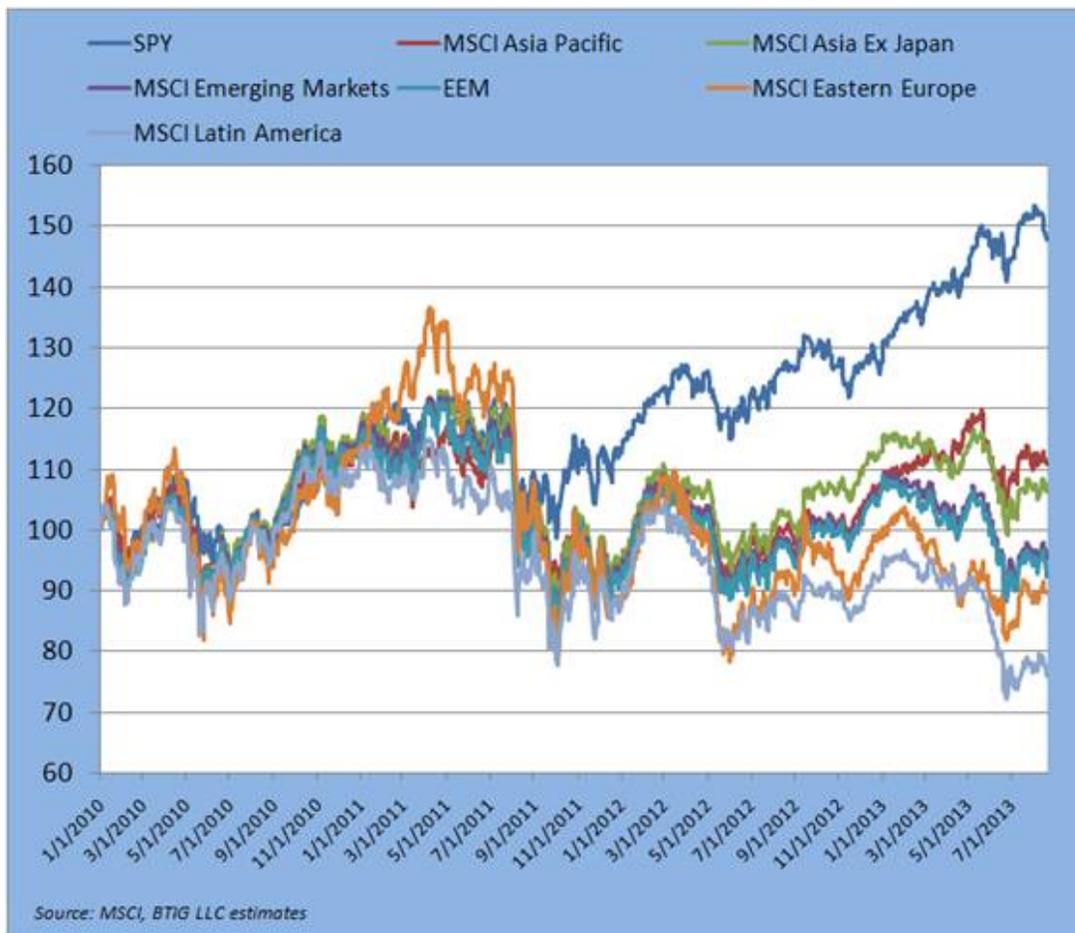




What Has QE Actually Accomplished?

John Mauldin | August 20, 2013

The market is obsessed with “tapering.” The assumption is that all the “juice” in the economy is somehow the product of the Federal Reserve’s actions. The headline on the front page of the *Wall Street Journal* today reads “Fear of Fed Retreat Roils India.” I suppose one has to come up with some kind of reason to explain the convergence of emerging equity markets and those of the US. My friend Dan Greenhaus over at BTIG sent out this ugly graph (if you are an emerging-market investor) this morning:



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As I've highlighted over the last few months, I'm pretty well convinced that there is something more fundamental going on. And that even bigger changes may be coming in the near future. This week we look at two pithy analyses of the likely effectiveness of Fed tapering and what it might portend.

