

***EMBARGOED UNTIL
Monday, June 9, 2014 at 1:30 p.m. U.S. Eastern Time
and 11:30 a.m. local time in Guatemala City
Or Upon Delivery***



***“New Monetary Policy Tools:
What Have We Learned?”***

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President & Chief Executive Officer
Federal Reserve Bank of Boston**

***The Central Bank of Guatemala
XXIII Cycle of Economic Lectures***

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I would like to thank the Central Bank of Guatemala and President Barquín Durán for this opportunity to discuss U.S. monetary policy. I appreciate the opportunity to take part in your Cycle of Economic Lectures, and to be here with so many practitioners from the region.

Today, I would like to suggest some context for the Federal Reserve’s forward guidance and large-scale asset purchases (LSAPs), discuss some of the impacts of those policies, and provide my own view of how these tools might evolve if the U.S. economy continues to slowly recover and the high degree of monetary accommodation can be gradually removed.

As always, I would note that my comments reflect my own views, not necessarily those of my colleagues on the Federal Open Market Committee or the Federal Reserve’s Board of Governors.

While forward guidance and LSAPs have been actively used in the United States in recent years, I would suggest that a full assessment of the costs and benefits of these programs is still somewhat premature at this time – since the Federal Reserve has really only recently begun a process that will ultimately remove the high degree of monetary accommodation that is currently in place. At present, our asset purchases continue to *add* to accommodation, albeit in smaller and smaller increments reflecting recent policy decisions.

Allow me to briefly preview my conclusions today.

My own view is that the “new” monetary tools – LSAPs and forward guidance – were essential. Particularly important, I believe, was the Federal Reserve’s stated emphasis on *doing what it would take* to generate an economic recovery, and on following through with actions that demonstrated we were indeed willing to do what it took.

Many of these policies were introduced at a time when the U.S. economy was in the throes of a significant recession – with the federal funds rate at the zero lower bound – and clearly required more accommodation from new monetary tools. As you can see in **Figure 1**, the Federal Reserve followed the first round in late 2008¹ with additional rounds of stimulus in 2010², 2011³, and 2012⁴ (still underway) as the economy continued to underperform relative to expectations and historical norms for recoveries.

The LSAPs, Maturity Extension Program, and forward guidance policy tools lowered key interest rates and, importantly, also played a role in rebounding asset prices, such as U.S. housing values and stock prices. Certainly we saw more spending in interest-sensitive sectors of the economy. In sum, our new tools were partly responsible for improved economic conditions and improved labor markets – trends that have proven effective enough that the Federal Reserve could begin gradually stepping back the degree of accommodation.

In terms of the international view, I would say that while the U.S. has benefitted from these policies, they were introduced at a time when many other economies were also lagging – including Japan, Europe, and many emerging economies. The increased willingness of U.S. households to consume, and U.S. firms to invest, has helped generate a more robust export market to the U.S. – certainly a more favorable market than would have prevailed if policies had not changed and the U.S. economy had remained as subdued in outcomes as most forecasters expected at that time.

While our policies, in my view, have been instrumental in achieving better economic outcomes, they are not without challenges. Allow me to mention a few of these.

First, because financial market participants factor in the expectation of future policy rates, the Fed's exit strategy is of great interest to them. Uncertainty or misunderstanding about the contours of our exit has the potential to be problematic in both advanced and developing economies – as we were reminded a year ago – so effective and transparent communication has become even more important than in the past. This is not a traditional area of expertise for most central banks, but we are making strides and improving.

As we learn how to better communicate our intentions about these new and less-tested tools, markets too have to learn and adjust – given that our communication about these new tools, along with the effects on the economy, are new to markets. The period of adjustment on both sides has led to a few challenges, but appears to have evened out in recent months.

