



August 31, 2011

Investment strategy and recommendations
for the U.S. economy and financial markets

Special Report

NURSING THE PATIENT (PART III): UNWINDING THE MONETARY MESS

- QE3 is on the horizon if the U.S. recovery does not soon pick up pace. Another round of asset purchases would further complicate the Fed's exit from unorthodox monetary policy.
- In theory, the Fed will not be forced to quickly absorb the mountain of excess bank reserves when the time comes to raise interest rates.
- Policymakers believe that they will be able to control the expansion of credit and money by fine-tuning the spread between what banks can earn on their risk free deposits at the Fed, and what they can earn on other types of riskier loans.
- Experience in other countries that utilize a floor interest rate mechanism provides some confidence that the Fed's plan will work.
- Nonetheless, the Fed is in uncharted territory and there is certainly no guarantee that the exit will proceed smoothly.
- Capital losses on the Fed's balance sheet will be inconsequential and will not affect policymakers' interest rate decisions.
- If the Fed's tools prove ineffective in the face of an acceleration in money and credit growth, the ultimate weapon will be asset sales. This would cause real borrowing rates to rise in a hurry, tightening lending conditions, and crushing risk tolerance.

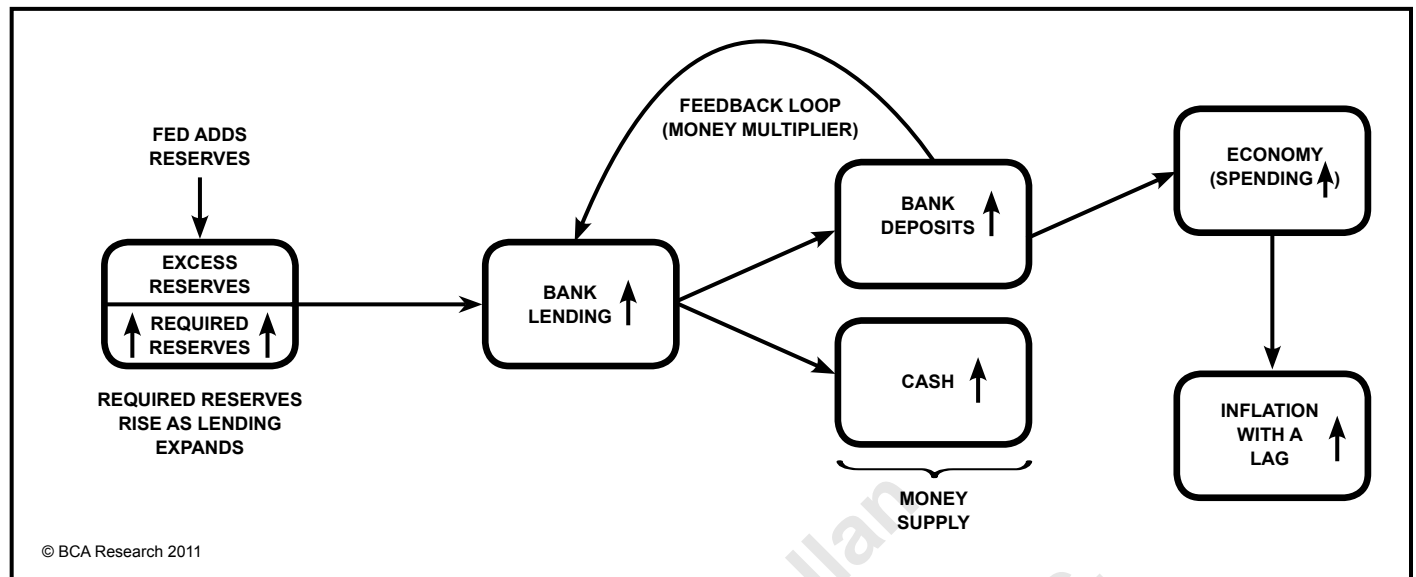
Fed policymakers are evaluating their toolkit and are on the edge of providing more stimulus. We discussed the policy options and their effectiveness in Parts I and II of this series of *Special Reports*. In Part III, we look further ahead to a time when the recovery is on solid ground and the FOMC begins to unwind the mess of ultra-low interest rates and a bloated balance sheet.

It seems premature to be discussing the Fed's exit plan at a time when policymakers are still looking for ways to boost growth. It could be 2014 before monetary policy reverses course and the Fed begins to navigate back to a normal balance sheet. Nonetheless, many clients are looking far down the road and have been asking pertinent questions related to how the Fed plans to undo the extreme measures that it has taken. Will more QE complicate the Fed's exit strategy? Would it further increase the risk of high inflation? These and other key questions that clients are pondering are discussed below. As with Parts I and II, the discussion is meant for non-monetary specialists.

Q: The Fed's balance sheet has expanded from \$900 billion to \$2.8 trillion and policymakers are thinking of doing more. Since the Fed is printing money, doesn't this mean that inflation is inevitable?

A: Inflation is possible, but not inevitable. There is a big difference between printing money and creating deposits if banks aren't lending.

