

The Need to Return to a Monetary Framework

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This paper examines the 100-fold increase in reserve balances at the Federal Reserve during 2008. By looking at the balance sheet of the Federal Reserve and factors influencing the supply and demand for reserves, the paper shows that the increase was due to large purchases of securities and loans to certain sectors and institutions. Such actions constitute a combination of monetary policy and industrial policy, or a mondustral policy. This characterization raises questions about the future of the Federal Reserve and suggests the need to return to a monetary framework that controls the money supply while the interest rate is zero and establishes rules for setting the interest rate.

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In mid-September 2008, the Federal Reserve began creating money at an amazingly rapid pace. For the week ending September 10, banks and other depository institutions held \$8 billion in deposits at the Federal Reserve. By the week ending

December 31, 2008, they held \$848 billion. Such deposits are commonly called “reserve balances.” They are the key component—along with currency—of base money or central bank money that the Federal Reserve is responsible for controlling. Hence, the Federal Reserve had increased the supply of reserve balances by 100-fold in a very short period of time.

Although the reasons for the unprecedented increase are complex, it is important to try to understand it and explain it as simply as possible. To do so, one must delve into the details of the Federal Reserve’s balance sheet and sort out forces likely to shift the supply and demand for reserve balances in a financial crisis. In this paper, I use a series of graphs to show what happened to the major items on the balance sheet during this period and then identify the key factors underlying the increase in reserve balances. I show that the increase came about as a direct result of the Federal Reserve’s decision to purchase securities and make loans to certain sectors and institutions.

Effectively, the Federal Reserve financed these securities purchases and loans by creating reserve balances—creating money. The increase in the supply of reserve balances was not, for the most part, a result of the Federal Reserve accommodating an increase in the demand for money (or a reduction in desired velocity), as had occurred in

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earlier episodes of sharp increases in reserve balances, such as around September 11, 2001. Nor was it the result of the New York Federal Reserve's trading desk adjusting reserve balances to implement the interest rate directive of the Federal Open Market Committee (FOMC); in fact the increase in reserve balances drove the federal funds rate way below the FOMC's directives at the time. And it was certainly not the result of decisions to increase the growth rate of the money supply by a certain calibrated amount in order to affect the real economy or inflation. Rather it is best characterized as an industrial policy—assisting certain sectors and firms—financed by monetary policy. The combination might be called *mondustrial* policy.

This characterization of the reasons for the large increase in reserve balances raises a number of important public policy questions and governance issues that deserve a wide and thorough discussion. In my view, it is important to return as quickly as possible to a clear monetary policy framework. The empirical evidence I summarized in Taylor [2009] shows that a failure of government to follow clear principles should be at the top of the list of causes of this severe financial crisis. The federal funds rate is now effectively zero and cannot go lower. The reduction in the effective federal funds rate from 2 percent, where it was when the large expansion of money began, to 0 percent was a direct result of the massive increase in central bank money. The FOMC decisions to lower the target for the federal funds rate followed the declines in the federal funds rate, effectively ratifying them. But whatever the reason, as long as the overnight interest rate is at zero, the monetary policy framework needs to focus on the level or the growth rate of the quantity of money. As soon as conditions warrant, the policy framework should again focus on systematic rules and procedures for setting the overnight interest rate—a policy that works well, as has been demonstrated during the great moderation period of the past quarter century. If policy does not go back to a monetary policy framework, then questions should be raised about the fundamental role, independence, and governance structure of the Federal Reserve.

I begin by laying out a conceptual way to think about such a framework and then examine actual policy. My empirical analysis covers the period through December 31, 2008, the latest day data were available when this paper was presented. Updates of the charts will be made available over time.

1. A Conceptual Framework

A wide variety of monetary policy frameworks have been discussed and debated over the years. Among frameworks that focus on the instruments of monetary policy, there are two broad types: those that focus on the interest rate and those that focus on the quantity of money. Among the latter, we have seen various quantity measures proposed, including the monetary base, several of the monetary aggregates, reserves, free reserves, and borrowed reserves. Because the overnight federal funds rate has a lower bound of zero, even a monetary policy framework that usually focuses on the interest rate needs to make use of a quantity measure when the interest rate hits zero.

