Where Has All the Money Gone? Foreign Aid and the Quest for Growth*

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Abstract

We attempt to explain a puzzling phenomenon in empirical studies that find no systematic relationship between foreign aid and economic growth. Two alternative behavioral explanations, namely fungibility and rent-seeking, are examined in the context of an endogenously growing open economy. The composition of foreign aid plays a crucial role in determining the magnitude of both fungibility and rent-seeking and, consequently, their impact on growth. Investment aid is shown to be more fungible than non-investment aid, which leads to a reduction in productive public spending in the recipient economy, thereby offsetting any positive impact that aid might have on growth. By contrast, the incentive to extract rents is higher from non-investment aid than from investment aid. We illustrate scenarios where, in the presence of rent-seeking, long-run growth may be positively, negatively, or not correlated with foreign aid.

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1 Introduction

The apparent inability of foreign aid in affecting growth and development in the Third world has emerged as a challenging puzzle to both economists and policy-makers. At the same time, the demand for aid in the developing world has increased rapidly, especially in light of the staggering and persistent disparities in per-capita incomes and standards of living across countries. During 1975-2000, foreign aid, in the form of Official Development Assistance (ODA), made up for 3-5 percent of Gross National Income, accounted for 53.8 percent of central government expenditures, and financed between 10-20 percent of gross capital formation in the 50 most aid-dependent countries, (World Bank, 2004). However, despite large and persistent doses of development assistance, economic growth and standards of living have been largely unaffected in the poorest countries, and have even stagnated in many cases. A stark example can be seen in Africa, where incomes and growth in the most aid-dependent countries have actually declined over 1960-2000 (Easterly, 2001).

The ultimate objective of any foreign aid program is to promote investment and growth, help eradicate poverty, and enhance social well-being. However, the picture that has emerged over the past five decades is anything but encouraging. The apparent “failure” of foreign aid in alleviating economic problems in the Third world has led to an increase in “aid fatigue” and skepticism amongst donors, as governments in the donor community question whether aid programs are indeed a waste of national resources. At the same time, the World Bank, in its Millennium Development Goals Program, has pledged to reduce world poverty in half by 2015 and has urged donors to increase their allocations of aid to developing countries.

In this paper, we examine two behavioral aspects of aid-recipient economies that might potentially offset the positive impact that foreign aid is intended to have on growth and macroeconomic performance: fungibility and rent-seeking. These phenomena typically arise in circumstances where monitoring the actual disbursement of aid in the recipient country is prohibitively costly for the donor; see Clements et al. (2004). Fungibility arises when
the marginal dollar of aid ends up financing the provision of a public good that it was not intended to finance. In other words, foreign aid relaxes the recipient government’s budget constraint by substituting, rather than supplementing, domestic spending. This may lead to a reduction in domestic public spending or revenue generation in the recipient economy, thereby offsetting the positive impact of aid. On the other hand, the existence of weak institutions in the recipient economy can give rise to rent-seeking, a phenomenon that can make foreign aid ineffective and, in some cases, detrimental to growth. Rent-seeking refers to an economic activity whereby powerful social groups or public officials have access to a common pool of public resources (such as foreign aid) earmarked, say, for investment, which provides them with the incentive to appropriate such resources for private consumption. These two phenomena, while widely prevalent in the developing world, have scarcely been studied in an intertemporal context. By embedding these behavioral responses in a general equilibrium model of endogenous growth, we seek to provide a better understanding of the “missing link” between foreign aid, growth, and development.

The link between aid and growth has been one of the most under-researched areas of economic development and economists have only recently started paying attention to this issue. A number of empirical papers since the mid-1990s have gradually changed the initial enthusiasm and optimism surrounding aid programs into concern and skepticism. Notable among these is Boone (1996), who found that foreign aid has had no significant impact on the prominent indicators of development and quality of life. Easterly (1999) paints a much bleaker picture, reporting that an increase in foreign aid has actually led to a decline in growth rates in many recipient countries. The influential work of Burnside and Dollar (2000) argues that aid works only in economic environments that are characterized by “good” policymaking by recipient governments. Thus, their results call for greater selectivity from donors when designing aid programs. However, some recent papers, including Hansen and Tarp (2001), Dalgaard and Hansen (2001), and Easterly (2003) have argued that the Burnside-Dollar results are not robust to alternative definitions of aid, growth, and good policies.
On the other hand, the empirical literature on foreign aid has been severely constrained by the lack of a comprehensive theoretical framework within which one can understand the mechanism by which foreign aid might impact growth. A majority of the aid programs in the 1960s and 1970s were developed using the static “two-gap” model of Chenery and Strout (1966), which had little, if any, intertemporal ramifications. Recently, in a series of papers, Chatterjee et al. (2003) and Chatterjee and Turnovsky (2005, 2006) have developed a general equilibrium endogenous growth framework within which the dynamic effects of aid can be analyzed. Their analysis suggests that the positive impact of aid depends crucially on (i) the restrictions imposed by the donor on how aid must be spent, (ii) the recipient’s structural conditions, as embodied by the input-flexibility of the production sector, access to capital markets, the size of the government, and the choice between labor and leisure, and (iii) the duration of the aid program. However, these theoretical contributions do not account for responses such as fungibility or rent-seeking in the recipient economy and, consequently, cannot explain why an increase in aid could be associated with a decline in growth.

