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Finance

Current Topics in Corporate Finance and Litigation

About this Newsletter

In this issue of Finance we discuss the size and composition of both U.S. Treasury equity investments and Federal Reserve credit programs, outline alternative mechanisms the Treasury and Fed can use to liquidate their positions, and speculate on the price impacts of the alternative liquidation methods.

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Understanding the Credit Crisis Part 2: Getting Down the Mountain

By George Oldfield, Michael Cragg, and Jehan deFonseka

Introduction

*Mountaineering Rule One: Getting up the mountain is optional, getting down the mountain is mandatory.*¹

Everyone in the securities business knows that it is easy to buy securities at rich prices but hard to sell them that way. The U.S. Treasury (Treasury) and the Federal Reserve (Fed) now have plenty of selling to do. Since the crest of the credit crisis in late 2008, the Treasury has taken equity positions in almost 700 government-sponsored enterprises (GSEs), banks, financial institutions, and automobile manufacturing companies.

In a parallel initiative that dwarfs the Treasury's investments, the Fed has extended approximately \$1.1 trillion in credit by making loans and buying financial instruments beyond its traditional investments in Treasury bills, notes, and bonds. This was the climb up the credit mountain.

This newsletter reviews the size and composition of both Treasury equity investments and Fed credit programs,

outlines alternative mechanisms the Treasury and Fed can use to liquidate their positions, and speculates on the price impacts of the alternative liquidation methods. One conclusion is clear: no easy route down the credit mountain exists, and some routes are fraught with peril.

The Treasury holds a tricky sort of margined vulture equity fund, while the Fed holds a mortgage-based hedge fund that creates the potential monetary nightmare of general price inflation. In combination, these two public sector investment positions also create the conditions for a perilous descent down the litigation mountain that is growing parallel to the credit mountain.

Success in legal actions that reduce the litigation mountain will require a comprehensive understanding of both microeconomic and macroeconomic details

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of the events in question. Identifying cases where well-founded investment strategies are confounded by public sector missteps may be decisive factors in evaluating the financial performance of banks and funds.

When the Treasury and Fed eventually sell off their investments, the sales pace and prices realized will strongly influence prices and price volatility in all financial markets. Poor sales execution will adversely affect the investment performance of private sector funds and institutions. Moreover, sales by the Treasury and Fed of existing securities and loans will compete with private issues of new securities whose proceeds would finance future real economic growth. Cheap sales prices by the Treasury and Fed will make it expensive for private issuers to raise new capital.

The recent period of market upheaval has generated a matching mountain of litigation. This mountain is still growing and will likely take many years to work down. Due to the various interventions by government agencies, as well as changing market conditions, identifying liability and measuring damages will require careful consideration of the information available to market participants at specific points in time.

It will also require a separation of systematic events that affect all investors from outcomes caused by individual actions. Overall, evaluation of financial performance should not be biased by unforeseeable events that impact all institutions the same way or that occur subsequent to a disputed private action. It is likely that the judicial system will be rife with complaints based on hindsight rather than economic and financial analyses founded on accurate parsings of events and responsibilities.

We begin with a précis of Treasury and Fed actions at the end of 2008 and then detail developments in 2009. This period defines the ascent up the public sector credit mountain. A financial analysis of the Fed's balance sheet shows the extent of the current credit problem.

We also review what has happened with interest rates during this period. We then outline what Federal Reserve Board Chairman Benjamin Bernanke has said about working out of the Fed's credit position and the alternative steps that might be taken to get back down the credit mountain. Litigation risks are also discussed.

Going Up the Mountain

U.S. TREASURY ACTIONS

U.S. Treasury interventions began with the first bailouts of Fannie Mae and Freddie Mac in July 2008, when the Treasury provided the GSEs with unspecified credit lines and pledged additional capital injections if necessary. In the second bailout of Fannie Mae and Freddie Mac in September 2008, the two GSEs were placed into conservatorships under the Federal Housing Finance Agency, a move endorsed by both Treasury Secretary Paulson and Fed Chairman Bernanke. Under the conservatorship agreements, the Treasury guaranteed future capital investments in each GSE of up to \$100 billion in exchange for \$1 billion in senior preferred stock with a ten percent coupon from each GSE.²

The Treasury was also given warrants for common stock representing a 79.9 percent ownership stake in each GSE. This began the Treasury's initiative of making direct equity investments in troubled institutions. Direct equity investing in such institutions is now done through the Troubled Asset Relief Program (TARP), which was established by Congress in October 2008. Through TARP, the Treasury also purchased \$80 billion of senior preferred stock in AIG in November 2008.

Figure 1 shows the Treasury's TARP investments. Note that the Treasury's equity portfolio is heavily weighted toward positions in the most troubled companies. Over some uncertain number of future years, the Treasury will eliminate its holdings as companies either fail (Treasury positions marked to zero value) or recover enough to repurchase their shares and warrants. Defaults caused by failures that are not offset by gains on other investments will create a loss for the Treasury, which will have to be satisfied through future taxes.

Private litigation involving failed companies will last for years, and the prices companies pay to repurchase their shares and warrants from the Treasury will not be immune to investors' complaints either. While conventional shareholder suits may not get far, ERISA-based complaints against investment advisors and asset managers may gain substantial traction.

