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Unconventional monetary policy had large international effects

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ABSTRACT

The Federal Reserve's unconventional monetary policy announcements in 2008–2009 substantially reduced international long-term bond yields and the spot value of the dollar. These changes closely followed announcements and were very unlikely to have occurred by chance. A simple portfolio choice model can produce quantitatively plausible changes in U.S. and foreign excess bond yields. The jump depreciations of the USD are fairly consistent with estimates of the impacts of previous equivalent monetary policy shocks. The policy announcements do not appear to have reduced yields by reducing expectations of real growth. Unconventional policy can reduce international long-term yields and the value of the dollar even at the zero bound.

1. Introduction

Following the extreme credit market disturbances in the fall of 2008, the Federal Reserve initiated two types of unconventional policies: forward guidance about future interest rates and announcements of a novel program to purchase large quantities of long-term securities to improve credit market conditions.

On December 16, 2008, and March 18, 2009, the Federal Reserve provided "forward guidance" about the federal funds rate target. More specifically, it announced that economic conditions would likely warrant exceptionally low levels of the funds rate for "some time" and "an extended period", on the respective dates.

On November 25, 2008, the Federal Reserve announced that it would purchase up to $100 billion of government-sponsored enterprise (GSE) debt and up to $500 billion in agency mortgage-backed securities (MBS) to reduce risk spreads on GSE debt and mitigate turmoil in the market for housing credit. On March 18, 2009, the Federal Open Market Committee (FOMC) announced that the Fed would purchase an additional $750 billion of agency MBS, an additional $100 billion in agency debt, and $300 billion of longer-term Treasury securities. Kohn (2009) calls these purchases "large-scale asset purchases" (LSAP).

Central banks have tried similar—but much smaller—asset purchases before. For example, the Federal Reserve famously attempted to influence the long end of the yield curve in "Operation Twist" in the early 1960s. Modigliani and Sutch (1966) found that this earlier attempt to bring down long rates was moderately successful, at best, probably because the purchases were insufficiently large and offset by new Treasury issuance (Blinder, 2000).

The recent unconventional policies are especially informative because they constitute an unusually large "natural experiment"—an isolated change in the economic environment—that illuminates market reactions and joint asset price determination. As such, researchers have studied the effect of unconventional policies on asset classes with several different methods.

Ait-Sahalia et al. (2012) take the broadest view of financial crisis policy interventions by looking at pooled and unpooled effects of different types of interventions—i.e., interest rate cuts, liquidity support, liability guarantees, and recapitalization—across countries. This bold approach presents a broad view of average effects

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but does not substitute for a close examination of the specific effects of heterogeneous announcements.

Several papers focus on domestic effects of asset purchase programs. Stroebel and Taylor (2012) use time series methods to argue the Federal Reserve's MBS purchases produced small or statistically insignificant effects on mortgage-Treasury spreads—not yields—that are adjusted for pre-payment and default risks. In contrast, Gagnon et al.'s (2011a,b) event study finds that LSAP announcements reduced U.S. long-term yields (see also Kohn, 2009; Meyer and Bomfim, 2010). Joyce et al. (2011) find that the Bank of England's quantitative easing program had quantitatively similar bond yield effects as those found by Gagnon et al. (2011a,b) for the U.S. program. Hamilton and Wu (2012) indirectly calculate the LSAP's impact with a term structure model that predicts the effects of changes in the maturity structure of U.S. debt from asset purchases/swaps. Their estimates of the effects of a large short-for-long-term debtswap are roughly consistent with the predictions of this paper's simple portfolio balance (PB) model.

In addition to influencing U.S. yields, the unconventional policies could affect international asset prices through the signaling and PB channels.[2] The signaling channel implies that the forward guidance or asset purchases would reduce expected future interest rates. On the other hand, the PB channel implies that a purchase of U.S. assets would tend to push down the excess yields on those securities and those of substitutes, until a new equilibrium is reached.

The primary contribution of this paper is to evaluate the unconventional policies' joint effect on nominal international long bond yields in local currencies and exchange rates with event study methods.[3] The unconventional policies significantly reduced the 10-year nominal yields of Australia, Canada, Germany, Japan, and the United Kingdom and also depreciated the USD versus the currencies of those countries. The jump depreciations of the USD are mostly consistent with the expected effects of conventional monetary shocks of equivalent stimulus. These findings reinforce and significantly extend the view of Gagnon et al. (2011a,b) that central banks retain effective tools at the zero bound.

Secondarily, this paper demonstrates that the observed asset price behavior is approximately consistent with the expected effects of an asset purchase in a simple PB model under the assumption of long-run purchasing power parity. Although other plausible PB models could imply larger or smaller effects, the simple PB model used here illustrates that the PB mechanism can produce a quantitatively significant effect that is consistent with the data. This does not imply that observed effects are from a PB model or that other channels—e.g., signaling—do not contribute substantially.