From an empirical point of view, there have been some attempts to study the behavioral link between aid and macroeconomic performance. Several authors have focused on the fungibility problem in aid-receiving countries by trying to determine the response of domestic public spending to an increase in foreign aid. However, there is no consensus on the exact magnitude and importance of fungibility. Pack and Pack (1990, 1993) find that while foreign aid to Indonesia does not seem to be fungible, the opposite is true for the Dominican Republic, where they observe major shifts in public spending away from development expenditures into deficit reduction and debt service. Examining inter-governmental transfers in India, Swaroop et al. (2000) find evidence that foreign aid disbursements typically finance activities that are very different from the intentions of donors. Aggregate studies also differ in their conclusions about fungibility. For example, Feyzioglu et al. (1998), using annual data for 14 developing countries that span over 1971-90, find that foreign aid is not fungible and is also not associated with tax relief. On the other hand, a recent study by Gupta et
al. (2003) finds that while concessional loans are not fungible and generate higher domestic resource mobilization, grants do indeed reduce revenue generation in recipient countries.

The empirical literature on rent-seeking and foreign aid is also very sparse. Svensson (2000) finds evidence that foreign aid and windfall gains in developing countries are, on average, associated with higher corruption. In another contribution, Alesina and Weder (2002) report that donors often do not pay attention to corruption in recipient countries, and the most corrupt countries turn out to be the largest recipients of foreign aid. Therefore, while there may be evidence to suggest that foreign aid may be associated with fungibility and rent-seeking, the current empirical literature provides no insight into the underlying mechanism and causality, or the ultimate impact of these phenomena on economic growth.

The main objective of this paper is to analyze the mechanism through which fungibility and rent-seeking might impact growth in a small open economy that is also a recipient of foreign aid. The contribution of our results are two-fold. First, we show that the problem of fungibility arises only when the recipient economy’s government chooses to respond optimally to the inflow of foreign aid. We derive a crucial link between the magnitude of fungibility and the composition of foreign aid. We find that if aid is ear-marked for a public investment good, then it results in a proportionate reduction in domestic government investment spending, thereby implying full fungibility. On the other hand, aid that is ear-marked for a public consumption good is only partially fungible, leading to a less-than proportionate adjustment of domestic spending. Further, fungibility can be accompanied by a reduction in revenue-generating efforts by the recipient government. This domestic re-allocation of resources completely offsets any positive effect that the foreign aid flow might have had on growth. This result is consistent with the huge body of empirical work that has been unable to find any systematic relationship between aid and growth. Second, we show that the composition of aid is also an important determinant of rent-seeking behavior which, in turn, can drive a wedge between the aid-growth link. The allocation of time between productive work and
rent-seeking depends crucially on the marginal benefits and costs, which in turn depend on whether foreign aid is being targeted for investment or non-investment purposes. We show that the larger is the fraction of foreign aid ear-marked for non-investment purposes, the higher is the incentive for rent-seeking. Using some simple numerical examples, we illustrate scenarios where foreign aid may be positively, negatively, or not correlated with long-run growth. This is an interesting result, since it might provide an explanation for the observed decline in growth rates in Africa in periods when foreign aid flows to the region were on the rise (Easterly, 1999).

The rest of the paper is organized as follows. Section 2 lays down the analytical framework of the model and examines the consequences of fungibility. Section 3 introduces rent-seeking behavior and illustrates the possibility of foreign aid having a detrimental effect on the recipient economy. Finally, section 4 concludes.