A recent *Brattle* newsletter outlines the legal exposures of various parties that might be construed as potential fiduciaries in ERISA-based actions.³

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Figure 1 - The Treasury's Ascent: TARP Equity Investments

Since the beginning of TARP, the Treasury has made direct equity investments in almost 700 different companies through various subprograms such as the Capital Purchase Program (CPP) geared towards financial institutions, the Automotive Industry Financing program, and various others. As of October 2009, \$204 billion in investments comprised mainly of the purchase of preferred stock with warrants have been made through the CPP. Ninety percent of this money went to 30 institutions such as Citigroup, JPMorgan Chase, Goldman Sachs, and Bank of America. Through the Automotive Industry Financing program, the Treasury has invested a further \$85 billion in GMAC, General Motors, Chrysler, and associated entities in the form of debt and preferred equity. The Treasury has made an additional series of significant investments in AIG, Citigroup, and Bank of America through other programs.

To date, almost 50 companies have repurchased a total of \$70 billion of the preferred stock with warrants from the Treasury, leaving \$134 billion outstanding. Companies that have repurchased preferred shares include JPMorgan Chase, Goldman Sachs, and Morgan Stanley. Major remaining Treasury positions in financial companies, excluding GSEs, are shown in the table below. All values are book values based on the initial purchase prices.

Current U.S. Treasury Investments through TARP

Program/Company	Book Value of Investments Outstanding (\$ millions)
Capital Purchase Program	133,922
Bank of America Corporation	25,000
Citigroup Inc.	25,000
Wells Fargo & Company	25,000
The PNC Financial Services Group, Inc.	7,579
SunTrust Banks, Inc.	4,850
Regions Financial Corp.	3,500
Fifth Third Bancorp	3,408
Hartford Financial Services Group, Inc.	3,400
KeyCorp	2,500
CIT Group, Inc.	2,330
Comerica Inc.	2,250
Other (each less than \$2 billion)	29,104
Automotive Industry Financial Program	79,967
Automotive Supplier Support Program	5,000
Systematically Significant Failing Institutions (AIG)	69,835
Asset Guarantee Program (Citigroup)	5,000
Targeted Investment Program	40,000
Bank of America Corporation	20,000
Citigroup Inc.	20,000
Total	333,724

All figures are in \$ millions. Source: www.financialstability.gov/impact.

About \$70 billion in other Treasury investments have been repurchased by issuers.

The Treasury is also committed to buying at least \$100 billion in equity from both Fannie Mae and Freddie Mac if necessary. These positions, along with TARP investments, make the Treasury the largest single investor in domestic financial institutions.

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FEDERAL RESERVE ACTIONS

Although credit markets continued to operate in 2007, Federal Reserve credit programs in response to rumblings in the subprime mortgage market began in August 2007. The first Fed initiative was the Term Discount Window Program, a new Fed credit facility that allows banks and thrifts to borrow against eligible collateral for up to 90 days.

Between December 2007 and October 2008, the Fed announced eight additional credit programs focused on improving money market liquidity. Each program requires suitable collateral, but collateral standards have faded with each additional credit facility. Thus the Term Discount Window Program requires the same high quality collateral as is eligible to back loans at the Fed's discount window, which traditionally means Treasury instruments or top-grade commercial paper.

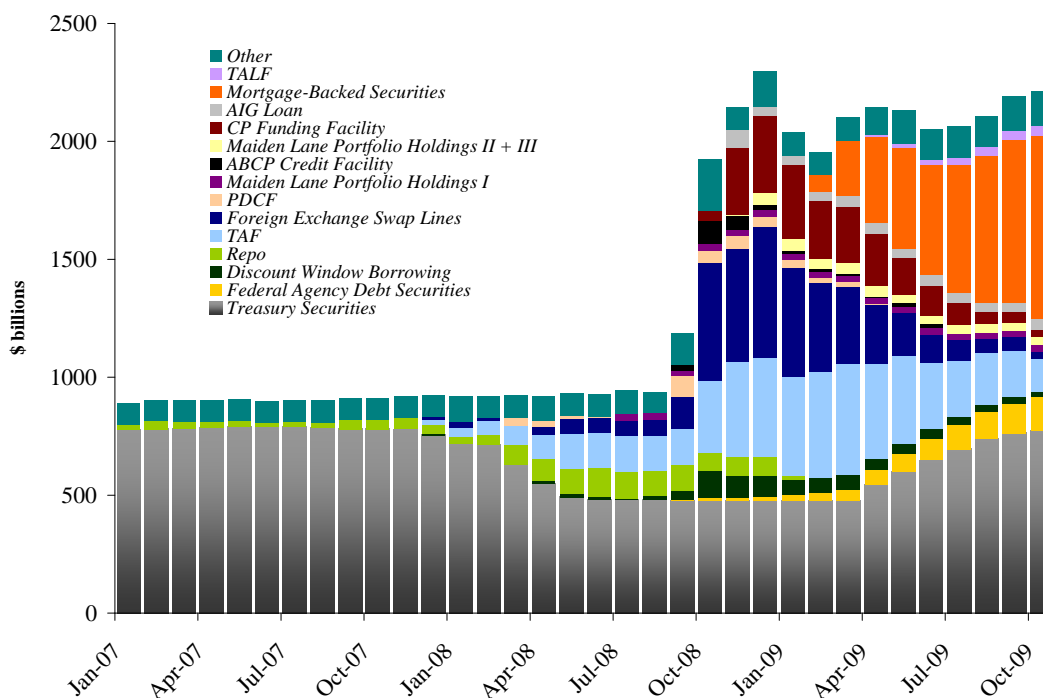
In contrast, the ninth program, called the Commercial Paper Funding Facility (CPFF), which started in October 2008, is a credit facility for a Fed-sponsored special purpose vehicle. This

program purchases unsecured and asset-backed commercial paper issued by Fed-designated eligible issuers, and borrows money from the Fed to finance its purchases.