The first article is from (of all places) the San Francisco Federal Reserve, where Janet Yellen used to be the president, prior to her appointment to the Federal Reserve Board of Governors. Authored by Vasco Cúrdia and Andrea Ferrero, the paper is called "[How Stimulatory Are Large-Scale Asset Purchases?](#)" When you read this, remember, you have here Federal Reserve system economists writing publicly about the policy of the Federal Reserve. There is a certain diplomatic politeness required in such papers. What Cúrdia and Ferrero are really saying is that the latest round of QE, massive as it has been, has not had all that much effect on the economy, and that other factors should be taken into account. I'm sure this thesis is somewhat controversial, and I look forward to seeing what QE proponents like David Zervos over at Jefferies have to say about it.

Cúrdia and Ferrero write:

The Federal Reserve's large-scale purchases of long-term Treasury securities most likely provided a moderate boost to economic growth and inflation. Importantly, the effects appear to depend greatly on the Fed's guidance that short-term interest rates would remain low for an extended period. Indeed, estimates from a macroeconomic model suggest that such interest rate forward guidance probably has greater effects than signals about the amount of assets purchased.

This piece makes a great set-up to an essay published just yesterday by my friend and "Camp Kotok" fishing buddy Bob Eisenbeis, vice chairman & chief monetary economist at Cumberland Advisors. Bob points out that there is going to be a great deal of turnover in the Federal Reserve Board of Governors in the coming year, leading to a lot of discussion and a probable walking back of the QE asset-purchase process. Bob continues:

So what does this mean for investors? There clearly is a disconnect between theory and evidence, and it is currently impacting the FOMC's intended policy. This, together with the personal/political considerations surrounding the composition of the Board of Governors, its leadership, and the makeup of the voting presidents, makes divining what is likely to happen even more difficult. One thing seems rather clear at this point, and that is that other factors besides "incoming data" will be in play, which will only serve to increase volatility and place a premium on hedging by investors.

In reading the speeches of the various FOMC participants, it seems to me there is growing concern over the size and continuation of the current asset-purchase model. Now, with the analysis from Cúrdia and Ferrero and the follow-on commentary from Eisenbeis, there is even data questioning its efficacy. Given the volatility that has clearly been introduced into the market, I think you're going to see a real effort to begin to reduce the size of QE. The interesting thing is that if the San

Francisco Fed paper is right, the effects of tapering shouldn't be all that large, and the far more important question concerns the level of interest rates. And on that topic the consensus seems to be clear: we are going to have low rates for a very long period of time. Indeed, it is that low-rate regime that we should be paying far more attention to than to tapering. I think you will find this week's *Outside the Box* interesting and provocative summer reading.

I am back in Dallas, where we are having what is the mildest August that I can remember in my almost 64 years in Texas. Sitting outside at a restaurant or by the pool in the evening is quite pleasant. This follows one of the mildest winters that I can remember. If this becomes typical Dallas weather in the new, global warming era, our biggest problem will be dealing with tax refugees from San Diego seeking more favorable tax and weatherclimates.

Last week I finished a major project while I was in Montana. I feel as if I have got a 900-pound gorilla off my back. Now I can now focus on the 50 20-pound monkeys that have lined up in the last few months, waiting their turn. But small monkeys are easy—I can dispatch a few of those every day. As long as I can get rid of more of them than get in line, I can end the day with a sense of accomplishment. Meanwhile the apartment construction is now entering the fun phase where we can see things really happening, and I get to play amateur designer while being supervised by professionals. Yesterday we met with the young gentleman who will be handling media and connectivity for the apartment. Everything is now tied together—TVs, computers, lighting, air conditioning and heating, security cameras, door locks, sound and music—into one server/controller, organized by iPad minis and accessible anywhere in the world from my iPad. If it has an electronic connection, it is going into the home network.

