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Can corruption favour growth via the composition of government spending?

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Abstract

In an endogenous growth model with two public goods, we analytically derive the optimal composition of government spending in the presence of corruption. Although corruption results in a loss of productivity per se, an increase in corruption in the category of public spending that is harmed relatively more by corruption could have a favourable effect on growth, as it would encourage a benevolent government to divert spending towards the public good that is more productive, net of corruption.

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1. Introduction

Can corruption actually favour growth despite having a productivity-reducing effect, *per se*? In an endogenous growth framework with more than one public good (which augment private productivity via the production function), we show that under certain conditions it does, providing the government pursues a welfare-maximising fiscal policy. In demonstrating this result, the paper links the literature on the effects of optimal composition of government spending on growth to that on corruption and growth. We also highlight a different channel through which corruption could favourably affect growth from that discussed in the literature.

Devarajan *et al*. (1996) were the first to demonstrate how the composition of government expenditure affects an economy's growth rate. They show analytically that a shift in favour of an 'objectively' more productive type of expenditure may *not* raise the growth rate if its initial share is 'too high'. Somewhat surprisingly, in their empirical section they found, for their sample of developing countries, that an increase in the share of current – rather than capital – expenditure has positive and statistically significant growth effects. In a recent paper, Ghosh and Gregoriou (2008) investigate the same, but from an optimal fiscal policy perspective. Their empirical results demonstrate that developing countries that have correctly perceived current spending as being the more productive have increased the share of spending on this category of public goods, and this has led to higher growth, while countries that have not done so have lost out.

As regards the overall impact of corruption on growth, the influential paper by Mauro (1995) demonstrates that corruption lowers private investment and thereby growth. Subsequently, many other papers (for instance, Knack and Keefer (1997), Sachs and Warner (1997), Pellegrini and Gerlagh (2004), Meon and Sekkat (2005), etc.) have highlighted the negative effects of corruption on growth. The literature on rent-seeking supports this; for example, Murphy *et al*. (1991) have suggested that countries where talented people are allocated to rent-seeking activities will tend to grow more slowly. On the other hand, authors like Leff (1964), Huntington (1968), Leys (1970), and Lui (1985) have suggested that corrupt practices such as "speed money" might *raise* economic growth by enabling individuals to get things done by circumventing bureaucratic delay and red-tape.[1] Proponents of this view also feel that when bribes act as a piece rate, it is likely that bureaucrats would be more helpful when paid directly.[2] However, as Myrdal (1968) has argued, corrupt officials may actually *cause* administrative delays in order to attract more bribes; so it is not clear that corruption actually does any good in effect.

The effects of corruption on the different components of government expenditure are also important. Mauro (1998) shows that improvement in the corruption index coincides with declines (increases) in capital (current) expenditure. In that paper, the negative relation between corruption and government expenditure on education seems to be robust to a number of changes in specification, which is particularly worrying from a policy-making

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[1] As we shall see, this is not the channel through which corruption favours growth in our paper.

[2] Mauro (1995), however, found that even in sub-samples of countries where bureaucratic regulations are rather cumbersome, corruption affects growth negatively.

perspective, given that educational attainment and human capital accumulation are important determinants of long-run growth. This is because education does not provide as many lucrative opportunities and bribes for government officials as certain other components of spending, as its provision typically does not require high technology inputs provided by oligopolistic suppliers.[3] In a similar vein, Tanzi and Davoodi (1997) find that corruption underpins the bias in the composition of government spending towards large-scale capital investment (in infrastructure, etc.) because such projects facilitate the use of hefty bribes for bureaucrats; so, while the actual expenditure incurred by government officials increases, the productivity of such projects does not.

What we intend to do in this paper is to link the optimal composition of government spending to growth in the presence of corruption. As noted, Devarajan *et al*. (1996) and Ghosh and Gregoriou (2008) link the composition of government spending to growth, but neither of these studies considers the role of corruption in the process, although in the latter, a possible reason for current spending being more productive than capital spending was attributed to the possible presence of widespread corruption that generally exists in capital spending.

The intuition behind our apparently surprising result is as follows: Given that an optimising government spends on two public goods (or "sectors"), 1 and 2, a higher level of corruption in sector 2 would increase the economy's growth rate if the *net* productivity (i.e., productive capacity net of corruption) of sector 1 is higher than that of sector 2. This is because optimal fiscal policy would dictate that government expenditure be channelled to the sector where net productivity is higher, and higher corruption in the less efficient sector (sector 2) would give the government the incentive to do exactly that. Hence, more corruption in the less efficient sector would increase the economy's growth rate. Thus, in this paper, we show that the beneficial effect of corruption on growth arises through very different channels from those established in the literature (discussed earlier).

