

Removing the punchbowl: central bank exit strategies

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Introduction

Only a few years ago, the worldwide challenge that central banks faced was to avoid the mistakes of the US Federal Reserve in the early 1930s, that is, to avoid sitting by idly as banks failed, the money supply and the price level fell dramatically, unemployment skyrocketed, and GDP contracted sharply. Although the recession has been severe and many uncertainties remain, it appears that the extraordinary responses have helped to avoid a repeat of the Great Depression. As economies revive and recover, however, the next key challenge is for a smooth unwinding of these measures.

In this paper, I begin with a very briefly discussion of the fragilities of the system that motivated the non-traditional use of the asset side of the balance sheet by the Federal Reserve (Fed) to avert the collapse of the financial system. In particular, the Fed created facilities that expanded the counterparties it could lend to, broadened the acceptable collateral for that lending, and lengthened the maturity of its lending. These innovations and exercises of “emergency” powers by the Fed came about in recognition of the limits of the traditional tools to respond to the greatest financial crisis in the United States since the 1930s.

I then describe how the short-run facilities were structured naturally to unwind as markets normalised and the Fed has already exited from more than a trillion dollars of this short-term lending. The purchase of more than a trillion dollars of long-term securities now held in the Fed’s portfolio, however, poses the next challenge for a smooth exit. Although the task is difficult and there certainly will be some bumps along the exit path, I will argue that the Fed has the tools, with interest on reserves, and the focus, using appropriate criteria to decide on timing, to be able to avoid high inflation while sustaining economic recovery on the way out. Managing inflation expectations will be crucial to success. Mistakes of abrupt policy reversals and complications from fiscal policy actions are important lessons to be learned to avoid the “double-dip” that occurred in the late 1930s. I conclude with some suggestions for how best to remove the punchbowl of highly accommodative traditional and non-traditional monetary policy.

Lengthening intermediation chains, interconnections, and the limits of traditional monetary policy²

The financial system has evolved significantly from a bank-based system 75 years ago to one with a much richer set of financial institutions and markets that are globally interconnected. In the United States, depository institutions (banks for short) then accounted for more than 60 percent of the assets held by the financial sector, but by 2006 that share fell by more than half.

² Parts of this section and the next draw on Randall Kroszner and William Melick, “The Response of the Federal Reserve to the Recent Banking and Financial Crisis,” forthcoming in Adam Posen et al, eds., *An Ocean Apart? Comparing Transatlantic Response to the Financial Crisis*, Peterson Institute of International Economics, 2010.

Rather than a single bank accepting deposits from households and making commercial loans to firms or mortgage loans to other households, for example, the financial system has evolved so that a saving household might purchase shares in a money-market mutual fund that holds commercial paper issued by a bank that engages in a repurchase agreement with a securities firm that has a special purpose vehicle that issues asset-backed securities that funds a pool of residential mortgages and that purchases over-the-counter credit derivatives from other financial institutions to hedge its exposure to these securities and others in its portfolio, etc. You get the picture. In other words, financial intermediation chains have grown much longer and many of the links in the chain are market-based, non-bank financial intermediaries that do not rely on deposits for their funding.

Regardless of what the driving forces may be behind this increase in the length and complexity of financial intermediation – ranging from a more efficient allocation of risk to regulatory arbitrage aimed at avoiding capital requirements – the many layers of intermediation create chains of inter-linkages that can make the entire system more vulnerable to shocks and significantly complicate the ability of a central bank and regulatory authorities to respond to a financial crisis. In a crisis, the classic admonition from Bagehot was for central banks to lend freely but at a high rate of interest to illiquid but not insolvent institutions on good collateral. In the modern financial system, which institutions should be included and what collateral should be acceptable?

At least in the United States, the tools available to the central bank did not evolve along with the financial system. The Fed's toolkit was essentially set in the 1930s. Open market operations and discount lending, in addition to affecting the overall level of interest rates, are also designed to impact bank reserves and thereby the larger economy via the bank lending channel. When banks are the largest players in the financial system, these tools can be sufficient for quelling a crisis, but they are unlikely to be sufficient in a financial system characterised by long intermediation chains with many market-based intermediaries.

