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Since August 2007 the Board of Governors of the Federal Reserve System (Fed) has approached near panic in their adoption of multiple and inconsistent traditional policy measures and, since December 2007, they have multiplied these efforts by adopting major new policy tools, some of which may go well beyond their congressional mandate. These actions have been motivated, in the first instance, by an emerging mortgage foreclosure crisis that began in late-2006 and that the Fed first recognized in May 2007, in the second instance by a credit crisis that emerged in August in Europe and quickly moved on shore. This article summarizes and explains the Fed actions since last August.

Normal policy actions

The Fed conducts monetary policy primarily through setting a federal funds rate target and a primary credit rate (formerly called the discount rate). The federal funds rate is the rate at which depository institutions (banks) borrow or lend funds held in their deposit accounts at the Fed. This rate is agreed between borrower and lender institutions on individual loan transactions, generally overnight. The Fed attempts to intervene in Treasury security market through open market operations, which are the purchase or sale of Treasury securities with primary security dealers, in order to change the amount of depository institutions' deposits at the Fed. The Fed does this in order to influence the federal funds rate and to keep the monthly average of daily average rates at its target rate. The primary credit rate is the rate at which qualifying depository institutions can borrow from the Fed directly, again generally overnight. Borrowing from the Fed is not common or frequent for banks.

Table 1 shows the multiple, frequent and sometimes large changes in the federal funds target rate and discount rate since August 2007. There are two large changes in the federal funds rate that equaled 75 basis points, one in January at an unscheduled meeting, followed up eight days later with another 50 basis point cut. Either the situation was deteriorating faster than at any time in history, or the changes reflected some degree of hesitancy or indecision on the part of the Fed. Note that the lead-off action was a cut in the discount rate in August 2007. This reflects the character of the problem. Apparently, the Fed's primary concern was to direct credit to financial institutions most in need of liquidity assistance instead of sending a generalized signal of easier credit as indicated by a federal funds rate cut. The narrowing of the spread between the federal funds rate and primary credit rate also reflects a decision to make credit easier for borrowing banks since the spread had been fixed by policy since 2004.

Another set of actions that constitute normal policy responses to international financial market disruptions are swaps loans of U.S. dollars for foreign currencies. Pressures in credit markets abroad led the Fed, the European Central Bank and the Swiss National Bank to agree to bilateral swap arrangements of $20 billion and $4 billion, respectively, on December 7, 2007, and to extend and increase them to $30 billion and $6 billion on March 11, 2008. These actions were generally perceived to have reduced the liquidity

shortfall of dollars in Europe and London and to bring down the London Interbank Borrowing Rate (LIBOR), which had spiked up relative to the fed funds rate.

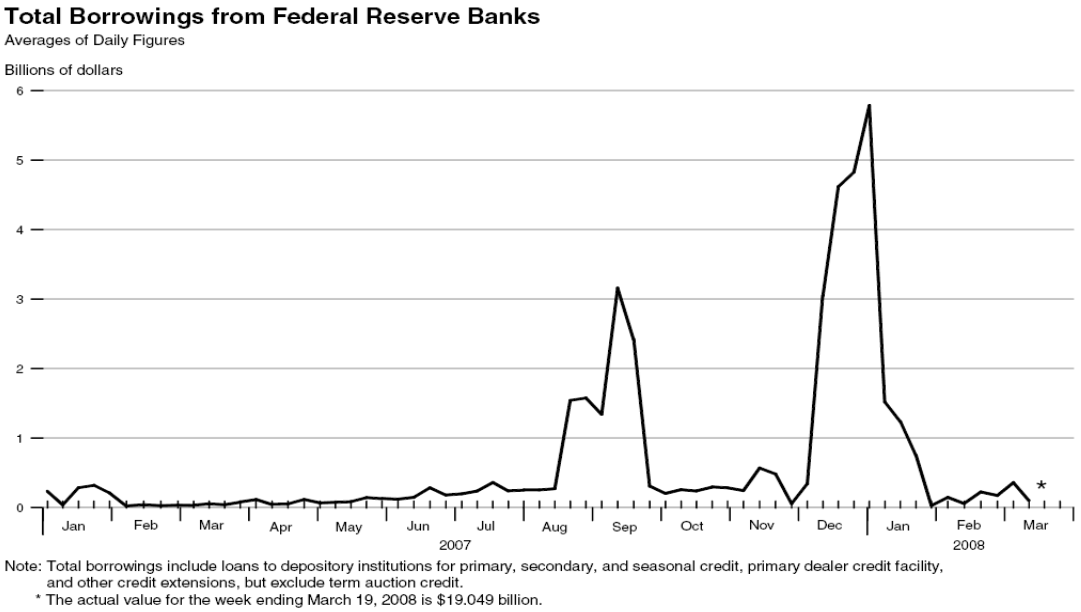
Table 1: "Normal" Policy Actions since January 2007

