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Summary of Hamilton and Wu (2011): “The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment.”^{1 2}

On December 16, 2008, the Federal Open Market Committee (FOMC) reduced its target for the federal funds rate—its primary tool for implementing monetary policy—to essentially zero and has maintained the target at that level since then. A number of analysts have suggested that the FOMC can do nothing more to affect economic growth and employment. However, others, such as Chairman Bernanke (2010), have suggested that the Fed can affect long-term interest rates by purchasing longer-term securities to change “the quantity and mix of financial assets held by the public” through what is called the *portfolio balance channel* of monetary policy.³ The portfolio balance channel has an effect on longer-term rates relative to shorter-term rates by reducing the proportion of longer-term securities held in the portfolios of private sector investors.

Standard term structure theory suggests that longer-term bonds yield a higher return because those who invest in these bonds must be compensated for the additional *market risk* associated with holding longer-term bonds. The higher market risk of longer-term bonds is a consequence of the fact that, for a given change in the interest rate, the price of longer-term bonds changes more than the price of an otherwise equivalent shorter-term bond. Hence, if interest rates were to rise unexpectedly, the price of longer-term bonds would decline more than that of shorter-term bonds—i.e., the capital loss would be greater.

As Bernanke (2010) notes, the portfolio balance effect of monetary policy cannot work in an environment where bonds that are equivalent in every way—except their term to maturity—are perfect substitutes, i.e., the market is dominated by investors that care only about the risk/return tradeoff. Hence, Hamilton and Wu’s (2011) analysis is based on a model by Vayanos and Vila (2009) that has both *arbitrage investors*, i.e., investors that care only about the mean return and risk, and *preferred-habitat investors*, i.e., investors that prefer to invest in bonds of a given maturity.

Hamilton and Wu estimate the effects of quantitative easing on the term structure: They use a model based on Vayanos and Vila’s and initially estimate this model using monthly data for the period January 1990 through July 2007, the pre-financial crisis period. Based on their findings, they estimate

¹These 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.

²For another summary of this paper see, “Policy tools that could lower interest rates further,” Econbrowser, August 31, 2010, http://www.econbrowser.com/archives/2010/08/policy_tools_th.html.

³Ben S. Bernanke, “The Economic Outlook and Monetary Policy,” speech presented at the Federal Reserve Bank of Kansas City Economic Symposium, Jackson Hole, Wyoming, August 27, 2010.

the effect of the Fed selling \$400 billion in short-term securities and simultaneously purchasing \$400 billion in long-term securities. Assuming the debt structure that existed as of December 2006, they estimate that such an action would reduce the slope of the term structure of interest rates, i.e., the relationship between the return and the maturity of otherwise identical bonds, by 25 basis points. Rates on securities with a maturity of about 3 years or less would rise, while rates on securities with a maturity of more than about 3 years would fall. Very short-term (e.g., overnight) interest rates would rise by about 13 basis points, while 10-year yields would decline by about 15 basis points. This action would have no effect on the average level of interest rate, however, because it would have no effect on the total supply of credit in the credit market.

They then repeat this experiment under quantitative easing (QE), i.e., purchasing longer-term securities by providing depository institutions with short-dated interest-bearing reserves, which Hamilton and Wu assume are indistinguishable from 1-week bonds. They note that “the effect of quantitative easing is to reduce the available supply of longer-term securities without changing the private-sector’s exposure to the risk associated with holding short-term securities. With short-term rates at their zero lower bound (ZLB), changes in the supply of short-term securities have essentially no effects on short-term rates. Longer-term rates decline while very short-term rates remain essentially unchanged. Consequently, the average level of interest rates declines. Considering the same \$400 billion purchase of longer-term securities as before, they estimate that the 10-year Treasury yield would decline by 14 basis points. Because the effect on short-term rates is muted, the average level of interest rates declines, even though there was no net increase in the supply of credit. However, they note that “quite massive operations would be necessary to have a measurable effect” on the overall level of interest rates.

They also engage in a preliminary analysis of the effect of the FOMC’s QE2. On November 3, 2010, the FOMC announced plans to purchase an additional \$600 billion in longer-term Treasury securities, primarily securities with maturities between 2.5 and 10 years, by the end of June 2011. However, they note that over the first three months of QE2, the Treasury issued more longer-dated debt than the Fed purchased, so that not only did the average maturity of Treasury debt outstanding rise, but “the fraction of publicly-held debt of more than 10 years maturity continued to increase even as the Fed was implementing its QE2 bond purchases.” They conclude that “QE2 as implemented had little potential to lower long-term interest rates via the mechanism explored in this paper.”⁴

Other References:

Hamilton, J.D., and J.C. Wu. 2011, “The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment,” unpublished manuscript, May 17, 2011.

⁴ Hamilton and Wu (2011), p. 46. Also see “Progress report on QE2,” Econbrowser. February 13, 2011, http://www.econbrowser.com/archives/2011/02/progress_report.html.

Vayanos, D. and J-L. Vila. 2009, "A Preferred-Habitat Model of the Term Structure of Interest Rates,"
NBER Working Paper # 15487.