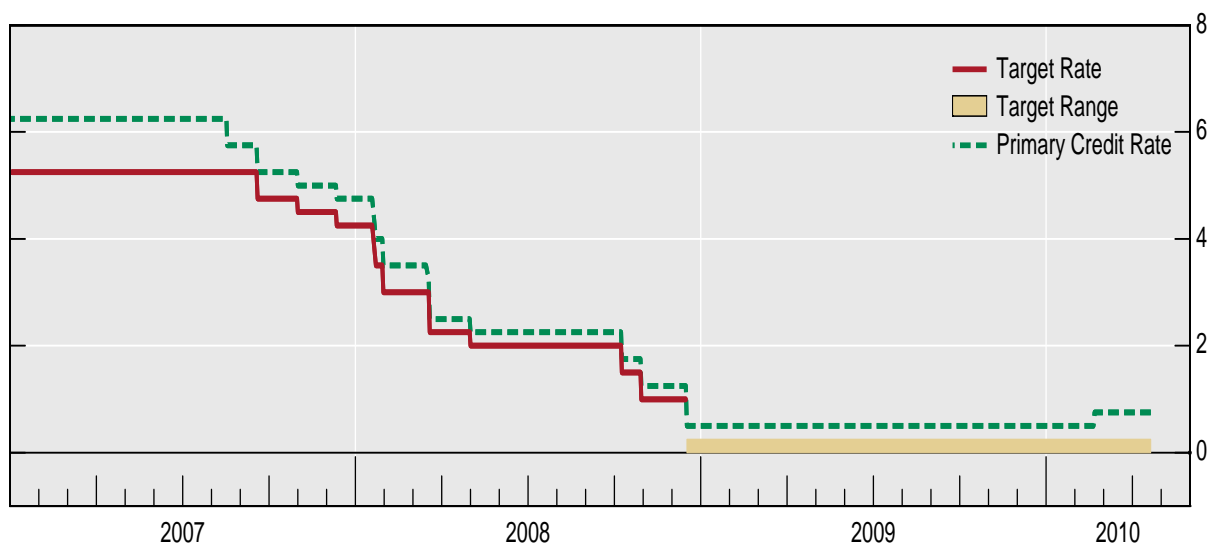
Policy responses: traditional and non-traditional

The initial responses to the crisis were with traditional monetary policy tools. As Figure 1 illustrates, in August 2007, the Fed narrowed the spread between the primary credit rate (the discount rate at which banks could borrow from the Fed) and the federal funds rate to reduce borrowing costs and to try to mitigate the stigma associated with borrowing from the central bank rather than in the marketplace. The federal funds rate target began to move down from 5.25 percent in the summer of 2007, reaching the unprecedented zero to 25 basis point level by the end of 2008.

The Federal Reserve Board, however, did not believe that even bringing the federal funds rate to the zero lower bound would be sufficient to avoid the possibility of a financial collapse. Traditional central bank policy tools can flood the banking system with liquidity, but this liquidity may not spill over to the market-based intermediaries when the financial markets linking the various institutions are not functioning. Open market operations and discount window lending will increase bank reserves, but there is no guarantee that these bank reserves will revive bank lending or much less the entire chain of intermediation. Bank deposits, protected by deposit insurance,

may be slow to run off, but bank deposits are a much smaller fraction of the funding of financial activity than once was the case. Institutions increasingly relied on the ability to securitise (that is, to sell) assets, to issue short-term commercial paper, to finance portfolios through secured repurchase agreements, etc., that is, on market-based intermediation rather deposits. Thus, traditional policy tools can liquefy banks but in these circumstances may have little direct effect on either traditional bank lending or market-based intermediaries.

Figure 1
Target Federal Funds Rate and Primary Credit Rate
 In per cent



Source: Federal Reserve.