Our paper has important policy implications. If, empirically, it is found that in developing countries, the growth effects of capital spending (on infrastructure, education and health, for instance) are negative after taking into account the effect of corruption, while current spending has a positive effect, then one can argue that the correct policy for the government would be to switch from capital to current spending (i.e., to categories like operations and maintenance expenditure, which are more productive, *ex post*). This is what we would advocate from an optimal fiscal policy perspective. However, this could be potentially problematic in the sense that it may imply the diversion of resources away from important components of public spending, leaving them at less than socially desirable levels. Given that this is an important issue, attention should be focused on how the productivity of human and other components of public capital could be increased if corruption can provide a partial explanation of productivity losses from capital spending.

The rest of the paper is organised as follows. Section 2 sets up the theoretical model with public spending on two goods, and derives the analytical results under optimal fiscal

[3] See also Mauro (1997).

policy when corruption is present in both categories of public spending. Finally, Section 3 concludes.

2. The Analytical Framework

In this section, we first spell out the nature of welfare-maximising fiscal policy in the presence of corruption, and then derive some comparative-statics results.

2.1. Optimal fiscal policy with corruption

We modify the analytical model of optimal fiscal policy and growth developed by Ghosh and Gregoriou (2008) to include corruption in public spending. As in that paper, government expenditure on two goods enters the production function as inputs. In this model, though, corruption is present, which we capture in terms of a parameter that reduces the productivity of public spending. Corruption impacts on the two public goods to differing extents; thus we can study the impact of corruption on growth via the composition of public spending.

Without loss of generality, a CES technology (where y is output, k is private capital, and g_1, g_2 are two types of government spending) is considered, which is given by

$$y = [\alpha k^{-\zeta} + \beta_P(1-\delta_1)g_1^{-\zeta} + \gamma_P(1-\delta_2)g_2^{-\zeta}]^{-1/\zeta} \quad , \qquad (1)$$

where $\alpha > 0$, $\beta_P(1-\delta_1) \geq 0$, $\gamma_P(1-\delta_2) \geq 0$, $\alpha + \beta_P(1-\delta_1) + \gamma_P(1-\delta_2) = 1$, $\zeta \geq -1$.

In this specification, we define β_P and γ_P as the "pure" productivity parameters associated with the two types of public spending. In other words, these could be defined as the productivities when corruption (or any other potentially productivity-reducing effect) distorts the positive effect of public spending on output, in which case, the "net" productivities of public investment are given by $\beta_P(1-\delta_1)$ and $\gamma_P(1-\delta_2)$ respectively. Corruption in this set-up is like a leakage that leads to a lower proportion of government expenditure reaching the production process, and drives a wedge between the growth rate that society could have attained in its absence, and what it actually achieves. As, for example, in Mauro (2004), corruption could be interpreted as manifesting itself through appropriation by rent-seekers who basically consume the proceeds.[4] Higher corruption in g_1 (g_2) is captured by a higher value of δ_1 (δ_2), and the corruption parameter is bounded between 0 and 1.[5] Clearly, in the absence of corruption in g_1 (g_2), there is no difference between the pure and net productivities, as defined above. Here $0 < \delta_1, \delta_2 < 1$, because it encapsulates activities like bribe-taking, inflating costs of procurement of public goods,

[4] In our model, labour supply is inelastic, and is normalized to 1. In Mauro (2004), the unit of labour service is allocated between productive work and theft from the government. Incorporating this aspect in our set-up would reinforce our results.

[5] Alternatively, corruption could be modelled using the production function,

$$y = [\alpha k^{-\zeta} + (\beta_P - \delta_1)g_1^{-\zeta} + (\gamma_P - \delta_2)g_2^{-\zeta}]^{-1/\zeta},$$

where $\alpha > 0$, $(\beta_P-\delta_1) \geq 0$, $(\gamma_P-\delta_2) \geq 0$, $\alpha + (\beta_P-\delta_1) + (\gamma_P-\delta_2) = 1$, $\zeta \geq -1$.
The only difference with the previous case is that the corruption parameter can now take on values from 0 to β_P, γ_P (instead of from 0 to 1).

and procurement of low-quality products that typically reduce the productivity of the goods purchased by bureaucrats which ought to stifle growth.[6]

The government's budget constraint is

$$g_1 + g_2 = \tau y\,, \tag{2}$$

where τ is the income tax rate.

The shares of government expenditure that go toward g_1 (ϕ) and g_2 (1-ϕ) are given by

$$g_1 = \phi\tau y \quad and \quad g_2 = (1-\phi)\tau y\,, \tag{3}$$

where $0 \leq \phi \leq 1$.

The representative agent's utility function is isoelastic, and utility is derived from private consumption (c), and is given by

$$U = \int_0^{\infty} \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt\,, \tag{4}$$

where ρ (> 0) is the rate of time preference.

