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Dissecting fiscal multipliers under the fiscal theory of the price level

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ABSTRACT

We derive analytical expressions for fiscal multipliers on output and inflation under the Fiscal Theory of the Price Level. In the associated 'fiscal regime', taxation multipliers turn positive, while the government spending multiplier has the same functional form as its counterpart in the 'monetary regime', augmented by a nominal wealth effect. As a result, fiscal multipliers tend to be larger in the fiscal regime, with the degree of price stickiness being a key determinant of their exact sizes. In particular, multipliers go to infinity as prices become fully fixed, and collapse to their equivalents in the monetary regime as prices become fully flexible. Standard calibrations suggest that the fiscal regime hosts a government spending multiplier on output that lies between 1 and 3. We also analyze the effectiveness of money-financed fiscal stimulus. In the fiscal regime, money-financed stimulus is equivalent to a particular form of debt-financed stimulus. The effectiveness of money-financed stimulus in raising output (relative to inflation) decreases as monetary policy becomes more responsive to inflation.

1. Introduction

In this paper, we derive analytical expressions for fiscal multipliers on output and inflation under the Fiscal Theory of the Price Level ('FTPL') and the associated 'fiscal regime'. We show that these are closely linked to their equivalents in the more-standard 'monetary regime', but that fiscal policy is typically more potent in the fiscal regime.

In an environment where governments issue nominal debt, the monetary and fiscal regime differ in their treatment of the government budget equation (which equates the real value of government debt to the present-discounted value of all future real primary surpluses). While the monetary regime treats this equation as a constraint (implying that policy needs to adjust when the present-discounted value of future surpluses differs from the real value of debt), the fiscal regime views it as an equilibrium condition.[1] In the latter case, there is 'fiscal dominance' and a shock to the current primary surplus does not have to lead to changes in future primary surpluses; instead, the price level can adjust to restore equality. Leeper (1991) has dubbed the underlying, autonomous form of fiscal policy 'active', while the associated mechanism has led Woodford to characterize the FTPL as 'non-Ricardian': since an increase in government spending under the FTPL is not

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[1] See Auernheimer and Contreras (1990); Begg and Hague (1984); Leeper (1991); Sims (1994); Woodford (1995) and Cochrane (1998; 2005) for early contributions to this theory. Canzoneri et al. (2011) and Leeper (1991) offer overviews of the associated literature.

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automatically associated with higher future primary surpluses, agents perceive the government bonds that are placed into their hands as net wealth. As a result, they demand more consumption goods and the price level rises.

The FTPL seems to have particular relevance for developing countries (to the extent that they issue domestic currency debt[2]): they often lack the fiscal capacity to collect the necessary real tax revenues (giving rise to an 'active' fiscal authority; cf. Baldini and Poplawski-Ribeiro, 2008), while concerns for capital flows imply that monetary policy tends to be 'passive'.[3] Others have moreover argued that the FTPL has applied at times in the U.S.,[4] with Cochrane (2011; 2014) forcefully making the case that the FTPL provides a useful framework to think about the U.S. economy post-financial crisis.

Although there is a large literature analyzing fiscal multipliers in the monetary regime,[5] there is no such focused analysis for fiscal multipliers in the fiscal regime. Fiscal multipliers play a big role in FTPL-based papers like Davig and Leeper (2011); Kim (2003), and Leeper et al. (2016), but these papers typically have a different focus and report only a limited set of analytical results. Bhattarai et al. (2014) obtain a broad set of analytical results for the fiscal regime, but only focus on monetary policy.

With the present paper, we fill this gap by obtaining analytical expressions for fiscal multipliers under the FTPL. We uncover that fiscal multipliers in the monetary and fiscal regime are intimately linked. In particular, the functional form of the government spending multiplier in the fiscal regime is equal to the government spending multiplier in the monetary regime plus the taxation multiplier in the fiscal regime, minus a 'fiscal inflation tax'. This additive relationship arises because debt-financed government spending in the fiscal regime produces the same real effects as in the monetary one, but also adds a nominal wealth effect, resulting from unbacked bonds being placed in the private sector.

The analytical expressions reveal three novel facts. First, the degree of price stickiness is key in determining the size of the nominal wealth effect and hence the fiscal multipliers. In particular, the multipliers on output in the fiscal regime explode to infinity as prices become fully fixed, and collapse to their counterparts in the monetary regime as prices become fully flexible. Standard calibrations suggest that the fiscal regime hosts a government spending multiplier on output that lies between 1 and 3. In the monetary regime, the standard three-equation New Keynesian model only attributes a marginal role to price stickiness in determining the size of fiscal multipliers.

Second, in contrast to the monetary regime, multipliers in the fiscal regime depend on the government's debt-to-output ratio. In particular, more indebted countries have smaller multipliers, in line with the empirical evidence documented by Leeper et al. (2016) and Huidrom et al. (2016). The literature has suggested two transmission channels to account for this empirical relationship: first, a Ricardian channel, whereby households expect fiscal stimulus by more indebted governments to be offset by tax increases sooner; and second, an interest rate channel, whereby fiscal stimulus by more indebted governments increases sovereign credit risk, thereby crowding out private consumption through higher interest rates. In this paper, we add a third channel, operating through the nominal wealth of the private sector (similar to Leeper et al. (2016)): in the fiscal regime, bonds issued by a more-indebted government represent a smaller nominal wealth increase (relative to the size of the existing debt stock), thereby leading to a smaller nominal wealth effect of fiscal stimulus on output and inflation.

Third, as the fiscal regime adds a wealth stock to the model, fiscal multipliers start displaying persistence, even when the underlying shock is purely transitory. This result is consistent with empirical evidence presented in Leeper et al. (2016), who find large persistence in their estimates of the government spending multiplier in the fiscal regime. In the monetary regime, the standard three-equation New Keynesian model displays no persistence in multipliers unless the underlying shock itself is persistent.

Finally, we use our model to analyze the effects of money-financed fiscal stimulus in the fiscal regime. Our analysis shows that the effects of money-financed stimulus can be replicated by debt-financed stimulus if the fiscal authority is willing to take an 'active' stance, with the monetary authority accepting a 'passive' role. Our results indicate that the effectiveness of money-financed stimulus in raising output relative to inflation decreases as monetary policy becomes more responsive to inflation.

2. Model

To 'dissect' the fiscal multipliers, we start by considering a standard New Keynesian model. It is set in a discrete-time, infinite horizon environment, lacks capital, but allows for non-zero, wasteful government spending. The representative

[2] For a sample of 18 emerging markets, Ottonello and Perez (2016) document that about one-third of all debt is issued in local currency. It ranges from as low as 0% in Bulgaria, to as high as 68% in Thailand.

[3] Central banks in developing economies are often reluctant to increase the interest rate when the economy is booming, as that would attract further capital inflows—throwing oil on fire. The reverse worry implies that they are less keen to cut the interest rate when the economy is in recession. Federico et al. (2014) document the passivity of monetary policy for developing economies empirically.

[4] See Bianchi (2012); Bianchi and Ilut (2014); Davig and Leeper (2006) and Chen et al. (2015).

[5] Cf. Aiyagari et al. (1992) and Baxter and King (1992) (both papers analyze the size of the multiplier in a neoclassical model), (Christiano et al. (2011), who look at the size of the multiplier when nominal interest rates are at the zero lower bound), (Woodford, (2011)), who derives analytical expressions for the multiplier in various incarnations of the New Keynesian model), (Galí, (2014), who compares multipliers depending on whether the underlying government spending is money-financed or debt-financed), and Rendahl (2016), who shows that the existence of equilibrium unemployment can increase the size of the government spending multiplier).