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The effects of fiscal spending shocks on the performance of simple monetary policy rules

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ABSTRACT

We examine the effects of fiscal shocks on the performance of alternative monetary policy rules in a small dynamic general equilibrium framework. We explicitly consider the interaction between fiscal and monetary policy rules which may be present in the real world. We use a simple specification for the fiscal policy rule and various specifications for the (simple) monetary policy rule. Our analysis suggests that some form of flexible inflation targeting regime would perform well in response to fiscal shocks compared to other forms of policy regimes.

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1. Introduction

Monetary policy rules have come under extensive examination in the literature on monetary policy in the recent years. Simple monetary policy rules appear to be more robust across a wide range of models compared to the optimal rules and tend to perform better empirically as well, see Taylor (1999a). Taylor (1993, 1999b) finds that his simple policy rule (known as the 'Taylor' rule) performs remarkably well in empirically (approximating) the monetary policy of the Federal Reserve Bank. The literature on the interaction between fiscal and monetary policy rules as opposed to monetary policy rules alone remains undeveloped at large. The literature on monetary policy mostly avoids the explicit specification of the fiscal policy rules. Fiscal policy is usually assumed to be of passive nature in the papers on monetary policy. This therefore largely avoids any interaction between the fiscal and monetary policy rules which may be present in the real world. The extensive amount of recent analysis on the performance of alternative monetary policy rules has resulted in the advocating/adoption of inflation targeting regimes in many countries and granting of independence to central banks in a few countries as well. In all these analyses the behavior of fiscal policy is mostly ignored however. As a result of this the literature on fiscal and monetary policy has developed largely in isolation. The terminology 'fiscal theory of the price level' does however correspond to some earlier work that allows for the impact of fiscal policy on inflation, see Woodford (2001). Given that the recent financial crisis has further highlighted the importance of this issue, a few other more recent papers also explicitly consider the interaction between fiscal and monetary policy. [1]

We in this paper examine the effects of changes in government spending on economic activity. The models mostly utilized in the literature predict that a rise in government spending will have an expansionary effect on output, however the models often differ with regards to the effects on consumption. Since consumption is the largest component of aggregative demand its response is a key determinant of the size of the government spending multiplier. The standard RBC model generally predicts a decline in consumption in response to a rise in government purchases of goods and services (i.e. government spending). In contrast, the IS-LM model predicts that consumption should rise, hence amplifying the effects of the expansion in government spending on output. Of course, the reason for the differential impact across those two models lies in how consumers are

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[1] Some of the other recent papers on the interaction of fiscal and monetary policy rules include Davig and Leeper (2011), Gali et al. (2007) and Leith and Wren-Lewis (2000) and Schmitt-Grohe and Uribe (2004). Also see the discussion in Walsh (2003) and Woodford (2003) textbooks.

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assumed to behave in each case, see Gali et al. (2007) for a detailed discussion.[2]

We focus on an environment (in this paper) in which monetary and fiscal policy are set according to simple rules. As a result we explicitly consider the effects of fiscal shocks on the performance of alternative monetary policy rules and the impact on the macroeconomic variables. We therefore evaluate combinations of a fiscal policy rule and active/passive monetary policy rules by examining their implications for the macroeconomic variables. We perform this analysis in a simple dynamic general equilibrium (closed economy) model with staggered price setting and physical capital accumulation. Therefore despite the richness of the dynamic general equilibrium model, we retain the simplicity in our analysis by focusing purely on the simple monetary and fiscal policy rules as opposed to the optimal and other complex policy rules utilized in the literature.

We use a small dynamic general equilibrium model for examining the appropriate response of monetary policy to fiscal shocks. The model we utilize can be characterized as a standard forward-looking New Keynesian framework, discussed in detail in Gali (2002), Walsh (2003) [chapters 5, 11] and Woodford (2003) [chapters 3, 4], modified for the inclusion of physical capital and the fiscal side of the economy. The capital stock evolves according to a simple linear transition law of form (Eq. (4)). The fiscal policy rule (Eq. (27)) we assume in our analysis is similar to one utilized in the studies by Gali et al. (2007), Leeper (1991), Leith and Wren-Lewis (2000) and Sims (1994) and in some other papers on the interaction between fiscal and monetary policy. Our model is optimization based and therefore provides a useful framework for evaluating alternative monetary policy rules in the face of fiscal shocks. We also evaluate the performance of these alternative monetary policy rules in response to a productivity shock as well in the later part of the analysis. As discussed in Davig and Leeper (2011) in the new Keynesian framework, the general mechanisms through which a change in government purchases affects the equilibrium, regardless of the monetary–fiscal regime, are: higher government spending raises demand for the goods sold by monopolistically competitive intermediate-goods producing firms; intermediate-goods producing firms meet demand at posted prices by increasing their demand for labor; higher labor demand raises real wages and real marginal costs; firms that have the option of reevaluating their pricing decision will increase their prices. These mechanisms operate across all monetary–fiscal regimes. Also, the positive comovement of output and prices occurs in each regime. The policy regime, however, does play a critical role in determining the movement of real rates, consumption and the path for inflation.

