratios. The Fed monitors banks and other depositories so closely and regularly that it will know within a week whether bank reserve ratios are declining. And it has displayed a guiding desire to employ these tools if necessary to prevent any sudden jump in price inflation.

24. Jeffrey Rogers Hummel, "Why Default on U.S. Treasuries Is Likely," *Library of Economics and Liberty*, August 3, 2009, <http://www.econlib.org/library/Columns/y2009/Hummeltbills.html>; and Hummel, "Some Possible Consequences of a U.S. Government Default," *Econ Journal Watch* 9, no. 1 (January 2012): 24–40, <http://econjwatch.org/articles/some-possible-consequences-of-a-us-government-default>.

“The Fed has four tools that will permit it to respond effectively without selling a single asset from its balance sheet.”

Indeed, the real danger is that, given these tools, the Fed has no real need to normalize its balance sheet and therefore may not do so after full economic recovery. For example, even if the Fed purchases no new mortgage-backed securities and merely allows a runoff of those that mature, more than \$400 billion worth will still remain on its books as late as 2025. The FOMC's June 2011 exit strategy promised to eventually minimize "the extent to which the SOMA [System Open Market Account] portfolio might affect the allocation of credit across sectors of the economy," but Bernanke announced in his June 2013 press conference that "a strong majority now expects that the Committee will not sell agency mortgage-backed securities during the process of normalizing monetary policy."²⁵

All these developments highlight the extent to which quantitative easing is converting the Fed into a financial central planner. With its new tools and its \$4.2 trillion balance sheet, the Fed is now regularly borrowing on its liability side. Like Fannie and Freddie, it can determine where savings flow without altering the money stock. Couple this power with the Fed's obsessive focus on controlling interest rates as the primary function of monetary policy. Its goals are different from those of the government-sponsored enterprises and less driven by political rent-seeking, but its relative independence makes its discretion greater. Such a dramatic transformation represents a critical step toward an economy where the Fed, rather than the market, determines the allocation of large amounts of credit.²⁶

25. The estimate of remaining mortgage-backed securities comes from Carpenter et al., "The Federal Reserve's Balance Sheet," September 2013, which also cites the FOMC minutes of 2011 and press conference of 2013. A major conclusion of Hall and Reis, "Maintaining Central-Bank Solvency under New-Style Central Banking," is that a reliance on paying interest on reserves creates an upward ratchet effect on central bank balance sheets after recessions. One prominent economist who advocates that the Fed not normalize its balance sheet is the University of Chicago's John Cochrane in his "A Few Things the Fed Has Done Right," *Wall Street Journal*, August 21, 2014, <http://online.wsj.com/articles/john-h-cochrane-a-few-things-the-fed-has-done-right-1408662715>.

26. Hummel, "Ben Bernanke versus Milton Friedman"; Jeffrey Rogers Hummel, "The New Central Planning," review of *The Federal Reserve and the Financial Crisis* by Ben S. Bernanke, *Wall Street Journal*, March 29, 2013, A-13, <http://online.wsj.com/article/SB10001424127887324662404578334120770679806.html>. I've discussed the general problems with interest-rate targeting in Jeffrey Rogers Hummel, "The Myth of Federal Reserve Control over Interest Rates," *Library of Economics and Liberty*, October 7, 2013, <http://www.econlib.org/library/Columns/y2013/Hummelinterestrates.html>.

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