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SPECIAL INTEREST POLITICS
AND AID FUNGIBILITY

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AND AID FUNGIBILITY

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ABSTRACT

Special Interest Politics and Aid Fungibility*

We develop a political-economic model of aid fungibility. A donor country gives aid to a recipient government for the benefit of a target group. However, the recipient government accepts political contributions from a lobby group not targeted by the donor and transfers a fraction of the aid to the non-target group. The size of this fraction is determined endogenously in the political equilibrium in the recipient country. We examine how the donor's behaviour affects the equilibrium and how changes in the parameters of the model affect the total amount of aid and the proportion of it reaching the target group.

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NON-TECHNICAL SUMMARY

One of the important issues in the analysis of foreign aid is whether aid is used for the purposes it is provided by the donor. In the literature this is known as the issue of aid fungibility. A number of empirical studies have shown that redirection of aid does indeed occur and that it is very difficult for a donor country to control the final destination of aid provided by it. This fungibility of foreign aid has been blamed for the recent reductions in foreign aid budgets in many developed countries and as such it is important to analyse it.

The literature on the fungibility of foreign aid is only empirical. In understanding what creates fungibility, and thus what to do about it, the common approach usually assumes that the problem lies at the inability of the donor to enforce a contract in which the use of aid is specified. Possible solutions include developing better monitoring systems and in general actions that improve the enforcement of the contract. This approach, however, assumes that private agents in the recipient country have nothing to do with the fungibility of aid. As a consequence of this, the existing studies treat fungibility as an exogenous parameter, controlled entirely by the donor country.

In the present Paper we follow a different approach in which we try to endogenize the degree of fungibility. We model a situation where the reasons for fungibility are found in the recipient country and in particular in the political process that determines income distribution in the recipient country. We develop a model where the donor government gives aid for the benefit of the poor in a recipient country. However, an organized interest group lobbies the recipient government on behalf of the people (the rich) not targeted by the donor and diverts part of the aid from the target group. This diversion of aid from its intended purpose constitutes a form of fungibility which is controlled completely by the recipient government and which has not been examined in the literature. In specifying the political equilbrium in the recipient country, we follow the political contribution approach as this was specified in Dixit, Grossman and Helpman (JPE, 1997).

The behaviour of the donor government, however, is not unimportant. As the donor government controls the total amount of aid, it can influence the political process in the recipient country and thus the allocation of aid across groups, i.e. the degree of fungibility. We examine three types of donor: (i) remains passive, (ii) acts simultaneously (Nash) with the recipient government and (iii) acts in sequence with the recipient government. We compare the equilibrium allocation of aid and the total amount of aid across the three cases.

Interestingly enough, we find that a donor government that acts as a follower to the recipient government – i.e. it announces its reaction function before the recipient government decides on aid allocation – will benefit the poor in the recipient country more (the total amount of aid reaching the poor will be larger under a follower-donor than under a Nash-donor). Moreover, and under an intuitive and simple condition, this behaviour turns out to be to the advantage of the donor country (the total amount of aid given will be lower under a follower-donor than under a Nash-donor). The intuition for these results rests on the disciplinary effect that the (known) donor's reaction function has on the political process in the recipient country.

In this sense, this Paper explains the recent reduction of the total amount of foreign aid in terms of a political process in the recipient countries. In our model, while this reduction of foreign aid unambiguously hurts the recipient country as a whole, it is important to emphasize that it may not hurt the poor people in the recipient country, provided the donor acts as a follower.

1 Introduction

More often than not foreign aid is given for the benefit of specific target groups in recipient countries. However, several studies have shown that it is very difficult for the donor countries to enforce such conditionalities, and foreign aid is, to all intents and purposes, highly fungible (see Pack and Pack, 1993, Khilji and Zampelli, 1994, Boone, 1996, and Feyzioglu et.al., 1998). This fungibility is often blamed for the high degree of aid fatigue in donor countries.[1]

We develop a stylised model of foreign aid in which a donor government gives aid for the benefit of a specific group in a recipient country. However, an organised interest group lobbies the recipient government on behalf of the people not targeted by the donor, and diverts part of the aid away from the target group. In other words, we try to explain the allocation of aid within the recipient country by a domestic political process.

The importance of political process in economic decision making in general and international policy issues in particular is well recognised. There are many alternative approaches in modelling the political process – see Rodrik (1995) for a survey – including the tariff-formation function approach (Findlay and Wellisz, 1982), the political support function approach (Hillman, 1989), median voter approach (Mayer, 1984), the campaign contribution approach (Magee et.al., 1989), and the political contributions approach (Grossman and Helpman, 1994).

