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This Economic Letter is adapted from a speech delivered by Janet L. Yellen, president and CEO of the Federal Reserve Bank of San Francisco, on January 4, 2009, to the Andrew Brimmer Policy Forum during the IBEFA/ASSA meeting held in San Francisco.

Today the Federal Reserve faces some of the greatest challenges in its history as it strives to restore economic growth, job creation, and financial stability and to preserve price stability. To achieve these policy objectives, the Federal Reserve is committed to using every tool at its disposal.

The challenges are all too well known. Almost 18 months since the onset of the now-global financial crisis, the functioning of financial markets remains greatly impaired, and diminished credit flows are impeding the ability of households and firms to borrow and spend. As a consequence, the U.S. economy is undergoing a sharp contraction, with almost two million jobs lost thus far and unemployment poised to rise further in the year ahead. And the adverse feedback loop goes on, as these deteriorating economic conditions, in turn, are intensifying financial sector distress. Regarding price stability, pressures from soaring commodity prices at the onset of the crisis have ebbed dramatically, and inflation is subsiding. Indeed, with growing economic slack, inflation may well decline, for a time, below levels that best promote the dual goals of full employment and price stability.

An important lesson of theory and history is that circumstances like these call for prompt and aggressive action. And the Federal Reserve has responded vigorously. Since September 2007, the Federal Open Market Committee (FOMC) has cut the federal funds rate target roughly 500 basis points. In December, the Committee took the historic final step of lowering the federal funds rate essentially to its "zero bound," establishing a target range of 0 to ¼% and communicating its expectation that weak economic conditions would likely warrant exceptionally low levels of the federal funds rate for some time. This

move exhausts the Fed's ability to provide stimulus through "conventional" monetary policy actions. But it by no means exhausts the Fed's options to stimulate the economy through other measures. The Committee's focus going forward will be on "non-conventional" programs that use its balance sheet to improve the functioning of financial markets, an arena where considerable scope for action remains. In my remarks today, I will describe the balance sheet measures that the Fed has already put in place, addressing some frequently asked questions: Have the programs worked? What is the scope for expanding these policies going forward? How does the Fed's approach compare to the quantitative easing policy implemented by the Bank of Japan between 2001 and 2006? I will also discuss the potential role that enhanced Fed communications might play in helping to achieve both short- and long-run objectives.

To preview my answers, I will argue that the suite of programs that the Fed has already announced or put in place are an appropriate and creative response to alleviate strains from the ongoing credit crunch. The evidence suggests to me that they have improved liquidity in the money markets and lowered the cost of private credit. Going forward, asset purchases and lending programs could be expanded and extended to additional sectors impacted by the credit crunch. As for the comparison to Japan's experience, to my mind, the differences outweigh the similarities. Roughly speaking, the Fed is focused on the potential for targeted programs on the "asset side" of its balance sheet to improve credit flows in specific impaired markets, whereas the Bank of Japan was primarily focused on the potential for an expansion of the total quantity of its liabilities—the excess reserves of the banking system—to spur additional bank lending.

The Fed's balance sheet policies

Since the onset of the crisis, the Fed has massively expanded the provision of liquidity to financial institutions, thereby easing the broader credit crunch. Serving as lender of last resort is a time-honored function for central banks and is critical in mitigating systemic risk. But in doing so during the current crisis, the Fed has crossed traditional boundaries by extending the maturity of the loans, the range of acceptable collateral, and the range of eligible borrowing institutions. At the onset of the crisis, the Fed encouraged banks to use the discount window. The apparent stigma associated with use of the window, however, discouraged banks from borrowing. To address this problem, the Fed introduced and has substantially expanded a new auction system (the Term Auction Facility or TAF) to distribute discount window loans. Auctions of longer-term (up to 84-day) loans at regular intervals were added to address a persistent shortage of term funding in the money markets, as evidenced, for example, by exceptionally high spreads of term versus overnight Libor loans. To further ease severe liquidity pressures at quarter- and year-end, the Fed introduced a system of forward auctions on TAF loans. In addition, the Fed supported the provision of dollar liquidity beyond our own shores through a vast expansion of its network of swap lines with foreign central banks, raising the size of borrowing lines with existing swap partners and adding additional central banks to the network.