From December 2007 through March 2009, in order to revive the financial system, the Fed introduced 16 new facilities using the asset side of its balance sheet in non-traditional ways. These programs required unanimous votes of the five members of the Board of Governors³ to exercise emergency authorities bestowed on the Fed in the 1930s. The so-called section 13(3) amendments to the Federal Reserve Act empower the Board of Governors to act in “unusual and exigent” circumstances to provide credit beyond traditional short-term discount window lending to banks.

Rather than describing the specifics of each program, which are summarised in Table 1, we can categorise the new programs as supplementing the traditional central bank policy tools to achieve three objectives: expanding the type of counterparties receiving support, broadening the collateral required to access the support, and lengthening the maturity of the support. Dealing with new counterparties beyond commercial banks is critical to extending assistance to important markets and firms in

³ Normally there are seven Governors, but since early 2007 there have been only five, with two seats vacant.

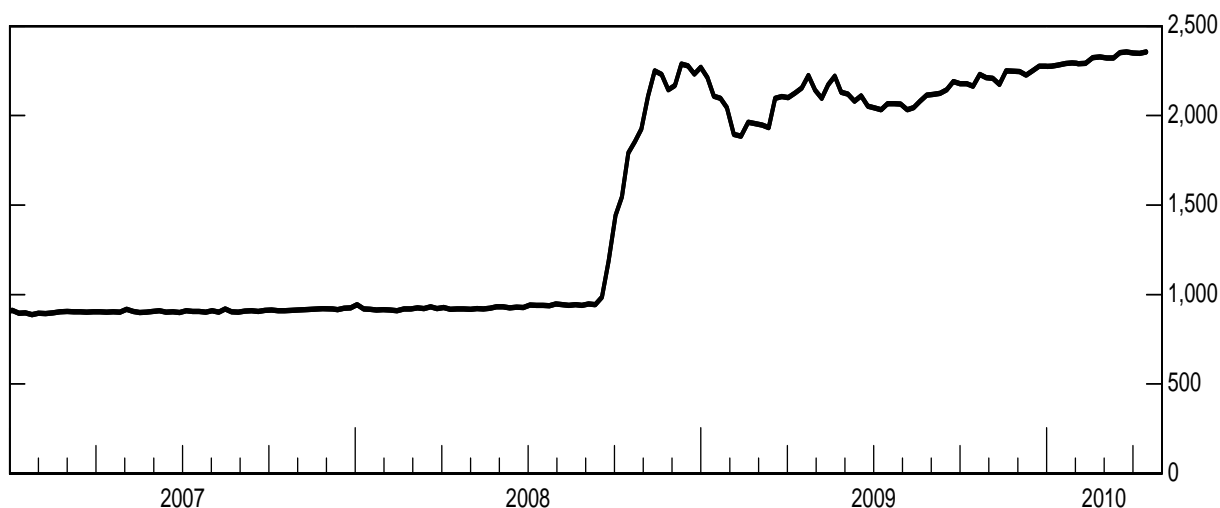
the intermediation chain, thereby acknowledging the interconnectedness of institutions and markets that has evolved. Accepting a wider range of collateral allows the Fed to support the financial system that has evolved from simple bank-based lending towards greater reliance upon securitisation and market-based intermediation. Finally, extending the maturity of the support provides important flexibility in countering a long-lived crisis. Extending maturities also provides confidence to market participants that institutions and counterparties will have a source of funding for longer periods to reduce the likelihood that sudden liquidity problems would force “fire sales” of assets that could compromise their solvency.

As Figure 2 illustrates, the Fed’s balance sheet nearly tripled in the second half of 2008, rising from \$800 billion in the summer to almost \$2.4 trillion at the end of the year. Virtually all of this increase involved short-term facilities that were structured to unwind naturally as risk spreads came down and markets normalised. For example, the rates and fees charged to borrow from the Fed or to use programs such as the Commercial Paper Funding Facility were much higher than private sources in normal market circumstances. As markets unfroze and began to function normally, financial institutions turned away from the Fed and to cheaper alternatives in the private markets. By March 2010, all of these short-term funding facilities had been shuttered so almost all of the \$1.6 trillion dollar additional funding that occurred in the second half of 2008 had unwound.

