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Dynamic adjustment of fiscal policy under a debt crisis

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ABSTRACT

In an overlapping generations framework that allows for the presence of a debt crisis scenario (debt bubbles), we introduce productive government expenditures, and endogenous deficits through a dynamic fiscal rule that combines fiscal stimulus and fiscal consolidation. We formally argue that a fiscal rule must be pro-cyclical to output for government investment financing and simultaneously has to control for the level of debt adjusting taxation for a policy aiming to escape a situation of exploding debt and low economic activity. Then, when the economy becomes sustainable (or in an economy's high initial private capital), the same rule, has to endogenously adapt to the actual level of debt and income in order to stimulate private investment through lower taxes. We provide a numerical example for our theoretical results and show that in economies with sufficiently low levels of capital and high levels of debt, the tax rate has to adjust non-monotonically during the recover process, reflecting the two counter-balancing properties of the examined fiscal policy rule. However, under a threshold level of initial capital stock, taxes must adjust monotonically (negatively) to boost private investment activity, and in turn, alleviating the volume of debt though a higher tax base.

1. Introduction

In recent years, particularly in Europe, we witnessed a shift to austerity measures and deficit reducing policies to target sustainable public debt. The International Monetary Fund (IMF), the European Central Bank (ECB), and the European Commission, in an effort to help European countries overcome exploding debt, focused on policies that place some level of fiscal austerity (increase in taxation and spending cuts) to control each country's debt. However, we first saw that those policies, due to their discretionary nature, are continuously re-optimized given some countries' failure to achieve their targets. Second, using almost the same fiscal policy measures in similar countries (e.g., Portugal and Greece), we observe diverging economic outcomes (for a detailed review, see Brendon and Corsetti, 2016). This variation in the dynamic adjustment of policy instruments and divergence from the expected economic outcomes resulted in an uncertain economic environment, raising the need to impose a stable dynamic fiscal policy rule subject to the state of the economy.

This study aims to examine the properties of a fiscal policy rule for debt sustainability in a framework that allows for the presence of debt bubbles. On the one hand, increasing productive government spending stimulates an economy with low private investment and, in turn, output. On the other hand, without considering a consistent financial plan for the level of debt, an expansionary policy can generate a debt bubble. According to our model, the effectiveness of fiscal stimulus and consolidation for debt sustainability is determined by the initial conditions of the level of debt and capital stock. To this end, we provide a fiscal rule that can endogenously adjust to the need for stimulus and consolidation as the economy develops.

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In particular, we show that a fiscal rule has to be pro-cyclical in output increases (contrary to perceived notions) through public investment ("productive" stimulus). However, at a high initial level of debt, taxation has to increase (endogenously) in order to finance deficits.[1] If the economy achieves (or starts) a threshold (or initial) level of capital stock, taxation negatively adjusts to output increases and government expenditures are financed through a higher tax base.

Our study is related to the literature on fiscal consolidation and debt sustainability and contributes in several respects. Earlier work by Sargent and Wallace (1981) states that there is a ceiling on government indebtedness and that permanent deficits will eventually need to be monetized. However, some countries either belong to a monetary union or monetary policy is constrained by the zero lower bound. Thus, Eggertsson (2011), Christiano et al. (2011), and Coenen et al. (2012), among others, highlight the role of fiscal stimulus and show that government spending multipliers are potentially larger when the zero bound is binding. However, their modeling approach does not allow for the presence of debt bubbles that fiscal stimulus can trigger and the fact that fiscal multipliers depend on the state of the cycle (Ramey and Zubairy, 2016) and the level of debt according to empirical evidence provided by Auerbach and Gorodnichenko (2013, 2012) and Fotiou (2017). Furthermore, Corsetti et al. (2013) highlight that the benefits to fiscal expansion could easily be undone if the fiscal solvency of the government comes into question – an issue of obvious relevance to Southern European countries at present.