2 Aid and Fungibility

We consider a representative agent who maximizes intertemporal utility from a private consumption good, $C$, and a public consumption good, $G_C$, over an infinite horizon

$$U = \int_0^\infty \frac{1}{\gamma} (C G_C^\theta) e^{-\beta t} dt, \quad -\infty < \gamma < 1, \; \theta(1 - \theta \gamma) > 0 (1)$$

$\theta$ denotes the relative weight of the public consumption good in the utility function. The agent produces output using her stock of private capital, $K$, and the flow of services from a public investment good, such as infrastructure, $G_I$, through a neoclassical production function

$$Y = G_I^\eta K^{1-\eta}, \; 0 < \eta < 1 \quad (2)$$

The accumulation of private wealth is subject to the following flow budget constraint
\[
\dot{K} = (1 - \tau)Y - C - T
\]  

(3)

where \(\tau\) is the income tax levied by the government and \(T\) denotes lump-sum taxes. The government provides the two public goods \(G_C\) and \(G_I\), and finances their provision using income tax revenues and a flow of foreign aid, \(F\). We will assume that the government maintains a balanced budget at all points of time:

\[
G_c + G_I = \tau Y + F + T
\]  

(4)

In order to maintain an equilibrium of sustained growth, all variables must be tied linearly to the scale of the economy, given by the underlying stock of private capital.

We will assume that both the public goods are co-financed, using a mix of domestic revenues and foreign aid:

\[
G_I = G_I^d + \phi F = (g_I^d + \phi \varepsilon) K
\]  

(5a)

\[
G_c = G_c^d + (1 - \phi) F = [g_c^d + (1 - \phi) \varepsilon] K
\]  

(5b)

where \(G_I^d\) and \(G_c^d\) represent domestic government investment in the public investment and consumption goods, respectively, while \(g_I^d\) and \(g_c^d\) are the respective domestic expenditure ratios. The foreign aid-private capital ratio is given by \(\varepsilon\) and \(\phi\) \((0 \leq \phi \leq 1)\) denotes the composition of aid.\(^1\) In other words, a proportion \(\phi\) of the total foreign aid flow is ear-marked by the donor for the public investment good and \((1 - \phi)\) is the corresponding allocation meant for the public consumption good. In that sense, \(\phi \varepsilon\) can be thought of as "investment aid", while \((1 - \phi) \varepsilon\) can be thought of as "consumption" or "non-investment" aid. Note that the

\(^1\)The model we develop can be thought of as a reduced form “AK” endogenous growth model, as in Romer (1986). Typically, in these models all growing variables are tied to the flow of output, \(Y\). However, since \(Y\) is linearly dependent on the private capital stock, \(K\), we use the reduced form version without any loss of generality.
allocation parameter is exogenous to the recipient economy, as it is determined by the donor.

Combining (3) and (4), we get the economy’s resource constraint

\[ \dot{K} = Y - C - G_c - G_I + F \]  

(6)

From the government’s point of view, the equilibrium resource allocation in response to a foreign aid shock can depend on two potential scenarios. One possibility is that the government remains passive and does not alter its own expenditures or tax rates. In this case, foreign aid is not fungible. This may happen if the donor is able to impose financing constraints or co-financing commitments on the recipient. Another possibility is that the government responds to the foreign aid shock optimally, by adjusting its own expenditures and taxes. In this case, aid is fungible. Our objective is to compare the equilibrium outcomes in the two scenarios and determine the relationship between the composition of foreign aid, government spending, and long-run growth.

2.1 Non-Fungible Aid

The agent maximizes (1) subject to (2) and (3), taking the two public goods, the foreign aid flow and its allocation, and the tax rate as given. The expenditure and tax parameters are arbitrarily set and do not change on the incidence of a foreign aid shock. The (balanced) growth rate (\( \tilde{\psi} \)) and the consumption-capital ratio (\( \mu \)) in equilibrium are then given by

\[ \tilde{\psi} = \frac{(1 - \tau)(1 - \eta)(g_d^f + \phi \varepsilon)^\eta - \beta}{1 - \gamma} \]  

(7a)

\[ \frac{C}{K} = \mu = \frac{[(1 - \gamma) - (1 - \tau)(1 - \eta)](g_d^f + \phi \varepsilon)^\eta - (1 - \gamma)(g_d^I + g_d^c) + \beta}{1 - \gamma} \]  

(7b)

It is immediately evident from (7a) and (7b) that as long as \( 0 < \phi \leq 1 \), an increase in aid (represented by an increase in \( \varepsilon \)) will increase both the equilibrium growth rate and the
consumption-capital ratio:\footnote{Results (8a) and (8b) hold under the mild restriction that $(1 – \gamma) > (1 – \eta)(1 – \tau)$.}

\[
\frac{\partial \psi}{\partial \varepsilon} = \frac{\phi \eta (1 – \eta)(1 – \tau)(g_I^d + \phi \varepsilon)^{\eta-1}}{1 – \gamma} > 0 \quad (8a)
\]

\[
\frac{\partial \mu}{\partial \varepsilon} = \frac{\phi \eta [(1 – \gamma) – (1 – \tau)(1 – \eta)](g_I^d + \phi \varepsilon)^{\eta-1}}{1 – \gamma} > 0 \quad (8b)
\]