CHART 1
Textbook Money Multiplier Process



The kneejerk reaction among investors when the Fed began quantitative easing was that the end result must be higher inflation, possibly a lot higher. Investors remember the lesson of Friedman's textbook Helicopter Drop description of how excessive money creation leads to higher inflation. While Friedman's example is instructive, the reality of quantitative easing is much more complex.

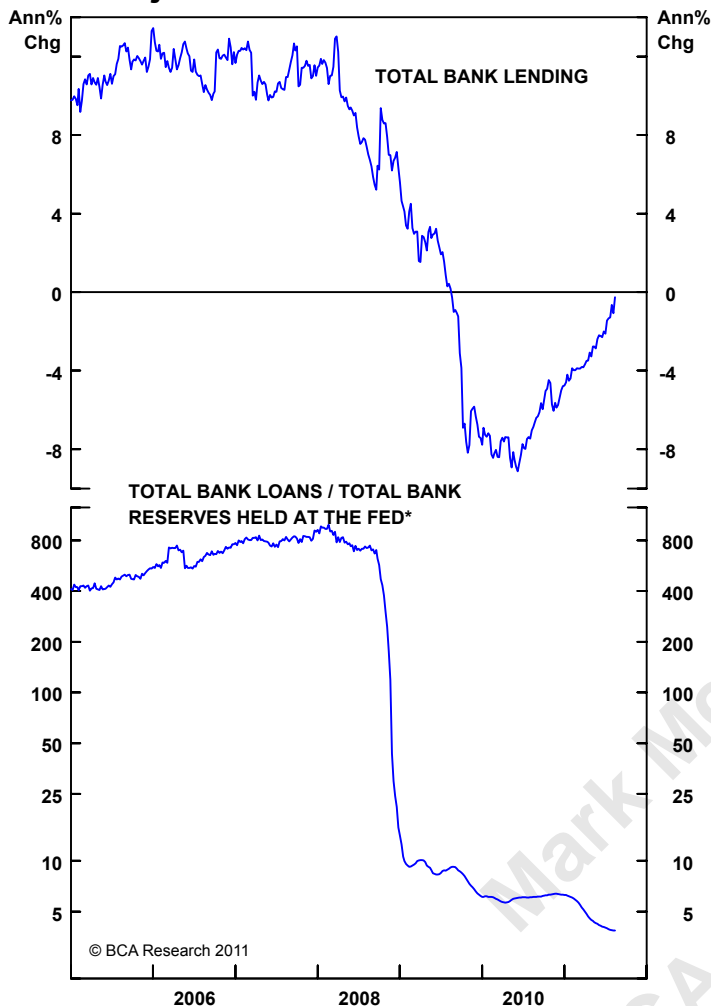
The Fed has created bank reserves, rather than simply "printed money". **Chart 1** depicts the way in which the Fed affects bank lending, the money supply and, ultimately, the economy and inflation. When the Fed wants to stimulate the economy, it purchases securities from banks and credits the banks' account at the Fed, thus creating excess reserves (i.e. reserves over and above those required to fulfill reserve requirements). Normally, banks have an incentive to lend out the excess reserves because they make little or no interest on them. As lending increases, it creates bank deposits and cash held by the public, and promotes spending. If the process is overdone and the economy expands beyond its full-employment limits, upward pressure on inflation will follow.

Bank reserves are the raw material necessary to generate bank lending and the money supply. The amount of broad money and credit that is created is a multiple of the amount of reserves the Fed adds to the system, due to the Money Multiplier process (see **Box 1**).

This is what is worrying so many investors. The Fed's quantitative easing policy has created a mountain of excess bank reserves. If banks were to make all of the loans theoretically possible based on their reserves, the money supply and the outstanding level of credit would explode, leading possibly to hyper-inflation. This would be analogous to Friedman's Helicopter Drop.

Yet, bank credit has barely climbed into positive territory and M2 growth, while picking up, has been slow to accelerate so far in the recovery (**Chart 2**). The same is true for currency in circulation. Total commercial bank lending has collapsed relative to bank reserves. Moreover, **Chart 3** highlights that the explosion of reserves has swamped the increase in the narrow money supply since the Lehman event.