We model the political process by following the political contribution approach. That is, there are lobby groups that make political contributions to the political party in power, and the amount they contribute is contingent upon the policy that the government adopts. The political contributions approach, derived from the common agency problem analysed by Bernheim and Whinston (1986), was first introduced by Grossman and Helpman (1994) in modelling the political economy of trade protec-

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[1]Although the developed countries agreed, after the publication of the United Nations sponsored Pearson Commission Report in 1969, to allocate 0.7% of GNP as overseas development assistance, the actual figure for the major donor countries is about 0.25%.

tion. However, one of the shortcomings of that framework is that the preferences of everyone in the country are assumed to be of the quasi-linear type which gives rise to constant marginal utilities of income. This assumption is particularly inappropriate for any problem where redistribution matters, as it is the case in the present analysis. Dixit, Grossman and Helpman (1997) have recently generalised the Bernheim-Whinston framework to allow for general preferences and therefore variability in marginal utilities of income. We shall follow their approach closely in this paper.[2]

The basic model with its description of preferences, the political process, and the equilibrium conditions is spelt out in the next section. Section 3 considers a benchmark case where the donor is passive and the level of total aid is exogenously given. Section 4 introduces endogeneity of the total amount of aid and examines in turn two cases: (i) the donor and the recipient government decide simultaneously their policy instruments, and (ii) the two governments choose their policy instruments sequentially. Section 5 makes some concluding remarks.

2 The Basic Framework

In our model there are two countries: a donor country (labeled α) and a recipient country (labeled β). The population in the donor country is homogeneous. However, there are two types of individuals in the recipient country: labeled β_1 and β_2. For expositional simplicity we shall call β_1 'poor' and β_2 'rich'. The size of population of the three groups are L^α, L^{β_1} and L^{β_2}. Without any loss of generality, we shall assume $L^\alpha = 1$. Both countries are small in the international goods market so that the commodity prices are exogenous. This together with the additional assumption that all factors are internationally immobile and inelastically supplied also mean that the factor prices do not vary in our analysis.[3] Therefore the per-capita factor incomes,

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[2]In a companion paper we use a similar framework to consider how lobbying by various ethnic minority groups in a donor country affect the allocation of aid between recipient countries (Lahiri and Raimondos-Møller, 2000).

[3]For a model that incorporates factor price changes in a political economy explanation of foreign aid, see Mayer and Raimondos-Møller (1999). Politics in the above paper is in the donor country.

before any lump-sum transfers are made, can be taken as given, and these are denoted by $\bar{Y}^i$, $i = \alpha, \ \beta_1, \ \beta_2$.

We assume that the people in the donor country are altruistic only towards the poor in the recipient country. The per-capita utility level, u_α, of the donor is given by

$$u_\alpha = V_\alpha + \lambda L^{\beta_1} u_{\beta_1} \tag{1}$$

where V_α is the direct utility derived from consumption, u_{β_1} is the per-capita utility levels of the poor in the recipient country, and λ is the altruism parameter.[4]

The total amount of aid given by the donor country is denoted by T. This aid is given by the government in the donor country to that in the recipient country for the purpose of benefiting the poor. However, rich people in the recipient country lobby the government and obtain a part of it. The allocation of this aid between the two groups in the recipient country is endogenous, and we denote by μ the proportion of the total aid that is allocated to the poor. In other words, the government in the recipient country decides how much of the aid should reach its intended destination. However, in deciding the allocation, the recipient government may need to take into consideration possible sanctions that the donor country may impose by lowering the volume of aid. The allocation variable is determined in a political equilibrium to be discussed later on.

Assuming that μT is distributed among the poor in a lump-sum fashion by the recipient government, and that aid is financed in the donor country by lump-sum taxation, the per-capita utility in the donor country and that of the poor in the recipient country are given respectively by

$$u_\alpha \ = \ V_\alpha(\bar{Y}^\alpha - T) + \lambda L^{\beta_1} u_{\beta_1}, \tag{2}$$

$$u_{\beta_1} \ = \ V_{\beta_1}\left(\bar{Y}^{\beta_1} + \frac{\mu T}{L^{\beta_1}}\right), \tag{3}$$

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[4]This simple specification of altruism where the utility is additive in direct self utility and the utility of the foreign consumers, is made for analytical simplicity and most of our results will go through under the more general specification $u_\alpha = f(\bar{u}_\alpha, \ u_{\beta_1})$ where the function f is an increasing function of both its arguments.

where V_i's are the indirect utility functions. Throughout the paper we shall assume positive and diminishing marginal utility of income for the consumers, i.e.

$$V_i' > 0 \quad \text{and} \quad V_i'' < 0, \quad (i = \alpha, \ \beta_1, \ \beta_2). \tag{4}$$

Equation (2) implies that the net income in the donor country is equal to its factor income minus the amount of foreign aid it gives. Similarly, (3) implies that the total income of the poor in the recipient country is equal to their total labour income plus the part of the aid that they receive.