Figure 1 summarizes a conceptual way to think about such a framework. I originally designed this diagram for the Bank of Japan while an adviser in the 1990s [Taylor 2001]. The inflation rate is on the vertical axis and the output gap is on the horizontal axis. The numbers in italics are the interest rate settings according to the Taylor rule.¹ The downward sloping line shows when the lower bound on the interest rate is hit according to such a rule. It is obtained by substituting a zero interest rate into a Taylor rule. For the area below the line, the interest rate is zero and policymakers must look at some quantity, such as the money supply or the monetary base; this is the region of quantitative easing. In this lower region, policymakers could use Milton Friedman's famous constant growth rate rule, or the money base rule proposed by McCallum [1988]. Or policymakers could design another procedure for determining the quantity based on economic principles. For the Friedman rule, a monetary aggregate would grow at a constant rate, say 4 percent. For the McCallum rule the growth of the monetary base is flexible, but would be around 4 percent according to conditions near the end of 2008.

Figure 1 illustrates that one should not think of quantitative easing as a separate or different framework for monetary policy, but rather as part of a broader framework. Any point in the region below the line is clearly undesirable, and the hope is that policy will help take the economy back above

¹The Taylor rule may be expressed as:

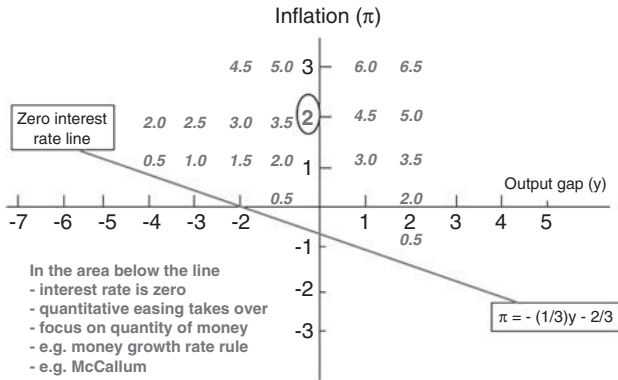
(1) $r = 1.5p + 0.5y + 1$, or

(2) $r = p + 0.5y + 0.5(p-2) + 2$,

where r is the federal funds rate, p is the inflation rate, y is the real GDP gap.

A brief discussion is contained in Taylor [2007].

Figure 1. A Monetary Framework that Incorporates Quantitative Easing



the line as soon as possible. Christiano and Rostagno [2001] have shown how such a broader framework could work technically, incorporating it into a macroeconomic model, although they assume that policymakers start targeting money growth when actual money growth falls below a certain level rather than when a combination of inflation and the output gap falls below zero.

The federal funds rate went to zero in the last quarter of 2008, so the Federal Reserve has gone into the quantitative easing region. In the next section, I examine the Federal Reserve’s balance sheet and try to characterize the type of quantitative easing that has been followed. I start by showing that the increases in reserve balances are orders of magnitude greater than the money growth rates proposed by McCallum or Friedman.

2. The Explosion of Reserve Balances

Figure 2 illustrates the unprecedented nature of the increase in reserve balances. For years reserve balances had usually fluctuated around the 7–12 billion dollar range; by adjusting the amount of reserve balances—largely through open market operations—the trading desk of the New York Federal Reserve carried out the directives of the FOMC in maintaining its overnight federal funds target.

The only exception before 2008 was the relatively small blip around September 22, 2001, when physical damage and delays in the payments system increased the demand for reserve balances by banks, and the Federal Reserve masterfully supplied them to keep the payments system running smoothly.

