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Monetary policy and liquid government debt[☆]

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ABSTRACT

We examine the conduct of monetary policy in a world where the supply of outside money is controlled by the fiscal authority–a scenario increasingly relevant for many developed economies today. Central bank control over the long-run inflation rate depends on whether fiscal policy is Ricardian or Non-Ricardian. The optimal monetary policy follows a generalized Friedman rule that eliminates the liquidity premium on scarce treasury debt. We derive conditions for determinacy under both fiscal regimes and show that they do not necessarily correspond to the Taylor principle. In addition, Non-Ricardian regimes may suffer from multiplicity of steady-states when the government runs persistent deficits.

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1. Introduction

It has long been recognized that safe government bonds like United States Treasury securities possess money-like properties (e.g., Fried and Howitt, 1983). Given the rapid growth of the shadow banking sector in recent decades and its reliance on treasury securities as an exchange medium, the demand for government bonds as a form of wholesale money is greater today than ever. Moreover, as the spread between bond yields and interest on central bank reserves continues to narrow, the size of central bank treasury holdings is likely becoming increasingly irrelevant from an economic perspective.

The growing relative importance of government debt over central bank reserves as money has an interesting implication, namely, that the supply of base money is increasingly under the control of the fiscal authority. Because this is the case, fiscal policy is likely to play an important role in determining the rate of inflation. But even if open-market purchases of treasury securities are of little economic significance, central banks–like the Federal Reserve Bank of the United States–seem able to dictate the nominal and real interest rate on at least short-term government bonds. The central question we pursue in this paper is the following: How are we to think about the economic consequences of a central bank that can influence the yield on government bonds in a world where the fiscal authority controls the supply of base money?

[☆] The views expressed in this paper do not necessarily reflect official positions of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Board of Governors.

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To study this question, we develop an analytically tractable model where government bonds serve as an exchange medium between investors producing final goods and suppliers involved in the provision of new capital goods. Monetary and fiscal policies are linked through a consolidated government budget constraint. While we abstract from central bank money, seigniorage revenue is still possible because government debt is nominal. Monetary policy is modeled as a forward-looking Taylor rule. The fiscal authority determines the path of the real primary deficit and the rate of nominal debt-issuance. Two alternative fiscal policy regimes are considered: in a *Ricardian* regime, the primary deficit adjusts passively to satisfy the government budget constraint, whereas in a *non-Ricardian* regime, the fiscal authority sets the primary deficit independently of other policy variables.[1]

We begin by characterizing stationary equilibria and describing their properties. We find that there is a unique stationary equilibrium when the fiscal authority is Ricardian. Non-Ricardian fiscal regimes are problematic in the sense that they open the door to non-existence and a multiplicity of equilibria. In the case of multiple equilibria, a classic Laffer curve effect is at work; namely, the economy can find itself stuck in a high-inflation equilibrium that generates the same real primary deficit possible in a low-inflation equilibrium. Running a surplus (even weakly) eliminates this type of multiplicity.

Under a Ricardian fiscal policy, the long-run inflation rate is determined by the rate of nominal debt-issuance, which is outside the control of the monetary authority. By choosing the nominal interest rate, the central bank effectively controls the real rate of return on government debt. When the real yield on treasury debt is lower than the natural interest rate (the inverse of the discount factor), collateral is scarce so that government bonds possess a liquidity premium. The optimal monetary policy is to eliminate the liquidity premium on bonds; that is, to follow a generalized Friedman rule–a policy that equates the real rate of return on bonds to the natural interest rate. Interestingly, it is not necessary for the central bank to hit its inflation target to achieve this goal.

Under a Non-Ricardian fiscal policy, control of the long-run inflation rate returns to the central bank. The central bank policy rate affects the inflation rate through the effect that interest rates have on the interest expense of government debt. For a fixed real primary deficit, a higher nominal interest rate necessitates a faster pace of nominal debt-issuance from the treasury. In this way, a central bank can increase long-run inflation through a persistent increase in its policy rate. In the same way, a low-interest-rate policy leads to low inflation. These result are consistent with the claims made by Neo-Fisherian theory, though our results do not depend on inflation expectations being driven by the Fisher effect (Williamson, 2016).

The model makes clear that the collateral shortage cannot be alleviated through an injection of new debt (which is neutral) or persistent injections of new debt (which is inflationary and *worsens* the shortage). What is needed is a sufficiently large and persistent real primary budget surplus to finance the carry cost of debt that yields the natural interest rate.

Our analysis then turns to studying the dynamic properties of equilibria. We find that the condition leading to determinacy does not correspond to the Taylor principle, which requires the central bank's policy rate to react more than one-for-one with expected inflation. Specifically, under a Ricardian regime any Taylor-rule coefficient up to some upper bound (determined by parameters) implies determinacy of equilibrium. This upper bound is greater than one, so typical estimates of this coefficient are still consistent with determinacy in our environment. We can recover the Taylor principle if government debt is illiquid and the central bank reacts to current rather than future inflation. Under a Non-Ricardian regime with a zero primary deficit, any forward-looking Taylor rule leads to determinacy, except one that reacts one-for-one with future inflation.[2] In this case, recovering the Taylor principle only requires that the central bank reacts to current rather than future inflation. Determinacy in this case is not affected by whether bonds are liquid or not.

In our model, there is no reason to believe *a priori* that a central bank's preferred long-run inflation rate is consistent with the actual inflation rate that is generated by fiscal policy. What, if anything, can a central bank do to achieve its preferred inflation target in the face of an uncooperative fiscal authority? The equilibrium inflation rate in our model is determined in part by treasury supply growth and in part by treasury demand growth. Because the central bank in our model can influence the path of the interest rate, it can influence the path of real treasury demand and, hence, the rate of inflation–even if it cannot control the supply of treasuries.

Achieving a lower inflation target entails an ever-increasing path for the nominal and real interest rates. Because this policy works to diminish the liquidity premium on bonds, it actually stimulates output in credit-constrained sectors. But because the natural interest rate serves as an upper bound on the real yield for treasury debt, the central bank cannot maintain its lower inflation target indefinitely. In the opposite scenario, achieving a higher inflation target requires an ever-decreasing nominal and real interest rate. In principle, there is no lower bound on the real interest rate. However, real-world policy constraints (like the zero lower bound) would imply once again that the central bank must ultimately fail in defending its inflation rate peg.

As a final exercise, we apply our model to interpret the consequences of recent developments in U.S. monetary policy; namely, the apparent desire to systematically raise the policy rate to a more historically normal level. As is well-known,

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[1] We use these labels in the same way as Woodford (1995); see also Canzoneri et al. (2001). The labels "active" and "passive" used by Leeper (1991) and others to describe the policy stance of the fiscal and monetary authorities can be misleading in our setup, since even when the primary deficit adjusts passively (the Ricardian regime), the fiscal authority can still actively manage the growth rate of government debt. As we shall see, there are circumstances under which one of the two authorities has no choice but to accommodate the other.

[2] When the nominal interest rate reacts one-for-one with future inflation (i.e., the coefficient in the Taylor rule is equal to one), there is real determinacy, but nominal indeterminacy.

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