There is a young gentleman in our family who has now gone to work for Sony. He sat in on the initial meeting about the home network and talked to us about where Sony (and their competitors) will be in five years. He emphasized that our wiring needs will be very different then and that we need to plan for the changes today. He and the media guy walk through the place like two kids in a candy store, talking about what can be done. So we are wiring the place for products that don't even exist yet. Somehow that appeals to the amateur futurist in me. And we will be installing more than a few Sony products, without even benefiting from the yen depreciation that I think we will see in the next several years.

You're watching the world change rapidly around him analyst,

A handwritten signature in blue ink that reads "John Mauldin". The signature is stylized and cursive.

John Mauldin, Editor

Outside the Box

How Stimulatory Are Large-Scale Asset Purchases?

By Vasco Cúrdia and Andrea Ferrero

The Federal Reserve's large-scale purchases of long-term Treasury securities most likely provided a moderate boost to economic growth and inflation. Importantly, the effects appear to depend greatly on the Fed's guidance that short-term interest rates would remain low for an extended period. Indeed, estimates from a macroeconomic model suggest that such interest rate forward guidance probably has greater effects than signals about the amount of assets purchased.

With the Federal Reserve's benchmark federal funds rate near zero since late 2008, the central bank has used alternative tools to stimulate the economy. In particular, the Fed has purchased large quantities of long-term Treasury and mortgage-backed securities, a policy often referred to as quantitative easing. It has also provided more information about the probable future path of the short-term interest rate, a policy known as forward guidance. This *Economic Letter* uses a macroeconomic model to examine the effects of quantitative easing and forward guidance on growth and inflation.

In November 2010, the Fed's policy committee, the Federal Open Market Committee (FOMC), announced a program to purchase \$600 billion of long-term Treasury securities, the second of a series of large-scale asset purchases (LSAPs). The program's goal was to boost economic growth and put inflation at levels more consistent with the Fed's maximum employment and price stability mandate. In Chen, Cúrdia, and Ferrero (2012), we estimate that the second LSAP program, known as QE2, added about 0.13 percentage point to real GDP growth in late 2010 and 0.03 percentage point to inflation.

Our analysis suggests that forward guidance is essential for quantitative easing to be effective. Without forward guidance, QE2 would have added only 0.04 percentage point to GDP growth and 0.02 to inflation. Under conventional monetary policy, higher economic growth and inflation would usually lead the Fed to raise interest rates, offsetting the effects of LSAPs. Forward guidance during QE2 mitigated that factor by making it clear that the federal funds rate was not likely to increase.

Our estimates suggest that the effects of a program like QE2 on GDP growth are smaller and more uncertain than a conventional policy move of temporarily reducing the federal funds rate by 0.25 percentage point. In addition, our analysis suggests that communication about when the Fed will begin to raise the federal funds rate from its near-zero level will be more important than signals about the precise timing of the end of QE3, the current round of LSAPs.

Macroeconomic models and asset purchases

Evaluation of LSAP programs requires a model to examine what would have happened without these initiatives. Chen et al. (2012) propose a standard macroeconomic model with two additional

features: first, allowing LSAPs to affect the spread between short- and long-term yields, and, second, allowing changes in that spread to affect economic activity and inflation.

The first feature involves LSAP effects on financial markets. An investor can buy either a short-term bond and reinvest proceeds until the desired maturity or buy a long-term bond of the desired maturity. If these alternatives are identical, then their expected returns should also be identical. Hence, the long-term yield should be an average of expected future short-term yields. In reality though, these alternatives present different risks and costs, which imply that the long-term yield equals the expected average future short-term yield plus a risk premium.

LSAPs can affect economic growth and inflation through the risk premium. (For an analysis of the impact of LSAPs through signaling effects about future short-term yields, see Bauer and Rudebusch 2012). In our model, the risk premium results from transaction costs paid to buy long-term bonds. We assume that transaction costs increase with the amount of long-term bonds held by private investors, suggesting that LSAPs reduce the long-term bond risk premium by reducing the absolute amount of privately held long-term bonds.

