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Unconventional government debt purchases as a supplement to conventional monetary policy

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ABSTRACT

In response to the Great Financial Crisis, the Federal Reserve, the Bank of England and many other central banks have adopted unconventional monetary policy instruments. We investigate if one of these, purchases of long-term government debt, could be a valuable addition to conventional short-term interest rate policy even if the main policy rate is not constrained by the zero lower bound. To do so, we add a stylised financial sector and central bank asset purchases to an otherwise standard New Keynesian DSGE model. Asset quantities matter for interest rates through a preferred habitat channel. If conventional and unconventional monetary policy instruments are coordinated appropriately then the central bank is better able to stabilise both output and inflation.

1. Introduction

The Great Financial Crisis has seen the emergence of monetary policy instruments that are often described as "unconventional". The events of 2007–2008 forced monetary policy authorities to adopt new tools, even though they had little previous experience with them and there was considerable uncertainty about their likely impact. The general belief was that unconventional policy was an emergency response that would be phased out once the crisis was over. However, if it is designed carefully it may help a central bank reach its objectives even in non-crisis times.

This paper investigates whether the unconventional policy of central banks purchasing long-term government debt could be useful even after the Great Financial Crisis has passed. We obtain our results in a New Keynesian DSGE model with a stylised financial sector and a Taylor-type policy rule for central bank asset purchases. Asset quantities matter because of the behaviour of banks and the incompleteness of financial markets. Households can only transfer income between periods with the help of banks, who invest the deposits they receive into government bonds. Banks allocate deposits into government bonds of different maturities according to a perception that savers are heterogeneous with respect to their preferred investment horizons. Central bank purchases of long-term government bonds reduce the supply of long-term debt available to the private sector, which increases the marginal willingness of banks to pay for it. This reduces yields on long-term debt, discourages saving, and hence

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increases output and inflation. When the policy parameters are chosen optimally, a combination of conventional and unconventional policies leads to significantly lower losses compared to when the central bank uses only conventional policies.

Central bank purchases of government bonds in our model have an effect through a "preferred habitat" channel of the type identified by Modigliano and Sutch (1966), and later developed by Vayanos and Vila (2009). The idea is that investors see government bonds of different maturities as imperfect substitutes and so are willing to pay a premium on bonds of their preferred maturity. The quantities of assets available then matter for prices and returns; if the central bank purchases government debt of a particular maturity then the supply of that asset to the private sector is reduced, its price rises and its return falls. The preferred habitat channel operates in our model as banks hold government debt of different maturities in response to a perception that savers have heterogeneous investment horizons. The closest models to ours are Andrés et al. (2004) and Chen et al. (2012), although they consider different mechanisms and have less emphasis on implications for optimal policy coordination.

The main focus of the current unconventional monetary policy literature is on credit easing, i.e. central bank purchases of private financial assets.[1] An important exception is Eggertsson and Woodford (2003), who examine central bank purchases of government debt. They argue that unconventional monetary policy works by acting as a signal for the future path of short-term interest rates, so will be especially useful when the main policy rate is constrained by the zero lower bound. In their model, though, the risk-premium component of long-term interest rates is unaffected by any reallocation of assets between the central bank and the private sector. This is because risks are ultimately born by the private sector, even if government debt is purchased by the central bank. If the central bank makes losses on government debt then government revenue falls and taxes on the private sector have to rise to satisfy the government budget constraint.[2] This view is not supported by the empirical evidence in Bernanke et al. (2004), D'Amico et al. (2012), D'Amico and King (2013), Gagnon et al. (2011), Krishnamurthy and Vissing-Jorgensen (2011) and Neely (2010). Instead, these studies find strong evidence that central bank purchases of government debt have small but significant effects via the term premium component of long-term interest rates. The evidence supporting a preferred habitat mechanism comes from the "scarcity channel" in D'Amico et al. (2012) and the "safety channel" in Krishnamurthy and Vissing-Jorgensen (2011).

2. Model

The model economy consists of households, monopolistically competitive firms, banks, a treasury and a central bank. There is price stickiness, wages are assumed to be fully flexible, and firms use labour as the only input in the production of consumption goods.[3]

2.1. Households

The preferences of the representative household are given by

$$U_0 = E_0 \sum_{t=0}^{\infty} \beta^t \left(\chi_t^C \frac{C_t^{1-\delta}}{1-\delta} - \chi_t^L \frac{L_t^{1+\psi}}{1+\psi} \right)$$

where $C_t \equiv [\int_0^1 C_t(i)^{(\theta_t-1)/\theta_t}\, di]^{\theta_t/(\theta_t-1)}$ is a CES consumption index composed to minimise cost and L_t is the time devoted to market employment. χ_t^C and χ_t^L are exogenous preference shock processes that evolve according to

$$\ln(\chi_t^C) = \rho_C \ln(\chi_{t-1}^C) + \varepsilon_t^C \quad \text{with } \varepsilon_t^C \sim N(0, \sigma_C^2) \tag{1}$$

$$\ln(\chi_t^L) = \rho_L \ln(\chi_{t-1}^L) + \varepsilon_t^L \quad \text{with } \varepsilon_t^L \sim N(0, \sigma_L^2) \tag{2}$$

The household maximises expected utility subject to the budget constraint:

$$P_t C_t + T_t + P_t^S S_{t,t+1} = S_{t-1,t} + W_t L_t + (1-t_\pi)(P_t Y_t - W_t L_t) \tag{3}$$

$P_t \equiv [\int_0^1 P_t(i)^{1-\theta_t}\, di]^{1/(1-\theta_t)}$ is the price of the composite consumption good, T_t is a lump-sum tax paid to the government and $S_{t,t+1}$ is the quantity of a savings device purchased from perfectly competitive banks at unit price $P_t^S < 1$ in period t. The household can secure a payment of $S_{t,t+1}$ in period $t+1$ by saving $P_t^S S_{t,t+1}$ in period t. W_t is the nominal market wage. Households own firms that produce and sell consumption goods, so they receive dividend income $(P_t Y_t - W_t L_t)$ which is subject to tax at the rate t_π.[4] All prices are measured in units of the numeraire good "money", which is not modelled.

The first-order conditions of the household's optimisation problem are

$$1 = \beta E_t \left[\frac{\chi_{t+1}^C}{\chi_t^C} \left(\frac{C_{t+1}}{C_t} \right)^{-\delta} \frac{1}{\Pi_{t+1}} \right] \frac{1}{P_t^S} \tag{4}$$

[1] See Cúrdia and Woodford (2011), Del Negro et al. (2011), Gertler and Karadi (2011), Gertler and Kiyotaki (2010), Gertler et al. (2012) and Kiyotaki and Moore (2012).

[2] This intuition is given on page 5 of Cúrdia and Woodford (2010).

[3] The model incorporates elements from Benigno and Woodford (2005), Gali (2008) and Woodford (2003).

[4] The representative household views dividends as lump-sum income and does not internalise the effect of labour supply on profits.