A unique feature of the current financial crisis is that it has engulfed not only the banking system but also an enormous sector comprising the so-called "shadow banking system," which includes an array of nonbank financial institutions. It was apparent early on that confining the provision of liquidity to depository institutions alone would be insufficient to meet the liquidity needs of the broader financial markets. In response, the Fed invoked, for the first time since the Great Depression, its authority under section 13(3) of the Federal Reserve Act to lend in "unusual and exigent circumstances" to "individuals, partnerships, or corporations" that are "unable to secure adequate credit accommodations from other banking institutions." Discount window lending under this authority was used to facilitate the acquisition of Bear Stearns and to stabilize AIG and Citigroup—three systemically important financial firms. It has also been invoked to establish a discount window facility for primary dealers (the Primary Dealer Credit Facility or PDCF) and a new facility to enhance the ability of primary dealers to finance their securities inventories through the repo market. This Term Securities Lending Facility (TSLF), through an auction

mechanism, lends out Treasury securities from the Fed's own holdings to primary dealers in exchange for investment-grade securities. The facility, in effect, offers collateral to dealers for use in repos that is more desirable in the market than most asset-backed securities.

The Fed's use of its balance sheet to support the functioning of credit markets expanded dramatically following such events as the bankruptcy of Lehman Brothers and the near-collapse of AIG. Those events triggered severe disruptions in short-term money markets, as investors in prime money market funds fled to the safety of the shortest Treasury securities. These disruptions also triggered dysfunction in the commercial paper market, a large and important source of short-term financing for both financial and nonfinancial corporations. Two new facilities, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) and Money Market Investor Funding Facility (MMIFF), were introduced to provide backup liquidity to money market mutual funds to help them cope with redemptions that could otherwise cause them to "break the buck." The AMLF provides nonrecourse discount window loans to banks to enable them to purchase asset-backed commercial paper from money market mutual funds, and the MMIFF provides loans to a private-sector vehicle established to purchase a broad range of assets from these funds.

In order to restore functioning to the commercial paper market, the Fed has also committed to providing loans to a new Commercial Paper Funding Facility (CPFF) that was set up to purchase commercial paper from highly rated (A1P1) issuers. Importantly, the ultimate purpose of all of these facilities is to enhance the provision of credit to a broad range of private borrowers by restoring the liquidity and functioning of short-term money markets.

In my judgment, the suite of facilities that the Fed has created to improve money market conditions is working to satisfy the financial system's greatly increased demand for safe assets and liquidity. Conditions are still abnormal, but money market functioning has clearly improved relative to the dark days of last September and October. For example, term Libor rates have declined along with the spreads of these rates over the federal funds rate. Since term Libor rates are a benchmark for many adjustable-rate loans, including mortgages, the benefits of these reductions are rippling throughout the private sector. For highly rated commercial paper, eligible for the CPFF, spreads have also narrowed substantially. In contrast, the borrowing spreads for less highly rated paper (A2P2) remain extremely elevated.

Moving beyond the money markets, interventions have only just begun, and considerable scope remains for targeted asset purchases and discount window lending programs to improve the flow of credit and reduce its cost in sectors that have been severely impacted by the financial crisis. In November, the Fed announced and commenced a \$600 billion program to purchase agency debt and agency-insured mortgage-backed securities. A successful initiative in this area could provide significant support to the housing sector. Scope remains for larger interventions, and in December the FOMC reiterated its readiness to expand upon these purchases "as conditions warrant." Even at this early stage, the program appears to be having an impact. For example, yields on mortgage-backed securities and 30-year fixed-rate mortgages fell substantially immediately after the program was announced. The decline in mortgage rates, which also has been affected by a decline in Treasury yields, has prompted an upsurge in refinancing activity in recent weeks. The FOMC could also expand its purchases of longer-term Treasury debt—an initiative that could lower government borrowing rates and spill over into private borrowing rates more broadly. In its December statement, the FOMC noted that it is evaluating the potential benefits of such purchases.