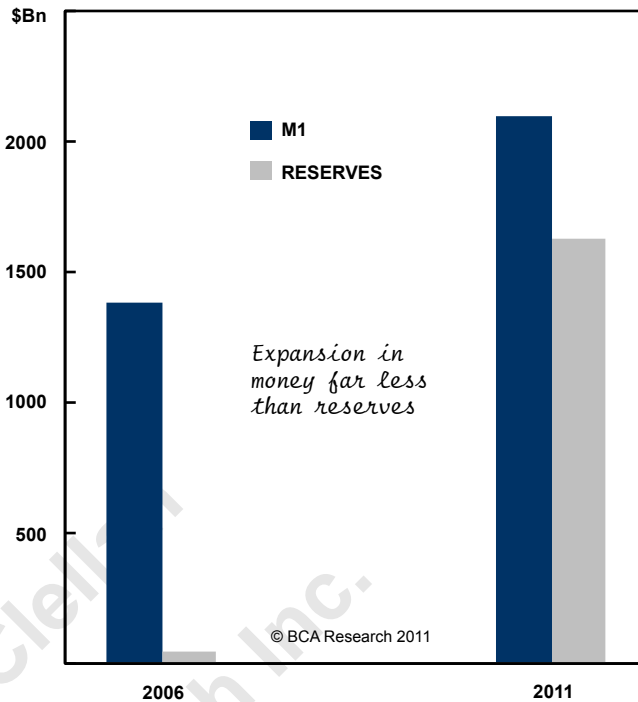
**CHART 2
Money & Credit Growth**



*SHOWN AS A 10-WEEK MOVING AVERAGE; SOURCE: FEDERAL RESERVE

The reason is that credit demand is extremely depressed. The Fed can create base money (reserves), but it does not result in an expansion of the economy’s money supply until banks lend or buy assets from the public. The demand for credit is weak because consumers are deleveraging, corporations are flush with cash, and the broader business sector is in no mood to expand when the sales and regulatory outlook is so uncertain. Banks have also been reluctant to lend, although they are now easing lending standards. The result is that banks have simply left their excess reserves sitting idle at the Fed earning very little. Friedman’s Helicopter Drop problem of “too many dollars chasing too few goods,” is a poor description of the current situation because the Helicopter has not had enough fuel to get off the ground.

**CHART 3
Narrow Money And Reserves**



Q1. What happens when banks begin to aggressively lend again and the money multiplier starts to work? If the multiplier reverts back to its historical average, the massive reserve base would support a monumental jump in the money supply. How will the Fed prevent that?

A: By raising rates in a timely fashion and thereby tempering the demand for credit. But it will be tricky.

Banks will ease lending standards and the demand for credit will gradually revive even in a lackluster recovery. The Fed will respond as it normally does — by lifting the cost of short-term funds and this will be reflected in higher rates all along the curve.

The speed and extent of rate hikes will be a judgment call, as the Fed tries to strike a balance between tightening fast enough to avoid a large overshoot of real GDP relative to its potential, but at the same time avoiding a recession. In this sense, the Fed’s job is the same as in every tightening cycle.

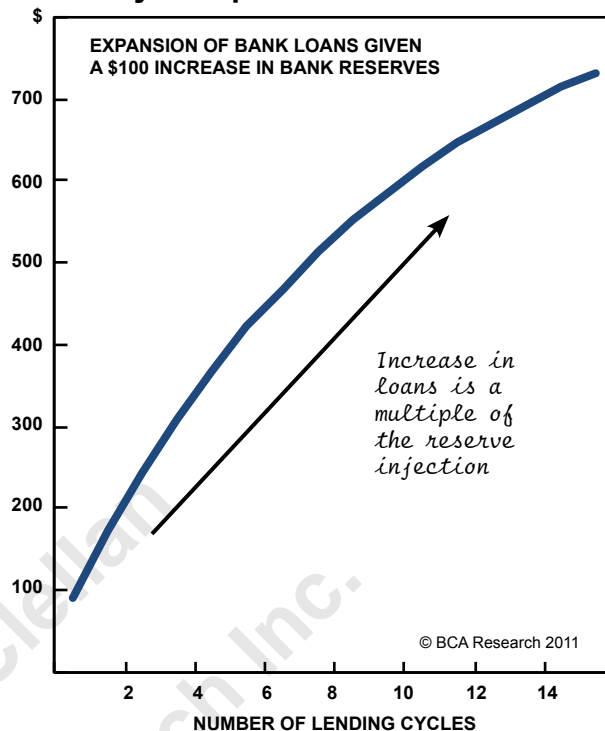
Box 1: Money Multiplier

Banks must keep a fraction of deposits as reserves under a so-called fractional reserve banking system (called the required reserve ratio). In the traditional textbook explanation of the money multiplier, the central bank increases the amount of bank reserves by purchasing government bond from banks. This lowers interest rates and creates excess reserves that banks then lend out because they make zero, or close to zero, in returns on deposits held at the central bank. The increase in lending leads to spending and the creation of narrow money — currency and bank deposits. The latter are then lent out a second time, although some cash has to be retained to satisfy the required reserve ratio. Again, the re-lent funds boost spending and currency demand, and some find their way back into the banking system as deposits.

The circular process continues in a geometrically declining fashion. The end result is that the amount of new money and credit created is a multiple of the original injection of reserves by the central banks (i.e. the money multiplier). **Chart B1** shows how a \$100 increase in bank reserves (provided by the Fed) leads to an expansion of bank loans of almost \$800 under normal circumstances with a 10% required reserve ratio.

Nonetheless, the money multiplier breaks down if banks decide they are willing to hold more than

CHART B1
Money Multiplier



the required amount of reserves at the Fed. This is exactly what happened in the financial crisis. The money multiplier has collapsed because banks are unwilling to boost lending despite a massive amount of excess reserves, while deleveraging has meant that the private sector's appetite for new loans has been extremely weak. The breakdown in this process helps to explain why the economy has struggled to gain momentum and why inflation has remained low.

That said, the Fed's job will be tougher given the unprecedented nature of the stimulus. Never before has the Fed's tightening cycle started with such a bloated balance sheet.