The agent's budget constraint is

$$\dot{k} = (1-\tau)y - c\,. \tag{5}$$

We can derive an expression for the ratio, g/k, and use this to obtain the economy's (endogenous) growth rate, λ, given by

$$\lambda = \frac{\alpha(1-\tau)\{\alpha\tau^{\zeta} / [\tau^{\zeta} - \beta_P(1-\delta_1)\phi^{-\zeta} - \gamma_P(1-\delta_2)(1-\phi)^{-\zeta}]\}^{-(1+\zeta)/\zeta} - \rho}{\sigma}\,. \tag{6}$$

The representative agent's problem is to choose *c* and $\dot{k}$ to maximise utility—which is *U* in (4)—subject to (5), taking τ, g_1 and g_2, and also k_0 as given. The first order conditions give rise to the Euler equation:

$$\lambda \equiv \frac{\dot{c}}{c} = \frac{1}{\sigma}\left[(1-\tau)\frac{\partial y}{\partial k} - \rho\right]. \tag{7}$$

The objective of the benevolent government in a decentralised economy is to run the public sector in the nation's interest, taking the private sector's choices as given. In other words, the government's problem is to choose τ, g_1 and g_2 to maximise the representative agent's utility subject to (2), (5) and (7), taking k_0 as given. The first order conditions with respect to τ, g_1 and g_2 respectively yield $\frac{\partial y}{\partial g_1} = \frac{\partial y}{\partial g_2} = 1$, from which we can obtain the optimal ratio of the two public goods.

[6] We have noted that some of the literature deals with a positive effect of corruption on growth through the avoidance of bureaucratic delays and red-tape in getting things done more efficiently. Clearly, here this does not happen.

Using this, together with the value of g/k derived earlier, we can obtain the individual values of g_1/k and g_2/k.

Then, from $\frac{\partial y}{\partial g_1} = 1$, we obtain $$g_1^* = [\beta_P(1-\delta_1)]^{\frac{1}{1+\zeta}} .y \,, \qquad (8)$$

and from $\frac{\partial y}{\partial g_2} = 1$, we obtain $$g_2^* = [\gamma_P(1-\delta_2)]^{\frac{1}{1+\zeta}} .y \,. \qquad (9)$$

So, the ratio of optimal values of the two types of spending is given by the ratio of net productivities (i.e., pure productivities less corruption) of the two types of spending. So, even if g_1 in the absence of corruption is more productive than g_2 in the absence of corruption (i.e., $\delta_1 = \delta_2 = 0$), the presence of corruption could make g_1 effectively less productive than g_2, in which case, the optimal thing for a government to do, if its objective is to raise the growth rate, is to switch its spending in favour of sector 2.

We are now in a position to find an expression for the optimal tax rate for the decentralised economy under a benevolent government. From the government budget constraint given by (2), and given the optimal shares (of output) of the two productive inputs given by (8) and (9) above, the optimal tax rate is given by

$$\tau^* = [\beta_P(1-\delta_1)]^{\frac{1}{1+\zeta}} + [\gamma_P(1-\delta_2)]^{\frac{1}{1+\zeta}} \,. \qquad (10)$$

The optimal share of the two public services from a welfare-maximising point of view is obtained by combining equations (3), (8), (9) and (10), to obtain

$$\left(\frac{g_1}{g_2}\right)^* = \frac{\phi^*}{1-\phi^*} = \left(\frac{\beta_P(1-\delta_1)}{\gamma_P(1-\delta_2)}\right)^{\frac{1}{1+\zeta}} \,. \qquad (11)$$

This shows that the ratio of optimal shares of spending in the two sectors equals the ratio of net productivities in the two sectors.

Finally, one can derive an expression for the growth rate that could be achieved in this set-up. This optimal growth rate expression can be obtained by combining equation (6) with equations (10) and (11), and is given by

$$\lambda^* = \frac{\alpha^{-1/\zeta}[1-\{\beta_P(1-\delta_1)\}^{1/(1+\zeta)} - \{\gamma_P(1-\delta_2)\}^{1/(1+\zeta)}]^{(1+2\zeta)/\zeta} - \rho}{\sigma} \,. \qquad (12)$$

As is expected, when the government pursues welfare-maximising fiscal policy, the growth rate of the economy depends on the net productivities of the two types of public goods. So, there are interesting implications for policy when we consider the cases where the pure productivities of public goods which impact on the growth rate via the government spending ratios, and also on the effects of corruption on the growth rate. This is shown in the section below.

2.2. Comparative-statics effects

In this section, we first study how the optimal growth rate (λ^*), responds to a change in the pure productivity parameters, β_P and γ_P.

First, from equation (12), we find $d\lambda^*/d\beta_P$ and $d\lambda^*/d\gamma_P$.

