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## **Summary of Gagnon et al. (2011): Large-Scale Asset Purchases by the Federal Reserve: Did They Work?<sup>1</sup>**

In the fall of 2008, U.S. financial markets experienced very high turbulence and the overall economic outlook deteriorated substantially. The Federal Reserve responded by easing monetary policy in a variety of ways, from conventional reductions in the federal funds target to special lending programs to restore liquidity and functioning to specific sectors of financial markets. An especially important initiative was to purchase substantial quantities of assets with medium- to long-term maturities to drive down borrowing rates for these maturities.

Gagnon et al. examine the effect of the December 2008 and March 2009 installments of the Federal Reserve's Large-Scale Asset Purchase (LSAP) programs. The LSAP could reduce the yields on long-term bonds in a combination of ways, including a reduction in the term premium and the pre-payment premium and an improvement in how these markets function.

The "term premium" is the difference between the yields of long-term bonds and short-term bonds. These asset purchases reduced the term premium by decreasing the amount of long-term assets held by the public relative to short-term assets. To persuade investors to willingly hold fewer long-term assets and more short-term assets, the expected return on the long-term assets must fall relative to the expected return on the short-term asset. That is, the term premium must fall.<sup>2</sup>

In addition to removing assets with long duration, the Federal Reserve also purchased a lot of assets with pre-payment risk.<sup>3</sup> The reduction in pre-payment risk held by the public would tend to reduce the yield premium associated with it.

### **Analysis of the Program**

The paper described the technical details of the purchase program. To purchase at better prices, the New York Fed made transactions in more liquid markets. Most agency debt purchases were medium term. Agency mortgage-backed securities (MBS) purchases were new, 30-year issues. Treasury

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<sup>1</sup> These summaries have been prepared by the St. Louis Fed's research staff and are designed to provide a general audience overview of the authors' research. Any errors present or misinterpretations of the authors' views are the sole responsibility of the St. Louis Fed's staff. The views expressed in these summaries do not necessarily reflect the official positions of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Federal Open Market Committee.

<sup>2</sup> Tobin (1958, 1969) described this relation between the available quantities of securities and their expected returns, which is known as a "portfolio-balance effect."

<sup>3</sup> Pre-payment risk is also known as negative convexity. MBS tend to have a lot of negative convexity because, when long-term interest rates decline (bond prices rise), people tend to refinance their mortgages, paying off the MBS.

purchases were concentrated in the 2- to 10-year maturity range. The New York Fed hired external investment managers to execute the purchase of the complex MBS instruments.

The paper employs two methodologies to study the effects of the LSAP purchases: 1) an event study and 2) a statistical model designed to predict term premia and yields from common macroeconomic variables and supplies of debt.

### **Event Study**

Event studies accurately estimate the effect of events on asset prices when all the changes in expectations fall in the studied “event windows” and there are no changes in asset prices that do not reflect the events.

The Gagnon et al. event study considers the reaction of seven functions of U.S. bond yields — 2-year U.S. Treasury, 10-year U.S. Treasury, 10-year agency, agency MBS, 10-year term premium, 10-year swap, and the Baa index—to all FOMC purchase announcements, statements, minutes releases, and speeches by Chairman Bernanke from November 25, 2008, to February 17, 2010.<sup>4</sup>

The authors find that “with one minor exception, interest rates moved in the expected direction on each of the baseline event days. On November 25, December 1, December 16, and March 18, FOMC communications pointed to greater-than-expected LSAP purchases, and long-term rates fell. On January 28, August 12, and November 4, FOMC communications pointed to lower-than-expected LSAP purchases, and long-term rates rose.” In other words, all the events that raised market expectations of asset purchases reduced the yield on long-term assets.

Declines in the term premium drove most of the declines in the 10-year Treasury yield around these announcements. Changing the event study methodology—e.g., the size of the event windows—did not change the results significantly.

Some observers have noted that 10-year Treasury yields actually increased over the whole course of the LSAP program. The authors argue that this increase reflected the strengthening economy, a reversal of the fall 2008 flight-to-quality, and large increases in the expected fiscal deficit.

### **Statistical Model**

The second methodology for studying the effect of the LSAP is to create a statistical model (a regression) that seeks to explain the term premium in terms of macro variables and various measures of the supply of medium- and long-term Treasury securities. The authors estimate such models on monthly data over the period January 1985 to June 2008, finding that the models fit well according to the usual statistical measures.

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<sup>4</sup> The authors also consider the reactions to a narrower set of eight “baseline” announcements.

The authors use estimated statistical models to “predict” the change in term premia caused by the given changes in Treasury supply associated with the LSAPs. The statistical models of the term premia imply that the LSAP purchases reduced the 10-year term premium by between 38 and 82 basis points. This range of point forecasts overlaps considerably with the event study results, which the authors consider to be “impressive given that entirely separate data and methodologies were used to obtain the results.”<sup>5</sup>

### **Conclusions**

The paper concludes as follows: “By reducing the net supply of assets with long duration, the Federal Reserve’s LSAP programs appear to have succeeded in reducing the term premium. The overall size of the reduction in the ten-year term premium associated with LSAPs through March 2010 appears to be somewhere between 30 and 100 basis points, with most estimates in the lower and middle thirds of this range. In addition to reducing the term premium, the LSAP programs had an even more powerful effect on longer term interest rates on agency debt and agency MBS by improving market liquidity and removing assets with high prepayment risk from private portfolios...Based on this evidence, we conclude that the Federal Reserve’s LSAP programs did lower longer term private borrowing rates, which should stimulate economic activity...That conclusion is promising, as it means that monetary policy remains potent even after the zero bound is reached.”

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<sup>5</sup> Again, changing elements of the statistical model, such as allowing for a long-run relation between the term premium and the macroeconomic variables, did not change the results significantly.