The second feature in our model concerns the transmission from the risk premium to the economy. We consider an economy with two types of investors. The first can invest in both short- and long-term assets. For them, a lower risk premium prompts them to reallocate their portfolios, but doesn't change their spending behavior. If all investors behaved this way, a change in the risk premium would not affect the economy.

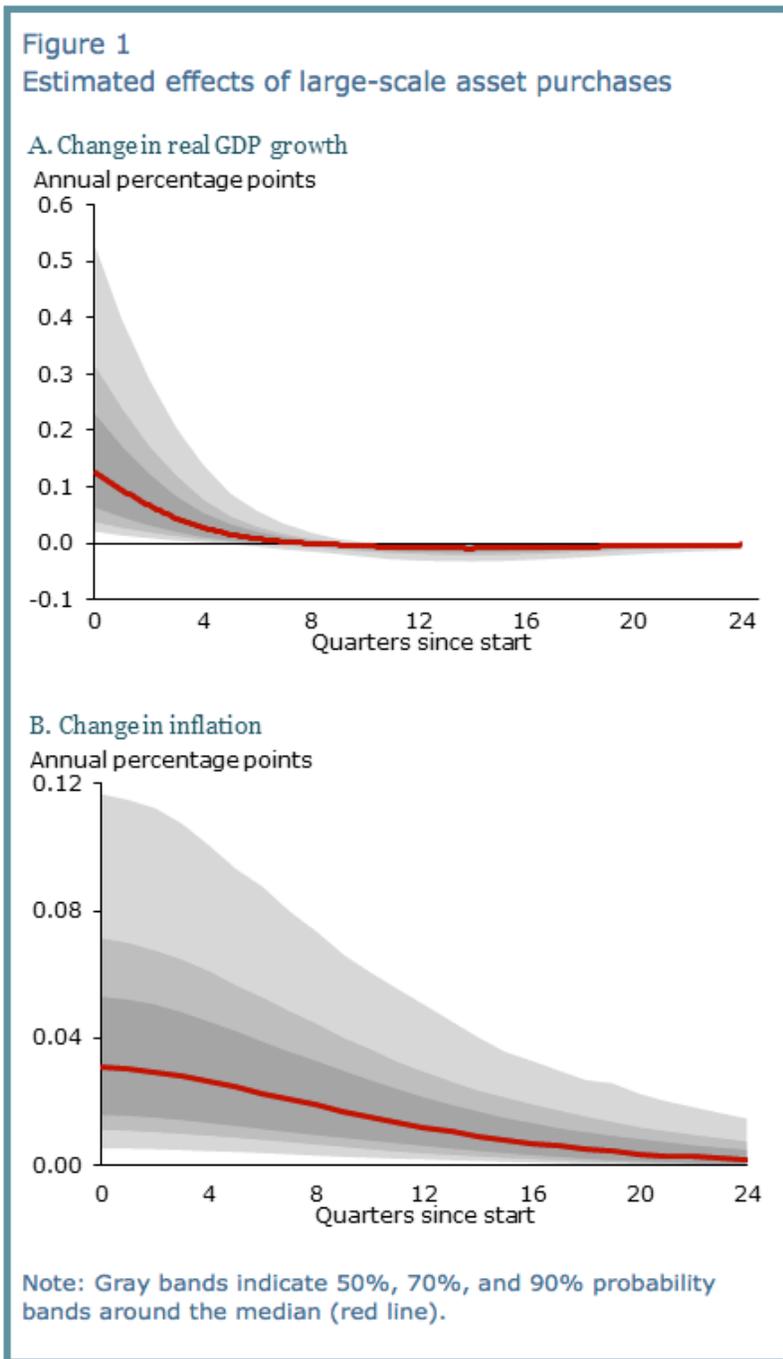
The second type of investor buys only long-term bonds, for example to match asset duration with life events, such as retirement date. If long-term yields fall, these investors have less incentive to save and may allocate more money to consumption or investment in nonfinancial assets. This boosts aggregate demand and puts upward pressure on inflation.