Federal funds rate (%)	Change (basis points)	Primary credit rate (%)	Change (basis points)	Effective date	Spread (primary credit – fed funds)	Scheduled meeting
5.25%	25	6.25	25	6/29/06	100	Yes
NA	NA	5.75	-50	8/17/07	50	No
4.75	-50	5.25	-50	9/8/07	50	Yes
4.50	-25	5.00	-25	10/31/07	50	Yes
4.25	-25	4.75	-25	12/11/07	50	Yes
3.50	-75	4.00	-75	1/22/08	50	No
3.00	-25	3.50	-50	1/30/08	50	Yes
2.25	-75	2.50	-100	3/18/08	25	Yes

Source: Federal Reserve Bank of St. Louis (FRED)

New policy actions

Throughout the credit crunch, the Fed has exhibited a profound concern for directing credit to the financial sector where the evidence of the credit crunch was believed to be greatest. In August and September 2007 and again in December 2007, there were large surges in borrowing from the Fed through discount lending to banks. Financial market conditions apparently deteriorated again in March 2008. As a result, the Fed created new a credit program in December 2007 and took several new steps in March 2008. The chart below from the Federal Reserve Bank of St. Louis shows the unusual surges in borrowing. After March 12, 2008, the data go far beyond the grid.



Source: Federal Reserve Bank of St. Louis, *U.S. Financial Data*, March 21, 2007

The first new credit facility implemented by the Fed is the Term Auction Facility (TAF), announced on December 12, 2007. This facility allows banks to acquire funds in regular auctions for 28 days with the same collateral as would be required for borrowing at the discount window. The amount of funds auctioned is announced ahead of time and the market determines the auction rate at which transactions occur. Initially auction amounts were $20 billion but have been raised to $50 billion. The purpose of the TAF is to overcome the aversion of banks to borrow from the Fed through the discount window. The rates at which banks have borrowed are near the target federal funds rate, allowing for expectations of declines over the next 28 days, an alternative borrowing rate for banks borrowing from another bank.

The second new facility, announced on March 7 and expanded on March 11, 2008, is the Term Security Lending Facility (TSLF), which began on March 27, 2008. This program arose in light of the liquidity and solvency problems at Bear Stearns, which teetered on insolvency on Friday, March 14, 2008, and the potential for contagion or illiquidity at other investment banks. Most large investment banks are also authorized as primary security dealers by the Federal Reserve Bank of New York and are authorized to buy and sell U.S. securities with the Fed. Currently there are 20 primary dealers, but two (Bear Stearns and Countrywide Securities) will disappear soon due to mergers. Bear Stearns agreed to merge with JPMorgan Chase, subject to their board's approval, on March 16, 2008, with the Fed's approval.

The TSLF will provide up to $200 billion in U.S. Treasury securities through a weekly auction of Treasury securities loans to primary dealers for a term of 28 days. The collateral asset is essentially a sort of swap, though not technically called one, with the Fed. It can include government agency debt, including residential mortgage-backed securities (MBS), or AAA/Aaa private label MBS (which some have referred to as the toxic waste of the financial system because they are relatively illiquid due to uncertainties of what each security contains), and commercial MBS. The increased availability of Treasury securities at financial institutions is expected to improve liquidity in the repo market in particular, and to enhance liquidity at financial institutions. There is already an overnight security lending facility (since December 2006), but this new facility adds more certainty to availability of the securities and terms.