The next section discusses the channels through which asset purchases can affect asset prices. Section 2 describes the policy events; Section 3 outlines the event study methods; the data are presented in Section 4. Section 5 presents the impact of the policy events on nominal asset prices. Section 6 discusses what to expect from a portfolio balance effect, and Section 7 reviews whether the actual results are consistent with such a model. Section 8 concludes.

2. Channels through which unconventional policy affects yields

Forward guidance and asset purchases can potentially affect asset prices through three channels: liquidity, signaling, and PB. The liquidity channel can raise asset prices to the extent that official asset purchases improve market liquidity by providing a consistent buyer. As such, the liquidity channel is likely to have been the least important for the unconventional policy effects, as it would be operative only very early in the sample (Gagnon et al., 2011a,b).

In distinguishing the signaling and PB channels, it is useful to define the n-year yield on a bond as the sum of expected average instantaneous (overnight) rates and the term premium:

$$y_{t,t+n} = \bar{y}_{t,t+n} + TP_{t,n}, \tag{1}$$

where $y_{t,t+n}$ is the yield at time t on an n-year bond, $\bar{y}_{t,t+n}$ is the average expected overnight rate over n years at time t, and $TP_{t,n}$ is the term premium on an n-year bond at time t. The term premium, which compensates investors for the risk of rising interest rates, is the major component of the U.S. Treasury risk premium, though credit and liquidity premia also contribute to MBS and agency debt risk premia.

Researchers usually motivate PB models by citing frictions—typically preferred habitat/market segmentation—that preclude perfect arbitrage between long and expected short rates (see Gagnon et al., 2011a,b; Joyce et al., 2011).[4] These frictions permit official purchases of long-term debt to reduce yields by removing duration risk from the market, which implies that investors will demand less compensation to hold the remaining amount of that type of risk, reducing term premia. Such frictions are not unique to PB models, of course; monetary models require frictions if money is to have real effects.

The signaling channel affects long-term interest rates through expected overnight rates. If forward guidance or asset purchase announcements reduce expectations of the future federal funds rate—perhaps due to weaker growth forecasts—then the average expected overnight rate ($\bar{y}_t$) will decline and reduce long-term interest rates.[5]

Several papers have empirically investigated the relative importance of these channels for LSAPs. Gagnon et al. (2011a) use the Kim-Wright term structure model, swap rates, and changes in short bond rates to argue that PB channel effects produced the great majority of the yield changes from U.S. LSAP. Similarly, Joyce et al. (2011) cite swap rates to argue that U.K. bond purchases were also effective through the PB channel. Hamilton and Wu's (2012) term structure estimates also support a large PB effect. Bauer and Rudebusch (2011), however, claim that the signaling channel accounts for 30–65% of the total impact, rather than the 30% suggested by their interpretation of Gagnon et al.'s (2011a) analysis. Krishnamurthy and Vissing-Jorgensen (2011) find both signaling effects and a unique demand for safe long-term assets that might be considered a PB effect. In addition, these authors argue that inflation expectations affect interest rates. Li and Wei (2013) use a term structure model with observable and supply factors to find term premia effects of QE 1 and the maturity extension program. Bauer and Neely (2014) decompose QE's effect on zero-coupon foreign bond yields in local currencies with term structure models and then show that each country's bonds characteristics help determine the importance of signaling vs. PB channels. For

[2] Kozicki et al. (2011) estimate how changes in central bank balance sheets affect international 5- and 10-year forward interest rates over 28-year samples. Ehrmann and Fratzscher (2005) find that U.S. and European money markets became more sensitive to monetary policy and macro shocks after the emergence of the European Monetary Union (EMU). Valente (2009) examines how short-term interest rates in Hong Kong and Singapore respond to the unexpected component of U.S. federal funds target announcements.

[3] D'Amico and King (2013) find small (3.5 basis point) flow effects of LSAP operations on specific Treasury issues.

[4] Gagnon et al. (2011a,b) argue that the LSAP increased long-term bond prices by removing convexity (i.e., sensitivity to interest rate risk) from the public's portfolio, reducing the required rate of return to hold long-term assets. Hamilton and Wu (2012) consider the effects of the LSAP in a term structure model with preferred habitat characteristics (Vayanos and Vila, 2009).

[5] Bauer and Rudebusch (2011) caution that changes in expected overnight rates conservatively estimate the importance of the signaling channel because successful signaling or PB effects will raise expected output growth and thereby partially reverse declines in expected overnight rates, muting the estimated signaling effect. Evidence in Appendix C and Rosa (2013) documents that LSAP announcements increased oil prices, which suggests that unconventional policy did not signal weak growth.