These two types of investors represent a form of financial market segmentation, allowing for the risk premium to affect economic activity. The degree of segmentation is determined by what fraction of investors buy only long-term bonds. The higher the proportion of such investors, the more LSAPs affect the real economy.

Simulating the effects of QE2 on GDP and inflation

To examine the economic effects of an LSAP program similar to QE2, we run simulations based on U.S. macroeconomic data from the third quarter of 1987 to the third quarter of 2009. We assume that the Fed's purchase program lasts five years, gradually accumulating \$600 billion of long-term Treasury securities in the first year, holding them for two years, and gradually reducing them over the last two years. We further assume that forward guidance states that the central bank will keep the policy interest rate at zero for the program's first four quarters.

Our model estimates that such a program lowers the risk premium by a median of 0.12 percentage point. Figure 1 shows the program's effects on real GDP growth and inflation. The red line is the median effect in annualized percentage points. The shaded areas represent probability bands from 50% to 90% around the median. The estimates reflect uncertainty arising from three factors: the sensitivity of the risk premium to the asset purchases, the degree of investor segmentation, and other model parameters influencing the economy's response to interest rate changes.



The 0.13 percentage point median impact on real GDP growth fades after two years. The median effect on inflation is a mere 0.03 percentage point. To put these numbers in perspective, QE2 was announced in the fourth quarter of 2010. Real GDP growth in that quarter was 1.1% and personal consumption expenditure price index (PCEPI) inflation excluding food and energy was 0.8%. Our estimates suggest that, without LSAPs, real GDP growth would have been about 0.97% and core PCEPI inflation about 0.77%.

Chung et al. (2011) find effects about twice as big. Baumeister and Benati (2010) find marginal effects on GDP and inflation of about 3 percentage points and 1 percentage point respectively. Both studies use different methods and assumptions regarding the risk premium. The results of Chung and co-authors fall inside our 50% probability band. But our analysis assigns a negligible chance of LSAP effects as strong as those reported in Baumeister and Benati. Our effects are more limited because the data do not support much bond market segmentation. Thus, we find only modest economic impact.

It's possible that our data sample excludes periods of high financial turbulence that could encourage stronger financial segmentation. That could cause us to underestimate LSAP effects, particularly during the first few asset purchase rounds. To evaluate this, we run our simulation with at least a 5% degree of segmentation. In our first simulation, the probability of at least that level of segmentation is only 50%. With at least 5% segmentation, the impact on real GDP growth nearly doubles to 0.22 percentage point. The effect on inflation remains only about 0.04 percentage point.

Asset purchases and interest rate policy

Fed interest rate policy plays an important role in determining the effects of LSAPs on economic growth. The Fed normally sets a higher federal funds rate target in response to higher inflation or economic growth. Thus, if LSAPs boost the economy, they should lead to a higher federal funds rate, offsetting the stimulus. In our simulation, we assume that the FOMC keeps the rate at zero for four quarters and then follows conventional monetary policy.

To explore this interaction, we consider two alternative scenarios. First, if the FOMC had no commitment to keep the interest rate near zero, the median effect of QE2 would have dropped to only 0.04 percentage point on economic growth and 0.02 percentage point on inflation. Second, if the commitment to keep the federal funds rate near zero lasts five quarters instead of four, then the effect would be 0.22 percentage point on GDP growth and 0.05 percentage point on inflation. Taken together, these alternative simulations suggest that LSAP economic effects greatly depend on expectations about interest rate policy.