The CPFF was initiated as a temporary adjunct to the regular commercial paper market, which virtually froze after the Lehman Brothers bankruptcy. It is designed to provide working capital finance for corporations that would normally get short-term funds through commercial paper issues. The CPFF was due to terminate in April 2009, but has since been extended until at least February 2010.⁴

A look at Figure 2 shows how the Fed's asset investments have grown and changed since November 2007. Not much changed in Fed holdings in 2007 and early 2008. Even up to the Lehman Brothers failure in September 2008, the size of the Fed's investment portfolio stayed stable, although the quality of its holdings declined as the Fed attempted to create liquidity in short-term credit markets.

Figure 2 - Changes in the Asset Side of the Fed Balance Sheet Over Time



All figures are book values in \$ billions. Source: www.federalreserve.gov/RELEASES/H41/.

Note that the Fed reported a large increase in "Other" assets from October 2008 to December 2008 primarily because foreign exchange swap lines were not listed as a separate line item until January 2009, at which point foreign exchange swap lines were reported for prior months as well (seen on the above chart). Since September 2007, the Fed's asset portfolio has more than doubled in size. Further purchases of MBS are scheduled.

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During the period between November 2007 and September 2008, the Fed sold about \$400 billion in Treasury instruments and purchased a like amount of high-grade commercial paper and foreign exchange assets. Figure 2 shows that by the end of December 2008, the Fed's balance sheet had grown from \$900 billion to \$2.5 trillion with over \$1 trillion in lending through various programs such as the Term Auction Facility (TAF), which makes short-term funds available to depository institutions and through the CPFF.

The Appendix summarizes major Fed initiatives to provide credit to the private sector. While the Fed holds some low quality investments (Bear Stearns-related Maiden Lane positions and AIG loans), its primary effort has been to support the market for agency-sponsored mortgage-backed securities (MBS).⁵

Where the Treasury and the Fed Stand Now

The Treasury now holds a \$450 to \$550 billion equity position in private sector companies. Figure 1 shows how the Treasury went from:

- ◆ *Zero investments in 2007 to a TARP investment portfolio of equities*
- ◆ *Warrants and credits of \$134 billion through the Capital Purchase Program (CPP)*
- ◆ *\$115 billion in additional funding to large financial institutions through different TARP programs*
- ◆ *A further \$85 billion in investments to companies related to the automobile industry*
- ◆ *An additional \$100 to \$200 billion in capital commitments to the GSEs*

The advances to GSEs are not included in TARP investments.

The Treasury has financed its TARP and GSE positions by issuing its own tax-backed debt to the public. Thus the Treasury owns, in effect, a fully margined \$450 to \$550 billion portfolio of troubled company investments. It resembles an enormous vulture investment fund financed with maximum margin. These investments might work out quite well for taxpayers if the companies turn around, pay full value for their shares and warrants, and pay down their debts on a timely basis. Companies have already repurchased \$70 billion.

Of course, events could go the other way too, at which point the margin debt must be paid off by taxpayers. In fact, according to the Federal "watchdog" for TARP, Neil Barofsky, TARP almost certainly will result in a net loss for U.S. taxpayers.⁶ The latest estimate of expected loss is about \$200 billion.⁷

The Fed is in a more interesting position because of the link between its balance sheet, currency, monetary reserves, the money supply, and the potential inflation rate. We can start by looking at the Fed's balance sheet from November 2007, before the credit crunch reached crisis proportions. This balance sheet appears in Figure 3.

The Fed conducts its monetary policy initiatives through transactions with the private sector. These transactions affect the size and composition of the Fed's balance sheet, and likewise affect the size and composition of banks' balance sheets. For example, if the Fed wants to lower interest rates, it bids for and buys Treasury instruments or MBS from commercial banks and securities dealers. To pay for its purchases and keep its balance sheet in balance, the Fed simply credits the Fed reserve balances of the sellers. These reserve accounts are Fed liabilities.

The Fed's open market purchases have two immediate effects. First, by bidding up the prices of Treasuries with its purchases, the Fed bids down the market yield of these instruments. Second, by supplying banks with more reserves, it enables banks to issue more deposits, which banks accomplish by making loans. The lower market yields on Treasuries make competitive loan rates lower too, which stimulates loan demand for the banks to fill.

Of course, sales of Treasuries or other investments by the Fed have the opposite effect: bond prices are bid down and rates are bid up as the Fed reduces buying banks' reserve accounts. Thus the Fed's implementation of its policies, transmitted to the private economy through the Fed's transactions with the commercial banking system, shows up right away on the Fed's balance sheet.