The aid allocation parameter μ is a policy instrument for the government of the recipient country and it is determined endogenously in the political equilibrium. We shall follow very closely Dixit, Grossman and Helpman (1997) (henceforth to be referred to as DGH) in specifying the equilibrium. The poor in the recipient country do not lobby the government, but the rich do by making political contributions to the political party in power. The political contribution schedule for the rich is denoted by $c(\mu)$. The recipient government's objective function is given by

$$G = \rho c + \left(L^{\beta_1} u_{\beta_1} + L^{\beta_2} u_{\beta_2} \right), \tag{5}$$

where $\rho > 0$ is a constant parameter. The parameter ρ is the weight given by the recipient government to its political funds in its objective function and as such it indicates the degree of corruption in the recipient government. A bigger value of ρ means a higher degree of corruption. It is implicit in the above specification of the government's objective function that it cares about the total welfare of its nationals, and also about the total amount of political contributions that it receives.[5]

The political equilibrium is an outcome of a two-stage game. In stage one of the game, the rich choose their political contribution schedule. Government sets policy in stage two. A political equilibrium is given by (i) a political contribution schedule $c^*(\mu)$, such that it maximises the welfare of the rich given the anticipated political

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[5]Rather than considering the sum total of individual welfare levels (which we do for analytical convenience), we could have considered a more general social welfare function as the second term in the above objective function, without changing the qualitative nature of our results.

optimisation by the government, and (ii) a policy variable, μ^*, that maximises the government's objective given by (5), taking the contribution schedule as given.

As discussed in DGH, the model can have multiple sub-game perfect equilibria. Following DGH, we consider a refinement called the *truthful* equilibrium. We shall first state formally the equilibrium conditions and then we shall explain them.

Let $\left(c^0(\mu^0, u^0_{\beta_2}),\ \mu^0\right)$ be a truthful equilibrium in which $u^0_{\beta_2}$ is the equilibrium per-capita utility level of the rich. Then $(c^0(\mu^0, u^0_{\beta_2}),\ \mu^0,\ u^0_{\beta_2})$ is characterised by: (i) the truthful contribution schedules chosen by the lobby group

$$c(\mu,\ u^0_{\beta_2}) = \max\left(0,\ A\right), \tag{6}$$

where A is defined in

$$u^0_{\beta_2} = V_{\beta_2}\left(\bar{Y}^{\beta_2} + \frac{(1-\mu)T - A}{L^{\beta_2}}\right), \tag{7}$$

(ii) the optimal allocation of aid, μ^0, chosen by the recipient government

$$\mu^0 = \text{Argmax}_\mu\left\{\rho c(\mu, u^0_{\beta_2}) + \left(L^{\beta_1} u_{\beta_1}(\mu) + L^{\beta_2} u^0_{\beta_2}\right)\right\}, \tag{8}$$

and (iii) the following equation that ties down the utility level of the lobby group

$$L^{\beta_1} u_{\beta_1}(\mu_1) + L^{\beta_2} u_{\beta_2}(\mu_1) = \rho c(\mu^0, u^0_{\beta_2}) + L^{\beta_1} u_{\beta_1}(\mu^0) + L^{\beta_2} u^0_{\beta_2}, \tag{9}$$

where μ_1 is defined in

$$\mu_1 = \text{Argmax}_\mu\left\{L^{\beta_1} u_{\beta_1}(\mu) + L^{\beta_2} u_{\beta_2}(\mu)\right\}, \tag{10}$$

and $u_{\beta_1}(\mu)$ is defined in (3).

Intuitively equations (6) and (7) state that the truthful contribution schedule is never negative and is set to the level of compensating variation relative to the equilibrium utility level of the rich, i.e. the rich offer exactly the amount of money that would keep them at the same equilibrium utility level for all actions μ of the government (see Dixit, Grossman and Helpman, 1997, p.759). Equation (8) is self explanatory: given that the government acts at stage two of the game, it takes the utility level of the lobby group as given and chooses its aid allocation parameter so as

to maximise its objective function. Equation (9) completes the characterisation of the truthful equilibrium and is derived from the premise that the rich would pay the lowest possible contribution to induce the government pursuing the equilibrium policy given in (8). For this to be the case (9) must hold, i.e. the government must be indifferent between implementing the equilibrium policy and receiving contributions from the rich (right hand side term) and implementing a policy by accepting no contribution (left hand side term).[6] Finally, (10) describes the equilibrium allocation of aid when no group lobbies, i.e. when the government is a pure social welfare maximiser.