Note that the effect of an aid shock is proportional to the allocation parameter $\phi$. When $\phi = 0$, i.e., aid is completely tied to the public consumption good, it has no impact on the macroeconomic equilibrium. On the other hand, the larger is the proportion of investment aid, larger is its positive impact on equilibrium growth and consumption. The intuition here is that investment aid, by increasing the allocation of resources to the public investment good (given that domestic spending ratios remain unchanged), enhances the productivity of private capital, thereby leading to higher private capital accumulation and growth in equilibrium. This is the standard result in most of the theoretical literature, which argues in favor of tying foreign aid to investment spending; see Chatterjee et al. (2003).

However, even though the results in (8) are plausible and serve as a useful benchmark, they are usually not supported by empirical evidence. Given the high cost to donors of monitoring the implementation of aid programs and their allocation, it is entirely plausible that the recipient government treats the aid flow not as a supplemental source of financing public goods, but rather as a substitute for domestic revenues, and adjusts its own expenditure and tax parameters in response to the aid shock. In that case, the domestic expenditure ratios $g_I^d$ and $g_c^d$ are no longer exogenous. This is the idea of fungibility, to which we now turn.

\section*{2.2 Fungible Aid}

When aid is fungible, the government optimally adjusts its own expenditure and tax parameters in response to the aid shock. The government’s problem then is to maximize
(1) subject to (2), (3), its own budget constraint (4) and the financing constraints (5a) and (5b). The government takes the private allocation decisions in (7) as given, and chooses the domestic expenditure rates, \( g^d_I \) and \( g^d_c \), for the two public goods, respectively. Given the magnitude of the aid shock, \( \varepsilon \), and lump-sum taxes, \( T \), the optimal tax rate is automatically determined from (4).

The optimal rates of domestic expenditure on the public investment and consumption goods, \( g^d_I \) and \( g^d_c \), are given by

\[
\hat{g}^d_I = \eta \frac{1}{1 - \gamma} - \phi \varepsilon \tag{9a}
\]

\[
\hat{g}^d_c = \frac{1}{1 + \theta} \left[ \theta \left\{ \frac{(1 - \gamma) - (1 - \tau)(1 - \eta))\eta^{1-\eta}}{1 - \gamma} + \beta - \hat{g}^d_I \right\} - (1 - \phi) \varepsilon \right] \tag{9b}
\]

From (9a) we see that aid ear-marked for investment is indeed fungible. Domestic spending on the public investment good declines in proportion to the inflow of investment aid (as long as \( \phi > 0 \)), thereby indicating that aid allocated for investment merely substitutes for domestic spending:

\[
\frac{\partial \hat{g}^d_I}{\partial \varepsilon} = -\phi < 0
\]

On the other hand, the change in domestic spending on the consumption good in response to a foreign aid shock is less clear:

\[
\frac{\partial \hat{g}^d_c}{\partial \varepsilon} = \phi - \frac{1}{1 + \theta}
\]

The response of domestic spending on the public consumption good to an aid shock depends on the relationship between the marginal contribution of investment aid, \( \phi \), and the relative importance of the public consumption good in utility, \( \theta \). Consumption is aid is fungible too, but only partially. To see this, consider the case when the entire aid is tied to
the public consumption, i.e., $\phi = 0$. Now,

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = -\frac{1}{1+\theta} < 0$$

The increase in foreign aid leads to a reduction in domestic spending on the consumption good, but less than proportionately, i.e., $|\partial \hat{g}_c^d| < |\partial \varepsilon|$. The partial fungibility of consumption (non-investment) aid is due to the fact that the public consumption good yields direct utility benefits to the representative agent as opposed to the public investment good, whose benefits are realized only indirectly (through higher output). This prevents a one-for-one decline in public consumption spending. On the other hand, if $\phi = 1$, (aid is ear-marked only for the investment good), the inflow of aid, being fully fungible, finances an increase in the spending on the public consumption good on the margin, but less than proportionately, as $0 < \frac{\partial \hat{g}_c^d}{\partial \varepsilon} < 1$. When aid is allocated to both public goods $(0 < \phi < 1)$, spending on the public consumption good rises only if $\phi > 1/(1+\theta)$, i.e., the allocation of aid to the public investment good increases the valuation of the public consumption good on the margin.

