



Government spending, capital accumulation and the optimal policy rule: The role of public service capital

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Abstract

In this paper, we modify the Djajić [Djajić, S., 1987. “Government Spending and the Optimal Rates of Consumption and Capital Accumulation,” *Canadian Journal of Economics* 20, 544–554.] model in such a way that government consumption expenditure provides utility to households via the total stock of government services rather than the government consumption flow alone. By using such a framework, we show that the optimality condition for the public service capital stock is the marginal rate of substitution between public service capital and consumption that equals the *intertemporal* marginal rate of transformation between the two goods. In addition, we show that the relationship between private consumption and public service capital in a household’s utility plays an important role in determining the transitional behavior of relevant variables. We also examine the second-best government consumption expenditure policy. By contrast, in the standard flow specification, e.g., Turnovsky and Brock [Turnovsky, S.J. and Brock, W.A., 1980. “Time Consistency and Optimal Government Policies in Perfect Foresight Equilibrium,” *Journal of Public Economics* 13, 183–212.], Ihori [Ihori, T., 1990. “Government Spending and Private Consumption,” *Canadian Journal of Economics* 23, 60–69.], and Turnovsky and Fisher [Turnovsky, S.J. and Fisher, W.H., 1995. “The Composition of Government Expenditure and its Consequences for Macroeconomic Performance,” *Journal of Economic Dynamics and Control* 19, 747–786.], the

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second-best government consumption expenditure is decided on the basis that the marginal utility of consumption is equal to the *discounted sum* of the marginal utility of the government's flow spending.

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1. Introduction

The impact of government consumption expenditure on private consumption and private capital formation has long been a subject of analysis and debate.¹ Neoclassical growth models, such as those of Djajić (1987) and Ihuri (1990), have concluded that an unanticipated permanent increase in government consumption spending will immediately crowd out private consumption one-for-one and will leave the capital stock and output constant at *all* points of time. Subsequently, Turnovsky and Fisher (1995), Palivos and Yip (1996), and Chang (1999) have introduced endogenous labor supply and Chang et al. (1998) have introduced the endogenous rate of time preference to examine the validity of the full crowding-out effect of government spending. They find that an unanticipated permanent fiscal policy will affect both the steady-state equilibrium and the short-run transitional behavior of private consumption and the capital stock.

One common element of these studies is that they set up their models with the *flow* specification of government consumption expenditure in the utility function. Evidently, such a specification of government consumption expenditure does not fit in with the reality. The typical examples of utility-enhancing public goods, such as public libraries, national defense, national parks, hospitals, highways and transportation programs, which have been presented in recent neoclassical growth frameworks, are *stock* variables by nature. By taking government expenditure on national parks as an example, the flow specification of government expenditure in the utility function implies that only newly-established national parks can raise the public's satisfaction, and that national parks previously established do not contribute any utility to the agents.² Obviously, it is more plausible for public services to enter into the utility function in the manner of a *stock* variable, rather than a flow variable.

In fact, Arrow and Kurz (1970, xiii) have put forward the view: "some government capital contributes directly to consumer satisfaction, and it would be more general to let U [utility] depend on ... per capita government capital." Turnovsky and Fisher (1995, p. 753) also make a similar suggestion, claiming that "[a]n alternative approach would be to allow the government also to accumulate stocks of durable consumption goods and physical infrastructure capital. This formulation has much to recommend in terms of added realism, in that many utility-enhancing public goods, such as national parks, and production-enhancing public goods, such as roads, are likely to impact on the economy through their accumulated stocks, rather than their current flows." However, they still treat utility-enhancing public goods as a flow variable in their analysis. To the

¹ The economics literature often considers two types of government expenditure: one is modeled as being utility enhancing to households, and the other is an input in the private production process. Turnovsky and Fisher (1995) classify them as government consumption expenditure and government infrastructure expenditure, respectively. For a more detailed discussion, see Barro (1993, ch. 12).

² Fisher and Turnovsky (1998, p. 399) similarly criticize the flow specification of government infrastructure expenditure. They claim: "the flow specification has the virtue of tractability, it is open to the criticism that insofar as productive government expenditures are intended to represent public infrastructure, such as roads and education, it is the accumulated stock, rather than the current flow, that is relevant."

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