But we should all acknowledge the possibility that this relative calm may be challenged in the future. The eventual exit from very low interest rates around much of the globe will also be unprecedented, and will thus hold challenges for communication and understanding. Having said that, I would observe that the careful consideration of all of the aspects of the exit strategy provides

opportunities to consider a broader set of monetary policy tools, and how those tools impact financial stability along with inflation and unemployment.

Economic Conditions Leading to “QE3”

It is important to remember the economic context around the selection of policy tools in the fall of 2012 – popularly referred to as “QE3,” shorthand for a third round of quantitative easing.

Figure 2 shows private sector forecasts for U.S. real GDP growth in August of 2012. The U.S. economy grew just 1.5 percent in the second quarter of 2012,⁵ and the consensus expectation was that the next several quarters were not likely to be significantly better. The different paths projected by averaging the 10 highest and the 10 lowest forecasts show that the outlook was clouded by a high degree of uncertainty. But again, both the consensus forecast and the pessimistic forecast were quite weak over the near term.

Figure 3 shows that private forecasters expected declines in the U.S. unemployment rate, but only gradual declines consistent with slow progress toward full employment. Notice the large gap between even the optimistic forecast and my own estimate of full employment in the United States, 5.25 percent, shown by the line near the bottom of the chart. With forecasters expecting unemployment to be above 7 percent at the end of 2013, it was clear that we were far from attaining normal conditions in labor markets (even if one’s estimate of the full employment level of unemployment was somewhat higher than my own 5.25 percent).

So in the fall of 2012, the case for additional monetary stimulus was straightforward to me. Unemployment was quite high, and it was likely that inflation would undershoot the Federal Reserve’s inflation target. We were falling short on both parts of the Federal Reserve’s “dual mandate,”⁶ so qualitatively speaking, the appropriate stance for monetary policy was clear.

As a result, in September of 2012,⁷ the monetary policymaking Federal Open Market Committee, intending to increase policy accommodation, undertook an additional program of monthly purchases of long-term mortgage-backed securities (MBS). In contrast to our previous asset purchase programs, the Committee did not specify how long the purchases would continue or how much it would buy in total. This was a manifestation of being willing to do “whatever it takes.” In addition, the Committee statement emphasized that purchases would continue if the outlook for the labor market did not improve substantially. The Maturity Extension Program – through which the Federal Reserve was extending the average maturity of its U.S. Treasury securities holdings⁸ – continued. These actions, declared the Committee’s policy statement, “will increase the Committee’s holdings of longer-term securities by about \$85 billion each month through the end of the year.”

In December of 2012,⁹ it was announced that the open-ended purchase program would include purchases of longer-term U.S. Treasury securities (once the Maturity Extension Program concluded at year end), and the Committee attempted to clarify that conditions in the labor market would determine the length of the asset purchase program in their statement – saying that “this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6.5 percent” and inflation and inflation expectations remain anchored. All in all, the open-ended purchase program, along with strong forward guidance, made it clear that U.S. monetary policymakers were determined to achieve significant improvements in labor market conditions.

A major source of the U.S. economy’s weakness at that time had been the failure of the housing market to rebound. In part, this was tied to concerns that housing prices in many areas would continue to fall, damping the impetus to buy. **Figure 4** shows a standard forecast for U.S. housing prices in August 2012. The figure shows that actual housing prices fared much better than the forecast made prior to our monetary policy decision.

Given that the cost of purchasing a home is tied to long-term interest rates, the Federal Reserve's accommodative monetary policy facilitated some of the recovery in housing values. Indeed, **Figure 5** shows that low interest rates and higher housing prices provided the driving force for a greater number of housing starts than had been forecast.

Other interest-sensitive sectors, such as automobile purchases, were also helped by the lower interest rates generated by the Federal Reserve's policy stance and actions. **Figure 6** shows that U.S. auto sales ended up much stronger than forecasters had expected in August of 2012.