The obvious question that comes up at this juncture is how does an increase in foreign aid affect total government spending in an economy? To see this, we begin by defining total public expenditures (scaled by the aggregate capital stock), which include domestic spending on the two public goods, given by (9a) and (9b), as well as foreign aid:

$$\tilde{g} = \hat{g}_f^d + \hat{g}_c^d + \varepsilon$$

(10)

Differentiating (10) with respect to the foreign aid parameter, $\varepsilon$, while taking into account (9a) and (9b), we get

$$\frac{\partial \tilde{g}}{\partial \varepsilon} = \frac{\theta}{1+\theta} < 1$$

(10a)

The result in (10a) is a formal statement of fungibility. It states that when aid is fungible, total public expenditures (including foreign aid) rise less than proportionately. This indi-
cates that foreign aid *substitutes* for domestic spending, rather than supplementing it. Note that when aid is not fungible, i.e., \( g^d_c \) and \( g^d_I \) are constant, then \( \partial \bar{q} / \partial \varepsilon = 1 \), implying that if the government does not reallocate domestic expenditures in response to the aid flow, total expenditures should increase one-for-one with foreign aid.

Finally, to examine the effect of aid on the equilibrium growth rate when it is fungible, substitute for \( \hat{g}^d_c \) and \( \hat{g}^d_I \) in (7a):

\[
\bar{\psi} = \frac{(1 - \tau)(1 - \eta)\eta^{1-\eta} - \beta}{1 - \gamma}
\]

(11)

From (11), we see that when foreign aid is fungible, the equilibrium growth rate is independent of foreign aid and its allocation. Therefore, an aid shock, irrespective of whether it is targeted for investment or consumption (or both) will have no impact on long-run growth. On the contrary, given the government’s allocation decisions in response to the aid flow, the consumption-capital ratio increases, indicating that the decline in domestic spending on public goods is, in some way, rebated back to the private sector in the form of higher private consumption. This rebate could take the form of a lump-sum transfer or a cut in taxes, both of which would lower government revenues. Many empirical studies such as Pack and Pack (1993) and Gupta et al. (2003) document a similar result. However, the domestic substitution away from public spending is welfare-enhancing for the economy, even though long-run growth remains unaffected. To see this, substitute the optimal domestic spending ratios in (9a) and (9b) into (7b) and differentiate with respect to \( \varepsilon \):

\[
\frac{\partial (C/K)}{\partial \varepsilon} = \frac{1}{1 + \theta} > 0
\]
3 Aid and Rent-Seeking

We will now extend the model described in section 2 to include rent-seeking behavior. Suppose that there are $n \geq 1$ powerful identical social groups or public officials, each indexed by $i$, who intratemporally allocate one unit of time between "productive" work, $l_i$, and "unproductive" work, $1 - l_i$. Productive work entails combining raw labor with the flow of services from the public investment good to yield labor efficiency units, which then interact with private capital to produce output:

$$Y_i = (l_i G_I)^\eta K^{1-\eta}$$ (12)

Unproductive work is reflected in "rent-seeking", whereby each social group uses the $1 - l_i$ units of time to appropriate resources from the inflow of foreign aid, $F$. Following Tornell and Velasco (1992) and Svensson (2000), we assume that this rent-seeking behavior is subject to a negative externality as each group, in its appropriative activity, fails to internalize the effect of all other groups performing the same activity.\footnote{This type of rent-seeking activity can be thought of as being subject to diminishing returns. An alternative specification, which gives similar results, is one where such activity is subject to increasing returns, as in Murphy et al. (1993) and Mauro (2004).} This makes rent-seeking from public funds a costly activity, as the rents accruing to each group are only a fraction of the aggregate rents extracted. Therefore, the income of each group from rent-seeking is given by

$$Y_i^R = (1 - l_i)\Phi(R)F, \quad \Phi'(R) < 0, \quad \Phi''(R) < 0$$ (13)

where $\Phi(R)$ represents the aggregate rent-seeking technology, which depends on the economy-wide allocation of time to appropriative activities, $R$, and is subject to diminishing returns. Note that aggregate rent-seeking, $R$, is related to individual allocations by

$$R = \sum_i (1 - l_i)$$ (13a)
Therefore, given (12) and (13), we can interpret $\Phi(R)F$ as the fraction of foreign aid that accrues to social groups as rents, while $Y_i^R$ denotes the proportion of these appropriated resources that is extracted by an individual group or agent $i$. Therefore, the aggregate amount of aid that fails to reach its intended use is given by

$$\sum_i (1 - l_i)\Phi(R)F = R\Phi(R)F$$

However, in performing its allocation decisions, each individual group takes the rent-seeking technology, $\Phi(R)$, as exogenously given and therefore fails to internalize (13), which makes rent-seeking a costly activity.