Q3. How can the Fed cause interest rates to rise when there are so many excess reserves in the banking system? Doesn't the Fed have to drain all those reserves first, before lifting interest rates?

A: No. In theory, the mass of reserves are irrelevant for setting short-term interest rates.

The Fed believes that it has the ability to raise short-term interest rates and dampen the demand for credit in the economy, even in the presence of surplus bank reserves. The main reason is that the Fed is now allowed to pay interest on reserves held at the central bank. **Box 2** provides details on how it works.

In short, the ability of the Fed to pay interest on reserves breaks the link between the quantity of reserves and interbank interest rates. The Fed plans to lift the interest rate on excess reserves (IOER) along with the fed funds rate. In fact, the IOER will

be the main focus of Fed interest rate adjustment for some time because it will be the effective floor for the fed funds rate. Banks will be unwilling to lend excess reserves to other banks in the interbank market at a rate less than that paid by the central bank. The fed funds rate will therefore move up with the IOER, which will cause the whole Treasury yield curve to shift higher.

Banks will have an incentive to boost lending as the economy recovers, since the risk-adjusted expected return from lending to the private sector will rise. By adjusting the IOER higher at the same time, the Fed can increase the opportunity cost of lending and thereby moderate the expansion of credit. In other words, the Fed will have the ability to fine-tune the spread between what banks can earn on their risk free deposits at the Fed, and what they can earn on other types of riskier loans.

Box 2: Monetary Policy When Reserves Are Excessive

Banks hold reserves both to satisfy reserve requirements and to meet settlement obligations. In a stylized textbook depiction of how the Fed sets the fed funds rate, banks' demand for reserves is downward sloping – that is, banks wish to hold fewer reserves at the central bank as market interest rates rise (Panel 1 in **Chart B2**). When banks receive no interest on their reserves, then the fed funds rate represents the opportunity cost of leaving funds sit idle at the central bank rather than lending to other commercial banks.

The supply of reserves is determined by the Fed and is unrelated to the level of interest rates (i.e. it is a vertical line in Panel 1). By withdrawing reserves, the Fed creates scarcity and the price (interest rate) on remaining reserves increases. When supply curve shifts to the left, the fed funds rate rises and the quantity of reserves falls. The opposite occurs when the Fed increases the availability of reserves.

During the financial crisis, the Fed dramatically increased the quantity of bank reserves to the point where the fed funds rate fell virtually to zero (Panel 2). Since nominal interest rates cannot drop below zero, the fed funds rate was stuck at that level even as the Fed continued to pump reserves into the system.

If the Fed were unable to pay interest on reserves, policymakers would have to remove a substantial portion of the excess reserves in order to have any impact on market interest rates (Panel 3). In theory, the Fed might have to quickly remove all of the extra reserves it has added post-Lehman (and even more if QE3 occurs) in order to return short-term interest rates to normal levels.

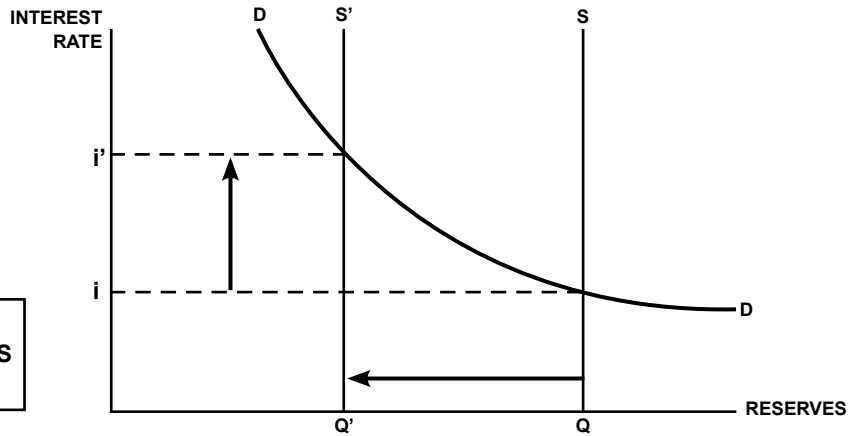
However, when the Fed is able to pay a positive rate on reserves, market interest rates are delinked from the quantity of reserves. The Fed plans to raise the interest rate on reserves (IOER) along with the fed funds rate when the time comes to tighten policy. Banks presumably would be unwilling to lend out excess reserves to other banks in the fed funds market at a rate lower than what they can obtain by leaving the reserves at the Fed. The IOER becomes the effective floor for the fed funds rate, and the normally downward-sloping demand for reserves flattens off at this level (Panel 4).

The result is that the supply of reserves can be left unchanged even as market interest rates rise. As long as the Fed can control the willingness of banks to lend out excess reserves via the IOER (together with term deposits and reverse repos), it can limit the money multiplier process and control the expansion of money and credit in the economy as the recovery matures. The result is that the Fed does not believe it has to drain reserves and shrink its balance sheet to shift interest rates higher and dampen the desire to borrow and lend in the economy.