Comparing LSAP effects with conventional policy rate cuts

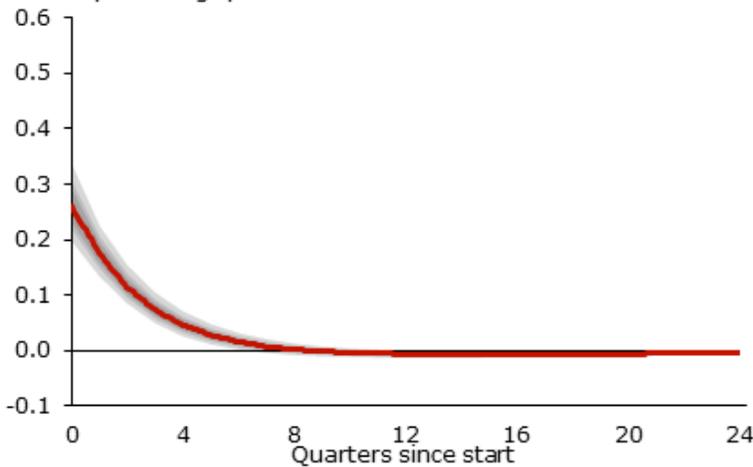
How do LSAP effects compare with those of a conventional federal funds rate cut? Figure 2 shows the effects of a standard 0.25 percentage point temporary federal funds rate cut. GDP growth

increases about 0.26 percentage point and inflation rises about 0.04 percentage point. This suggests that a program like QE2 stimulates GDP growth only about half as much as a 0.25 percentage point interest rate cut. Both policy tools have similar effects on inflation. However, if we pair the LSAP program with a commitment to keep the federal funds rate near zero for five quarters instead of four quarters, then the median effects on real GDP growth and inflation are similar to those of the 0.25 percentage point interest rate cut.

Figure 2
Estimated effects of temporary federal funds rate cut

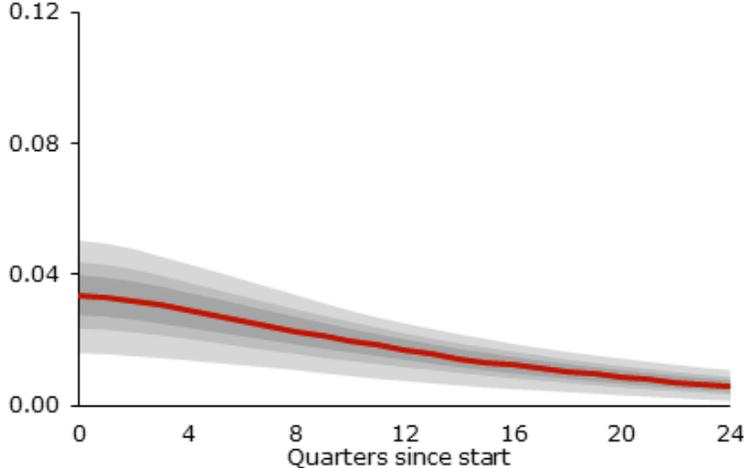
A. Change in real GDP growth

Annual percentage points



B. Change in inflation

Annual percentage points



Note: Gray bands indicate 50%, 70%, and 90% probability bands around the median (red line).

Importantly, uncertainty about the effects of LSAPs on economic growth is much higher than uncertainty about the impact of a federal funds rate cut, as can be seen by comparing the shaded bands in Figures 1 and 2. Our simulations suggest that the main reason for this difference is substantial uncertainty about the degree of financial segmentation. Segmentation is crucial for the effects of asset purchases, but is irrelevant for the impact of a federal funds rate cut on the economy.

Conclusion

Asset purchase programs like QE2 appear to have, at best, moderate effects on economic growth and inflation. Research suggests that the key reason these effects are limited is that bond market segmentation is small. Moreover, the magnitude of LSAP effects depends greatly on expectations for interest rate policy, but those effects are weaker and more uncertain than conventional interest rate policy. This suggests that communication about the beginning of federal funds rate increases will have stronger effects than guidance about the end of asset purchases.

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Andrea Ferrero is a senior economist at the Federal Reserve Bank of New York.

When Will the Fed Begin Tapering Its Asset Purchase Program?