The Federal Reserve Act confines the System's outright asset purchases to securities issued or guaranteed by the U.S. Treasury or U.S. agencies. Even so, the Fed has the potential to use its balance sheet to restore functioning in other impaired financial markets. The recently announced Term Asset-Backed Securities Loan Facility (TALF) provides a model for doing so. This new Fed facility is designed to spur lending to meet the credit needs of households and small businesses. The facility will support the

issuance of securities collateralized by auto, student, credit card, and Small Business Administration (SBA) loans—sectors where the issuance of new securities has slowed to a trickle. The high borrowing spreads on such securities, even when the underlying loans are government-guaranteed—as in the case of SBA and many student loans—suggest not only heightened credit risk but also an impairment of market liquidity which the facilities can address. The inability of financial institutions to securitize such loans, and of potential investors in such securities to borrow against them on reasonable terms, reflects an important breakdown in credit markets. By improving the functioning of markets for securitized assets, the Fed has the potential to boost private-sector credit flows in support of the economy. Under the TALF, which is a joint Federal Reserve-Treasury initiative, the Fed has agreed to provide nonrecourse loans to holders of eligible highly rated asset-backed securities. Cooperation with the Treasury is necessary because the program entails some risk of loss and, under the Federal Reserve Act, all Fed lending must be appropriately secured. The Treasury has committed \$20 billion of TARP funds to protect the Fed against losses on the Fed's lending commitment of up to \$200 billion.

The approach employed by the TALF can be expanded substantially, with higher lending volumes and additional asset classes covered by the program. Indeed, the Federal Reserve and the Treasury have announced that the facility could be expanded over time to include commercial and non-agency residential mortgage-backed securities. Securitization activity in these markets has all but dried up since the credit crisis began, and the shortage of credit in these critical sectors has made private borrowing costs exceptionally high. Along these lines, the FOMC stated that it “will continue to consider ways of using its balance sheet to further support credit markets and economic activity.”

It is worth noting that, as the nation's central bank, the Fed can issue as much currency and bank reserves as required to finance these asset purchases and restore functioning to these markets. Indeed, the Federal Reserve's balance sheet has already ballooned from about \$900 billion at the beginning of 2008 to more than \$2.2 trillion currently—and is rising.

The Fed's current “balance sheet approach” to monetary policy creates an entirely new set of policy issues and challenges. For example, the Fed normally eschews interventions that directly affect the allocation of credit, and to a considerable extent, the new facilities rely on financial markets to channel funds to individual borrowers. However, the new facilities do influence credit allocation because they must be targeted at particular sectors of the credit market. In effect, the Fed must judge where to intervene, deciding where market dysfunction is greatest and where adverse consequences for the overall economy are particularly severe. Furthermore, many of the interventions are novel, so no straightforward methods are available to quantify their effectiveness. There are also no clear guidelines for the Fed to gauge the appropriate size of its interventions and few precedents for the Fed to use in communicating its policy stance to the public beyond announcing new programs and describing their terms in detail. Although the purpose of most programs is to lower borrowing costs, the Fed must be careful to avoid the risks that could result from targeting some predetermined yield or spread. Finally, the Fed must ensure that it has an exit strategy to wind down the facilities in a timely and effective way when they are no longer needed. These challenges notwithstanding, I believe that the approaches I have described have considerable potential to contribute to a strong economic recovery.

Quantitative easing?