A third program that grew out of the sale of Bear Stearns is the extension of credit to cover the potential loss on the least liquid and highest loss potential securities on the books of Bear Stearns. Initially these loans were to Bear Stearns and averaged about $5.5 billion for the week ending March 19, 2008, or $7.74 billion for the five days from March 16 through March 18, 2008. By March 19, 2008 these loans had been repaid. The commitment by the Fed to lend to Bear Stearns was later formalized in the creation of a special investment vehicle (SIV), though the Fed does not refer to it as such. This is the arrangement that banks had used that led to the outbreak of the credit crunch and collapse of the asset backed commercial paper market that had financed bank SIVs in August, 2007. See Williams (2008) for more details. Under the Fed's new SIV, the Fed will lend $29 billion and JPMorgan Chase will lend $1 billion, with the SIV using the proceeds to

acquire $30 billion of the most illiquid and dubious securities from Bear Stearns portfolio. These securities are valued on a "mark-to-market" basis as of March 14, 2008. The SIV will be managed by Black Rock Financial Management, Inc. The interest rate on the Fed's loan will be the primary credit rate and the interest rate on JPMorgan Chase's loan will be the primary credit rate plus 475 basis points. Repayment is to begin no later than the second anniversary date of the loan. The Fed is the effective owner of the SIV because any profit or loss will accrue to the Fed after the first $1 billion loss, which will accrue to JPMorgan Chase. The term of the loans is 10 years, but this term is renewable at the discretion of the Fed.

Most analysts refer to this arrangement as a "bailout" of Bear Stearns. This is a strange notion since Bear Stearns will cease to exist and the biggest losers will be the owners of Bear Stearns, 30 percent of whom are employees. It is understandable, however because of the lack of information on the structure of the loans and closure of Bear Stearns and also because at the outset, the Fed loaned funds to Bear Stearns for a few days. The initial loan from March 14, 2008 was quickly repaid and the existing commitment is to create a Fed-owned SIV which will hold assets that have a mark-to-market value in excess of the Fed loan. Bear Stearns will cease to exist under the arrangement, taken over by JPMorgan Chase at a fire sale price of $10 per share. This means that the owners of Bear Stearns (again, 30 percent of whom are employees) will lose nearly all of their equity in the firm, and many employees will lose their jobs in the transition of ownership to JPMorgan Chase. If there was a bailout, it was for JPMorgan Chase and they are likely to profit handsomely on the transaction. The biggest losers are the owners of Bear Stearns. One implication of the Fed loan, however, is that it creates the expectation that investment banks can be "too big to fail," at least for the four that were larger than Bear Stearns. Another is that the willingness to lend to investment banks now has created questions in political and other circles as to whether investment banks should also be regulated by the Fed. Of course the logic here is tortured because Bear Stearns will go out of business as a condition of the loan, and regulating them would not have protected them from failing. Moreover, the arrangement with JPMorgan Chase is more like a forced merger such as can occur when a bank fails; that is more similar to the bank insurer's function than the Fed's concern.

The fourth new facility created by the Fed is the Primary Dealer Credit Facility, announced on March 16 with initial transactions on March 17, 2008. This facility allows for Fed lending to primary dealers for up to 6 months at the primary credit rate with the normal collateral required for discount lending to banks.

The Fed has largely neutralized their efforts until recently

New and traditional credit facilities have been relatively large but have not carried through fully to the bottom line, the Fed's total assets. The reason is that new loans have been "sterilized" by sales of other assets on the books of the Fed, especially their holding of U.S. government securities. This is somewhat like the way a traditional commercial bank would meet an emergency credit demand by a client: it might reduce credit availability to other customers because of its existing funding. But even today, a commercial bank would recognize that it could meet this new credit demand without

disrupting its business by seeking new funding in the form of deposits in the marketplace. The key textbook distinction between a commercial bank and a central bank is that the latter is unconstrained by its liabilities or its funding. A central bank can print money, so if there is a new credit demand that it wishes to meet, it can print money instead of selling or reducing other assets. This was the great error of the Fed in the Great Depression; it did not expand its assets to produce more money and credit in the economy to stimulate spending. It made this mistake because it acted like a private commercial bank and not a central bank. Ironically, the Fed is doing this again, behaving even more like a commercial bank by aggressively expanding its credit to the private sector.

Table 2 shows key elements of the assets of the Fed at the beginning of the crisis and in the week of March 26, 2008. The data come from the Fed's weekly H.4.1 release for August 2, 2007, the week before the credit crisis component of the mortgage foreclosure crisis, and March 27, 2008, the latest week available. Note first that Securities bought outright have declined dramatically since August 2007. Securities normally account for over 90 percent of Fed assets, but have declined 20.4 percent in the past eight months, an amount equal to 18 percent of current total assets of the Fed. This is a dramatic and unprecedented shrinkage, all the more so at a time when the Fed is expected and claiming to be increasing liquidity and credit in the financial system. Overall total assets rose only $21.7 billion over the period, or about 2.5 percent. Such offsetting of asset acquisitions by sales of other assets is usually restricted to foreign exchange transactions and is referred to as sterilization; in effect, the Fed is sterilizing its credit extensions to financial institutions by liquidating its holding of Treasury securities.

