Infrastructure, alternative government finance and stochastic endogenous growth

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Abstract

This paper constructs a stochastic version of an endogenously growing economy with a public good that raises the productivity of private capital. We explore how growth and welfare are influenced by changes in the mean and variance of productive public spending under two alternative financing methods, mixed money–bond financing and wealth-tax financing. In addition, to evaluate the differences between money financing and bond financing, we consider mixed money–bond financing, under which a larger ratio of bonds to money is utilized to finance a given increase in public spending.
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1. Introduction

Government expenditure financing is regarded as an important factor explaining variations in economic performance, and many economists have extensively examined the theoretical interaction between aggregate activity and the way that public spending is financed. For example, based on the framework of a nonmonetary

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Ramsey growth model, Turnovsky (1992) examines the steady-state effects of changes in public spending under different financing methods. Using the monetary growth model of Sidrauski (1967), Gokan (2003) investigates how alternative government financing affects the speed at which capital stock converges to a steady state. Ploeg and Alogoskoufis (1994) develop Sidrauski's model with noninterconnected overlapping generations to compare the growth effects of public spending financed by creating money, issuing bonds and imposing lump-sum taxes. Palivos and Yip (1994) utilize cash-in-advance model of Stockman (1981) to assess the relative merits of tax financing and money financing. However, the present paper differs from the existing literature in two respects.

First, the above economists assume that public spending has no direct impact on the behavior of the private sector. It can be interpreted as being either a real drain on the economy or alternatively as some good that does not influence the productivity of private capital. In the study of public spending, it is convenient to distinguish between government consumption expenditure and government infrastructure expenditure. The economists above restrict their attention to government consumption expenditure, and the concept of government infrastructure expenditure is excluded from their analyses. Clearly, an alternative discussion of the role of government spending is required within this topic. To capture the role of infrastructure capital, this paper incorporates public capital into the production function as an input. However, owing to the analytical complexities, we are restricted to considering a steady-state equilibrium and examining the steady-state effects of alternative government financing.

Second, the stochastic factors are completely ignored in the existing alternative government financing literature.[1] Unforeseen policy shocks occur over time, and the economic activities are inherently subject to the unforeseen risk. Thus, the importance of the interaction between the stochastic factors in the public sector and the real economy should be emphasized in this field. We extend a general equilibrium model to consider a richer, more realistic picture of government sectors. This paper allows us to clarify whether the mean and variance of productive public spending could mitigate the size of business cycle fluctuations in the steady state.

In the present paper, productive public capital is introduced in a stochastic AK model, as studied in Turnovsky (1993) and Grinols and Turnovsky (1993). It should be noted that public spending corresponds to a flow of public capital. There are two different financing methods to raise a given increase in public spending: mixed money–bond financing and financing through taxes on wealth. Hence, we can compare how the level of welfare and the mean and variance of real growth are affected by increasing the first and second moments of productive public spending under the two different financing schemes. In addition, to explore the qualitative differences between money financing and bond financing, this paper considers a mixed money–bond financing under which government relies on a larger ratio of bonds to money to raise the necessary revenue. As for tax and monetary policies, we

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[1]An exception is Gokan (2002), who has a stochastic general equilibrium model but focuses on government consumption expenditure.