The representative social group is constrained by the following budget constraint

$$\dot{K} = (1 - \tau)Y_i + Y_i^r - C_i - T$$

(14)

The government finances the provision of the public investment and consumption goods by using a combination of domestic revenues and foreign aid. However, resources intended for each public good is now subject to rent-seeking from foreign aid:

$$G_I = G_I^d + [1 - R\Phi(R)]\phi F = [g_I^d + \{1 - R\Phi(R)\}\phi\varepsilon]K$$

(15a)

$$G_c = G_c^d + [1 - R\Phi(R)](1 - \phi)F = [g_c^d + \{1 - R\Phi(R)\}(1 - \phi)\varepsilon]K$$

(15b)

As before, the government continuously maintains a balanced budget by appropriately choosing the income and lump-sum tax parameters, given its expenditures and receipt of foreign aid:

$$G_I + G_c = \tau Y + T + [1 - R\Phi(R)]F$$

(16)

Combining (14) and (16), and aggregating across all social groups yields the aggregate re-
source constraint for the economy

\[ \dot{K} = Y - C - G_c - G_I + F \]  

(17)

Each social group maximizes the intertemporal utility function (1), subject to (14), (12) and (13). Since all social groups behave identically in equilibrium, we must have \( C_i = C \), and \( l_i = l \), for all \( i \). Therefore, \( R = 1 - l \). Further, for simplicity, we normalize \( n = 1 \). The equilibrium allocation yields the following relationships

\[
\eta(1 - \tau)(1 - \tilde{R})^{\eta-1}[g^d_i + \{1 - \tilde{R}\Phi(\tilde{R})\phi\varepsilon\}^{\eta} = \varepsilon\Phi(\tilde{R}) \tag{18a}\n
\]

\[
\tilde{\psi} = \frac{(1 - \eta)(1 - \tau)}{1 - \gamma} \left[ (1 - \tilde{R})\{g^d_i + (1 - \tilde{R}\Phi(\tilde{R}))\phi\varepsilon\} \right]^{\eta} - \beta \tag{18b}\n
\]

\[
\tilde{\mu} = \frac{1}{1 - \gamma} \left[ \left( 1 - \gamma - (1 - \tau)(1 - \eta) \right) \left[ (1 - \tilde{R})\{g^d_i + (1 - \tilde{R}\Phi(\tilde{R}))\phi\varepsilon\} \right]^{\eta} + \beta \right) \tag{18c}\n
- \left[ g^d_i + g^d_c - \tilde{R}\Phi(\tilde{R})\varepsilon \right]

Equation (18a) describes the equilibrium allocation of time to rent-seeking, \( \tilde{R} \). In allocating effort between productive work and rent-seeking, the representative social group balances the marginal benefit from productive work, given by the left-hand side of (18a), with the opportunity cost, measured in terms of rents foregone, i.e., the aggregate amount of foreign aid available for appropriation, given by the right-hand side. Given \( g^d_i \), and an explicit rent-seeking technology, \( \Phi(,) \), (18a) can be solved for the equilibrium allocation of effort or time between rent-seeking (\( \tilde{R} \)) and productive work (\( \tilde{l} = 1 - \tilde{R} \)). Given the solution for \( \tilde{R} \), (18b) and (18c) can be immediately solved for the equilibrium growth rate and the consumption-capital ratio, respectively.
To get explicit solutions for $\tilde{R}$, $\tilde{\psi}$, and $\tilde{\mu}$, we will need an explicit functional form for the rent-seeking technology, $\Phi(\tilde{R})$. However, given our assumption that rent-seeking is a costly activity (declining in $\tilde{R}$) and subject to diminishing returns, equations (18a)-(18c) will involve higher-order polynomials and therefore cannot be solved analytically. However, given specifications for the structural and policy parameters, we can easily solve for the equilibrium numerically. The next sub-section, therefore, provides some numerical illustrations of the impact of foreign aid on the choice between productive and unproductive work and its consequences for long-run growth.

### 3.1 Some Numerical Examples

To evaluate the predictions of the theoretical model developed in Section 3, we will need a specific functional form for the rent-seeking technology, $\Phi$. One such specification, that is consistent with our assumptions is

$$\Phi(R) = \frac{b}{\tilde{R}} = \frac{b}{1 - \tilde{l}}, \quad 0 < b \leq 1$$

(19)

The parameter $b$ in (19) can be thought of as an exogenous indicator of the aggregate cost of rent-seeking, which could be influenced by political factors in the economy, such as institutions and law and order. Therefore, smaller values of $b$ indicate that rent-seeking is very costly, while larger values indicate that rent-seeking is more attractive to social groups. The functional form in (19) is related to the idea of appropriative competition from a common pool of resources, and is based on the work of Dasgupta and Heal (1979) and Tullock (1980). More recently, Svensson (2000) uses a special case of (19), where $b = 1$.\(^4\)

