An Exit Rule for Monetary Policy

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February 10, 2010

This paper was originally prepared for a hearing at the House Committee on Financial Services on "Unwinding Emergency Federal Reserve Liquidity Programs and Implications for Economic Recovery," where I was invited to be a witness. The hearing was cancelled because of snow. Witnesses were asked to give an assessment of whether these extraordinary measures have worked and what is an appropriate policy for unwinding them. The paper begins with my assessment and then considers a specific exit strategy.

Assessment of the Extraordinary Measures

Table 1 summarizes the Fed's extraordinary measures—mostly special loan and securities purchase programs—going back to 2007 when the financial crisis first flared up in the money markets. Figures 1 through 4 show how the programs have changed in size during this period, either adding to or subtracting from the Fed's balance sheet.

Review of Recent Developments

Some of the programs, such as the Mortgage Backed Securities (MBS) purchase program and the Term Asset Backed Securities Loan Facility (TALF), have expanded [Figure 4], while others, such as the Term Auction Facility (TAF) or the SWAP facility with foreign central banks, have contracted [Figures 1 and 2]. Some programs have been closed down, including the Primary Dealers Credit Facility (PDCF), the Commercial Paper Funding Facility (CPFF), and the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF). But the loans and other vehicles used to bailout the creditors of Bear Stearns and AIG are still on the Federal Reserve balance sheet and are about the same size they were a year ago [Figure 3].

The Fed has financed these programs mostly by creating money—crediting banks with reserve balances at the Fed—or by selling other items in its portfolio. From December 2007 until September 2008 it sold other items in its portfolio. Since September 2008 it has added significantly to reserve balances and expanded its balance sheet. During the past year, reserve balances have continued to rise as expanding programs have kept pace with contracting programs and Treasury has withdrawn deposits from the Fed. For the two weeks ending February 3, 2010, reserve balances were $1,127 billion, up from $662 billion during the same period in February 2009. These reserves are still far in excess of normal levels and will eventually have to be wound down to prevent a significant rise in inflation. By way of comparison, reserve balances were only $9 billion during the same period in February 2008.

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Assessing the Impact

Determining whether or not these programs have worked is difficult. First, there are many programs, and they interact with each other. In addition to the Fed's actions, other U.S. government agencies undertook extraordinary interventions, including the takeover of Fannie Mae and Freddie Mac, the FDIC Temporary Liquidity Guarantee Program, the Troubled Asset Relief Program (TARP) and the guarantee of money market portfolios. Moreover, many of the programs were significantly reworked after they were implemented—the switch of the TARP from a program to purchase toxic assets to one of injecting capital into banks was perhaps the biggest reworking. Second, financial conditions and the entire global economy were changing rapidly around the time of these interventions, and markets were dynamically reacting and adjusting to the changes. Third, developing a counterfactual to describe what would have happened in the absence of the programs requires analyzing large quantities of data, and using, when possible, economic models and statistical techniques.

Perhaps for these reasons, there has been surprisingly little empirical work on this important question. Recent papers by Peter Fisher (2009) and James Hamilton (2009b) stress the difficulty of the task. In this paper I make use of empirical research at Stanford University and the Hoover Institution (Taylor 2007, 2008b, 2009a, 2009b, 2009e), (Taylor and Williams 2008), (Stroebel and Taylor 2009), which has focused on several of the programs including the TAF, the PDCF, the MBS purchase program, and the bailouts, all in the context of overall monetary policy, including its possible role as one of the causes of the crisis.

Three Phases of the Crisis

It is useful to divide an assessment of the programs into three periods. The first period runs from the flare-up in August 2007 until the severe financial panic in late September 2008. The second period is the panic itself; based on equity prices and interbank borrowing rates, the panic period was concentrated in late September through October 2008 as it spread rapidly around the world, turning the recession into a great recession. The third period occurs after the panic. Thus the financial crisis and the Fed's actions are naturally divided into three periods: pre-panic, panic, and post-panic.