Having described the basic framework of our analysis, we shall now examine how the behaviour of the donor affects the final allocation of aid between the two groups in the recipient country. We start by looking at a benchmark case where the donor is passive and the total amount of aid T is exogenously given. The case where the donor government is an active player and chooses the level of total aid follows in section 4.

3   The case of passive donor

In this section we shall assume that the total amount of aid is exogenous and examine how the allocation of aid among the two groups in the recipient country is affected by four parameters: the volume of aid T, the degree of corruption in the recipient country characterised by the parameter ρ, the per-capita income of the poor $\bar{Y}^{\beta_1}$, and the number of poor people L^{β_1}. Before embarking on these exercises, we shall first obtain the first order conditions corresponding to the optimisation problems given in (8) and (10).

When the rich do not lobby, the government maximises (10) and if the solution is in the interior the marginal utilities of the two groups in the country will be equalised, i.e. $V'_{\beta_2} = V'_{\beta_1}$. However, under the realistic assumption that the amount of aid is not

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[6] As is well known, it follows from this condition that a single lobby group is able to acquire the entire rent from its agency relation with the government. See also Rama and Tabellinin (1998) for a model where political contributions are provided only by a single lobby group.

large enough, or the income differential between the rich and poor is too big, to equalise marginal utilities, the optimisation problem will result in

$$\mu_1 = 1.$$

Thus, if the government maximises social welfare, all aid will go to the poor. This is exactly what the donor country wants.

However, when the rich lobby, the government maximises (8) and allocates aid according to:

$$\rho = V'_{\beta_1}. \tag{11}$$

That is, the benefit of allocating an extra unit of aid to the poor (the right hand side) should be equal to the cost of allocating an extra unit of aid to the poor (the left hand side). This extra allocation to the poor means less transfer to the rich which, in turn, implies less political contribution from the rich. This is clearly a cost to the government. Thus, if the recipient government cares about political contributions from lobby groups, it will choose to distribute aid differently from what a donor would want it to.[7]

Let us now examine how changes in the parameters of this model affect the proportion of aid reaching the poor. From (11) it is clear that for a given value of ρ, the per-capita marginal utility, and therefore utility, of the poor remains constant. Therefore from (3) it follows that an increase in T and/or $\bar{Y}^{\beta_1}$, or a decrease in L^{β_1}, would reduce the equilibrium value of μ^0, i.e.

$$\frac{d\mu^0}{d\bar{Y}^{\beta_1}} < 0, \ \frac{d\mu^0}{dL^{\beta_1}} > 0, \ \frac{d\mu^0}{dT} < 0,$$

and leave the utility of the poor people unchanged, i.e.

$$\frac{du^0_{\beta_1}}{d\bar{Y}^{\beta_1}} = \frac{du^0_{\beta_1}}{dL^{\beta_1}} = \frac{du^0_{\beta_1}}{dT} = 0.$$

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[7]Strictly speaking, in order to get an interior solution for μ in (11), given that we assumed that we could not get it in (10), we need to assume that ρ is sufficiently large. This does not seem a very strong assumption given the extent of corruption in many of the recipient countries.

Given (4) it also follows from (11) that an increase in the corruption parameter ρ would reduce both $u_{\beta_1}^0$ and μ^0, i.e.

$$\frac{d\mu^0}{d\rho} = \frac{L^{\beta_1}}{TV_{\beta_1}''} < 0, \quad \text{and} \quad \frac{du_{\beta_1}^0}{d\rho} = \frac{V_{\beta_1}'}{V_{\beta_1}''} < 0.$$

Proposition 1 formally states the above results.

Proposition 1: *When the total amount of aid is exogenous, a reduction in the number of poor people, or an increase in either the volume of aid, the per capita income of the poor, or the degree of corruption, reduces the proportion of aid going to the poor. However, whereas an increase in the degree of corruption reduces the per-capita utility of the poor, a change in any of the other parameters leaves the per-capita utility level of the poor unchanged.*

Consider first an increase in the total amount of aid. The special interest group will have more to lobby for and therefore will make larger political contributions. The government then pays relatively less attention to social welfare and more to its political funds. This will lead to a lower proportion of aid going to the poor. The net result of a larger pie (a higher T) and a smaller slice for the poor (a smaller μ) is that the per-capita utility of the poor remains the same. An increase in the corruption parameter will have a similar effect on the distribution of aid, i.e. the government puts more weight to its political contributions and reduces the proportion of aid going to the poor, but this now will also reduce the per-capita utility of the poor.