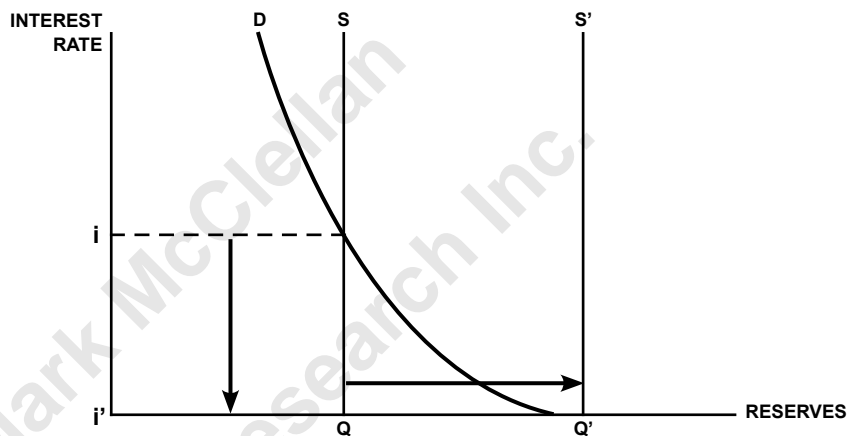
**CHART B2
Supply And Demand For Bank Reserves**

**Panel 1:
Normal
Procedure**

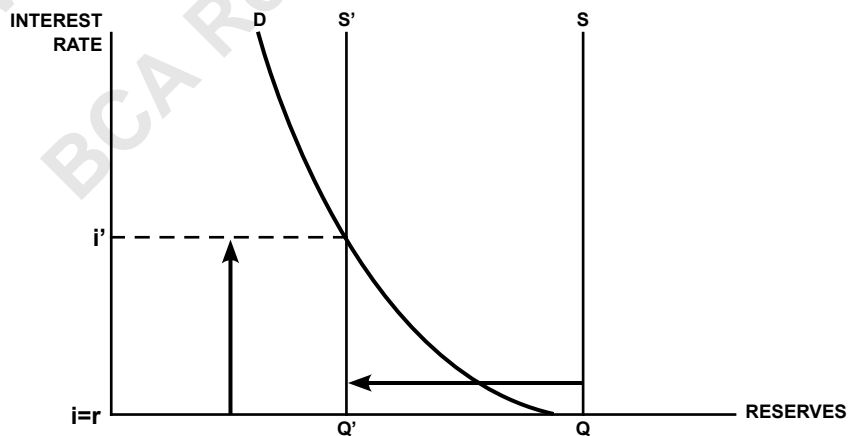
LEGEND:
 r = INTEREST ON EXCESS RESERVES
 i = FED FUNDS RATE



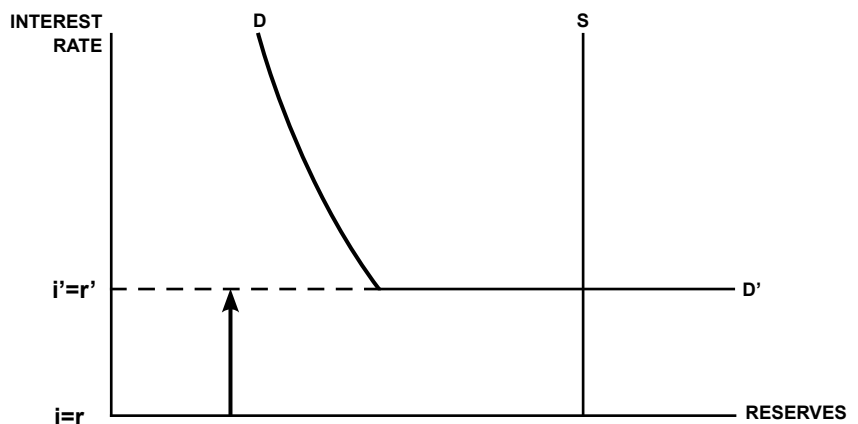
**Panel 2:
Oversupply
Of Reserves**



**Panel 3:
Raising Rates
When IOER=0**



**Panel 4:
Raising Rates
When IOER>0**



The implication is that the Fed can increase market interest rates and slow the pace of bank lending and money creation, without changing the quantity of reserves. As Fed economists put it “...the rate of interest paid on reserves now acts as a valve, reducing the pressure that the Fed purchases [of securities] might place on banks to increase lending and thereby spur money growth...the reserves are put in a sort of reservoir, relieving a flow that could ultimately generate higher inflation”.¹

Of course, this is all theory. How it will work in practice is not yet known, although there are historical examples that suggest the Fed’s plan will work. A Fed study looked at the historical record and operating procedures for eight central banks.² Five of them are currently operating a “floor system” in which banks are left with substantial excess holdings of central bank balances and the short-term market interest rate is allowed to trade at a level close to the floor (the ECB, the Bank of Japan, the Bank of England, the Bank of Canada and the Norges Bank).