Figure 7 shows that U.S. unemployment actually fell more quickly than expected by forecasters in August of 2012. In my view, the unconventional use of forward guidance and LSAPs did contribute to a faster improvement in labor markets than forecasters were expecting.¹⁰ However, the exact mechanism for this faster recovery is still a source of some debate; since labor markets showed improvement fairly quickly, but the growth in aggregate spending during this period remained frustratingly slow by historical standards. Still, my own view is that the open-ended nature of the Federal Reserve's purchase program and the strong forward guidance together encouraged private sector investors to purchase a wide array of long-term assets, lowering long-term interest rates and helping many asset prices rebound – and thus amplifying the impact of the Federal Reserve's actions.

To the extent that this generated a stronger economy and rebounding prices, it was at that point a great benefit. However, the success in driving down long rates bore with it a future downside risk, as well. Those investors who were buying assets under the assumption that their prices would rebound and their yields fall as the Federal Reserve pursued its expansionary policy were likely to be quite sensitive to the reversal of these policies. Of course, the point at which that reversal would happen was quite uncertain, so that knowing when and how to protect against that risk was likely somewhat difficult.

Indeed, **Figure 8** shows the movement of 10-year U.S. Treasury security yields over the course of 2013. Once the U.S. economy began to improve and the Federal Reserve began to discuss a gradual reduction in purchases, many market participants who had been invested “alongside” the Federal Reserve became active sellers.

This was particularly true for highly leveraged investors who had borrowed “short” and invested “long” by engaging in the so-called “carry trade” – an issue of particular relevance in emerging markets where interest rates were considerably higher than in the United States. The result was a fairly significant increase in long-term rates and a repatriation of funds that had been previously borrowed short and invested long in emerging-market securities.

The unwinding of the carry trade was a particularly thorny issue for countries with high dollar-denominated yields and fixed exchange rates, and for countries that had high yields and a policy of gradual currency appreciation relative to the dollar. The speed and magnitude of the readjustment highlighted just how low long-term rates had been pushed. It also suggested that many models of the impact of Federal Reserve asset purchase programs had not fully accounted for potential investor reaction to the policy, or the impact of a sudden reassessment of investor desire to engage in the carry trade.

Despite the rather abrupt change in market interest rates last spring, the U.S. economy has continued to improve, as have the economies in many other countries. To be sure, the increase in market rates had some noticeable effects: some of the recent slowdown in housing activity is likely attributable to the rise in mortgage rates in the wake of last year’s market adjustment.

In sum, this episode made clear the importance of Federal Reserve communication and market understanding about programs and policies. The episode also underlined the importance of calibrating investor reactions into models of policy impact.

With the onset of the gradual tapering that was announced in December of last year, the Federal Reserve's asset purchase program has been reduced from \$85 billion a month to now \$45 billion a month – still providing policy accommodation, but at a lessening rate. **Figure 9** shows that the volatility of U.S. Treasury securities has recently been quite low. I would attribute that in part to the very gradual and predictable reduction in the purchase program, along with an economy that has continued to improve, albeit only gradually and with some setbacks along the way.

Importantly, I suspect that the benign reaction to the gradual tapering of stimulus over the last 6 months may be instructive as we consider how best to wind down the Federal Reserve's balance sheet once the tapering of asset purchases is complete. While the optimal program for reducing the Fed's balance sheet will need to be dependent on the state of the economy, the recent tapering experience suggests to me that a predictable, transparent reduction in the balance sheet could be done in ways that may minimize the risk of financial disruption.

Let me offer one scenario that I have been considering, in light of the sorts of financial stability concerns that I and my colleagues keep in mind. In one scenario, a reduction in the balance sheet, when that becomes appropriate, could be implemented as a basically seamless continuation of the tapering program used for reductions in the purchase program. For example, the Committee could decide to *reinvest all but a given percentage* of securities on the balance sheet as they reach maturity, and *increase that percentage* at each subsequent meeting, assuming conditions allow.