Before the Panic My assessment is that the extraordinary measures taken in the period leading up to the panic did not work, and that some were harmful. The TAF did little to reduce tension in the interbank markets during this period, as I testified to the House Committee on Financial Services in February 2008 (Taylor 2008a) based on research reported in Taylor and Williams (2008), and it drew attention away from counterparty risks in the banking system. The extraordinary bailout measures, which began with Bear Stearns, were the most harmful in my view. The Fed's justification for the use of Section 13(3) of the Federal Reserve Act in the case of Bear Sterns led many to believe that the Fed's balance sheet would again be available in the case that another similar institution, such as Lehman Brothers, failed. But when the Fed was unsuccessful in getting private firms to help rescue Lehman over the weekend of September 13-

14, 2008, it surprising cut off access to its balance sheet. Then, the next day, it reopened its balance sheet to make loans to rescue the creditors of AIG. It was then turned off again, so a new program, the TARP, was proposed. Event studies show that the chaotic roll out of the TARP then coincided with the severe panic in the following weeks (Taylor 2008b). The Fed's on-again off-again bailout measures were thus an integral part of a generally unpredictable and confusing government response to the crisis which, in my view, led to panic.

During the Panic This is the most complex period to analyze because the Fed's main measures during this period—the AMLF and the CPFF—were intertwined with the FDIC bank debt guarantees and the clarification on October 13, after three weeks of uncertainty, that the TARP would be used for equity injections. This clarification was a major reason for the halt in the panic in my view (Taylor 2008b). Based on conversations with traders and other market participants the Fed's actions taken during the panic, especially the AMLF and the CPFF, were helpful in rebuilding confidence in money market mutual funds and stabilizing the commercial paper market. The Federal Reserve should also be given credit for rebuilding confidence by quickly starting up these complex programs from scratch in a turbulent period and for working closely with central banks abroad in setting up swap lines (Fisher 2009). However, most of the evidence is anecdotal, and it would be useful if the Federal Reserve Board, with its inside information about day to day events and data, examined the programs empirically and reported the results. For example, statistical evidence (Taylor 2009a) indicates that the PDCF was effective in reducing risk (measured by rates on credit default swaps) at Merrill Lynch and Goldman Sachs in October 2009.

After the Panic The two measures introduced by the Fed following the severe panic period were the MBS program and the TALF. Of these two, the MBS has turned out to be much larger as shown in Figure 4, and it will soon reach $1.25 trillion. As with the other Fed programs there has been little empirical work assessing the impact of the MBS program on mortgage interest rates. My assessment, based on research with Johannes Stroebel, is that it has had a rather small effect on mortgage rates once one controls for prepayment risk and default risk, but the estimates are uncertain. I have not studied the impacts of the TALF; it has been very slow to start and it is still quite small. As shown in Figure 4, in the absence of the MBS program, reserve balances and the size of the Fed's balance sheet would already be back to normal levels before the crisis. If it were not for this program, the Fed would have already exited from its emergency measures removing considerable uncertainty about its exit strategy going forward.

Longer Term Implications

Whether one believes that these programs worked or not, there are reasons to believe that their consequences going forward are negative. First, they raise questions about Fed independence. The programs are not monetary policy as conventionally defined, but rather fiscal policy or credit allocation policy (Goodfriend 2009) or mondustrial policy (Taylor 2009b) because they try to help some firms or sectors and not others and are financed through money creation rather than taxes or public borrowing. Unlike monetary policy, there is no established rationale that such policies should be run by an independence agency of government (Thornton 2009). This is likely why many members of Congress are calling for a complete audit of the Fed.

Even though monetary policy does not warrant such an audit, many of these extraordinary measures do. By taking these extraordinary measures, the Fed has risked losing its independence over monetary policy (Shultz 2009).

A second negative consequence of the programs is that unwinding them involves considerable risks. In order to unwind the programs in the current situation, for example, the Fed must reduce the size of its MBS portfolio and reduce reserve balances. But there is uncertainty about how much impact the purchases have had on mortgage interest rates, and thus there is uncertainty about how much mortgage interest rates will rise as the MBS are sold. There is also uncertainty and disagreement about why banks are holding so many excess reserves now (Kiester and McAndrews 2009). If the current level of reserves represents the amount banks desire to hold, then reducing reserves could cause a further reduction in bank lending.

A third negative consequence is the risk of inflation (Hamilton 2009a). If the Fed finds it politically difficult to reduce the size of the balance sheet as the economy recovers and as public debt increases, then inflationary pressures will undoubtedly increase.