Figure 2. Reserve Balances 2000–2008

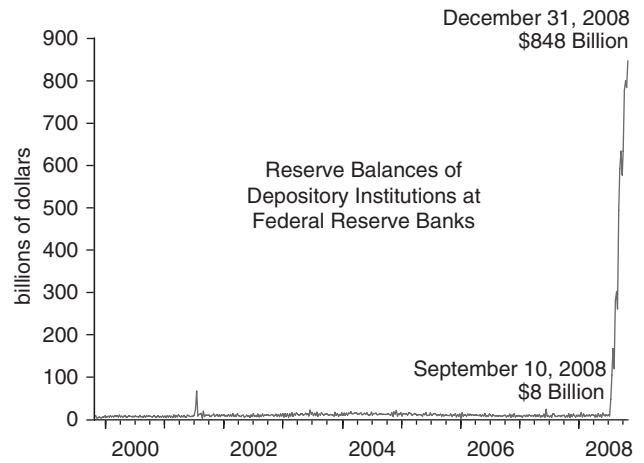


Figure 3. Reserve Balances, Weekly Averages, June 27 to November 28, 2001

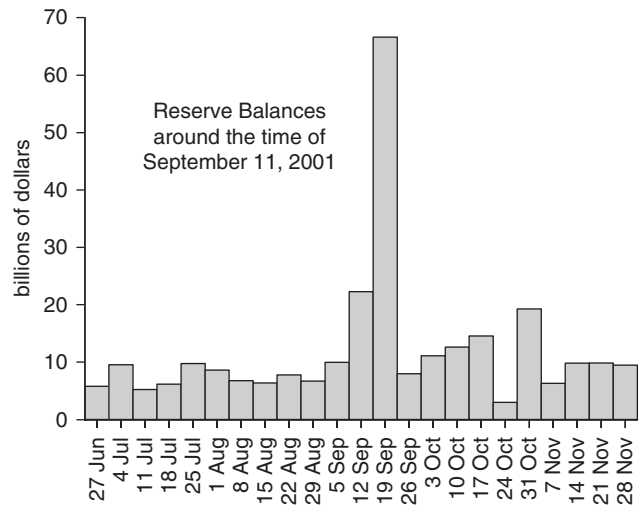


Figure 3 shows in more detail what happened during that 9/11 period. Observe how the supply of reserves were first increased and then were drawn down equally rapidly. Although this looks like a small blip in Figure 2, it was viewed as very large and unusual at the time. I can attest to this because I had just completed a research project [Taylor 2000] on the New York Federal Reserve’s trading desk operations in the late 1990s; around the time of 9/11 Donald Kohn, then on the staff of the Federal Reserve Board, kindly shared the daily numbers with me while I was at the U.S. Treasury

Figure 4. Reserve Balances, Weekly Average, Wednesday Levels, July 30 to December 31, 2008

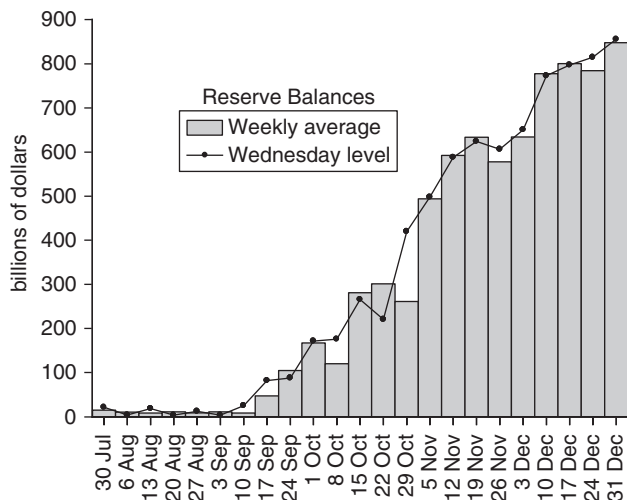
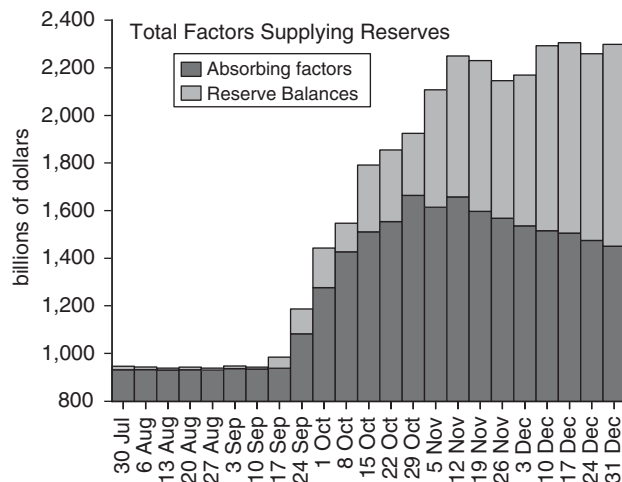


Figure 5. Reserve Balances: Equal to Supplying Factors Less Absorbing Factors



and we marveled together at their size and at the rapidity at which they came and went. The increase in reserve balances in 2008 differed in both magnitude and timing from that in 2001. To see this, compare Figure 3 with Figure 4, which gives the weekly details for 2008. Observe that the increase in reserve balances was much larger and was not quickly withdrawn in the later period. I show both weekly averages and Wednesday levels in Figure 4. Daily data on the Federal Reserve’s balance sheet are not released to the public, but by comparing Wednesday levels one can infer a little about daily developments during the week. For example the Wednesday numbers show that the first large increase in reserve balances occurred sometime between September 10 and September 17. This will help us identify the reason for the increase and in particular whether it was due to a shift in demand or supply as I explain below. In the next section, I show how the behavior of the supply of reserve balances can be understood by examining the details of the Federal Reserve’s balance sheet. I focus on the period in Figure 4.

