Implications of productive government spending for fiscal policy

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ABSTRACT

The standard assumption in macroeconomics that government spending is unproductive can have substantive implications for tax and spending policy. Productive government spending introduces a positive feedback between the tax rate, the productive capacity of the economy, and tax revenue. We allow marginal tax revenue to be optimally allocated between productive subsidies to human capital and utility-enhancing government consumption and calculate Laffer Curves for the US. Productive government spending yields higher revenue-maximizing tax rates, steeper slopes at low tax rates and higher peaks. The differences are particularly pronounced for the labor-tax Laffer curve. The use of tax revenue is an important determinant of the actual revenue that a tax rate increase generates.

1. Introduction

A major role of government is to provide public goods, some of which enhance the productivity of the economy. Examples include the Eisenhower interstate highway system in the US, the extensive rail system in Europe, public education, government-funded research, among other projects. Yet, a standard simplifying assumption in macroeconomics is that government spending is unproductive. An even more extreme but common assumption is that government spending is entirely purposeless with purchases thrown into the ocean or tax revenue redistributed back to the same representative agent who paid it. These standard assumptions eliminate any positive direct effects of government spending on the economy. Those direct effects, however, must be the purpose of the spending and the reason for which the spending is undertaken.

This paper focuses on the importance of including the purpose of government spending when trying to understand the effects of an increase in distortionary tax rates on output, total tax revenue, and welfare. We define productive government spending as spending which raises output per worker. When a distortionary tax increase finances productive government spending, it can increase the productivity of the economy. This increased productivity offsets some of the distortion from the increased tax rate, mitigating the output and welfare loss from the tax rate increase. When the spending is not productive, these effects are absent. Baxter and King (1993) wrote an early paper in which they demonstrated substantial differences in

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fiscal multipliers under distortionary taxation for the cases of productive and non-productive government spending. We follow their lead and compare Laffer curves and welfare with and without productive government spending. With productive spending, revenue-maximizing tax rates are higher. Additionally, the slope of the Laffer curve at low tax rates and its peak are higher. The net welfare impact of a distortionary tax increase also depends on the type of spending financed.

We model productive government spending as subsidies to education, essentially subsidies to private investment in human capital. Following the literature initiated by Lucas (1988)'s endogenous growth model, we provide a role for government subsidies to education by assuming that human capital has an externality in production, inducing the private market to provide too little of it. However, in the presence of distortionary labor taxation, the government would optimally choose to provide subsidies even in the absence of the externality in order to offset some of the distortion created by the labor tax.

We provide a calibrated model to show that when the government allocates marginal tax revenue optimally between utility-enhancing spending on a public good and subsidies to investment in productive human capital, compared with allocating all marginal revenue to the public consumption good, the difference in the shape of the Laffer curve is economically significant. Revenue maximizing tax rates rise from 0.65 to 0.70 for the labor tax rate and from 0.67 to 0.73 for the capital tax rate. Additionally, Laffer curve peaks are higher and the slope at low tax rates is steeper. The peak of the labor-tax Laffer curve with optimal allocation provides an additional 71% in revenues compared with an additional 49% with full allocation to government consumption. The capital tax Laffer curve is much flatter and corresponding numbers are 12% and 8%. These numbers imply that optimal allocation of tax revenues yields additional revenue at the peak between 45% and 50% higher than that possible with full allocation to the public consumption good. Our focus on a single type of productive government spending ignores other types of productive spending. This implies that our results yield a lower bound on the government's ability to raise tax revenue with an increase in the tax rate when some marginal tax revenue is allocated toward productive use.

Our assumption that marginal tax revenues are allocated toward welfare-enhancing uses allows us to meaningfully compute optimal labor and capital tax rates, conditional on exogenous components of fiscal policy. We find that the optimal capital tax should be zero, as in the optimal tax literature, and that the optimal labor tax is higher than its current rate.

These issues are particularly relevant in current budgetary environments, where countries are facing difficult choices over spending cuts and tax increases needed to achieve long-run fiscal sustainability. Education expenditures have been widely targeted for cuts. Our analysis demonstrates that cuts to productive government spending are considerably less effective in achieving fiscal sustainability than cuts to utility-enhancing spending since the former will reduce the long-run productive capacity of the economy. This does not mean that all spending cuts should be to utility-enhancing spending because choices should be guided by welfare, not by maximizing tax revenues. However, in comparing costs and benefits of alternative spending cuts, their differing effects on marginal tax revenues should be included in both the budget-balancing and welfare calculations.

Our paper is related to recent papers by Trabandt and Uhlig (2006, 2011, 2012) (TU), which compute steady-state Laffer curves by calibrating the steady state of an exogenous neoclassical growth model with capital and labor as inputs. We calibrate the Laffer curve to the steady state of a growth model, but make significant departures.

The first departure is that we ask a different question. TU asks how far various economies are from the peaks of their Laffer curves. Their answer is that some countries are close. Their paper does not have productive government spending. We ask how the addition of productive government spending alters the shape of the Laffer curve. We want information about how the addition of productive government spending changes the slope of the Laffer curve at tax rates below the peak, equivalently information on the effectiveness of a tax rate increase in raising tax revenue. And we want information about the position of the peak which implies a revenue maximizing tax rate.

We compute Laffer curves in two variants of our model, where the variants differ only in whether or not government spending can be productive. We find that productive government spending increases the slope of the Laffer curve for tax rates below the peak, and increases the revenue-maximizing tax rate. The steeper slopes imply that our ability to raise tax revenues with an increase in tax rates is greater than that we might have thought from a Laffer curve which omits productive government spending. Additionally, the higher revenue-maximizing tax rates imply that productive government spending could change the answer to the TU question, implying that countries with productive government spending are further from their peaks than they would be in its absence.

The second departure from TU arises over the need to add productive government spending to our model. Given the large fraction of government spending on education, and work initiated by Lucas (1988) on the productivity of human capital, we model productive government spending as subsidies to education expenditures. This requires that we build a model of human capital accumulation in which expenditures on education serve as a factor of production in human capital. Our model of human capital accumulation differs from the learning-by-doing specification in TU due to the need to allow education expenditures to be a factor of production.

The third departure we make is to change how the government uses the marginal tax revenue due to an increase in the tax rate. In TU, all marginal tax revenue is redistributed as lump-sum transfers. Prescott (2002) has shown that allocation of marginal tax revenue to redistribution, compared with purposeless spending, eliminates the wealth effect of any tax increase, thereby sharpening the labor supply reduction in response to a tax increase. The implication for the Laffer curve is