On the surface, it may seem appropriate to equate the Fed's use of its balance sheet to stimulate the economy with the quantitative easing policy pursued earlier by the Bank of Japan. But as I noted at the outset, the differences outweigh the similarities in my opinion. The main similarity is that the Fed, like the Bank of Japan, has increased the quantity of excess reserves in the banking system well above the minimum level required to push overnight interbank lending rates to the vicinity of zero. The creation of such a large volume of excess reserves, in the Fed's case, results from the enormous expansion in the Fed's discount window lending, foreign exchange swaps, and asset purchases. In the Bank of Japan's case, the expansion in excess reserves resulted from the deliberate adoption of an explicit numerical

target for them. The theory underlying the Bank of Japan's intervention was that banks might be encouraged to lend by replacing their holdings of short-term government securities with excess cash. The problem with this idea is that, near the zero bound, short-term government securities and cash are almost perfect substitutes—both are essentially riskless assets that yield a zero or near-zero rate of return; thus, exchanging one for the other should have little effect on banks' desire to lend. Indeed, the Japanese experience during their quantitative easing program in the early 2000s suggests that simply expanding excess bank reserves—even by a very large amount—had little effect on bank lending or on the economy more broadly. The policy may have lowered longer-term borrowing rates, however, by symbolizing and highlighting the Bank of Japan's commitment to fighting deflation by holding its short-term interest rate at zero for an extended time—until deflationary pressures had been convincingly dissipated.

In contrast, the overall size of assets on the Fed's balance sheet will be the result of decisions concerning the appropriate scale of each particular program and the extent to which the various programs and facilities are actually used by market participants. The take-up rates on these programs and facilities are likely to fluctuate over time as market conditions change. For example, early in a new Fed lending program, its impact on economic activity might rise with the associated expansion of the Fed's balance sheet. Later on, if the program helps to improve the functioning of the private market, success could be associated with the contraction of the Fed's balance sheet as the Fed exits from the market, leaving the determination of credit flows to private participants. Furthermore, the mere availability of backup liquidity through a facility may improve market functioning, even if the volume of borrowing is low. Thus, the impact of the totality of Fed programs should not be judged by the overall size of the Fed's balance sheet. Rather, it will be necessary to evaluate the success of each individual program in improving market function and facilitating the flow of credit.

Federal Reserve communications

An extensive literature and some recent experience suggest that central bank communications may also play a helpful role in addressing the constraints relating to the zero bound. For example, Reifschneider and Williams (2000) and Eggertsson and Woodford (2003) showed that the constraints imposed by the zero lower bound are not very restrictive if the Fed can credibly commit to keeping the funds rate low for an extended period of time. The idea is that the FOMC can work around the zero lower bound on the *overnight* interest rate by lowering interest rate *expectations* in the future, thus pushing down longer-term interest rates to stimulate private spending. The Fed employed such an approach between 2003 and 2005, and has taken an important step along the same path in its December announcement by stating that "exceptionally low levels of the federal funds rate" are likely to be warranted "for some time" due to "weak economic conditions." I believe that such statements can play a useful role in more clearly indicating to markets the Committee's own expectations concerning the federal funds rate path, conditional on the Committee's economic forecast.

Communication also can be important in the Fed's efforts to anchor long-term inflation expectations. As I mentioned at the outset, the odds are high that over the next few years, inflation will decline below desirable levels. It is especially important in such circumstances for the Fed to emphasize its commitment to returning inflation over time to the higher levels that are most appropriate to the attainment of its longer-term objectives. A decline in inflationary expectations when economic conditions are weak is pernicious, especially so when the federal funds rate has reached the zero bound, because any downdrift in inflation expectations leads to an updrift in real interest rates and a tightening of financial conditions.

Work by Gürkaynak, Swanson, and coauthors (2005, 2006) suggests that committing a central bank to a long-run inflation objective helps anchor longer-run inflation expectations in that country. Over the past few years, the FOMC has in fact taken important incremental steps toward making its longer-term inflation goals more explicit. For example, we are now publishing FOMC members' inflation forecasts for

the next three years under the assumption of “appropriate monetary policy,” and the publication of such forecasts has helped shape public understanding concerning the range of inflation outcomes that FOMC members regard as desirable in the longer term. Looking forward, there could be scope for the Committee to improve the clarity of these communications. I am optimistic that, by clearly communicating the Fed’s commitment to low and stable inflation and by backing that commitment up with determined policy actions should the need arise, any deflationary pressures caused by the weak economy can be contained.

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