The Need for a Clear and Credible Exit Strategy

For these reasons, it is important that the Federal Reserve return, as soon as possible, to a monetary policy framework of the kind that worked well for over twenty years in the 1980s and 1990s when recessions were short and infrequent, expansions were long, and inflation was low.

A Monetary Policy Framework That Worked and Will Work Again

What are the key characteristics of such a framework? First, the short term interest rate (the federal funds rate) is determined by the forces of supply and demand in the money market. Second, the Fed adjusts the supply of money or reserves to bring about a desired target for the short term interest rate; there is thus a link between the quantity of money or reserves and the interest rate. Third, the Fed adjusts the interest rate depending on economic conditions: The interest rate rises by a certain amount when inflation increases above its target and the interest rate falls when by a certain amount when the economy goes into a recession. Fourth, to maintain its independence and focus on its main objectives of inflation control and macroeconomic stability, the Fed does not allocate credit or engage in fiscal policy by adjusting the composition of its portfolio toward or away from certain firms or sectors.

Exit Strategy versus Exit Instruments

An exit strategy to take the Fed to this monetary framework must focus on three things: (1) the federal funds rate, (2) the level of reserve balances (or the size of the Fed's balance sheet), and (3) the composition of the Fed's portfolio of assets. In order to achieve this goal the direction of change of all three is clear: The interest rate must rise above its current abnormally low level of zero, the amount of reserves must decline, and the proportion of the Fed's assets

dedicated to the extraordinary programs such as TALF, MBS, and the Bear-Stearns-AIG facilities must be reduced. The timing and the amount by which these changes are made should depend on economic conditions. In particular the interest rate should be increased as the economy recovers. If the economy weakens, the tightening should be postponed. If inflation picks up, tightening should be accelerated.

Federal Reserve Board Chair Ben Bernanke (2009) has clearly described the instruments that are available to the Fed during an exit strategy, including paying interest on reserve balances, borrowing by the Fed to finance its extraordinary measures, and reducing reserve balances further by unwinding the extraordinary measures. Borrowing could be through bank term deposits at the Fed, longer-term reverse repurchase agreements, or issuing Federal Reserve securities. In my view, Fed borrowing instruments should be avoided as much as possible because they delay essential adjustments in reserves and create precedents which make it easier to deviate from the monetary framework in the future. Similarly, the instrument of paying interest on reserves to achieve the short term interest rate target should be used only during a well defined transition period.

An exit strategy, however, is more than a list of instruments. It is a policy describing how the instruments will be adjusted over time until the monetary framework is reached. It is analogous to a policy rule for the interest rate in a monetary framework except that it also describes the level of reserves and the composition of the balance sheet. Hence, an exit strategy for monetary policy is essentially an *exit rule*.

An Exit Rule

How would such an exit rule work? One possible rule would link the FOMC's decisions about the interest rate with its decisions about the level of reserves. In other words, when the FOMC decides to start increasing the federal funds rate target, it would also reduce reserve balances. One reasonable exit rule would reduce reserve balances by $100 billion for each 25 basis point increase in the federal funds rate. By the time the funds rate hits 2 percent, the level of reserves would be reduced by $800 billion and would likely be near the range needed for supply and demand equilibrium in the money market. The Trading Desk at the New York Fed would then be in a position to carry out the interest rate decisions of the FOMC as it has in the past, and the exit would be complete. Of course, at the start of this process, the FOMC is likely to need the assistance of increases in interest rates on reserves because of the high current level of reserves. And it might be wise to start reducing reserves by $100 billion or $200 billion before interest rates start to rise, because reserves are well above $800 billion now. In any case, this exit rule for reserves could be supplemented by a similarly defined rule for reducing the share of MBS and TALF in the Fed's portfolio.

Where does the "$100 billion per quarter point" come from? We do not know much about the reserve-interest rate relationship, but $100bn per 25bps is close to what was observed when the Fed started increasing reserves in the fall of 2008. As shown in Figure 5 the funds rate fell from 2 percent to 0 percent as the Fed increased the supply of reserves by $800 billion. Of course we do not know if this relationship will hold now with changed circumstances in the

banking sector, but it is a reasonable place to begin. In addition, these dollar amounts are not so large that they should constrain banks or put upward pressure on mortgage rates or other long term rates as the Fed's MBS or other assets are sold to enable the reduction in reserves. An attractive feature of this approach is that the Fed would exit unorthodoxy at the same 2 percent interest rate as it entered unorthodoxy: The federal funds rate was at 2 percent when it started financing its loans and securities purchases by increasing reserves and the balance sheet.