3. Looking Through the Balance Sheet for Reasons Why Reserve Balances Exploded

The Federal Reserve’s balance sheet data are published each week in the Federal Reserve Board H.4.1 release, which is the source of the data used in this paper. Reserve balances are shown as one line in the balance sheet and are best viewed as a

residual that is determined by all the other items on the balance sheet. At the most general level, reserve balances are equal to all factors “supplying reserves” less the all factors (other than reserve balances) “absorbing reserves.” In less technical terms, the factors supplying reserves are essentially all the assets on the Federal Reserve’s balance sheet. The factors absorbing reserves are essentially all the items on the liability side of the Federal Reserve’s balance sheet—except, of course, for reserve balances.

I illustrate this in Figure 5. The total height of the bars in Figure 5 represents the amount in billions of dollars of total factors supplying reserves. (Note that the vertical scale of Figure 5 starts at \$800 billion so that the absorbing factors are quite a bit larger than a first glance at the graph would suggest.) The bottom part of each bar is the amount of factors absorbing these reserves (other than reserve balances). The difference between the two—shown by the upper part of the bars—represents reserve balances; this is the same number found in Figure 4. To determine reserve balances we first examine total factors supplying reserves and then consider the absorbing factors. Observe that neither the supplying factors nor absorbing factors changed much until September 17. Then both started to increase, but because total supplying factors increased faster, a large gap was created, which accounts for the increase in reserve balances.

A list of the major factors supplying reserves is shown in Table 1. There are other factors including

Table 1. The Major Factors Supplying Reserves

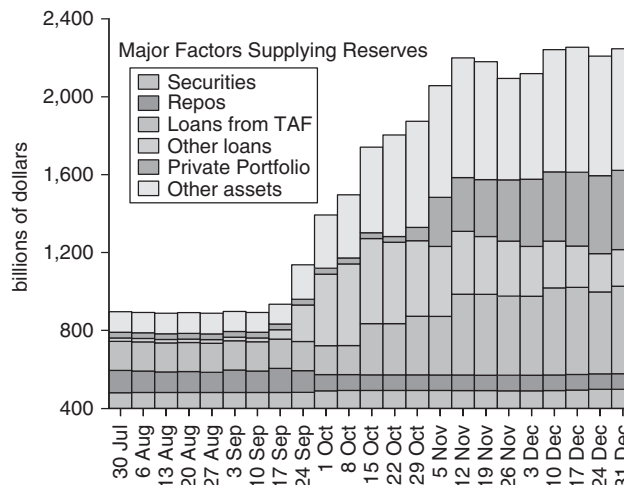
Securities (Treasury and Agency) Held Outright
Repos
<i>Loans from the TAF</i>
Other Loans
<ul style="list-style-type: none"> ● Primary Credit Facility (discount window) ● <i>Primary Dealer Credit Facility</i> ● <i>Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility</i> ● <i>Loans to AIG</i> ● <i>Term Asset-Backed Securities Loan Facility (credit card, student, auto)*</i>
Private Portfolio holdings
<ul style="list-style-type: none"> ● <i>Commercial Paper Funding Facility</i> ● <i>Maiden Lane I (Bear Stearns)</i> ● <i>Maiden Lane II (AIG)</i> ● <i>Maiden Lane III (AIG)</i> ● <i>Money Market Investor Funding Facility*</i> ● <i>Mortgage Backed Securities Purchase Program*</i>
Other Federal Reserve Assets (<i>very large loans to foreign central banks</i>)

Note: New programs have an italic font. An asterisk represents a program that was yet not activated at the time of presenting this paper on January 3, 2008.

the gold stock, special drawing rights (SDR) of the IMF, Treasury currency outstanding, seasonal and secondary discount loans, and float, but these either did not change during the period in question or changed by a minimal amount. A few of the items in Table 1 are familiar to students of economics as the classic ways that the Federal Reserve controls reserve balances and the money supply. These are the items with the regular font. In classic open market operations, the Federal Reserve buys and sells securities (the first line) and thereby increases or decreases the supply of reserves. When it engages in repurchase agreements (repos in the second line) it supplies reserves; repos have traditionally been reserved for relatively temporary injections of reserve balances. The primary credit facility is the classic discount window; when banks borrow from the Federal Reserve, their reserve balances increase. The last line in Table 1, “Other Federal Reserve Assets,” is largely loans to foreign central banks, which also increase reserve balances.