By Bob Eisenbeis, Vice Chairman & Chief Monetary Economist, Cumberland Advisors

This question is on all market participants' minds. Attention is now centered on whether the process will begin, as some FOMC participants have suggested, as early as the September FOMC meeting. Indeed, it seems highly unusual that, in the first week of August and in the wake of the controversial press conference held after the FOMC's June meeting, four Federal Reserve Bank presidents, widely considered representative of the full spectrum of views among FOMC participants, have gone on record suggesting that tapering of the Fed's \$85 billion/month asset purchase program could begin as soon as the September. The four are President Fisher (hawk), Presidents Pianalto and Lockhart (centrists), and President Evans (dove). To be sure, we have heard ad nauseum from FOMC participants that their actions will be conditioned upon "incoming data." Putting all that aside, there are both personal and political considerations as well as theoretical economic issues that complicate the tapering formulation process.

First, there are some interesting internal FOMC political considerations that might give current FOMC members pause as they consider starting the tapering process this year. To do so with only

three FOMC meetings left before a new Fed chairman might be seated would effectively pre-commit both that new chairman and the reconstituted FOMC to a policy path that virtually no members would have had a say in formulating.

Consider first the situation on the Federal Reserve Board itself. President Obama has indicated that he will nominate a new chairman of the Fed sometime this fall, so Chairman Bernanke is already a lame duck. Additionally, Governor Duke has left the Board, and Governor Raskin has been nominated for the number-two position at the Treasury. Governor Powell's term is up on January 31, 2014. These transitions mean that there are soon to be four vacancies on the Board of Governors. Finally, should Governor Yellen not be named to replace Chairman Bernanke, there would be little reason for her to stay on. That would leave only two current Board members – Governor Tarullo, a lawyer, and Governor Stein (the only economist), neither of whom experienced the events of the 2007-2008 financial crisis firsthand at the Fed.

Add to this unprecedented turnover at the Board the fact that the only Federal Reserve Bank president who will vote both this year and next is the New York Fed's President Dudley, a permanent FOMC member. Finally, Cleveland President Pianalto, who is scheduled to have a vote next year, has announced her retirement; and President Fisher, who is also scheduled to vote next year, reaches the mandatory retirement age of 65 in 2014. This means that there potentially could be as many seven new voting members on the FOMC next year, none of whom are currently in place. The present FOMC has no idea what those people's views are or what their policy preferences may be. To initiate a tapering policy this year under such circumstances could be highly disruptive should the new FOMC desire to pursue a different policy program next year. All of this argues for caution on the part of the current FOMC, especially given the turmoil that has roiled markets recently over policy concerns and the lack of evidence that the economy has suddenly picked up sufficient steam, such that policy actions would be required at this time.

Another key issue concerns the theory behind the Fed's asset purchase programs and the growing evidence regarding their efficacy or lack thereof. Fed officials have been dogged in their attempts to distinguish among the FOMC's zero interest rate policy (holding the Federal Funds rate between 0 and .25 percent), the interest rate paid on reserves, its asset purchase programs, and its communications and forward-guidance tools. Because nominal interest rates cannot fall below zero, there is a limit to how far accommodative policy can be extended by lowering interest rates.

One way to think about this is that in fixing the price of Federal Funds, which constitute tradable excess reserves at the Fed, the FOMC is controlling the quantity of reserves in the banking system

and ultimately the money supply. Low rates are accommodative because the opportunity cost to banks of holding low-yielding assets in the form of deposits at the Fed is high relative to the returns that can be made by making loans (and in doing so, also increasing the money supply through the deposit expansion multiplier). The opposite applies when rates are high and policy is restrictive. But at the zero bound it is no longer possible to lower rates and encourage expansion of bank reserves and the money supply indirectly, so the Fed provides extra accommodation by operating directly on the supply of bank reserves through its asset purchases. The Fed pays for the Treasuries and MBS by writing up banks' deposits held at the Fed, and in that way it provides further accommodation by increasing the quantity of excess reserves, and hence Federal Funds, directly.