Figure 2

Total assets of the Federal Reserve

In billions of US dollars



Source: Federal Reserve.

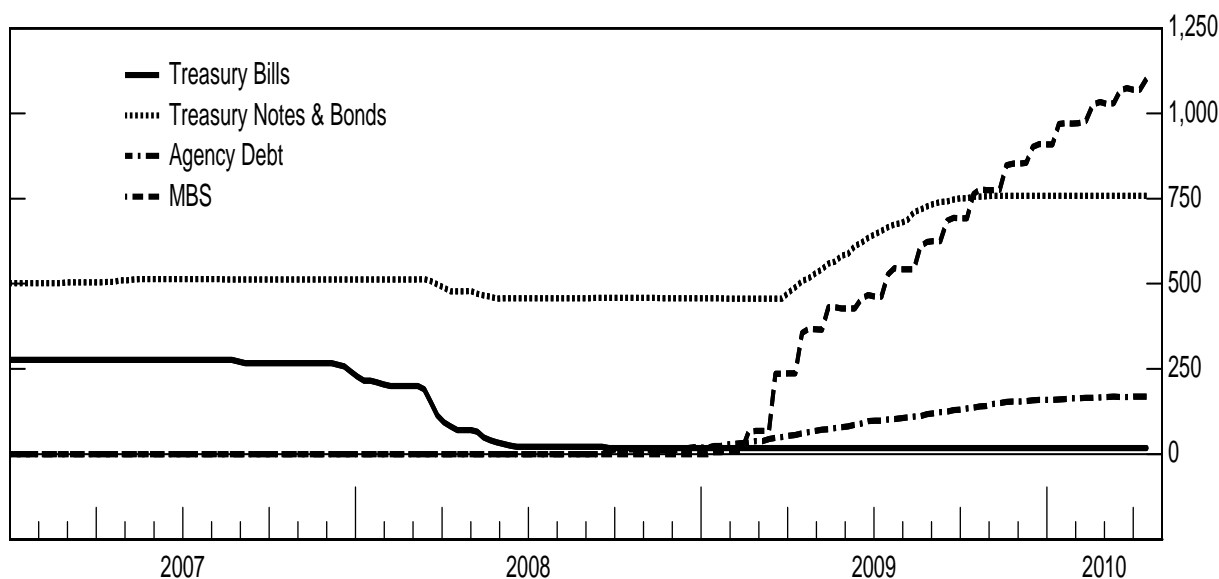
The Fed’s balance sheet, however, remains above \$2 trillion due to purchases for longer-term securities authorised in late 2008 and early 2009. Figure 3 illustrates this change in the composition of the Fed’s balance sheet. As of the end of March 2010, the Fed held roughly \$300 billion of long-term Treasury bonds, \$1.25 trillion of mortgage-backed securities (MBS) guaranteed by the government sponsored

enterprises (GSEs, also known as the Agencies), and \$175 billion of Agency debt. In addition, the Term Asset-Backed Securities Loan Facility (TALF) provides financing for longer-term assets, such as Commercial Real Estate Mortgage Backed Securities (CMBS). The challenge of the exit strategy, thus, is how best to manage the Fed's large portfolio of longer-term assets.

How to manage the exit?

As discussed above, the Fed has already been able to manage a smooth exit from the short-term facilities. With a balance sheet that is still over \$2 trillion and more than \$1 trillion of excess reserves held by the banks, can the Fed continue to manage a smooth exit without either causing disruption in the financial markets or inflation (or both)? While there undoubtedly will be some bumps along the road, I believe the answer is largely yes. The first question to ask is whether the Fed has the tools to do so.

Figure 3
Federal Reserve Holdings of Securities
 In billions of US dollars



Sources: Federal Reserve; Randall Kroszner and William Melick, "The Response of the Federal Reserve to the Recent Banking and Financial Crisis," forthcoming in Adam Posen et al, eds., *An Ocean Apart? Comparing Transatlantic Response to the Financial Crisis*, Peterson Institute of International Economics, 2010.