The choice of variables we examine in response to a government spending shock is based on the recent empirical evidence. Because private consumption constitutes about two thirds of GDP, the typical argument has stimulus raise consumption demand, the demand for labor, and employment. It is ironic that the consumption response to an increase in government spending is of utmost importance in the transmission mechanism for fiscal stimulus. Economic theory and empirical evidence however do not universally support the idea that higher government purchases raise private consumption.

Blanchard and Perotti (2002) and Fatás and Mihov (2001) identify exogenous shocks to government spending by assuming that the latter variable is predetermined relative to the other variables included in the VAR. Their most relevant findings for our purposes can be summarized as follows. First, a positive shock to government spending leads to a persistent rise in that variable. Second, the implied fiscal expansion generates a positive response in output, with the associated multiplier being greater than one in Fatás and Mihov, but close to one in Blanchard and Perotti. Third, in both papers the fiscal expansion leads to large (and significant) increases in consumption. Fourth, the response of investment to the spending shock is found to be insignificant in Fatás and Mihov, but negative (and significant) in Blanchard and Perotti.[3] Gali et al. using U.S. quarterly data, estimate the responses of several macroeconomic variables to a government spending shock. The latter is identified by assuming that government purchases are not affected contemporaneously (i.e., within the quarter) by the innovations in the other variables contained in a vector autoregression (VAR).Their findings suggest that government spending and output rise significantly and persistently in response to that shock, and more interestingly, however, consumption is also shown to rise on impact and to remain persistently above zero.[4]

Mountford and Uhlig (2009) apply the agnostic identification procedure originally proposed in Uhlig (2005) to identify and estimate the effects of a “balanced budget” and a “deficit spending” shock. They find that government spending shocks crowd out both residential and non-residential investment, but they hardly change consumption (the response of the latter is small and insignificant). Ramey and Shapiro (1998) also find that (nondurable) consumption displays a slight, though hardly significant decline, whereas durables consumption falls persistently, but only after a brief but quantitatively large rise on impact. They also find that the product wage decreases, even though the real wage remains pretty much unchanged.

The recent financial crisis has once again highlighted the importance of understanding the interactions between fiscal and monetary policy. A long line of research emphasizes that separating monetary and fiscal policies overlooks policy interactions that are important for determining equilibrium as discussed in Davig and Leeper (2011) monetary and fiscal policy responses to the recession of 2007–2009 have been unusually aggressive, particularly in the United States. The Federal Reserve rapidly reduced the federal funds rate more than 500 basis points, beginning in the summer of 2007, and the rate has effectively been at its zero bound since December 2008. Early in 2009 the U.S. Congress passed the $787 billion American Recovery and Reinvestment Act, in addition to the $125 billion provided by the Economic Stimulus Act of 2008. This unified and aggressive monetary–fiscal front to stimulate the economy is a distinctive feature of the current policy response. The overriding objective of the stimulus efforts is to spur job creation by increasing aggregate demand, particularly in the short run.

The rest of the paper is organized as follows. Section 2 specifies the model and the fiscal and monetary policy rules. Section 3 briefly discusses the solution and calibration of the model. Section 4 computes the responses of the macroeconomic variables under alternative monetary policy rules in response to the fiscal shocks. Section 5 concludes.

2. The model

The model we use below is a small dynamic general equilibrium model sharing a number of features of the New Keynesian framework, accommodating physical capital accumulation and the fiscal side of the economy.

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[2] As discussed in Gali et al. (2007), the RBC model features infinitely-lived Ricardian households, whose consumption decisions at any point in time are based on an intertemporal budget constraint. Ceteris paribus, an increase in government spending lowers the present value of after-tax income, thus generating a negative wealth effect that induces a cut in consumption. By way of contrast, in the IS-LM model consumers behave in a non-Ricardian fashion, with their consumption being a function of their current disposable income and not of their lifetime resources. Accordingly, the implied effect of an increase in government spending will depend critically on how the latter is financed, with the multiplier increasing with the extent of deficit financing.

[3] These empirical findings are mostly taken (and discussed in detail there) from Davig and Leeper (2011) and Gali et al. (2007).

[4] Perotti (2004) also finds positive comovement between consumption and income, conditional on government spending shocks, for a number of OECD countries.

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