4 The case of active donor

In this section we endogenise T by assuming that it is optimally chosen by the donor country. We shall do so in two ways depending on the timing of the two governments' decisions: (i) governments act simultaneously, (ii) the recipient chooses the allocation of aid taking into account the reaction of the donor. We shall consider the two approaches in turn.

4.1 Simultaneous actions by the governments

We start by examining the case where the donor and the recipient governments play Nash in choosing their respective policy instruments T and μ, i.e. they choose optimally their instrument taking the instrument of the other country as given.

The choice of the recipient country remains the same as in (11) since that equation was derived for a given T. The choice of the donor country can be derived from (2) as:

$$V'_\alpha = \lambda \mu^0 V'_{\beta_1}, \tag{12}$$

where, μ^0 has been taken as given, reflecting the Nash nature of the present game. Equation (12) simply says that the amount of aid T is adjusted until the marginal cost of giving aid (left hand side) is equal to the marginal benefit of aid (right hand side). The latter is the marginal utility of a poor person in the recipient country discounted by the degree of altruism and the fraction of aid reaching its target. Equations (11) and (12) simultaneously determine the optimal values of T and μ.

Before examining how changes in the parameters of the model affect the equilibrium values of T and μ, we first note some direct implications of (11). Any parameter change other than ρ leaves the total amount of aid reaching the poor μT unchanged, while an increase of ρ reduces the total amount of aid reaching the poor. However, it is interesting to examine the effects on μ and T separately. In doing so we totally differentiate (11) and (12) to obtain the following equations:

$$\left[\frac{\lambda \mu^0 V'_{\beta_1}}{T} - V''_\alpha \right] dT = \lambda \mu^0 \left[1 - \frac{\bar{Y}^{\beta_1} + \frac{\mu^0 T}{L^{\beta_1}}}{\frac{\mu^0 T}{L^{\beta_1}} \epsilon_1} \right] d\rho + \frac{\lambda V'_{\beta_1}}{T L^{\beta_1}} dL^{\beta_1}$$

$$- V''_\alpha d\bar{Y}^\alpha + \mu^0 V'_{\beta_1} d\lambda - \frac{L^{\beta_1} \lambda V'_{\beta_1}}{T} d\bar{Y}^{\beta_1}, \tag{13}$$

$$\left[\frac{T}{L^{\beta_1}} - \frac{\mu^0 \lambda V'_{\beta_1}}{V''_\alpha} \right] d\mu^0 = \left[\frac{1}{V''_{\beta_1}} + \frac{\lambda (\mu^0)^2}{L^{\beta_1} V''_\alpha} \right] d\rho + \frac{1}{(L^{\beta_1})^2} dL^{\beta_1}$$

$$- \frac{\mu^0}{L^{\beta_1}} d\bar{Y}^\alpha + \frac{(\mu^0)^2 V'_{\beta_1}}{L^{\beta_1} V''_\alpha} d\lambda - d\bar{Y}^{\beta_1}, \tag{14}$$

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where

$$\epsilon_1 = -\frac{V''_{\beta_1}}{V'_{\beta_1}} \left(\bar{Y}^{\beta_1} + \frac{\mu^0 T}{L^{\beta_1}} \right) > 0,$$

is the coefficient of relative risk aversion for the poor. Proposition 2 follows directly from the above relations.

Proposition 2: *When the recipient and the donor governments act simultaneously, an increase in the number of poor in the recipient country, or a decrease in their per-capita income, increases both the total amount of aid and the proportion of it going to the poor. Moreover, an increase in either the per-capita income of the donor country, or the level of its altruism, increases the total amount of aid, but decreases the proportion of it going to the poor. In all these cases, the per-capita utility of poor remains unchanged.*

The intuition for these results is similar to the one derived in the previous section. An increase of L^{β_1}, and/or a decrease of $\bar{Y}^{\beta_1}$, would increase both the proportion of aid going to the poor (for reasons explained in the previous section) and the total amount of aid (due to altruism). Turning to comparative static exercises with respect to factors in the donor country, note from (11) that an increase in the per-capita income of the donor country $\bar{Y}^\alpha$, or an increase in the altruism parameter λ, leaves the total amount of aid reaching the poor $(\mu^0 T)$, and therefore their per-capita utility, unchanged. However, from (13) and (14) we find that such a change would increase the total amount aid T and reduce the proportion of it going to the poor. An increase in Y^α reduces the marginal utility of income in the donor country and this makes it optimal for the donor country, given its altruism, to give more aid. Similarly, a higher altruism on the part of the citizens in the donor country forces the donor government to transfer more resources to the recipient country. This increase in the total amount of aid in turn makes lobbying by the rich in the recipient country more intense, resulting in a reduction in the proportion of aid going to the poor.