Most of the items in Table 1, however, did not exist before the financial crisis and have been created as a result of the financial crisis. I have marked these new items in the italic font. The first new facility was the Term Auction Facility (TAF),

Figure 6. Developments over Time in Major Factors Supplying Reserves



created in December 2007. The Primary Dealer Credit Facility (PDCF) was created in March 2008 around the time of the Bear Stearns intervention. The rest of the new loan items were created in the last few months of 2008 and are discussed below. In addition, the Federal Reserve now has a portfolio of private assets on its books, such as commercial paper and assets from Bear Stearns and AIG. I used italic font for the description in parentheses under “other federal reserve assets” because this has increased by a huge amount since the crisis began and is therefore as unusual as the other italicized items.

I will now examine the behavior of each of the items during the period that reserve balances increased. Figures 6–8 show the time patterns for each of the items during the period under study. Figure 6 corresponds to the six main categories in Table 1 including the categories “other loans” and “private portfolio holdings.” Figure 7 then shows the details for other loans, and Figure 8 shows the details for private portfolio holdings. By moving back and forth between these three figures you can see where most of the action has been.

Figure 6 makes it clear that almost all of increase in supply was due to purchases of securities and loans from the new Federal Reserve facilities. The term auction facility, the private portfolios, and the new loans to foreign central banks show the largest increases by the end of the year. Among these three categories, loans to foreign central banks show the largest increase. They jumped

Figure 7. Components of the Other Loan Category on the Federal Reserve's Balance Sheet

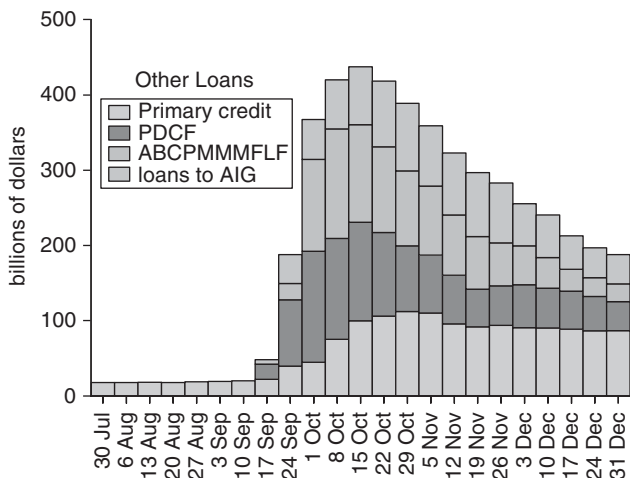


Figure 9. Changes over Time in the Factors Absorbing Reserves

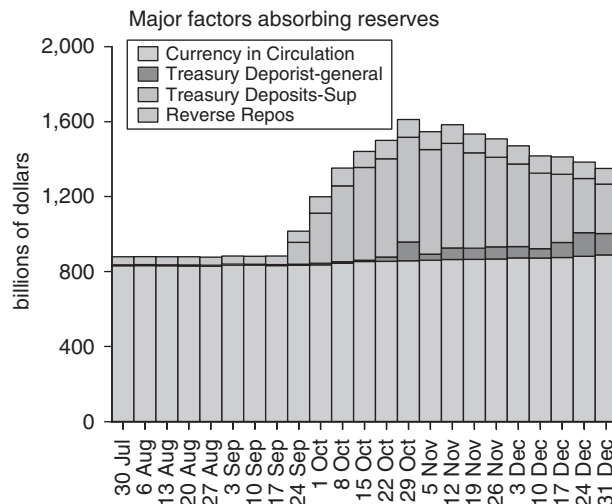
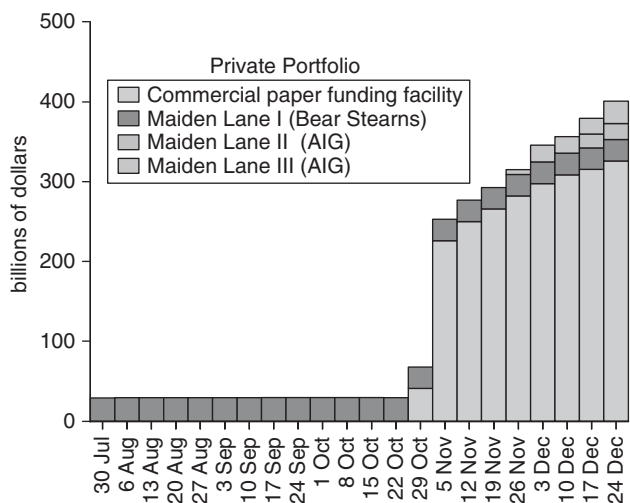


Figure 8. Components of the Private Portfolio on the Federal Reserve's Balance Sheet



Commercial Paper Money Market Mutual Fund Liquidity Facility were also large. Later in the period depository institutions upped their primary credit borrowing from the discount window.