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Turning to Figure 3, on the left side of the Fed's balance sheet, in what the Fed calls factors supplying reserve funds, are the Fed's assets on November 1, 2007. The Fed's largest holding was \$779.6 billion in Treasury instruments, part of the public debt. On the right side of the balance sheet appear items of credit made available by the Fed. First is currency issued, which totaled \$813 billion. This (with Treasury-issued coins) is the legal tender used in the United States.

The other important liability, at the bottom of the liability entries, is reserve balances with the Fed. These commercial bank deposits at the Fed back all dollar-denominated bank deposits and loans held by banks and other financial intermediaries.

Currency issued by the Fed plus banks' reserve balances held at the Fed make up the monetary base, the high-powered money that supports all other payment forms like checking accounts, credit cards, and money orders. All dollar payments for goods and services are eventually settled in monetary base, either through a direct currency payment or through an inter-bank settlement (check clearing) in a reserve transaction between banks at the Fed.

On November 1, 2007, before the real onset of the credit crisis, all the economic activity in the United States was founded at its base with \$813 billion in Fed-issued currency and \$8.9 billion in bank reserves deposited at the Fed. Soon after November 2007, the ascent up the credit mountain commenced. This ascent is shown in Figure 2, while Figure 4 shows the results of the Fed's credit initiatives.

The Fed's balance sheet for October 29, 2009 is displayed in Figure 4. The changes from two years earlier are dramatic. First note that in its traditional activities, little has occurred. Holdings of Treasury instruments are almost exactly what they had been: \$779.6 billion on November 1, 2007 and \$774.5 billion on October 29, 2009. Similarly, currency issued changed only from \$813.1 billion on November 1, 2007 to \$913.8 billion on October 29, 2009 – a compound annual growth rate of six percent.

But now look at the asset entries in bold font, which are those created by the Fed's new credit programs discussed above. Holdings of MBS have gone from zero to \$776 billion, so now the Fed owns more MBS than Treasury instruments. Similarly, loans, including those through Term Asset-Backed Security Loan Facility (TALF) and direct loans to AIG, have gone from zero to \$246.9 billion. These two initiatives alone have supplied over \$1 trillion in new credit to the private economy.

Next look down at the special financing transactions the Fed has done for commercial paper issuers, the Maiden Lane LLCs, and with foreign central banks. These total another \$127.3 billion. While repurchase agreements declined from \$41.3 billion on November 1, 2007 to zero on October 29, 2009 (likely due to the TAF), the net result is that the Fed's assets that back credit supplied to the private sector have grown from \$914.6 billion to \$2,213.3 billion, an increase of \$1,298.7 billion, or more than a doubling in size.

The Fed's liabilities have changed even more dramatically than its assets. The modest currency change is noted above. Again, focus on the bold font liability items. In the top right portion of its balance sheet, note the new direct loan program for the Treasury. This makes available almost \$30 billion to the Treasury in a supplemental account.

The supplemental account is offset by loans from the Fed to the Treasury, accomplished through bills issued from the Treasury to the Fed that are not separately listed in the Fed's assets. The most startling quantity is at the bottom of the liability accounts – bank reserve balances with the Fed – which now totals \$1.1 trillion. Recall that two years previously this quantity was only \$8.9 billion. This is the Fed-created credit mountain.

Getting down the credit mountain is the Fed's current problem. Without an orderly descent, a general price inflation of extraordinary magnitude or a private investment squeeze like the stagflation period of 1978-1982 are risks. But before we discuss the Fed's alternative routes down the credit mountain, we review the recent history of interest rates to show what the Fed's buying spree has done to credit prices since 2007.



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**Figure 3 - Factors Affecting Reserve Balances of Depository Institutions
November 1, 2007**

<u>Factors Supplying Reserve Funds</u> <u>(assets)</u>		<u>Factors Absorbing Reserve Funds</u> <u>(liabilities)</u>	
U.S. Treasury Securities	779,568	Currency In Circulation	813,083
Federal Agency Securities	0	Reverse Repurchase Agreements	38,131
Repurchase Agreements	41,250	Treasury Cash Holdings	308
Loans	283	U.S. Treasury General Account	4,950
Float	(728)	Foreign Official	169
Gold Stock	11,041	Other Liabilities	49,067
Special Drawing Rights Certificate Account	2,200		
Treasury Currency Outstanding	38,695		
Other Assets	42,323		
<i>Total Factors Supplying Reserve Funds (Assets)</i>	914,632	<i>Total Factors Absorbing Reserve Funds (Liabilities)</i>	905,708
		<i>Reserve Balances with the Fed</i>	8,924

All figures are book values in \$ billions. Source: www.federalreserve.gov/RELEASES/H41/.

The Federal Reserve System is the central bank of the United States. In this capacity, it fills three roles: the U.S. Treasury's investment bank, managing and underwriting the Treasury's periodic auctions of public debt; the Treasury's commercial bank, maintaining the Treasury's bank account for public disbursements; and managing the United States' money supply and payments system. Its balance sheet has entries that reflect all three roles.

On the asset side of the balance sheet, the Fed primarily owns Treasury instruments. This comprises Fed loans to the Treasury. Most traditional Fed monetary operations are done through purchases and sales of these instruments in secondary over-the-counter dealer markets. Repurchase agreements are short-term (overnight or a few days) loans to dealers and banks that are collateralized with Treasury instruments. Float is credit supplied to the banking system through delays in the Fed's check clearing operations. The gold stock is gold owned by the United States, which is valued at \$42.22 per ounce. Special drawing rights certificates are notes the Fed can use to borrow foreign currency from the International Monetary Fund. Treasury currency outstanding represents coins and notes issued by the Treasury that are mostly held in inventory by the Fed.