The study finds multiple examples over the past ten years of policy tightening that was not accompanied by draining excess reserves. The interest rate paid on reserves served as an effective floor as market rates were guided higher. The Fed concludes that “...interest paid on excess reserve balances...can be used by a central bank to tighten monetary policy and reduce reliance on supporting operations to drain balances.”³

One caveat is that there were only three cases in which the central bank raised rates in the presence

of **substantial** excess reserves. Two of the three drained some of the excess reserves as rates were lifted or beforehand (such as the Reserve Bank of Australia). The historical examples are therefore not directly comparable with the Fed’s position, but they at least provide some confidence that the Fed’s plan to raise rates without significantly draining reserves has a good chance of working.

Q: Why would the Fed want to maintain a large balance sheet if the economy is recovering?

A: The FOMC wants to avoid a “1994-style” bloodbath in the bond market.

The Fed will sell assets and thereby shrink its balance sheet, but officials have stated that this will happen well after interest rates have begun their ascent. The Fed is nervous that selling assets too aggressively might cause medium- and long-term yields to surge and choke off the recovery. Policymakers plan to sell in a slow-but-steady fashion so as to avoid shocking the market, believing that they can still tighten policy and head off an inflation overshoot even with a large balance sheet.

Q: But it will take time to lock up the excess reserves. What if banks suddenly decide that the rate of return on lending is substantially above what they are making on their reserves held at the Fed, leading to an explosion of lending and the money supply?

A: Given the ongoing household deleveraging process, an explosion in credit is the last thing we should be worrying about. But the Fed has a not-so-secret weapon.

The pendulum for bank lending attitudes will shift from cautious to more aggressive if the recovery is sustained. However, we doubt the shift will occur suddenly and catch the Fed off guard, especially in light of the sluggish, subpar recovery in the U.S. Credit does not tend to suddenly explode higher – it gathers momentum over time.

¹ Jamie McAndrews. Will The Federal Reserve’s Asset Purchases Lead to Higher Inflation? Liberty Street Blog, Federal Reserve Bank of New York, May 18, 2011.

² Interest on Excess Reserves as a Monetary Policy Instrument: The Experience of Foreign Central Banks. Board of Governors of the Federal Reserve System. International Finance Discussion Papers, Number 996. March 2010.

³ Ibid, page 1.

The Fed will expect money and credit growth to accelerate from current levels as part of a healthy recovery, and will not see it as a big inflation risk because there is so much slack in the economy. The test will be how quickly the Fed moves to normalize policy in order to ultimately temper the pace of money and credit expansion.

Could the Fed move too timidly, leading to some overshoot of the 2% inflation target? A modest overshoot is certainly possible, but we do not foresee the Fed deliberately trying to inflate away the value of government debt with extremely high inflation. Policymakers would see this as causing more harm than good in the long term, and it is not even clear that the bond vigilantes would allow it to occur.

If we are wrong and lifting the IOER is ineffective in the face of a sudden acceleration in money and credit growth, the Fed's ultimate weapon will be asset sales. Policymakers are planning on a slow and steady sales pace. But if their other policy tools fall short, selling MBS and Treasuries would cause real borrowing rates to rise in a hurry, tightening lending conditions, crushing risk tolerance and reducing the pace of money and credit growth.

Q: If the Fed can raise rates even with a large stock of excess reserves, then why bother locking up excess reserves with term deposits or reverse repos?

A: It is all about managing expectations.

Investors are understandably worried about the inflationary impact of quantitative easing. The Fed is very cognizant of the risk that a rise in inflation expectations can become self-fulfilling, leading to an uptrend in actual inflation. So far in this recovery, inflation expectations have tended to rise whenever growth accelerates to an above-trend pace. It might help to control inflation expectations if the Fed is seen to be making some of the excess reserves unavailable for lending by locking them up.

The Fed also believes that term deposits and reverse repos could have an important signaling effect for the markets, leading to higher rates all along the curve.

Q: What is the sequence of the Fed's exit strategy?

A: The sequence is fairly clear, but the timing is not.

The start of the tightening phase will begin when the FOMC announces that interest and principal repayments on its fixed income securities will no longer be reinvested. At the same time, the FOMC will likely adjust or remove altogether its guidance on how long rates will remain extremely low (currently for two years), to signal that rate hikes are on the radar screen.

About 2-3 meetings after that, the Fed will begin lifting the IOER and the fed funds target in tandem, although emphasis will be on the IOER as the main interest rate instrument. For technical reasons, the fed funds rate may continue to trade slightly below the IOER, but it will move higher along with other market rates.

The Fed expects to begin selling assets about a year after the rate hike cycle begins.

The speed of adjustment in short-term interest rates will depend on how quickly the economy returns to full employment. The normal operating procedure is that policymakers endeavor to lift the real fed funds rate to a neutral level slightly before the output gap closes, since monetary policy affects the economy with a lag. When the economy gets back to equilibrium is highly uncertain at the moment, but if we assume that the Fed will want the real fed funds rate to be roughly 2% (4% nominal) by the end of 2015, that would require tightening at a pace of 40-50 basis points per quarter beginning in the second half of 2013.

Of course, the rise in rates will not be smooth, and will be dictated by the ebb and flow of the recovery and inflation. It may be that the Fed chooses to proceed more slowly at first to ensure that the recovery is not derailed, and then ramp up rate hikes when the output gap is almost closed.