We conclude this subsection by analysing the effect of a change in the corruption parameter ρ. We have explained why an increase in ρ decreases the total amount of aid reaching the poor and therefore the latter's per-capita utility level. From (14) it is also clear that an increase in ρ decreases the proportion (μ^0) of aid going to the poor for reasons similar to the ones mentioned in the previous section. An increase in ρ however has an ambiguous effect on the total amount of aid (T). On one hand, since an increase in ρ reduces μ, the incentive for the donor country to give aid goes down. On the other hand, since an increase in ρ increases the poor's marginal utility of income, the marginal utility in the donor country must increase to satisfy the optimality condition (12). This increase in the marginal utility of income in the donor country implies a higher amount of aid. From (13) we find that the net effect is negative if and only if the degree of relative risk aversion for the poor is sufficiently small, i.e.,

$$\frac{dT}{d\rho} < 0 \quad \text{if and only if} \quad \epsilon_1 \cdot \frac{\frac{\mu^0 T}{L^{\beta_1}}}{\bar{Y}^{\beta_1} + \frac{\mu^0 T}{L^{\beta_1}}} < 1. \tag{15}$$

Since the amount of aid reaching a poor person is likely to be a small proportion of her total income, the above condition is likely to be satisfied in reality. The above results are stated formally as

Proposition 3 *When the recipient and the donor governments act simultaneously, an increase in the degree of corruption in the recipient country reduces the proportion of aid going to the poor and their per-capita utility level. Such an increase also decreases the total amount of aid received by the recipient country if and only if $\epsilon_1(\mu^0 T / L^{\beta_1})/(\bar{Y}^{\beta_1} + \mu^0 T / L^{\beta_1}) < 1$.*

This completes the case when the two governments act simultaneously and we now move on to the cases where the two governments act in stages.

4.2 Sequential actions by the governments

Let us consider now the situation where the recipient government, in deciding the allocation of aid, takes into account the fact that the total amount of aid it receives depends upon its decision on allocation.[8] Stage one of the game is same as in section 2. In stage two the recipient decides on the level of μ by taking into consideration the donor's reaction function $T(\mu)$ derived in the third stage. In stage three the donor government decides on the level of aid T by maximising its own welfare for a given value of the aid allocation parameter μ. In other words, the donor announces the schedule $T(\mu)$ and the recipient government chooses μ taking into account the donor's response schedule $T(\mu)$. In this way, the recipient can be made to take more account of the needs of the poor in allocating aid.

Solving backwards, the donor's reaction function $T = T(\mu)$ in stage three is given by (12). Determining the slope of this reaction function we differentiate with respect to μ and get:

$$-\left[V_\alpha'' + \frac{\lambda \mu^2 V_{\beta_1}''}{L^{\beta_1}}\right] T'(\mu) = \lambda\left(1 - \epsilon_1 \frac{\frac{\mu T}{L^{\beta_1}}}{\bar{Y}^{\beta_1} + \frac{\mu T}{L^{\beta_1}}}\right). \tag{16}$$

Under the condition that $\epsilon_1(\mu T/L^{\beta_1})/(\bar{Y}^{\beta_1} + \mu T/L^{\beta_1}) < 1$, the slope of the donor's reaction function is positive $(T'(\mu) > 0)$ indicating that a lower proportion of aid going to the poor induces the donor to reduce its total amount of aid. As we mentioned above, the above condition is very likely to hold in reality and henceforth we shall assume that $T'(\mu) > 0$.

The recipient government's problem in stage two is then described by equations (6)-(10) and $T = T(\mu)$. The first order condition for (8) determines the optimal allocation of aid in this sequential game and can be written as

$$G_\mu = \rho[-T + (1 - \mu^0)T'(\mu^0)] + (T + \mu^0 T'(\mu^0))V_{\beta_1}' = 0. \tag{17}$$

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[8]It is easy to show that in the opposite case, where the donor, in deciding the volume of aid, takes into consideration the aid-allocation process in the recipient country, the optimal amount of aid is zero. However, given that donor countries do give aid and the (empirically supported) premise that donors cannot effectively tie aid, our formulation of the problem is more realistic.