This exit strategy could be announced to the markets with a degree of precision that the FOMC deems appropriate for preserving flexibility. Of course, the FOMC would not instruct the Trading Desk to reduce reserves by the full amount on the day of the FOMC decision. Rather it would be spread out over weeks or months, and the Trading Desk should be given discretion to determine the best smoothing. Moreover, policy makers could treat this exit rule as an exit guideline rather than a mechanical formula to be followed literally, much as a policy rule for the interest rate is treated as a guideline rather than mechanical formula. They would vote on how much to reduce reserves at each meeting along with the interest rate vote. Note that the exit rule would we working in tandem with a policy rule for the interest rate, such as the Taylor rule.

Perhaps the biggest advantage of such an exit strategy is that it is predictable. It would reduce current uncertainty about the Fed's unwinding while providing enough flexibility to adjust if the exit appears to be too rapid or too slow. The strategy would likely have a beneficial effect on bank lending and thereby remove a barrier to more rapid growth: Some banks are apparently reluctant to buy mortgage securities because of uncertainty about the prices of the securities during a Fed exit. This strategy would reduce that uncertainty and allow market participants to start pricing securities with some basis for predicting Fed policy during the exit.

There are alternative exit rules. But whether policy makers choose this particular exit rule or another, it is essential that they develop and articulate one now.

Conclusion

My assessment of the Fed's extraordinary measures during the crisis is divided into three periods: pre-panic, panic, and post panic, where the period of the panic is from September to November 2008. While such assessments are inherently difficult and uncertain, I found that the measures taken before the panic did not work and likely worsened the crisis leading to the severe panic. The measures taken during the panic likely helped rebuild confidence and stabilize markets. The measures taken after the panic have had a rather small impact. The longer term consequences of these measures are negative and include risks to the Fed's independence to conduct monetary policy, risks of inflation, and uncertainty about the impact of an exit strategy.

In designing an exit strategy from these measures, it is important not only to list the instruments but also to describe the destination—the monetary framework—that the Fed is exiting to. It is also important to describe how the instruments will be changed over time in order to reach that monetary framework. I proposed a simple exit rule which illustrates such a strategy and which would increase predictability and reduce the negative impact of the exit.

Table 1

Extraordinary Federal Reserve Measures Affecting the Balance Sheet

TAF (Term Auction Facility)	December 2007
SWAPS (Loans to Foreign Central Banks)	December 2007
PDCF (Primary Dealer Credit Facility)	March 2008*
Bailout of Bear Stearns (Loan through JP Morgan Chase, Maiden Lane I)	March 2008
Bailout of AIG (Loan to AIG, Maiden Lane II and III, AIA-ALICO)	September 2008
AMLF (Asset-Backed Com. Paper Money Mkt Mutual Fund Liq. Facility)	September 2008*
CPFF (Commercial Paper Funding Facility)	October 2008*
MMIFF (Money Market Investors Funding Facility)	October 2008*
MBS (Mortgage Backed Securities Purchase Program)	November 2008
TALF (Term Asset-Backed Securities Loan Facility)	November 2008

*These facilities are now closed, MMIF in October 2009 and PDCF, AMLF, CPFF in February 2010. The Fed has also purchased the debt of Fannie Mae, Freddie Mac, and the Federal Home Loan Banks as well as longer term Treasury securities during this period.