Our choice of the structural and policy parameters that characterize the benchmark economy are given by:

\(^4\)Seen Drazen (2000) for a survey of this literature.
The preference parameters $\beta$ and $\gamma$ are chosen to yield an intertemporal elasticity of substitution in consumption of 0.4, consistent with the findings of Ogaki and Reinhart (1998). The choice for the output elasticity of public investment, $\eta$, lies in the empirically estimated range of 0.1 – 0.3; see Gramlich (1994). Since we do not have any empirical evidence on the exogenous cost parameter, $b$, we vary it between 0 and 1, to isolate its effects on growth and rent-seeking. The choice of the tax and domestic expenditure parameters are taken from Turnovsky (2004), though we are not calibrating a real economy. The foreign aid-private capital ratio, $\varepsilon$, is assumed to be about 0.1, which is in the lower end of the range reported in Svensson (2000) and World Bank (2004). Finally, since we are interested in the relationship between the composition of aid and the incentives for rent-seeking, we allow the aid allocation parameter, $\phi$, to vary from 0 (aid ear-marked only for government consumption) to 1 (aid ear-marked only for government investment).

Table 1 reports the benchmark equilibrium values for the allocation of time to rent-seeking and the long-run growth rate and their sensitivity to (i) the composition of foreign aid ($\phi$), and (ii) the cost parameter ($b$).

<table>
<thead>
<tr>
<th>$b$</th>
<th>$\phi = 0$</th>
<th>$\phi = 0.5$</th>
<th>$\phi = 1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$\tilde{R}$</td>
<td>0.1288</td>
<td>0.1436</td>
</tr>
<tr>
<td>0.5</td>
<td>0.38</td>
<td>0.1157</td>
<td>0.1237</td>
</tr>
<tr>
<td>1</td>
<td>0.57</td>
<td>0.1065</td>
<td>0.1065</td>
</tr>
</tbody>
</table>

The results in Table 1 provide some interesting insights into the relationship between rent-seeking and growth in the presence of foreign aid. First, given the allocation parameter,
\( \phi \), if rent-seeking is less costly (i.e., an increase in \( b \)), it increases unproductive work and lowers growth in equilibrium. On the other hand, given the cost parameter, \( b \), an increase in the allocation of aid to public investment lowers rent-seeking and raises the long-run growth rate. For example, when \( \phi = 0.5 \) and \( b = 0.5 \), the equilibrium allocation of time to rent-seeking is 36 percent and the growth rate is 12.37 percent. If \( b \) increases to 1 from this point, then rent-seeking increases to 57 percent and growth falls to 10.65 percent in equilibrium. On the other hand, starting with \( \phi = b = 0.5 \), if \( \phi \) increases to 1 (all aid is targeted towards public investment), rent-seeking falls to 35 percent, while equilibrium growth increases to about 13 percent. The intuition behind these results can be explained as follows. For a given allocation of aid between the two public goods, an increase in \( b \) makes rent-seeking less costly to each social group. This lowers the marginal return from productive work relative to unproductive work by making the "common pool" of resources (foreign aid) more vulnerable to appropriative competition. As a result, each social group reduces productive work in favor of rent-seeking. As rents are extracted from the aid funds, it has two detrimental effects on the economy: first, the economy’s spendable resources for the public investment good declines, and second, the decline in productive work lowers the marginal product of private capital. The combined effect of these factors leads to a lower growth rate in equilibrium. By contrast, for a given level of \( b \), if the allocation of aid to investment (\( \phi \)) increases, it increases not only the marginal product of private capital, but also the return from productive work. As a result, each social group reduces rent-seeking and, by consequence, increases the amount of aid that is invested in equilibrium, thereby raising the equilibrium growth rate.

Another interesting aspect of Table 1 is that when \( b = 0 \), i.e., rent-seeking is prohibitively costly, each social group allocates 100 percent of its time to productive work (\( \bar{R} = 0 \)) and the equilibrium growth rate increases as donors allocate more aid to public investment. On the other hand, when \( b = 1 \), rent-seeking and the equilibrium growth are insensitive to the composition of aid. This happens because the fraction of foreign aid available for investment,
1 − \( \tilde{R} \Phi (\tilde{R}) \) = 0 when \( b = 1 \). Therefore, aggregate rent-seeking is at a maximum at this point, and the equilibrium growth rate is independent of foreign aid or its composition.