Such a tapering of the reinvestment program could allow for a gradual and transparent reduction in the Fed's balance sheet. As the economy moved closer to the Federal Reserve's 2 percent inflation target and full employment, there could be a gradual reduction in the reinvestment policy – which would allow for a predictable reduction in the size of the balance sheet. However, the pace of reinvestment should always be considered in the context of the economic outcomes we are

seeking to achieve. If the economy was substantially stronger or substantially weaker than was expected, the reinvestment program would need adjustment. Again, I mention this as simply one scenario for consideration.

Financial Stability and Federal Reserve Exit Strategy

In the wake of a financial crisis with serious global ramifications, financial stability and early identification of troubling economic trends have received increased attention at central banks around the world. As the Federal Reserve considers its exit strategy from a very accommodative policy stance, significant attention is being given, as it should, to potential financial stability matters.

I personally do not expect that it will be appropriate to raise short-term rates until the U.S. economy is within one year of both achieving full employment and returning to within a narrow band around 2 percent inflation. Again, that is my personal view. However, both the transition to higher rates and the operating procedure for doing so could entail financial stability effects that should be thoughtfully considered – and I am certain will be.

As **Figure 10** illustrates, the Federal Reserve’s expansionary monetary policies over the past several years have resulted in a significant increase in what we call “excess reserves” – bank reserves that exceed regulatory reserve requirements. As long as a large quantity of excess reserves exist in the financial system, the standard tools for raising the federal funds rate are not available to the Fed – that is, affecting the supply of reserves and thus the cost of borrowing them, translating into interest rates. Fortunately, there are a variety of other tools the Federal Reserve can use.

One possible strategy, when it is appropriate to start raising rates, is to raise the rate of interest that the Federal Reserve pays on excess reserves. Banks will be unwilling to hold other assets that do not pay at least the rate of interest on excess reserves, so this should raise short-term market interest

rates even in the presence of substantial excess reserves. However, since only depository institutions hold reserves, the effect of this rate on other market rates may be somewhat muted, leading some short-term interest rates in the marketplace to trade below the interest rate on excess reserves.

If the Federal Reserve wants to have more control of short-term rates, it could engage in overnight reverse repurchase agreements, which are in effect collateralized loans to the Federal Reserve that would provide a risk-free rate of return to investors. Investors would essentially buy government securities from the Federal Reserve and agree to sell back those securities a day later at a pre-determined interest rate. Similar to setting the rate paid on excess reserves, the Federal Reserve could in effect place a floor on how low short-term rates would fall in the marketplace, by setting the reverse repo rate – since investors would have access to the low-risk reverse repo rates and thus be unwilling to accept lower rates of return in the markets. Because reverse repo transactions can involve a broader set of counterparties than just the banking system, this tool might have a more reliable effect on short-term market interest rates.

Let me be quick to add that one negative, collateral impact of engaging in reverse repos is that during a period of heightened financial risk, investors might flee to the reverse repo market. This would provide a safe asset for investors, but might also encourage runs from higher-risk, short-term private debt instruments. This would have the potential to create significant private sector financing disruptions during times of stress. Presumably, capping the size of the reverse repo facility could help limit the impact.

On the other hand, a positive collateral impact of using reverse repos and interest on excess reserves in these ways is that the ability to control short-term rates would not be tied to actions that impact the size of the Federal Reserve's balance sheet. This means the Federal Reserve could have additional financial stability tools at its disposal, if it chose to maintain a larger-than-traditional

balance sheet with a greater mix of assets. Naturally, maintaining a large balance sheet comprising both U.S. Treasury securities and mortgage-backed securities would provide the Federal Reserve with continuing options for impacting long-term interest rates and the spread between mortgage-backed securities and U.S. Treasury securities. For example, if a bubble seemed to be developing in housing markets generally, the Federal Reserve would have the option of addressing it by selling MBS or long-duration U.S. Treasury securities. This again is a notion that I consider worthy of further exploration and debate.