Clearly, $\frac{d\lambda^*}{d\beta_P} \;>\; (<)\; 0 \quad \text{if} \quad \beta_P(1-\delta_1) \;>\; (<)\; \gamma_P(1-\delta_2)$. (13a)

Similarly, $\frac{d\lambda^*}{d\gamma_P} \;<\; (>)\; 0 \quad \text{if} \quad \beta_P(1-\delta_1) \;>\; (<)\; \gamma_P(1-\delta_2)$. (13b)

What expression (13a) tells us is that if the pure productivity of g_1 rises (which is proportional to the share of the first public good in overall tax revenue), then this will raise the economy's growth rate only if the productivity net of corruption in sector 1 is higher than that of sector 2. But if corruption erodes the productivity of sector 1 to the extent that the productivity net of corruption in this sector is lower than the net productivity of sector 2 to start with, then a higher pure productivity of g_1 will actually lower the growth rate of the economy. The intuition behind this result is that in an optimal fiscal policy set-up, where the shares of expenditure devoted to the different public goods are directly linked to the productivities, being *per se* more productive ($\beta_P > \gamma_P$) is not enough; the economy will grow at a higher rate if productivity *net of corruption* is higher in this sector, i.e., $\beta_P(1-\delta_1) > \gamma_P(1-\delta_2)$. If this is not the case, then it is better to shift resources towards the sector where productivity net of corruption is higher.

This also explains why, in (13b), higher γ_P could result in lower growth. Clearly, the government should channel its spending to the sector with the overall higher productivity net of corruption, even if the pure productivity of the other sector rises. So, it is important to identify which in reality is the sector that is more productive after taking into account the effect of corruption.

Next, from equation (12), we find $d\lambda^*/d\delta_1$ and $d\lambda^*/d\delta_2$:

Clearly, $\frac{d\lambda^*}{d\delta_1} \;<\; (>)\; 0 \quad \text{if} \quad \beta_P(1-\delta_1) \;>\; (<)\; \gamma_P(1-\delta_2)$. (14a)

Similarly, $\frac{d\lambda^*}{d\delta_2} \;>\; (<)\; 0 \quad \text{if} \quad \beta_P(1-\delta_1) \;>\; (<)\; \gamma_P(1-\delta_2)$. (14b)

The results demonstrate that although corruption *per se* is bad in the sense that it reduces the productivity of all types of public spending, higher corruption in the more (less) efficient sector, i.e., where net productivity of the public good is higher (lower) would reduce (enhance) growth. Thus, if $\beta_P(1-\delta_1) \;>\; \gamma_P(1-\delta_2)$, a larger value of δ_1 (which is the corruption associated with the more productive sector) is bad for growth, as this would erode the productivity of the relatively more efficient sector. This condition is given by (14a). Looking at it from another angle, if corruption in sector 1 gives the incentive to the government to switch spending to sector 2, which is the sector that is less productive overall, the effect on growth would be adverse.

By contrast, as (14b) shows, a higher value of δ_2 (which represents a higher level of corruption in sector 2) would increase the economy's growth rate if the net productivity of sector 1 is higher than that of sector 2. This is because optimal fiscal policy would dictate that government expenditure be channelled to the sector where net productivity is higher, and higher corruption in the less efficient sector (sector 2) would give the government the incentive to do exactly that. Here corruption in sector 2 could encourage the government to apportion more of its spending towards sector 1. But this would only increase growth if the net productivity of sector 1 is higher than sector 2. If $\beta_P(1-\delta_1) > \gamma_P(1-\delta_2)$ in (14b) above, then this is, indeed, the case; hence, a higher value of δ_2 would increase the growth rate. So, although this result may seem surprising in the context of a one-sector growth model, it can be rationalised in a framework that focuses on the composition of government expenditure and optimal growth via a sectoral analysis of the effects of corruption on growth.

3. Conclusion and Policy Implications

This paper adds to the literature on optimal fiscal policy within an endogenous growth framework by introducing corruption in the different components of government spending (for example, capital and current spending), when one of the components is *a priori* more productive than another. Corruption is modelled analytically through a parameter that reduces the productivity of such spending. It is important to note that even if capital spending is *per se* more productive than current spending, increasing its share will be counterproductive to growth prospects if its productivity, net of corruption, is lower than for current spending. Such a situation would induce an optimising government to switch its spending in favour of current spending, which would favour growth because of the higher overall productivity of the latter. So, in a two-sector set-up, corruption in the less productive sector can be growth-enhancing due to the channelling of resources to the more efficient sector, even though corruption *per se* does not "grease the wheels" of growth, and this result can be generalised to a multi-sector set-up as well. This result, though intuitive, is not obvious, and could add an interesting dimension to the debate on the optimal composition of public spending in the presence of corruption.

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