The Fed has switched their credit from the U.S. government to banks and primary dealers, a slight majority of which are affiliated with banks or bank holding companies. Expansion of traditional lending to depository institutions has been trivial, except during a few periods noted above, but new facilities such as the TAF and PDCF have swelled to more than 12 percent of Fed total assets, increasing $113.5 billion since August 1, 2007.

Another category shown in Table 2 is Repurchase agreements (RPs). These are short-term acquisitions of Treasury securities from primary dealers under agreements to be sold back to the primary dealers at a fixed price. Normally these are overnight transactions, but there sometimes are term RPs that can run a few days or even a few weeks. RPs surged, increasing by $59.0 billion over the past eight months. An RP is normally a way the Fed provides funds to support bank reserves temporarily. They indirectly, at least, have an effect of easing the cost pressures on primary dealers by holding down their inventory cost of holding securities, in order to support their business with financial institutions as dealers in Treasury securities. In the current context, they represent another way the Fed is trying to channel credit to depository institutions and investment banks and away from the U.S. government and also to accommodate investment banks' demand for high quality securities by, in effect, borrowing those securities overnight rather than buying outright from them. In effect, the investment banks gain flexibility in their own Treasury security holdings, which is critical to their liquidity and funding requirements. RPs have more than tripled, rising to almost 10 percent of the Fed's assets. If linked with other credit lines shown below in Table 2, credit to financial institutions has risen from

about 3 percent of the Fed's balance sheet at the beginning of the crisis to more than 22 percent of the balance sheet.

Table 2
The Fed has offset most of the new credit by selling securities
Federal Reserve Balance Sheet (millions of dollars)

Selected Assets (average for week ending on date indicated)	March 26, 2008	August 1, 2007	Change
Securities bought outright	$628,977	$790,758	-$161,781
Repurchase agreements	84,821	25,786	59,035
Term auction credit (TAF)	80,000	NA	80,000
Primary credit	550	2	548
Primary dealer Credit facility (PDCF)	32,923	NA	32923
Other credit extensions	0	NA	0
Total credit	113,473	2	113,471
Total assets (end of period)	895,768	874,112	21,656

Source: Board of Governors of the Federal Reserve System

The other new programs discussed above do not currently affect the Fed's balance sheet. The $29 billion loan to fund the acquisition of former Bear Stearns securities will show up in the "other credit extensions" shown in the table, at least if the same practice as was used in the loans during the period March 14-18, 2008 is followed. This loan is not likely to show up until the transaction occurs, most likely on the day that the expected merger of Bear Stearns is completed in a couple of months. The other new facility, the TSLF, began on March 27, 2008 when $75 billion was auctioned in the first weekly auction. Since there is an exchange of collateral securities under this program, there is no effect on overall Fed assets, only their composition.

Prospects

There are numerous issues posed by the Fed's policy actions since last August, especially the necessity and appropriateness of the new credit facilities and whether they, in turn, require that Congress provide new regulatory powers to the Fed. The other concern going forward is how much longer and how severe the financial crisis will become. Alan Greenspan recently answered this question in the *Financial Times*:

> The current financial crisis in the US is likely to be judged as the most wrenching since the end of the Second World War. It will end eventually when home prices

stabilise and with them the value of equity in homes supporting troubled mortgage securities.

Of course, this is not a date certain. It is likely also to be most dependent upon, if not more fully determined by, when the mortgage foreclosure crisis begins to end. Most forecasts of that date are late in 2008 or in 2009 because mortgage resets, contractual increases in payments whether interest rate remain the same or even fall somewhat, on most adjustable rate subprime loans are not expected to ease until then. A second critical factor for the end of the financial crisis is the continuation of rapid monetary aggregate growth with some pass-through to accelerated credit growth. This is perhaps the most important factor in reversing the slowing in spending growth and in credit growth. Given the lag in monetary policy, the fact that it takes some time, perhaps six to nine months, before actions to accelerate the growth of money and credit begin to bear results in terms of higher spending and output, and the fact that monetary aggregates did not accelerate until January 2008, it is going to be awhile before the financial crisis can be laid to rest. Political uncertainties and uncertainties about the prospects for federal tax and spending increases underlying the current economic outlook are also not likely to be resolved soon.

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