On the liability side of the balance sheet, currency in circulation represents Federal Reserve notes issued to the public as legal tender. Reverse repurchase agreements are short-term, fully collateralized loans from dealers and banks. The Treasury holds some currency and maintains a bank account at the Fed for official disbursements. Foreign central banks also maintain accounts at the Fed labeled 'foreign official' for clearing transactions between central banks.

The most important quantity in the balance sheet is the last entry at the bottom of the liability side: reserve balances with the Fed. These are commercial banks' (and some dealers and other institutions) reserve deposits at the Fed. This is a major component of the monetary base (along with currency), the so-called high-powered money on which the amount of dollar-denominated bank deposits and loans rests.

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**Figure 4 - Factors Affecting Reserve Balances of Depository Institutions
October 29, 2009**

<u>Factors Supplying Reserve Funds</u> <u>(assets)</u>		<u>Factors Absorbing Reserve Funds</u> <u>(liabilities)</u>	
U.S. Treasury Securities	774,552	Currency In Circulation	913,756
Federal Agency Securities	141,601	Reverse Repurchase Agreements	65,737
Mortgage-Backed Securities	776,025	Treasury Cash Holdings	284
Repurchase Agreements	0	U.S. Treasury General Account	43,241
Loans	246,876	Foreign Official	2,297
-Term Asset-Backed Securities		U.S. Treasury Supplementary	
Loan Facility (TALF)	41,818	Financing Account	29,992
-Term Auction Credit	139,245	Other Liabilities	72,504
-Net Credit Extended to AIG	42,786		
-Other Loans	23,027		
Net Portfolio Holdings of Commercial			
Paper Funding Facility	32,256		
Net Portfolio Holdings of Maiden			
Lane LLC	26,381		
Net Portfolio Holdings of Maiden			
Lane II LLC	14,695		
Net Portfolio Holdings of Maiden			
Lane III LLC	20,656		
Central Bank Liquidity Swaps	33,315		
Float	(2,476)		
Gold Stock	11,041		
Special Drawing Rights Certificate			
Account	5,200		
Treasury Currency Outstanding	42,605		
Other Assets	90,476		
<i>Total Factors Supplying Reserve Funds</i>		<i>Total Factors Absorbing Reserve Funds</i>	
<i>(Total Assets)</i>	2,213,202	<i>(Total Liabilities)</i>	1,127,810
		<i>Reserve Balances with the Fed</i>	1,085,392

All figures are book values in \$ billions. Source: www.federalreserve.gov/RELEASES/H41/.

Two features of the Fed's recent balance sheet are important to note. On the asset side, the Fed's special credit initiatives have more than doubled the Fed's holdings, with MBS investments now exceeding the Treasury's. The Maiden Lane securitizations are listed separately and the "other assets" category has doubled in size.

The liability side of the balance sheet has ballooned in a corresponding fashion, with virtually its entire growth concentrated at the bottom of the right side in high-powered monetary reserves. This represents credit made available by the Fed to the banking system.

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Interest Rates and Rate Volatility

The Fed purchases MBS and other fixed-rate instruments by paying reserves (Fed liabilities) to sellers. This has had a significant impact on the structure of interest rates over the past few years. Figure 5 shows how rates have changed between the time just before the subprime mortgage collapse, through the ensuing credit crisis, and up to the current time.

The Federal Funds rate is the overnight rate banks charge one another to borrow and lend portions of their reserve positions at the Fed. The 90-day T-Bill yield is the market rate for short-term Treasury borrowing while the 10-year Treasury bond yield is a market rate for long-term Treasury bonds.

Notice in the chart that before the subprime problem, which surfaced with dramatic effect with the Bear Stearns hedge fund failures in the summer of 2007, the yield structure was upside down. The Federal Funds overnight rate exceeded the 90-day T-Bill rate, which exceeded the 10-year bond rate. This inversion of rates is unusual in credit markets. It reflected a very tight market for reserves.

It also created problems for hedge funds and banks, because it defeated "carry trades". A carry trade is buying a long-

term asset (MBS) and financing the purchase with short-term credit. While long-term rates exceed short-term rates, carry trades earn money.

As the Fed continues to pump reserves into the banking system, it can keep short-term rates low and stable temporarily. This has been the pattern from the end of 2007 through 2009. The Fed has driven short-term rates virtually to zero. However, while short-term rates have been driven down, long-term rate volatility has increased simultaneously. Inflation uncertainty is high, as evidenced by several recent long-term rate swings of 200 basis points or more. In fact, inflation fears from the bank reserve position and deflation fears from the recession appear to oscillate and cause big bounces in the long-term rate.

The Fed's current problem can be stated simply: it must reduce reserves at a pace that allows economic expansion without selling investments too fast (bidding rates up and crowding out new issues) or too slowly (generating price inflation and high nominal rates). Enough reserves must be available at all times to foster growth and prevent a deflation. This will require a deft hand at trading, a skill the Fed has not demonstrated in the past.