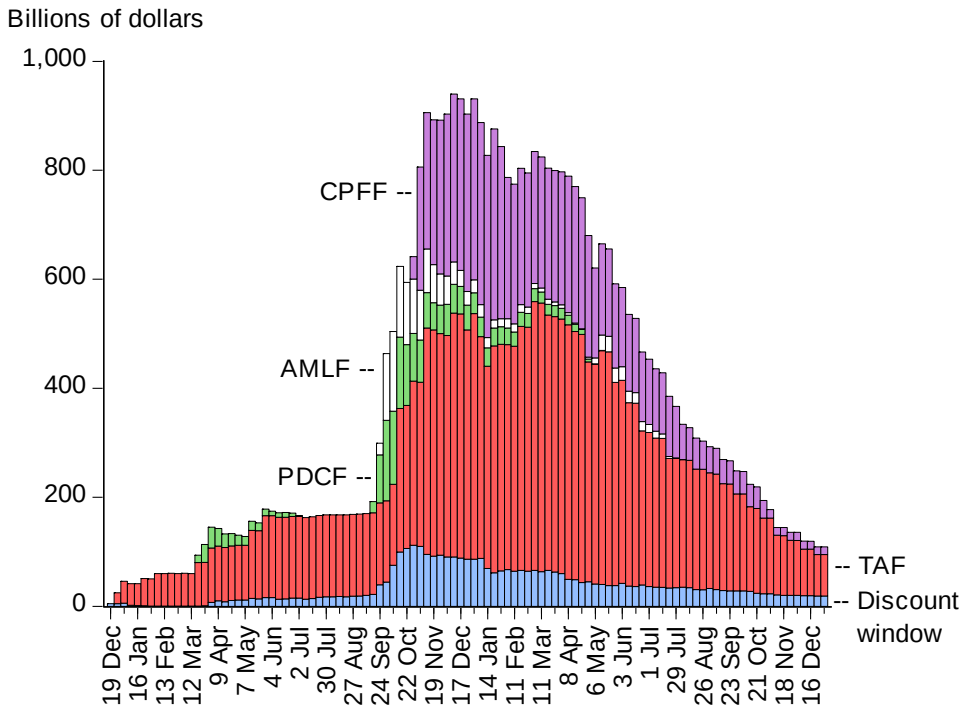

Figure 1

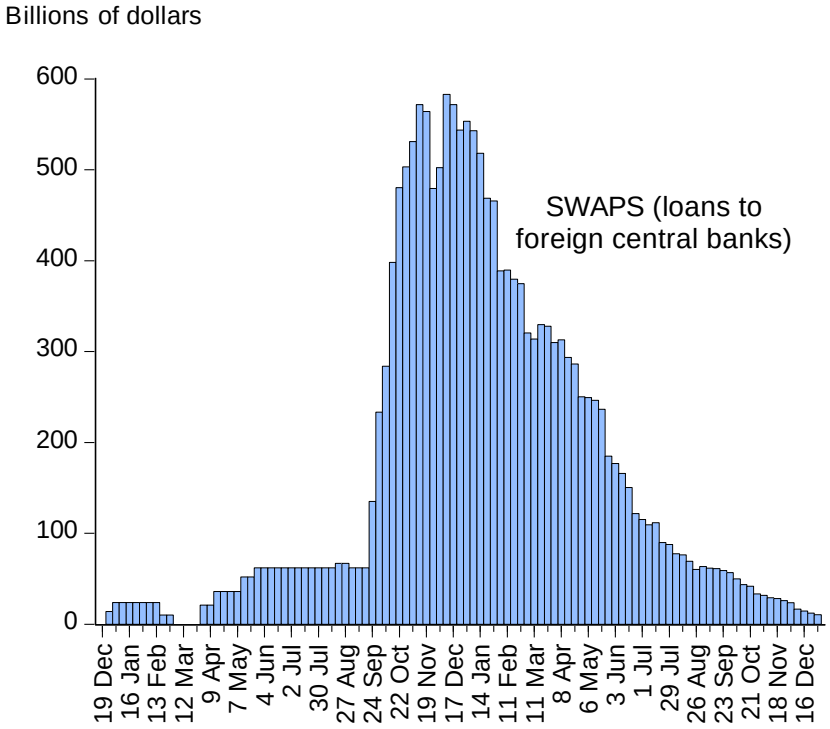

Figure 2

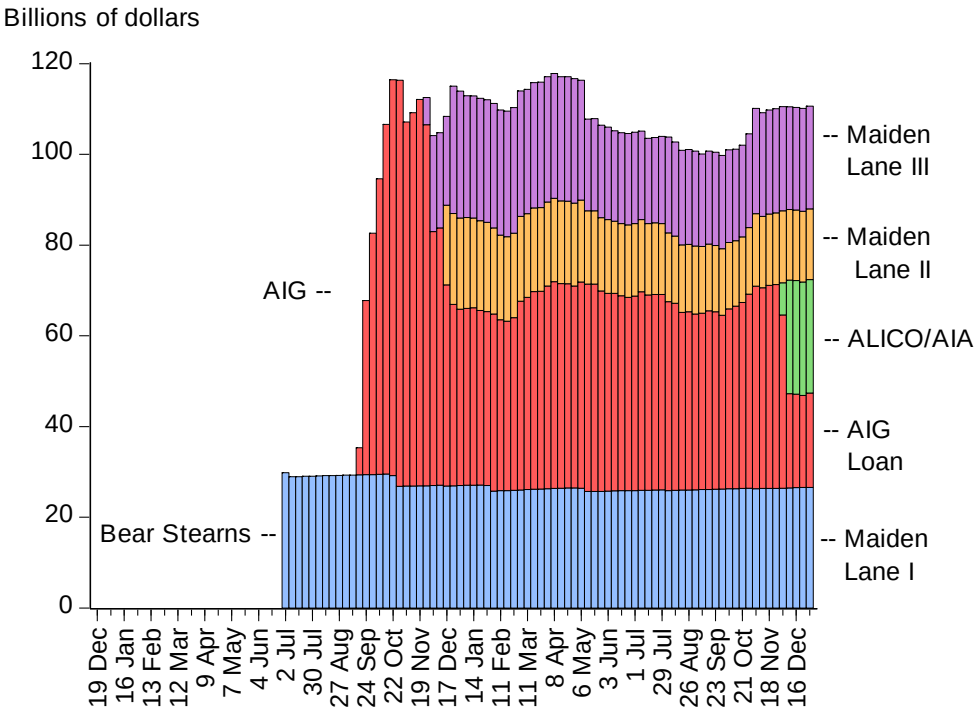

Figure 3

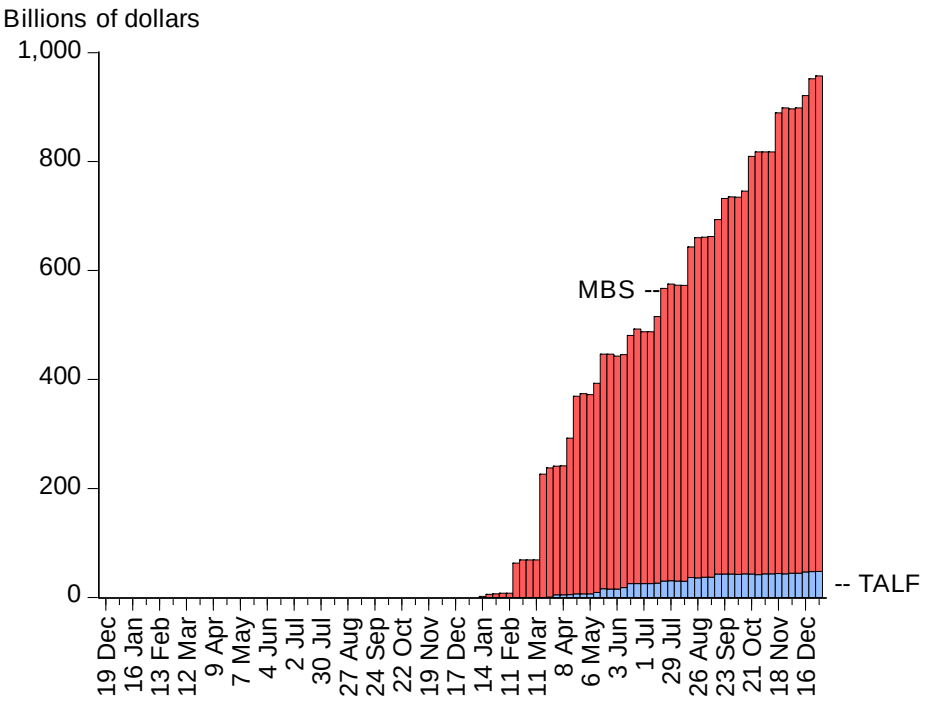

Figure 4