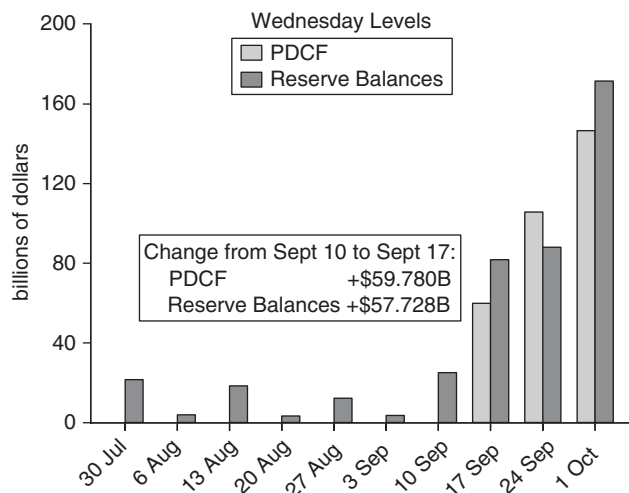
Figure 8 shows that the biggest part of the private portfolio as of the end of 2008 was for the holdings of commercial paper. The Commercial Paper Funding Facility was created in late October to relieve pressures in the commercial paper market, and shows the biggest increase at that time. The three Maiden Lane portfolios consist of the assets from AIG and Bear Stearns. These are comparatively smaller, though still large in absolute amount.

Finally we can look at the factors absorbing reserves in Figure 9. By far the largest change in this item was a special supplementary deposits program of the U.S. Treasury. Under this program the Treasury would borrow funds and deposit them at the Federal Reserve. Because the Federal Reserve serves as the Treasury's bank, the Treasury always has some deposits at the Federal Reserve, and these increased somewhat in November and December. But this increase was small compared with the \$500 billion increase in deposits by the end of October through the special supplementary program. However, this special account was being drawn down by the end of the year. This drawdown has led to a decline in the total amount of absorbing factors and a corresponding increase in reserve balances as shown back in Figure 5.

from \$40 billion in September to \$600 billion in November (recall these loans are in the "other federal reserve asset" category). Neither of the two traditional ways to increase reserves—securities and repos—moved much at all.

Figure 7 shows that early-on the largest increase was due to the loans from the PDCF, which were in turn due to extensive demand for borrowing after the bankruptcy of Lehman Brothers. Loans to AIG and the new Asset Backed

Figure 10. The Close Correlation between Reserve Balances and the PDCF



Now, what does one learn from wading through all these data besides a greater understanding of the dynamics of the Federal Reserve's assets and liabilities? Most important is that the real reason for the large increase in reserve balances was most likely an increase in supply rather than such alternative reasons as accommodation of an increase in the demand for reserves, the payment of interest on reserves, an exogenous decline in the money multiplier, or an increase in the demand for the monetary aggregates, as some have argued or believed. We will want to consider these other possibilities and other evidence, but this look at the Federal Reserve's balance sheet suggests that a policy of purchasing private securities and making loans to certain sectors and firms has been financed by increasing reserve balances, and that is the reason for the explosion of reserve balances.

Evidence from two Wednesdays

Other considerations bolster this conclusion. Figure 10 focuses on the week of September 17, when reserve balances first rose, and looks at the Wednesday levels rather than the weekly averages. It shows that the increase in loans to investment banks from September 10 to September 17 through the PDCF was very close in size to the increase in reserve balances. This is more evidence that the PDCF increase was being financed by central bank money creation.

Figure 10 raises other questions. September 17 was the first week since the beginning of the crisis that the Federal Reserve did not "sterilize" the increase in loans by selling off some of its securities. But why did it stop sterilizing? Was the Federal Reserve concerned that the stock of Treasury securities was already too low? Although it had been depleted during the first year of the crisis, it was still over \$400 billion. Perhaps the Federal Reserve wanted to be able to loan these securities as part of its term securities lending program.

Another possible answer is that the Federal Reserve simply decided that making loans through the PDCF at that time was so essential that it should be done even if it could not be sterilized, even if that created a downward pressure on the funds rate. A third possibility was that the Federal Reserve was hoping to pay interest on reserves and the Federal Reserve thought that doing so would keep the funds rate from declining even with a large increase in reserve balances.