Asset purchases also do another thing. When Treasuries and MBS are taken out of the private sector market, their prices increase and their yields decline. This makes them less attractive to hold relative to other higher-yielding assets such as equities, corporate debt, and loans. This is termed the portfolio balance effect. Indeed, many have argued that because of the portfolio balance effect, yield-seeking funds have found their way into equities and are behind the increase in the stock market. Of course, this was one of the intents of the asset purchase program: the hope was that an increase in perceived wealth would stimulate consumer spending, encourage investment and promote economic growth.

There is another component of this policy, however, that is rooted in the theory of the term structure. That theory in its simplest form, assuming no inflation, holds that real longer-term interest rates can also be represented by a series of real short-term rates. That is, if real long-term rates are higher than real short-term rates, this implies that investors expect short-term rates to rise in the future. The logic is simply that an investor could, for example, invest in either a two-year obligation or two one-year obligations – a one-year spot rate and a one-year forward contract on the same instrument. Aside from a small fee for giving up liquidity by holding the two-year instrument, an investor who does not expect short-term rates to rise would be indifferent as to the choice of holding two one-year instruments versus the two-year instrument. However, if the investor expects short-term interest rates to rise, then he or she would always opt to hold the sequence of two one-year investments unless the rate on the two-year instrument was sufficiently high to make the investor indifferent as to which option was chosen. So by comparing the rate on a two-year investment with the rates on a sequence of two one-year investments, it is possible to determine, for example, whether short-term rates are expected to rise in the future, because the rate on the one-year forward instrument will be higher than the spot rate if short-term rates are

expected to increase. The opposite would hold if short term rates are expected to fall.

In the case of the Fed's \$85 billion/month asset purchase program, which involves the purchase of long-term Treasuries and MBS, the Fed is taking these assets out of the private market, bidding up their prices, lowering their yields, and interfering with both the normal term structure and market expectations about future rates. By doing so, the FOMC is overriding market expectations and is de facto signaling that it intends to keep short-term interest rates lower than the might otherwise expected. In fact, this is exactly what the FOMC has said in the statements released after its meetings. This is the so-called signaling channel that has been investigated recently by economists at the San Francisco Fed. (See Bauer and Rudebusch, "The Signaling Channel for Federal Reserve Bond Purchases," FRB San Francisco Working Paper Series, August 2012.) Another FRB San Francisco paper (see Cúrdia and Ferrero, "How Stimulatory Are Large-Scale Asset Purchases?" FRBSF Economic Letter, August 12, 2013) supports the importance of the signaling interpretation. The authors estimate that without the signaling effect, the second asset purchase program, known as QE 2 (when the Fed purchased an additional \$600 billion in securities), would have added only 4 basis points to real GDP growth and 2 basis points to inflation. But when they also estimated forward guidance effect, they conclude that it dwarfed QE2 alone by adding another 9 basis points to GDP growth (but only another 1 basis point to inflation).

Now, what about the \$85 billion asset purchase program? Using data from the Treasury on its net issuance of debt in 2013 to date, we find that the Federal Reserve has purchased 75% of those securities. So, if the Fed were to begin to scale back its purchases, more Treasury supply would be available to the private sector, putting downward pressure on prices and raising rates. According to the expectations theory the rise in rates, because of the FOMC's tapering would logically be interpreted by the market as a signal by the Fed that short-term rates will rise sooner than previously expected. Thus, notwithstanding the FOMC's view that it was not (according to the theories it was following) tightening policy, markets would be led to conclude the opposite. Indeed, the abrupt reaction to even the hint by FOMC participants that the FOMC *might* consider tapering its program, demonstrates that the market interpreted the talk as a signal that rates would rise sooner than expected.

So what does this mean for investors? There clearly is a disconnect between theory and evidence and it is currently impacting the FOMC's intended policy. This, together with the personal/political considerations surrounding the composition of the Board of Governors, its leadership, and the makeup of the voting presidents, makes divining what is likely to happen even more difficult. One thing seems rather clear at this point, and that is that other factors besides "incoming data" will be

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