Clearly, there will be financial stability implications stemming from the set of transitional and longer-term tools that the FOMC eventually chooses. While the Federal Reserve has the ability to control short-term rates, different tools may have different implications for financial stability. As the Federal Reserve continues to experiment with different ways to alter short-term interest rates, I believe we should focus intently on, and develop a better understanding of, these potential financial stability issues.

Concluding Observations

In conclusion, I would note that regardless of the tools eventually chosen, history shows that monetary policy “exits” can be unsettled. Obviously the interaction of marketplace and central bank expectations can be quite intricate.

An example is shown in **Figure 11**. The dotted ovals reflect the last two times that monetary policy significantly reversed direction as the U.S. economy recovered from a recession. In 1994, the FOMC began to raise *short*-term rates, but *long*-term rates reacted significantly to the tightening. The 10-year rate rose substantially, and in fact rose much higher than the level it would settle at over

subsequent years. In contrast, the tightening in 2004 caused little reaction in *long*-term rates, despite the significant increases that were occurring in *short*-term rates.

So we see that even in a less complicated operating environment (like 1994), large discrete movements are quite possible. While some volatility may actually help reduce the risk that investors develop ultimately destabilizing carry-trade type strategies, too much volatility can obviously be counterproductive. Of course it is important to avoid binding specificity about future actions, since policies should be responsive to actual conditions as clarity emerges about the strength of the economy and the impact of various tightening tools.

As I conclude my remarks today, let me again show you **Figure 1**, which summarizes the growth in Federal Reserve assets given our policy actions since the financial crisis and recession. In sum, as I mentioned at the outset, my view is that these new monetary tools – the LSAPs, Maturity Extension Program, and forward guidance – were essential in recent years. However, while these policies have been instrumental in achieving better economic outcomes, clearly they are not without challenges. Despite the challenges, we need to seize this opportunity to carefully consider a broader set of monetary policy tools and how those tools impact financial stability in addition to inflation and unemployment.

The forum you are holding is a good example of that process of consideration, study, and debate, and again I thank you for inviting me to take part.

Thank you.

NOTES:

¹ See the Federal Reserve Press Release: “Federal Reserve announces it will initiate a program to purchase the direct obligations of housing-related government-sponsored enterprises and mortgage-backed securities backed by Fannie Mae, Freddie Mac, and Ginnie Mae”, November 25, 2008.

<http://www.federalreserve.gov/newsevents/press/monetary/20081125b.htm>

² See the November 3, 2010 FOMC Statement: <http://www.federalreserve.gov/newsevents/press/monetary/20101103a.htm>

³ The Maturity Extension Program began. See the September 21, 2011 FOMC Statement:

<http://www.federalreserve.gov/newsevents/press/monetary/20110921a.htm>

⁴ See the September 13, 2012 FOMC Statement:

<http://www.federalreserve.gov/newsevents/press/monetary/20120913a.htm>

⁵ The 1.5 percent figure for real GDP growth is the advance estimate, released July 27, 2012. The figure, following several revisions, is now 1.2 percent.

⁶ Maximum sustainable employment, and stable prices, are often referred to as the Federal Reserve's "dual mandate" from Congress.

⁷ See the statement at <http://www.federalreserve.gov/newsevents/press/monetary/20120913a.htm>

⁸ Through the Maturity Extension Program (“Operation Twist”) the Federal Reserve purchased U.S. Treasury securities with remaining maturities of 6 to 30 years and sold or redeemed an equal amount of U.S. Treasury securities with remaining maturities of 3 years or less. The program was announced in September 2011 and in June 2012 was extended through yearend 2012.

⁹ See the statement at <http://www.federalreserve.gov/newsevents/press/monetary/20121212a.htm>

¹⁰ However, the broader measures of unemployment remain unusually high relative to the narrow (U-3) measure of unemployment. I addressed this in more detail in a speech on February 6, 2014:

<http://www.bostonfed.org/news/speeches/rosengren/2014/020614/index.htm>