In the fall of 2008, US Congress gave the Fed a new tool that will play a crucial role as it exits from its unusually accommodative monetary policy: the ability to pay interest on reserves. Previously, a recovery would mean more opportunities for banks to lend, so they would draw down non-interest-bearing reserves and expand credit and, hence, the money supply. Interest on reserves, however, can cut that logic short by providing incentives for banks to hold reserve balances rather than lend them out, as the federal funds rate target rises. The Fed now has a greater control over the reserve choices of banks because it can raise the return on reserves relative to

banks' lending opportunities, and thereby better manage credit and money growth in a recovery. The ability to pay interest on reserves also allows the Fed to offer term deposits to the banks, thereby committing the depositing bank to keep its reserves with the Fed for a specified period of time. Since interest on reserves is a new tool, both for the Fed and for the banks, there undoubtedly will be some learning about what the spread to the federal funds rate will be in order to manage the large amount of excess reserves. The key is that now, unlike in the past, the Fed has the ability to reign in the incentives for banks to lend out the excess reserves as the recovery progresses.

In addition, there is the more traditional tool of "reverse repurchase agreements" in which the Fed can lend securities to financial institutions and, thereby, drain reserves from the system. While these types of repo transactions have been used before, the scale will be substantially larger than in the past. In recognition of the importance of the length and diversity of the intermediation chains, the Fed is expanding the set of counterparties with which it can engage in repo transactions. In addition to the primary dealers, the Fed is planning to include institutions such as money market mutual funds, which hold more than \$4 trillion in assets, and exploring other potential counterparties.

The Fed, of course, could simply sell the longer-term assets and directly shrink the portfolio and extinguish reserves. Significant direct selling, however, runs the risk of destabilising markets that the Fed's targeted asset purchases were trying to stabilise. An important objective of the purchase of the \$1.25 trillion of MBS, for instance, was to try to maintain the flow of housing finance and to keep mortgage rates at a relatively low spread to Treasuries. Through careful communication and a gradual reduction in the amount of MBS purchases over the life of the program, the Fed appears to have been engineering a relatively smooth end to the purchases program at the end of March 2010 without causing the spread on mortgages to Treasuries to rise. The announcement of a reversal of this program to begin large scale sales of MBS, however, could lead mortgage rates to move up considerably. In addition, the Fed's portfolio of these securities will steadily, albeit slowly, mature and shrink. Using interest on reserves and repo transactions strikes me as effective and less risky alternatives to significant asset sales, given ongoing fragilities and uncertainties in the market.

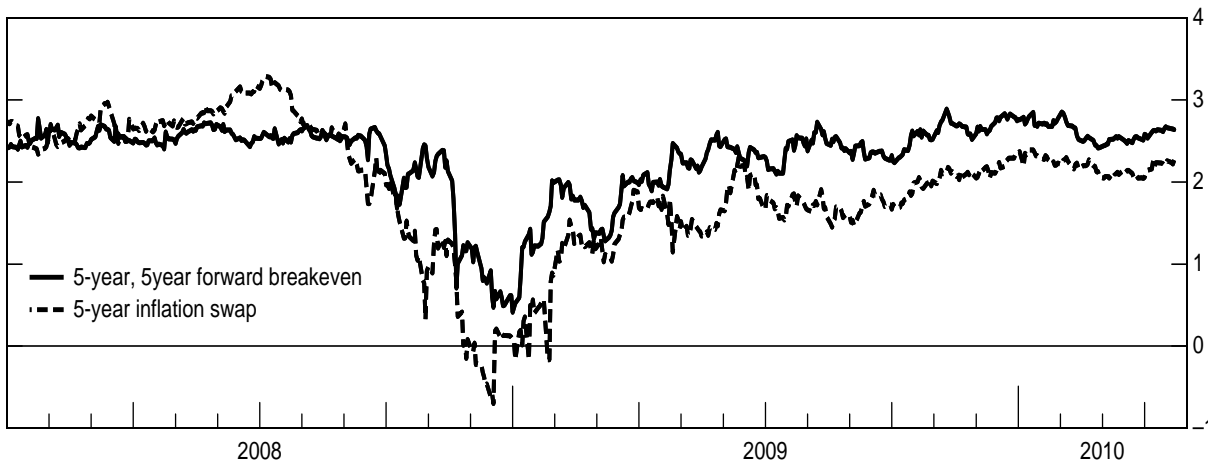
Since the Fed has the tools, the next question to ask is what criteria should be used to determine when to begin to raise interest rates and step back from the highly accommodative policy stance. The Federal Open Market Committee (FOMC) has articulated three criteria that it will use to judge when to exit: resource slack, inflation trends, and inflation expectations. I believe these are useful criteria not only for the US but for countries around the world. One indicator of "slack" is the unemployment rate. With the unemployment rate high and likely to remain elevated for some time in the United States, it is unlikely that there will be much wage pressure for some time into the recovery. Measures of overall inflation as well as core inflation (stripping out food and energy) continue to be subdued and have generally been trending down rather than up.