Evidence in an FAQ

More direct evidence that the increase in reserves was due to a shift in supply is a posting on the New York Federal Reserve's web page stating that this would be the policy going forward, implying that this was the policy all along. In particular an FAQ posted on December 30, 2008 as part of the new Mortgage-Backed Securities (MBS) purchase program was:

- Q: How will purchases under the agency MBS program be financed?
 A: Purchases will be financed through the creation of additional bank reserves.

Although this question and answer only pertains to the MBS program, one might presume that the intention was to finance other securities purchases and loans by money creation. It is this perspective that leads one to think of the policy as a combination of industrial policy and monetary policy, and to use the term *mondustral policy*.

4. Identifying Shifts in Supply and Demand

Now let us consider some of the other explanations. One is that the Federal Reserve accommodated an increased demand for reserves by banks, as it apparently did around 9/11, due to a flight to safety. If there were such a shift in demand one would expect there to have been upward

pressure on the federal funds interest rate; an accommodative supply response would then have alleviated that upward pressure, but would not have created downward pressure.

Figure 11 plots the federal funds rate along with reserve balances during this period using a dual scale. Observe that there is a close negative correlation between the interest rate and the quantity of reserve balances during this period. Clearly, there was downward pressure on the interest rate, rather than upward pressure. Figure 11 looks like the effects of a supply curve moving out along a downward sloping demand curve for reserves, rather than a demand curve moving out along a supply curve, even if that supply curve was itself moving out with demand as in the case of a classic accommodation move.

The decisions of the FOMC during this period are useful to examine in this context. The FOMC voted to cut the federal funds rate three times during this period. On October 8 it voted to cut it to 1.5 percent from 2.0 percent. But for the two weeks ending October 8 the effective federal funds rate was already well below 2.0 percent, averaging 1.45 percent. On October 29, the FOMC voted to cut the federal funds rate to 1.0 percent from 1.5 percent; but for the two weeks ending October 29, the effective federal funds rate was already below 1.5 percent, averaging 0.76 percent. On December 16, the FOMC voted to take the funds rate to a range of from 0 to 0.25 percent from 1 percent, but the rate was already in that range, averaging 0.14 percent for two weeks ending December 17. Thus,

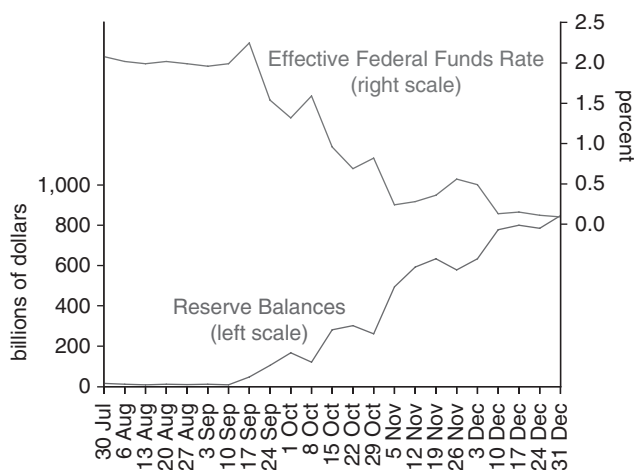
it appears that decisions that resulted in an increase in reserve balances were what drove down the funds rate rather than the FOMC's votes about the rate. Only after the fact did the FOMC vote to take the rates down. A subject for future research is why, as shown in Figure 11, reserve balances temporarily decreased and the funds rate temporarily rose at the time of the FOMC meetings.

A related explanation for the increase in reserve balances is that the Federal Reserve started paying interest on reserves, which would be expected to increase the quantity of reserve balances demanded. However, the timing is way off for this explanation to make sense. The Federal Reserve announced it would pay interest on reserves on October 6, but reserve balances had already reached about \$200 billion by then. The Federal Reserve altered the formula to effectively pay more on November 5, but reserve balances were already at \$500 billion by then. It does not appear that paying interest on reserves was much of a factor in the rapid growth of reserve balances.

Yet another explanation is that there was an increase in the demand for currency, demand deposits, and other checkable deposits by the public. Such an increase could have generated an increased demand for central bank money. In fact both currency and demand deposits rose quite rapidly during this period as shown in Figure 12, reflecting lower interest rates and flight from money market mutual funds.

However, both currency and demand deposits rose much less rapidly than reserve balances, as shown in Figure 13, which compares M1 with reserve balances plus currency. Hence the multiplier fell sharply.