Q: Will the Fed have to sell assets once it is time to shrink its balance sheet? What will it look like down the road?

A: The Fed plans to eventually return to a balance sheet that is normal in size and comprised mostly of Treasury securities. Rightsizing the balance sheet from the current level can occur largely via run-off, rather than through asset sales. If QE3 goes ahead, however, then rightsizing will eventually involve some active sales.

Assuming the Fed does not proceed with either maturity swapping or QE3, active security sales are a non-issue. Simply allowing security holdings (including Treasuries) to passively run off would quickly reduce the size of the Fed's balance sheet and thus absorb excess reserves.

This rapid pace of passive portfolio runoff is probably underappreciated. The average maturity of its Treasury holdings is about six years. The average maturity of its MBS holdings is much longer, but not the average life. Agency bonds and MBS will run off at a rate of about \$17 billion per month. This pace will slow as yields rise (and MBS extend), but even then the amount of MBS and agency bonds on the Fed's balance sheet will be cut in half in less than three years, even if the Fed does not seek to actively sell them (**Chart 4**).

The pace of runoff of Treasury securities is currently about \$15 billion per month. Once both Treasury securities and MBS are allowed to run off, then the asset side of the balance sheet will shrink back to pre-QE2 levels in little more than one year.

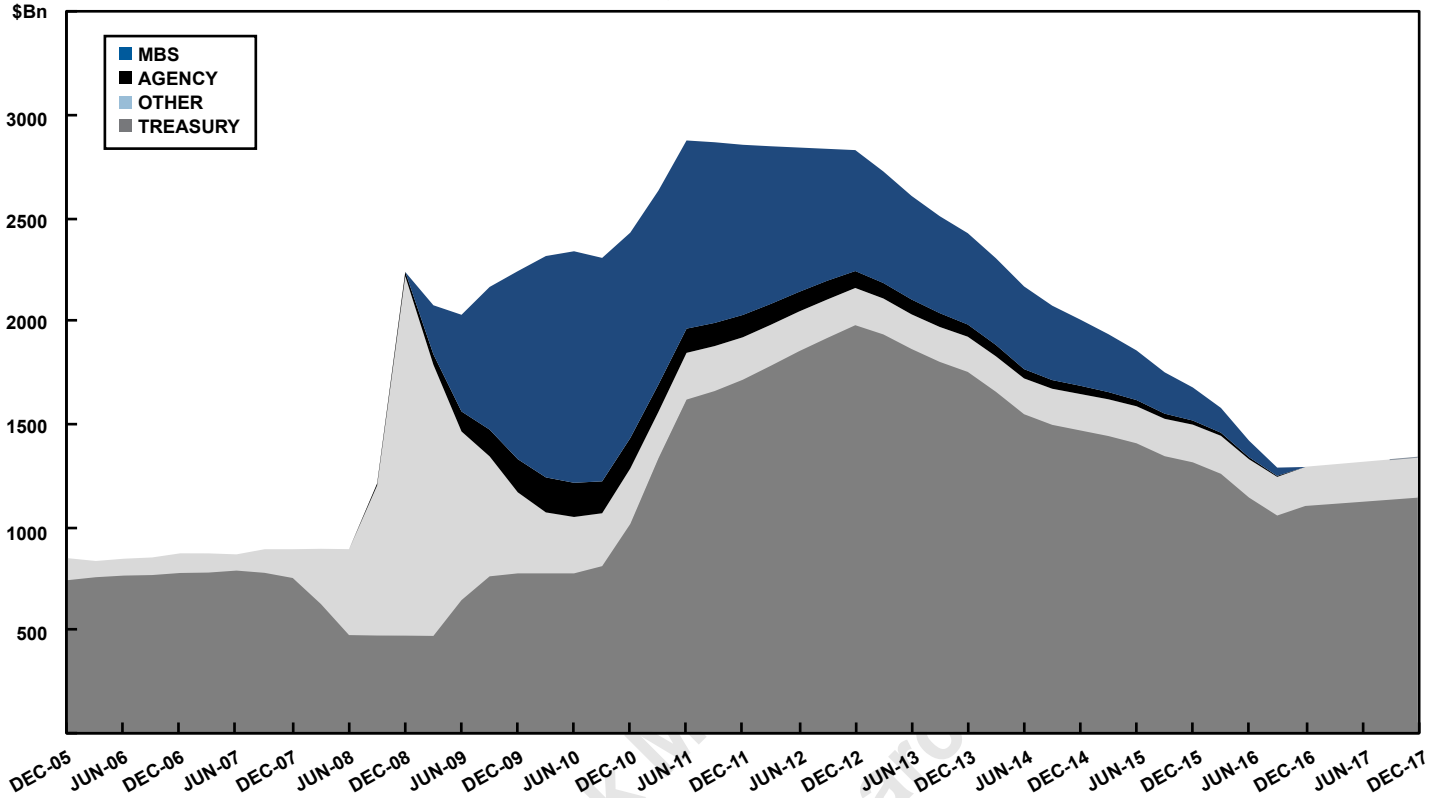
We present a pro forma balance sheet for the Federal Reserve in **Table 1**. Key assumptions used in this statement are:

- The Fed keeps its SOMA portfolio constant at \$2.65 trillion until December 2012. Treasury securities are allowed to mature without being replaced beginning in early 2013.
- The first rate hike of the tightening cycle does not occur until June 2013, as presently envisioned by the Fed.
- The Fed accelerates the pace of balance sheet contraction beginning one year after the first rate hike in June 2014 by means of active sales of mortgage-related securities. MBS and agency debt are fully excised from the balance sheet over the subsequent nine quarters.
- The equilibrium size of the Fed's SOMA Treasury holdings is about the same as its pre-crisis average of 6% of GDP.