Inflation expectations have moved up considerably from early 2009, when market-based measures from the Treasury Inflation Protected Securities (TIPS) markets implied that market participants expected slight deflation over a five to ten year horizon (see Figure 4).

Figure 4

US inflation expectations

In per cent



Source: Bloomberg.

These measures of longer run inflation expectations have been, however, relatively steady at the upper end of the average range of where they had been in the years prior to the crisis. If such expectations remain “well-anchored” in this range, then that provides flexibility for the Fed to wait for the recovery to be firmly in train before raising rates. If expectations begin to move up, however, then the Fed will need to begin “removing the punchbowl” of highly accommodative monetary policy sooner to avoid inflation expectations from becoming unanchored. Changes in inflation expectations are notoriously difficult to predict, so managing these expectations through clear communications about the Fed’s commitment to price stability and the timing of the implementation of the exit will likely be the most challenging aspect of the Fed’s exit strategy.

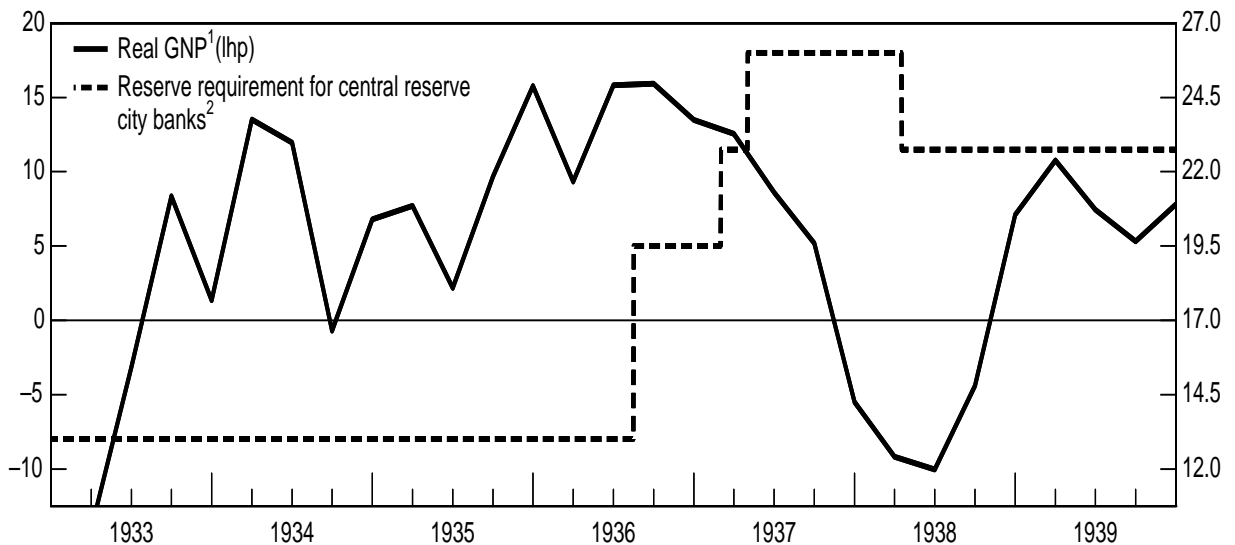
Lessons from the 1930s: how overzealous exit and complications from fiscal policy can lead to a double-dip⁴

The 1930s hold some important lessons for today. As noted above, inaction by the Fed in the early 1930s allowed the money supply to collapse and along with it prices and production. There are also important lessons for the exit strategy, both how an overzealous reversal of policy can undermine recovery and how fiscal policy complicates the exit strategy.