Figure 11. The Federal Funds Rate and Reserve Balances



5. Concluding Remarks

The purpose of this paper has been to explain how the explosion of reserve balances in the last few months of 2008 came about. Although some have pointed to an increase in the demand for money or reserves due to flight to quality during the financial crisis, this examination of the dynamics of the Federal Reserve's balance sheet and other factors shows that it was due to the increase in loans and securities purchased by the Federal Reserve in order to assist specific firms and sectors. There are three ways to finance such securities purchases and loans: one is for the Federal Reserve to borrow, the second is for the Treasury to borrow and deposit the funds at the Federal Reserve, and the third is

Figure 12. Growth of Currency and Demand Deposits in 2008

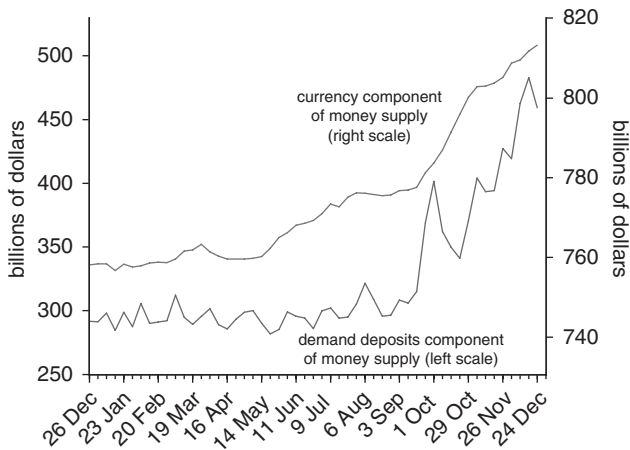
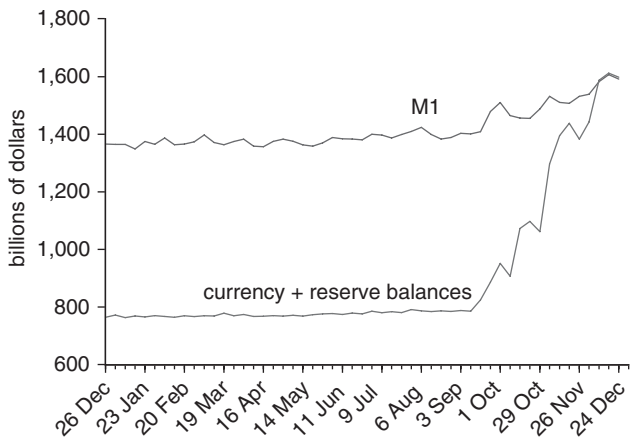


Figure 13. M1 and Currency plus Reserve Balances



for the Federal Reserve to print money, that is create bank deposits at Federal Reserve Banks. So far the Federal Reserve has mainly used the third method. It has used the second to some extent and it has avoided the first completely. Although the first and the second methods have the advantage of not increasing the supply of money more than is desired for price stability purposes, they raise legal and political issues about using Treasury or Federal Reserve borrowing to allow the Federal Reserve to invest in certain sectors or firms without specific authorization. If we are to have an extensive industrial policy, it should be approved by the Congress with the purposes stated and debated transparently.

But rather than go further in this direction it would be more appropriate for the Federal Reserve to begin to move back to monetary policy rather than what I have called here mondustral policy. The FOMC could start by reducing the growth of reserve balances and or even bringing them down. It could ask the Federal Reserve staff to study the impact of various growth rates for the quantity of reserve balances or the money supply, and discuss and vote on these quantities, at least until such time as the interest rate goes above zero. The Federal Reserve could refrain from using the Treasury to borrow funds for these specific interventions by the Federal Reserve. It could state that it does not plan to borrow itself in order to finance loans to certain markets and sectors.

It may be difficult for the Federal Reserve to move in this direction or to exit from its current policy. It is already going down a path to purchase \$700 billion more in securities backed by mortgages, credit card debt, student loans, and auto loans. It has stated that these actions are necessary because of the financial crisis. But are there no limits to increasing the size of such purchases in the future? And once the Federal Reserve owns these securities, they will be politically difficult to sell.

But if the Federal Reserve does not move in this direction, a number of questions need to be asked. What justification is there for an independent government agency to engage in such industrial policy? What is the role of District Bank presidents vs. Board members in making such decisions? How can one continue to apply the Section 13(3) “unusual and exigent” clause of the Federal Reserve Act when firms and people assisted can get credit but at a rate that seems too high? Will such interventions only take place in recessions? Or will future Federal Reserve officials use them to try to make economic expansions stronger or to assist certain sectors and industries for other reasons?

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