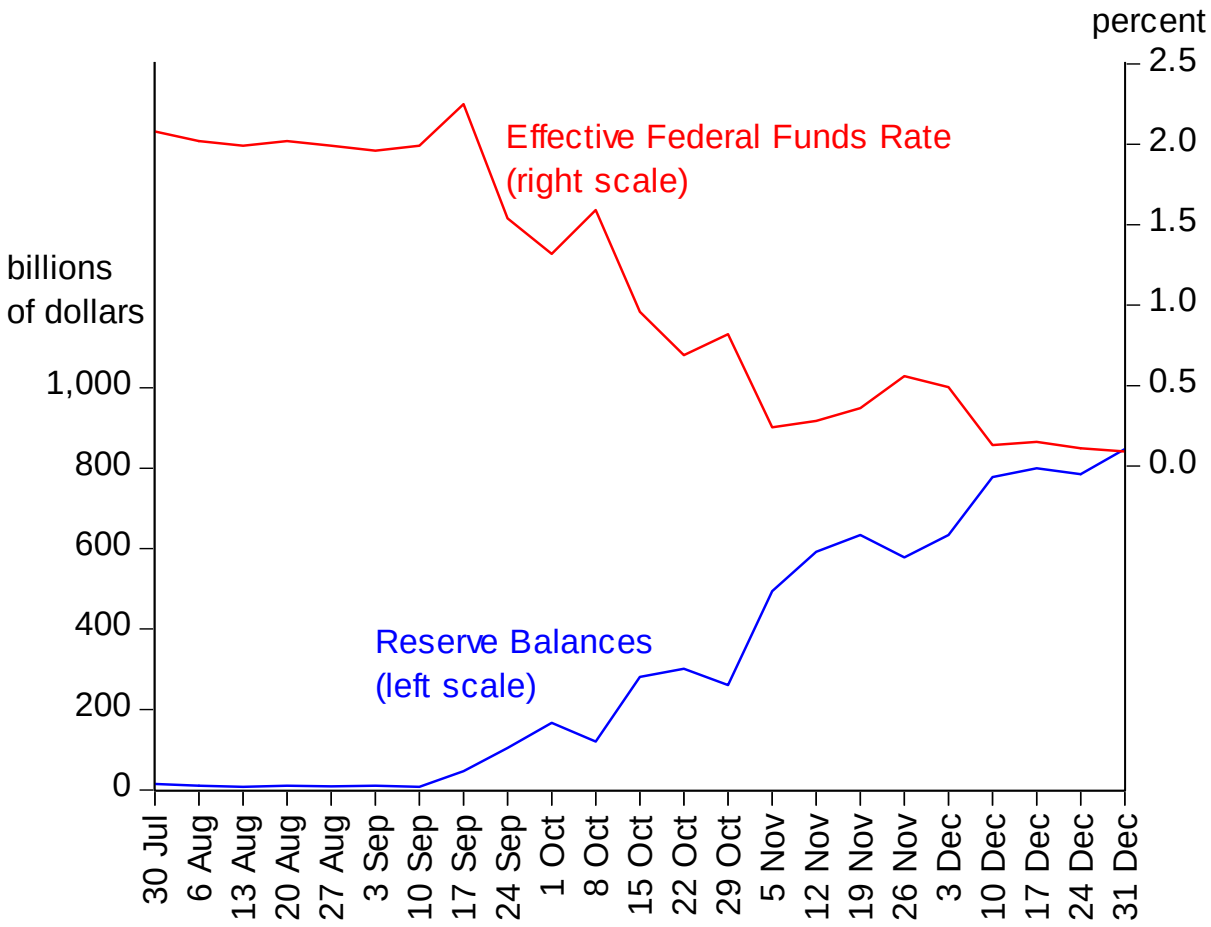
percent
billions
of dollars
Effective Federal Funds Rate
(right scale)
Reserve Balances
(left scale)
2.5
2.0
1.5
1.0
0.5
0.0
1,000
800
600
400
200
0
30 Jul
6 Aug
13 Aug
20 Aug
27 Aug
3 Sep
10 Sep
17 Sep
24 Sep
1 Oct
8 Oct
15 Oct
22 Oct
29 Oct
5 Nov
12 Nov
19 Nov
26 Nov
3 Dec
10 Dec
17 Dec
24 Dec
31 Dec

Figure 5

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