⁴ Parts of this section draw on Randall Kroszner, “Central Banks Must Time a Good Exit”, *Financial Times*, August 11, 2009.

Figure 5

The Fed and growth in the 1930s



¹ Annual change in per cent. ² in per cent.

Source: N Balke and R Gordon, "The American Business Cycle: Continuity and Change", *NBER Studies in Business Cycles*, vol. 25, 1986; *Banking and Monetary Statistics 1914-1941*.

Following the decline of GDP by roughly one-third from 1929 to mid-1933, the US economy rebounded sharply in a classic V-shaped recovery, as illustrated in Figure 5. Annual real growth averaged about 9 percent from the nadir in 1933 to the peak in 1936. During this period, banks had accumulated large amounts of excess reserves, in parallel to what is happening as the economy is recovering today. Given the strength of the recovery and the size of excess reserves, the Fed at the time feared that this combination could result in an "uncontrollable expansion of credit in the future" if the banks decided to lend out those reserves. In response, the Fed chose an abrupt exit strategy in 1936 and 1937 of sharply increasing required reserves in order to absorb the excess reserves and, thereby prevent the potential for an "uncontrollable expansion of credit."

The banks responded by calling in loans to build a liquidity cushion above legal requirements, thereby sharply contracting money, credit and economic activity. This sharp tightening of monetary policy helped to reverse the robust recovery that had been in train since 1933, precipitating a "double-dip" contraction in 1937-38, which according to Milton Friedman and Anna Schwartz in their 1963 book, *A Monetary History of the United States, 1867-1960*, "was one of the sharpest on record". Thus, the first lesson is that a lengthier exit, begun earlier and executed more gradually, may have helped to prevent a double dip.

It would be inappropriate, however, to place the blame for the contraction solely on monetary policy mistakes. A sharp and sudden reversal of fiscal stimulus also occurred around this time, complicating the Fed's exit decision and contributing to the contraction.

After Roosevelt took office in 1933, government spending as a percent of GDP began to rise. Roosevelt's New Deal programs were financed through deficit spending in

what has now become classic Keynesian fiscal stimulus. This increase in spending and deficits is in parallel to the fiscal expansion by governments around the world in response to the recent crisis (except that the 1930 debt-to-GDP ratio was much lower than in 2008). In addition, a very large fiscal boost occurred at the beginning of 1936. With an eye toward the 1936 election, US Congress passed a temporary and targeted “bonus” that involved sending checks totaling more than 1.5 percent of GDP to World-War One veterans. This large cash transfer undoubtedly helped to contribute to the extremely strong real growth (more than 15 percent annualised) that was worrying the Fed in early 1936. Thus, a second lesson is that a large fiscal stimulus can make it more difficult for the central bank to determine whether and when economic recovery needs to be reigned in by monetary policy tightening.

After the increase in government spending with the veterans’ bonus, many became concerned about sustainability of the cumulating deficits, again in parallel to concerns about fiscal sustainability in many countries today. The government then responded by significantly raising taxes. In particular, social security taxes were introduced for the first time in 1937. This sharp fiscal contraction then compounded the monetary tightening and underscores the risks of abrupt policy reversals.

Conclusions

The evolution of the Fed’s toolkit for crisis response did not keep up with the evolution of the financial system. Increasing reliance on external financing and lengthening of chains of intermediation increased fragilities in the system and motivated the central bank to undertake innovative non-traditional policies to respond to the crisis. The Federal Reserve Board exercised the emergency powers granted in the 1930s to expand the types of counterparties eligible for Fed lending, to broaden the types of collateral acceptable for such lending, and to lengthen the maturity of its lending. Most of the new short-term credit provision facilities have naturally wound down as market conditions have normalised and risk spreads have come down.