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We provide expert testimony, analyses, and financial economic consulting in matters concerning private equity, capital requirements, due diligence, structured finance, risk management, asset valuation, pricing of services, and the cost of capital.

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Getting Down the Mountain

Mountaineering Rule Two: Hope for the best but plan for the worst.

Unwinding the Treasury's vulture fund through open market sales will be tricky, so the easiest strategy is a simple one of buy, hold, and hope that repurchases by companies from the Treasury outweigh defaults. While Fannie Mae and Freddie Mac stagger forward, the insurance they provide against collateral defaults on their sponsored MBS is important to the Fed. The Fed is scheduled to own \$1.25 trillion agency mortgage-backed securities by early 2010.

An insurance failure would cause MBS prices to plunge. The GSE insurance is now underwritten fully by the Treasury, which can use its supplementary account at the Fed to supply credit when necessary to Fannie and Freddie. This circularity is at the heart of Treasury and Fed initiatives. An increase in Fed reserves has financed the whole operation.

Unlike the Treasury, the Fed cannot simply buy, hold, and hope. The high-powered money position it has created with reserves in the banking system potentially can generate an explosive rate of price inflation in the general economy. The effect of these reserves has been benign so far. Bank deposits have increased by \$900 billion since November 1, 2007 but bank loans have increased only \$200 billion.⁸ Thus most of the reserves the Fed created to pay for its mortgage-related positions have been held by banks, and the banking system has not used these reserves to increase deposits multiple times through new loans. This reflects the current economic slump, which has decreased loan demand even at low market interest rates. In economists' terms, it is a Keynesian liquidity trap. This is much like Japan's situation in the 1990's, when bank liquidity failed to stimulate economic expansion and deflation fears were prevalent.

The benign effect of the massive bank reserves position will not last forever. Once the economy begins to expand again, private sector loan demand will rise. Then the Fed will face a daunting problem of reducing reserves through sales of its positions to the private sector without pushing rates too high to stifle loan demand or crowding out new issues with cheap sales of used agency instruments and MBS.

In recent testimony and speeches, Fed Chairman Bernanke has outlined five strategies to reduce the reserve holdings of commercial banks and shrink or restructure the Fed's balance sheet. First, the Fed can engage in large reverse repurchase agreements with banks and dealers. The Fed would lend Treasuries and MBS from its inventory in exchange for reserves held by banks. Second, the Treasury can sell new bills, notes, and bonds and deposit the proceeds at the Fed. This would switch reserves held by banks (a Fed monetary liability) into Treasury deposits (a non-monetary Fed liability).

Third, the Fed can start paying higher rates on banks' reserve balances, thus reducing a rush in the banking system to change reserves into loans. Fourth, the Fed can sell its positions on the open market. Fifth, the Fed can hold its positions while the short-term credit rolls off; Maiden Lane LLC, AIG loans, and TALF senior pieces go into default; and its balance sheet naturally contracts. Some combination of all these strategies will likely be used both in parallel and in sequence by the Fed to get down the credit mountain.

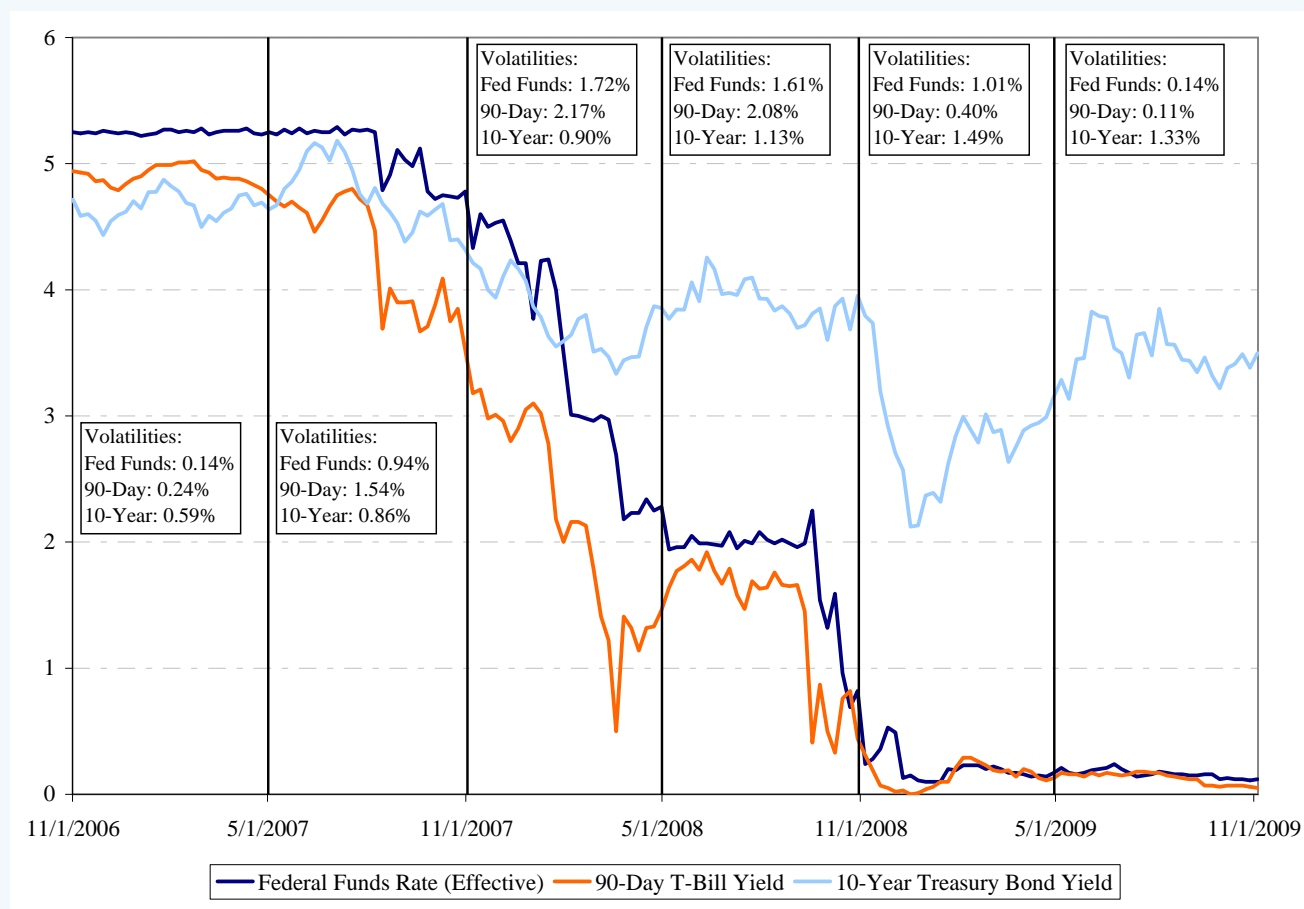
Looking at the Fed's assets in Figure 4 gives some idea about how the combination of strategies might work. The Term Auction Credit position can roll off quickly, as can the TAF and CFFIE positions. Eliminating these programs will reduce reserves by about \$200 billion. The federal agency bond holdings and the agency MBS investments are potentially marketable and also available for reverse repurchase borrowing.