We conclude the description of this sequential equilibrium by examining its properties. In particular, we will focus on how an increase in corruption affects the amount of aid allocated to the poor. From (17) we can derive

$$\frac{d\mu^0}{d\rho} = -\frac{G_{\mu\rho}}{G_{\mu\mu}}, \tag{18}$$

where $G_{\mu\rho} = -T + (1 - \mu^0)T'(\mu)$, and $G_{\mu\mu} < 0$ is the second order condition for the recipient government's maximisation problem.[9] Given that $T + \mu^0 T'(\mu^0) > 0$,[10] (17) implies that $-T + (1 - \mu^0)T'(\mu^0) < 0$. Thus, we see that

$$\frac{d\mu^0}{d\rho} < 0 \qquad \text{and} \qquad \frac{d(\mu^0 T)}{d\rho} = (T + \mu^0 T'(\mu^0))\frac{d\mu^0}{d\rho} < 0.$$

Proposition 4: *When the recipient government takes into account the donor government's reaction to aid fungibility, an increase in the degree of corruption in the recipient country reduces both the proportion and the total amount of aid going to the poor.*

Intuitively an increase in the degree of corruption implies that the government cares more about political contributions it receives than about the welfare of the population. It therefore allocates a higher proportion of aid to the rich. However, the recipient country knows that the donor country will react to this behaviour of the recipient country by reducing the total amount of aid. This knowledge reduces the overall lobbying activities and thus restores some of the aid back to the poor. However, the initial effect dominates, and the poor end up receiving a lower proportion of aid compared to the situation where the degree of corruption is lower.

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[9] From (17) it can be derived that

$$G_{\mu\mu} = \frac{V_{\beta_1}'' \left(T + \mu^0 T'\right)^2}{L^{\beta_1}} - \frac{2\rho \left(T'\right)^2}{T + \mu^0 T'} + \frac{\rho T T''}{T + \mu^0 T'}$$

Given that $T + \mu^0 T' > 0$, a sufficient condition for $G_{\mu\mu} < 0$ is that T'' is either negative or not a very large positive number.

[10] For this we do not have to rely on $T'(\mu^0) > 0$. From (16) we find that

$$- \left[V_\alpha'' + \frac{\lambda\mu^2 V_{\beta_1}''}{L^{\beta_1}}\right] \left[T + \mu^0 T'(\mu^0)\right] = -T V_\alpha'' + \lambda\mu^0 V_{\beta_1}'.$$

It follows that $T + \mu^0 T'(\mu^0) > 0$.

4.3 Comparing sequential and simultaneous equilibria

Having analysed both the simultaneous and the sequential equilibria, we shall now compare the two. The interesting questions that we shall address are: (i) under which equilibrium are the poor better off?, and (ii) under which equilibrium is the donor better off?

The result we obtain is stated formally as:

Proposition 5: *The total amount of aid reaching the poor people in the recipient country, and thus their welfare level, is larger in the sequential game than in the simultaneous game. The proportion of aid going to the poor is also higher in the sequential game.*

Proof: Equation (17) can be rewritten as

$$V'_{\beta_1} - \rho = -\frac{\rho T'(\mu^0)}{T + \mu^0 T'(\mu^0)}. \tag{19}$$

Since the donor's reaction function is positive sloped $(T'(\mu^0) > 0)$, it is clear that the sequential equilibrium satisfies $V'_{\beta_1} - \rho < 0$, while the condition is $V'_{\beta_1} - \rho = 0$ in the simultaneous game. Given that $V''_{\beta_1} < 0$, it follows that the total amount of aid received by the poor in the sequential game is larger than that in the simultaneous game, i.e. $(\mu T)_{seq} > (\mu T)_{sim}$. This in turn implies that the poor are better off when the governments play a sequential game rather than a simultaneous game. This proves the first part of the proposition.

For the second part, we have already noted above that

$$V'_{\beta_1}\left(\bar{Y}^{\beta_1} + \frac{(\mu T)_{seq}}{L^{\beta_1}}\right) < \rho, \tag{20}$$

and proved that

$$(\mu T)_{seq} > (\mu T)_{sim}. \tag{21}$$

From (11) and (12) we can write

$$V'_\alpha(\bar{Y}^\alpha - T_{sim}) = \lambda \rho \mu_{sim}. \tag{22}$$

From (21) and (12) we get

$$V'_\alpha(\bar{Y}^\alpha - T_{seq}) < \lambda\rho\mu_{seq}. \tag{23}$$

Let us now show that $\mu_{seq} > \mu_{sim}$ by contradiction. Suppose that $\mu_{seq} < \mu_{sim}$. Then it follows from (21) that $T_{seq} > T_{sim}$ and thus (given diminishing marginal utility of income) that $V'_\alpha(\bar{Y}^\alpha - T_{seq}) > V'_\alpha(\bar{Y}^\alpha - T_{sim})$. From (22) we can then write

$$V'_\alpha(\bar{Y}^\alpha - T_{seq}) > \lambda\rho\mu_{sim} \tag{24}$$

Subtracting (23) from (24) gives

$$\lambda\rho\left(\mu_{seq} - \mu_{sim}\right) > 0$$

which implies that $\mu_{seq} > \mu_{sim}$. But this contradicts our initial assumption that $\mu_{seq} < \mu_{sim}$.