In a January speech, Vice Chair Janet Yellen (then President of the San Francisco Fed) provided a hint on how long the Fed might take to reduce the size of its balance sheet back to an equilibrium level. She referred to an illustrative simulation, which assumed that the elevated level of Treasury holdings is maintained for about one year after completion of the purchase program and then unwound linearly over the following five years. According to our pro forma balance sheet, this equilibrium level can be achieved one year sooner (end-2016) with no active Treasury sales and with only minimal sales of MBS.

We have also considered the likely evolution of the balance sheet in the event that the Fed initiates a new round of asset purchases (QE3). In this case the Fed will likely need to actively sell Treasury securities in order to reach the desired equilibrium level within the five-year time frame. The pace of sales would depend on the amount and distribution of securities that the Fed bought during QE3. Purchases

**CHART 4
Federal Reserve Assets - Historical And Projection***



* PROJECTIONS BASED ON CURRENT BALANCE SHEET COMPOSITION; I.E, NO MATURITY SWAP OR QE3

**TABLE 1
Federal Reserve Pro Forma Balance Sheet (\$Billions)**

	AS AT DEC-2010	AS AT DEC-2011	AS AT DEC-2012	AS AT DEC-2013	AS AT DEC-2014	AS AT DEC-2015	AS AT DEC-2016
ASSETS	(ACTUAL)		PROJECTED				
TREASURY	1,016	1,713	1,977	1,751	1,468	1,314	1,103
AGENCY	147	108	82	59	40	34	0
MBS	992	822	584	441	320	160	0
TOTAL SOMA	2,155	2,643	2,643	2,251	1,828	1,508	1,103
AS A % OF GDP	14.9%	17.2%	16.6%	13.6%	10.7%	8.5%	6.0%
OTHER ASSETS	269	205	179	170	176	183	190
TOTAL ASSETS	2,424	2,848	2,822	2,421	2,004	1,690	1,292
LIABILITIES							
NOTES IN CIRCULATION	944	992	999	1,006	1,012	1,017	1,021
BANK RESERVES	1,021	1,623	1,592	1,176	744	416	5
OTHER LIABILITIES	402	179	175	182	188	195	202
CAPITAL	57	54	56	58	60	62	65
TOTAL LIABILITIES AND CAPITAL	2,424	2,848	2,822	2,421	2,004	1,690	1,292

of \$600 billion (the same as QE2) equally distributed along the curve from 3-30 years, for example, would require about \$60 billion in active Treasury sales in addition to the natural runoff. This would amount to just \$5 billion per quarter through the end of 2017. Increasing the pace of active Treasury sales to \$40 billion per quarter would return the balance sheet to equilibrium one year sooner, by the end of 2016.

To put it into perspective, these sales compare to gross Fed Treasury purchases during QE2 of \$100 billion monthly. The key point is that the fairly quick natural run-off of Fed assets, in combination with its other reserve-draining tools, should allow policymakers to soak up excess reserves, and yet avoid aggressive asset sales that might cause a disorderly selloff at the medium and long-end of the curve.

Q: As interest rates rise, won't the Fed be taking a capital loss? Will this affect the speed at which the Fed tightens?

A: Capital losses will be inconsequential, and will have no effect on the Fed's policy decisions.

In the case where the Fed does not proceed with either duration swapping or QE3, there is no requirement for active security sales, and therefore no opportunity for capital loss. If however, the Fed does implement QE3, then it could end up selling a significant volume of securities, likely at higher yields levels than it bought them. In the QE3 scenario, where the Fed returns the balance sheet to equilibrium by the end of 2016, we have estimated it would need to sell \$420 billion in Treasuries, \$18 billion in agency bonds, and \$276 billion in MBS. We further estimate the capital losses on these securities would amount to \$46 billion, or about \$18 billion per year spread out over 2½ years.

Meanwhile, the Fed would also be collecting interest income on its securities holdings. The interest income during this period would amount to \$140 billion, or about \$56 billion per year during the 2½

year when asset sales were taking place.

In short, even in the case where the Fed is starting from a much larger balance sheet than it has today, and decides to return to equilibrium over a fairly tight time frame, any capital losses it incurs on the sale of securities would be more than covered by interest income on its remaining portfolio.

In any case, the Fed has already addressed the possibility of capital losses on its SOMA account by changing its arrangement with the Treasury, which will now advance funds to the Fed in the event its capital position turns negative. This will not be a constraint on Fed policy. Whether it takes a loss on its own portfolio holdings is inconsequential compared to the task of supporting a non-inflationary economic recovery.



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