Together these positions total \$917.6 billion but the total is scheduled to grow to \$1391.6 billion if the Fed pursues its announced \$1.25 trillion MBS purchase program to completion. Dumping these positions into reverse repurchase agreements or sales will likely cause a significant interest rate upward bounce, so a measured rate of such bank reserves-absorbing transactions will be called for. The AIG loans and Maiden Lane transactions together total \$104.5 billion. These are illiquid and cannot be used for reverse repurchase agreements so they will likely stay on the Fed's balance sheet for quite some time. However, defaults will reduce the size of the positions.⁹

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Figure 5 - Credit Market Response to the Fed's Actions

As the crisis unfolded, the benchmark Federal Funds, 90-day Treasury, and 10-year Treasury rates all began to fall. After the Fed began to intervene with substantial purchases of credit instruments in the winter of 2007-2008, the rate plunge accelerated, the yield curve flipped upward, and rate volatility increased substantially. A temporary rate plateau was established by the Fed in the summer of 2008, but rates headed down once again as Fed purchases picked up in the fall of 2008.



Note that short-term rates are now virtually zero and the volatility of these rates has subsided to pre-crisis levels. The 10-year bond yield has begun to creep up. Now the term structure is upward sloping and quite steep. The 10-year yield has also become quite volatile due to uncertainty about the Fed's future actions. This rate environment encourages hedge funds and banks to renew MBS carry trade speculation. This is exactly the trading strategy that kyoed the Bear Stearns hedge funds at the start of the subprime mortgage meltdown.

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CONCLUSION

Boy Scout Motto: Be prepared.

The U.S. economy appears to be in the initial stages of recovery. This turnaround has been accompanied by an unprecedented expansion of bank reserves created by Fed credit programs. The mountain of bank reserves provided by the Fed looms over the future because the Fed must reduce the credit mountain to a modest mole hill while the recovery gains strength. Otherwise, as the reserves become monetized through commercial bank lending and new deposit creation, the inflation rate will skyrocket.

Reducing the mountain of bank reserves during the economic recovery will not be easy. Uncertainty about the Fed's future actions will generate substantial interest rate volatility even if the Fed clearly enunciates its policy, makes trades that ratify its statements, and executes its trades successfully with rich sales prices.

Interest rate volatility and Treasury and Fed sales will create losers and winners among private sector investing institutions. This will cause the litigation mountain to grow even as the credit mountain shrinks. Reducing the litigation mountain will require accurate assessments of liability, correct calculations of damages with properly specified "but for" worlds, and careful sorting of unlucky losers from incompetents and crooks.

This evaluation process will be an industry of the future. Assessments, calculations, and sorts will require informed uses of new and old economic tools, concise analyses of private responses to complex public actions, and cogent explanations of complicated events to curious judges and juries.