Table 2 reports the long-run changes in rent-seeking and growth when the economy experiences a rise in its foreign aid receipts, with \( \varepsilon \) increasing from its benchmark value of 0.1 to 0.2. As in Table 1, we report the sensitivity of these long-run responses to the composition of aid and the institutional parameter.

<table>
<thead>
<tr>
<th>Table 2. Long-run Responses Following an Increase in Foreign Aid</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \phi = 0 )</td>
</tr>
<tr>
<td>( \tilde{R}(%) )</td>
</tr>
<tr>
<td>( b = 0 )</td>
</tr>
<tr>
<td>( b = 0.5 )</td>
</tr>
<tr>
<td>( b = 1 )</td>
</tr>
</tbody>
</table>

As in Table 1, we see that as long as \( b > 0 \), i.e., rent-seeking is not prohibitively costly, an increase in foreign aid will increase the allocation of time to rent-seeking and thereby decrease productive work in the recipient economy. This happens because an increase in aid increases the size of the "pie" from which competing social groups can appropriate rents. For example, when \( \phi = b = 0.5 \), the increase in foreign aid increases rent-seeking by about 17.5 percent. However, whether the increase in rent-seeking raises or lowers the equilibrium growth rate depends crucially on the composition of aid. For \( b = 0.5 \), when \( \phi = 0.5 \), it implies that aid is equally allocated between the public investment and consumption goods. In this case, an increase in aid with a similar allocation lowers long-run growth by 0.3 percent. But when \( \phi = 1 \), i.e., aid is ear-marked only for the public investment good, the growth rate actually increases by 0.07 percent, even though it is accompanied by an increase in rent-seeking. This happens because when rent-seeking is costly (\( 0 < b < 1 \)), competition among social groups fails to exhaust the total foreign aid resources. Further, since \( \phi = 1 \), any aid that is not extracted as rents automatically trickles down to public investment, which raises
the growth rate by partially offsetting the detrimental effects of rent-seeking. On the other hand, when \( \phi \) is low, say 0, all aid is allocated to the consumption good and therefore has no growth consequences. In this situation and increase in rent-seeking, by lowering productive work and the return to private capital, will unambiguously lower the equilibrium growth rate.

In summary, the results in Table 1 and 2 indicate that non-investment aid is subject to a higher degree of rent-seeking than investment aid, as long as \( 0 < b < 1 \). The allocation of time or effort between productive work and rent-seeking depends crucially on the marginal benefits and costs, given in (18a). The larger is the allocation of foreign aid to investment, higher is the opportunity cost of rent-seeking, in terms of intertemporal income foregone by reducing productive work. By contrast, since non-investment aid has no growth effects, the corresponding opportunity cost is lower. As a result, the larger is the fraction of foreign aid ear-marked for non-investment purposes, the higher is the incentive for rent-seeking. By the same intuition, the negative correlation between foreign aid and growth also also declines as the allocation of aid to investment increases. These examples clearly show why most empirical studies find no systematic relationship between aid and growth. The relationship between the composition of aid and rent-seeking drives a wedge between the aid-growth link and, depending on institutional factors, allows for possibilities where foreign aid may be positively or negatively correlated with growth.

4 Conclusions

In this paper, we have attempted to explain a puzzling phenomenon in empirical studies which find no systematic relationship between foreign aid and economic growth. We propose two alternative behavioral explanations, namely fungibility, which arises out of the recipient government’s reallocation of resources in response to aid, and rent-seeking, which arises in the presence of weak institutions in recipient countries, whereby social groups compete to
appropriate a common pool of public resources. We show how the composition of aid, often determined by donors, plays a crucial role in determining the magnitude of both fungibility and rent-seeking and, consequently, their impact on growth. We derive scenarios where long-run growth may be positively, negatively, or not correlated with foreign aid.

In particular, we find that when aid is fungible, the substitution away from government investment is higher than from government consumption. This leads to a reduction in revenue generating efforts on part of the recipient government and completely offsets any positive impact that aid might have had on growth. On the other hand, in countries characterized by rent-seeking, we find that the incentive to extract rents from foreign aid ear-marked for public consumption goods is higher than from aid ear-marked for public investment goods.

Given the rich set of theoretical hypotheses that comes out of the analytics, it is our contention that any model that tries to explain the link between aid and growth must be based on the foundations of political economy and must illustrate the mechanism by which corrupt activities such as rent-seeking or spending incentives of aid-recipient governments serve to mitigate the beneficial effects of aid on growth. To that effect, our paper does not argue for a cessation of aid flows to poor countries, but it rather emphasizes the need to urge developing countries to strengthen their institutions, policies, and monitoring of how aid is designed, allocated and invested.
References