The increased size of the Fed’s balance sheet and the more than \$1 trillion of excess reserves, however, must be managed carefully to avoid disrupting financial markets and to avoid inflation. The newly granted power to pay interest on reserves will play a crucial role in giving the Fed the ability to maintain a large balance sheet without causing inflation as the economy recovers.

The key question, of course, is getting the timing right. When is the right time to take away the proverbial punchbowl? Keeping close watch on inflation expectations and clearly articulating and executing the exit strategy from extraordinarily accommodative monetary policy to ensure that such expectations do not become unanchored will be perhaps the greatest challenge for a smooth exit. Large amounts of fiscal stimulus that may be reversed also complicate the Fed’s task of determining the appropriate time for the exit to begin and how rapidly the exit should occur. The 1930s suggest that a gradual and well-anticipated withdrawal of accommodation rather than abrupt policy reversals will be the most effective way to achieve a smooth exit.

Table 1

Federal Reserve Non-traditional Policy Initiatives – Chronological (As of April 2010)

Initiative	Description					Objectives		
	Announced	First used	Date closed	Maximum size (billions)	Average size (billions)	Lengthen maturity	Broaden collateral	Expand counterparties
Term Auction Facility	12 Dec 07	17 Dec 07	8 Mar 2010	493	203	X		
Central Bank Swap Lines	12 Dec 07	20 Dec 07	01 Feb 10	583	157			X
Term Securities Lending Facility	11 Mar 08	27 Mar 08	01 Feb 10 ⁴	234	80	X		
Maiden Lane (Bear Stearns)	14 Mar 08	26 Jun 08	Ongoing	30	27		X	X
Primary Dealer Credit Facility ¹	16 Mar 08	19 Mar 07 ²	01 Feb 10	148	19			X
Term Securities Lending Facility Options	30 Jul 08	27 Aug 08	25 Jun 09	50	33	X		
AIG								
FRBNY Lending to AIG	16 Sep 08	17 Sep 08 ²	Ongoing	90	41		X	X
Maiden Lane II	10 Nov 08	12 Dec 08	Ongoing	20	16		X	X
Maiden Lane III	10 Nov 08	25 Nov 08	Ongoing	28	23		X	X
Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility	19 Sep 08	24 Sep 08 ²	01 Feb 10	152	21		X	
Commercial Paper Funding Facility	07 Oct 08	27 Oct 08	01 Feb 10	351	127		X	X
Money Market Investor Funding Facility	21 Oct 08	Not used	30 Oct 09	0	0		X	X
Citigroup Support	23 Nov 08	Not used	23 Dec 09	0	0			X
Term Asset-Backed Securities Loan Facility	25 Nov 08	25 Mar 09	31 Mar 10 30 Jun 10 ³	48	34	X	X	X
Purchase of MBS guaranteed by GSEs	25 Nov 08	05 Jan 09	31 Mar 10	1078	598	X		X
Purchases of direct GSE Debt	25 Nov 08	05 Dec 08	31 Mar 10	169	104	X		X
Bank of America Support	16 Jan 09	Not used	Sep 2009	0	0			X
Purchases of Longer-Term Treasuries	18 Mar 09	25 Mar 09	31 Oct 09	325	230	X		

¹ Includes transitional support for Goldman Sachs, Morgan Stanley and Merrill Lynch announced on 21 September 2008. ² Based on first appearance in the H.4.1 ³ Loans against newly issued ABS and legacy CMBS authorized through 31 March 2010, loans against newly issued CMBS through 30 June 2010. ⁴ Auctions against Schedule 1 collateral suspended on 01 July 2009

Sources: Federal Reserve Board of Governors weekly H.4.1 statistical release; Randall Kroszner and William Melick, "The Response of the Federal Reserve to the Recent Banking and Financial Crisis," forthcoming in Adam Posen et al, eds., *An Ocean Apart? Comparing Transatlantic Response to the Financial Crisis*, 2010.