ENDNOTES

1. This is a paraphrase from Holly Morris' review, "Deadly Summit," in *The New York Times Book Review*, November 8, 2009, p.33.
2. To date, Fannie Mae has received or requested \$60 billion and Freddie Mac has received \$45 billion in equity investments from the U.S. Treasury. These investments are not part of TARP.
3. *The Brattle Group Finance Newsletter*, "Lawsuits Stalk Pension Fiduciaries," Issue 01, 2008.
4. See the previous credit crisis report, *The Brattle Group Finance Newsletter*, "Understanding the Credit Crisis: The Treasury, the Fed, and the Banking System," Issue 02, 2008, and the Federal Reserve website <http://www.federalreserve.gov/newsevents/press/monetary/20090625a.htm>.
5. It is interesting that the Fed used a simple structured finance arrangement to facilitate the three problematic Maiden Lane transactions. Limited liability companies (LLCs) were established to own collateral and issue collateral-backed instruments much like what would occur in a private-label MBS deal, in which senior and subordinated classes of mortgage derivative instruments are issued. In the Maiden Lane transactions, the owner of the senior piece is the New York Fed. Recent events have shown that senior pieces are not wholly isolated from the effects of collateral defaults.
6. <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a44MGDYGcZHk>.
7. <http://online.wsj.com/article/SB125799009185344567.html>.
8. Deposit and loan figures are from October 2009, the most recent data available for these items.
9. The specter of defaults raises the issue of the Fed's capitalization and its ability to recognize write-downs. A 50 percent default rate net of recoveries on the AIG and Maiden Lane positions would almost break the Fed's balance sheet. This puts the spotlight on the Fed's gold position, which is a curious anachronism from the previous age of monetary gold and the gold standard for international settlements. The Fed values its gold holdings at \$42.22 per ounce while the market price of gold at present is in the \$1000 to \$1200 range. If the Fed marks its gold to market, then the value of its gold holding would total about \$300 billion. This would easily keep the Fed afloat. However, any sizable gold sale by the Fed would likely severely affect the market price of gold, much like a sizable sale from its MBS position would depress prices in that market.

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APPENDIX: The Fed's Mortgage-Backed Investments

The Fed accelerated its ascent up the credit mountain with the Bear Stearns collapse in March 2008.

- ◆ *As part of Bear Stearns' embrace by JPMorgan Chase, the New York Fed bought some \$29.9 billion of toxic assets from Bear Stearns that JPMorgan would not take and finance. This is the Fed's Maiden Lane I transaction.*
- ◆ *Maiden Lane I is an LLC the Fed formed to hold Bear Stearns' worst assets and receive a \$28.8 billion senior loan from the New York Fed and a \$1.15 billion subordinated loan from JPMorgan Chase.*

In contrast to its previous initiatives that provided direct, short-term credit to financial institutions, Maiden Lane I began the Fed's buying spree of mortgage-related instruments.

Two additional Maiden Lane transactions followed the first Maiden Lane transaction in late 2008.

- ◆ *Maiden Lane II LLC was formed to own \$20.8 billion in residential mortgage-backed securities purchased from AIG. The New York Fed provided a \$19.5 billion senior loan to the LLC, and AIG subsidiaries provided the funding balance with subordinated claims on Maiden Lane II LLC.*
- ◆ *Maiden Lane III LLC was set up to purchase collateralized debt obligations (CDOs) worth \$29.6 billion from AIG Financial Products Corp.'s credit default swap (CDS) counterparties (the counterparties also retained the CDS collateral previously posted by AIG Financial Products). The New York Fed provided a \$24.6 billion senior loan and AIG provided \$5 billion in equity funding for Maiden Lane III.*

In November 2008, the Fed announced that it would begin buying agency-sponsored mortgage-backed securities (MBS) on the open market.

- ◆ *The Federal Reserve Open Market Committee announced in March 2009 that in this program, the Fed would purchase up to \$1.25 trillion of agency MBS by the end of 2009.*
- ◆ *This was slightly modified in September 2009 when the Fed's purchase of \$1.25 trillion MBS was extended into the first quarter of 2010.*

The program is designed to support MBS prices in secondary markets given a dearth of other bids for these instruments and a need for banks to unload MBS paper.

Another Fed-sponsored credit program called the Term Asset-Backed Securities Loan Facility (TALF) was announced in 2009.

- ◆ *The TALF is designed to make credit more readily available for securitizing consumer, student, and business loans by facilitating the issuance of asset-backed securities (ABS) by loan originators.*
- ◆ *With the TALF, the Fed will make up to \$200 billion in loans to borrowers to finance the purchases of newly issued ABS. The loans have maturities of two to three years, are non-recourse to the borrowers, and are fully secured by eligible ABS and commercial mortgage-backed securities.*
- ◆ *About \$40 billion in TALF loans have been made so far by the Fed.*

The U.S. Treasury has a role in the TALF too, through TARP. Any loan collateral received back by the Fed from a defaulted TALF loan will be sold to a New York Fed-sponsored special purpose vehicle (SPV).

- ◆ *To purchase the collateral from the New York Fed, the SPV can issue up to \$20 billion in subordinated debt, which will be purchased by the Treasury through its TARP initiative.*
- ◆ *If more than \$20 billion in collateral is acquired by the Fed's SPV, the Fed will lend the additional amounts required on a senior basis.*

Once again, the Fed (with the Treasury) is using a structured finance vehicle to finance troublesome collateral. This is precisely the path banks followed for CDO and whole loan finance in the run up to the credit crisis.

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► This is the second of a two-part newsletter series on the credit crisis. The first, "Understanding the Credit Crisis: The Treasury, the Fed, and the Banking System," was published in late 2008. It discussed how the credit problems that began in the real estate market affected the liquidity and solvency of the commercial banking system as a whole. For more information and to read the first in the series, please visit *Brattle's* website www.brattle.com.