Q.E.D.

The intuition for these results is straightforward. The fact that the donor reduces the total amount of aid if it realises that aid has been distributed away from the poor, acts as a disciplinary mechanism in the political process in the recipient country. As a result of this, less lobbying goes on and poor people end up receiving a higher proportion of aid and, more importantly, more aid.

The question that remains unanswered is whether the donor is better off under a sequential game. For this, we first of all need to establish under which regime the total amount of aid is larger. Unfortunately, this cannot be done unambiguously. However, we shall show that $T_{seq} < T_{sim}$ if and only if the donor's response function in the sequential game is sufficiently elastic. In this case, the donor would be better off in the sequential game as it will have to hand out a smaller amount of aid, but at the same time the poor in the recipient country would receive a larger amount of the transfer. Formally,

Proposition 6: *The donor is better off in the sequential game than in the simultaneous game if $\eta_\mu > (\mu_{seq} - \mu_{sim})/(1 - \mu_{seq} + \mu_{sim})$, where $\eta_\mu = T'(\mu_{seq})\mu_{seq}/T_{seq}$.*

Proof: From (11), (12) and (19) we can write

$$V'_\alpha(\bar{T}_\alpha - T_{sim}) = \lambda\mu_{sim}\rho,$$

$$V'_\alpha(\bar{T}_\alpha - T_{seq}) = \lambda\mu_{seq}V'_{\beta_1}\left(\bar{Y}^{\beta_1} + \frac{\mu_{seq}T_{seq}}{L^{\beta_1}}\right),$$

$$= \lambda\mu_{seq}\rho\left[1 - \frac{T'(\mu_{seq})}{T_{seq} + \mu_{seq}T'(\mu_{seq})}\right].$$

From the above two equations and (4), we find

$$T_{seq} < T_{sim} \quad \Longleftrightarrow \quad \eta_\mu > \frac{\mu_{seq} - \mu_{sim}}{1 - \mu_{seq} + \mu_{sim}}.$$

From (2) and proposition 5, the proof then follows. **Q.E.D.**

If the donor's reaction function in the sequential game is highly elastic, then the recipient has to be very careful about not losing out a significant amount of aid by diverting away aid to the rich. In this case, the recipient cannot afford to give in much to lobbying, and the donor, by playing the sequential game, can ensure that the poor receive a larger amount of transfer (compared to the simultaneous game), although the size of the total transfer itself is reduced. The donor is therefore better off because (i) it hands out a smaller amount, and (ii) it feels better via the altruism factor.

5 Concluding remarks

The fungibility of foreign aid, viz. that a part of aid is diverted away from its intended use, is a major source of concern among people associated with development assistance in the donor countries. It undermines the effectiveness of foreign aid, and the knowledge of its presence leads to increased aid fatigue among the population in the donor countries. The existing theoretical literature offers no explanation for the diversion of foreign aid. In this paper we explain the diversion in terms of a domestic political process in the recipient country in which non-targeted groups manage to divert away aid by lobbying the government.

We model lobbying following the generalised common agency problem as developed in a recent paper by Dixit, Grossman and Helpman (1997). In this framework, the government accepts political contribution from lobby groups and the level of contribution depends on the policy that the government pursues. The government, however, also cares about the welfare of its nationals. Thus, the allocation of aid in the recipient country is determined by recipient government's attempts to balance its social welfare objectives and its preference for political contribution, the latter indicating the degree of corruption in the government.

Depending on the behaviour of the donor country, we examine and compare the equilibrium level of the proportion of aid going to the poor. We consider three cases of donor behaviour: (i) the donor is passive and treats the aid level as exogenous, (ii) the donor is active and chooses the level of aid simultaneously with the recipient government deciding on the allocation of aid between the rich and the poor, and (iii) the donor announces its reaction function — aid as a function of the proportion of aid reaching the poor — before the recipient allocates the aid.

For each of these cases we investigate how changes in the parameters of the model affect the equilibrium allocation of aid. In the case of exogenous foreign aid we see that a higher level of aid leads to a more intense lobbying and a lower proportion of aid reaching the poor. Common to all cases, we also find that an increase in the degree of corruption leads to a higher proportion of aid not reaching the target group. When aid is endogenous, higher corruption leads to an extra adverse effect on the target group, viz. it is likely that the total amount of aid will go down.

Comparing cross-scenarios, we find that the poor are unambiguously better off in the sequential game than in the simultaneous one. As for the donor, it is also better off under the sequential game provided its reaction function is sufficiently elastic.

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