To this end, driven by the aforementioned empirical evidence, we first allow for the presence of debt bubbles (following Tirole, 1985 and Chalk, 2000) to account for the unfavorable consequences of fiscal stimulus on debt. Second, through a policy rule, we consider state dependent fiscal stimulus (alternatively, through productive government expenditures) to remedy a recession while also controlling for the level of debt. We contribute a theoretical framework that formalizes the effectiveness of fiscal policy under the state of cycle and debt. Our new mechanism puts forward an analysis of the differential dynamic paths conditional to the initial conditions.[2]

In particular, regarding the literature on fiscal sustainability in a framework that allows for self-fulfilling bubbles, the closest work to ours is that of Chalk (2000). Once debt can be rolled over to generations (the Ricardian equivalence does not hold), Chalk (2000) studies the maximum level of permanent deficits (empirically observable in the US and elsewhere) that a country can run subject to its structural characteristics and initial conditions. Interestingly, the author shows that the level of permanent deficit that a country can afford depends on its inherited level of debt. However, Chalk (2000) assumes that deficits are exogenous and constant and thus ignores the implementation of deficits over time. We complement this study by endogenizing deficits through a policy rule, estimated empirically by Bohn (1998), that considers the source of deficits through the positive response of deficit to output (in our case, to finance productive expenditures). Second, the rule activates a positive response in taxation to increases in debt to control the emergence of a debt bubble.[3] To this end, we can investigate when and what determines the choice of stimulus and consolidation to bring the economy into sustainability. Furthermore, we examine the effect of those counter-balancing properties of the examined fiscal policy on the dynamics of taxation.

Regarding the literature on fiscal stimulus and consolidation above, our framework highlights the importance of productive government spending (in the spirit of a Samuelson and Paul (1954) rule) and its interaction with the state of output (capital) and debt.[4] Surprisingly, although past empirical studies show that government spending has a positive effect on the productivity of capital (Aschauer, 1989; Leeper et al., 2010; Nadiri and Mamuneas, 1994), recent studies assume that government expenditures are entirely wasteful and have no direct effect on the marginal productivity of private inputs (Christiano et al., 2011; Eggertsson, 2011; Coenen et al., 2012). Recent exceptions are works by Traum and Yang (2015) and Bouakez et al. (2017). Traum and Yang (2015) consider expansionary fiscal policy shocks and, contrary to the conventional view (and in the spirit of our paper), show that if a debt expansion is due to an increase in government investment, private investment rises within the first three years, despite a higher interest rate. Along the same line, Bouakez et al. (2017) focus on the effectiveness of public investment in stimulating an economy stuck in a liquidity trap. They estimate a positive impact of government investment on private productivity. Additionally, they find that the spending multiplier associated with public investment can be substantially large in a crisis scenario. Both frameworks exclude the possibility of a debt bubble, which generates differential self-fulfilling dynamics for initial conditions far from the steady-state. To this end, complementing the evidence and results from these studies, we advance the role of government investment and its association with (productive) stimulus under a threat of a possible debt bubble. The interaction of initial conditions (state of cycle and debt) with the (endogenous) efficiency of productive spending expands the set of mechanisms in the design of a fiscal plan that aims for debt sustainability.

Regarding policy implications, we argue that fiscal asymmetries may not rely solely on fundamentals but on self-fulfilling pessimism derived from initial conditions as recent empirical evidence indicates (De Grauwe and Yuemei, 2013). In

[1] In the optimal neoclassical growth model of infinitely lived agents debt bubbles are ruled out optimally and a procyclical fiscal rule crowds out private investment strongly and generates instability. However, under the existence of debt bubbles and unstable debt dynamics that can occur in an OLG framework, a procyclical policy in output can place the economy in the sustainability area (through increases in productivity) as we will show later on.

[2] Main computable macroeconomic models on the topic consider a stable and unique path for any initial condition (among others, Christiano et al., 2011; Eggertsson, 2011 and Coenen et al., 2012).

[3] This second feature of the rule provides an additional channel to deficit control when structural deficits, in the spirit of Chalk (2000), are close to achieve their upper bounds.

[4] Interestingly, the largest fiscal stimulus plan in U.S. history — the American Recovery and Reinvestment Act (ARRA) of 2009 — allocated roughly 40% of non-transfer spending to public investment.

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