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Decentralizing Aid with Interested Parties

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Abstract

This paper analyses the decentralization of decisionmaking in aid-giving in a theoretical rent-seeking framework. In this analysis the root donor establishes a necessary criterion for potential recipients: good governance. The potential recipients compete in hierarchal contests for funds. The paper investigates whether, under certain reasonable conditions, fashionable aid procedures will lead to the development of a poverty trap.

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1 Introduction

Due to a multitude of domestic and international political and economic forces, over the last three to four decades it became prudent for many national development agencies to develop something of an arms-length relationship towards their aid activity. The standard multilateral institutions had taken up some of this in the 1970s, and in the process changed the bonds between root donors and recipients, altering the roles and effectiveness of both bilateral and multilateral institutions. However, by the 1990s the standard multilateral institutions had their own reputation issues. Donor governments and multilateral institutions began to rely heavily on nongovernment organizations (NGOs) to allocate aid and to implement aid projects/programmes.[1] Since NGOs usually have well-defined goals, donor government policy can be achieved by funding the NGOs which have similar mindsets.

At the same time it became popular to discuss economic development in terms of developing the proper set of institutions—including the legal framework and social conventions. International aid was brought into this discussion in terms of its influence on institutional development and its impact on growth and other indicators of development. While not universally embraced, a stylized fact of development policy became that good governance is a necessary prerequisite in order for aid to be effective in terms of raising a nation's rate of growth.[2]

Together the movement by root donors towards more arms-length relationships with the aid process and the new light shown on the role of governance in implementing proper policies have had a large impact on both the discussion and implementation of development policy. If good governance is necessary for the effective use of aid, then by allocating aid on the basis of a country achieving good governance is a 'win-win' situation: aid is given to where it will have an impact and objective criteria can be established. This will minimize the necessity for detailed bureaucratic planning, disbursement and oversight, as aid is in part the reward for good governance, and with good governance it is assumed aid will be channelled properly. The introduction of the Millennium Challenge Account into the US debate and the establishment of the Millennium Challenge Corporation arose in this environment.[3]

This is a very powerful argument for decentralization: give aid to only those with good governance. You reduce the need for many levels of checks and you allow the aid allocation decision to be made by those closest to the needs. We analyse this decentralization of decisionmaking in a theoretical rent-seeking framework. We model

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[1] During the 1990s, the number and role of international nongovernmental organizations (NGOs) taking part in the foreign aid process grew. For all the Development Assistance Committee (DAC) countries, official development assistance (ODA) to NGOs increased from US$928 million in 1991-92 to US$1,246 million in 2002, an increase of 34 per cent. This represents an increase from 1.59 to 2.14 per cent of all DAC ODA from 1991-92 to 2002. For the United Kingdom, a country where this shift is quite stark, the funding of ODA to NGOs went from US$21 to US$226 million, an increase of 976.2 per cent, and from 0.65 per cent of all UK ODA in 1990-91 to 4.6 per cent in 2002. The number of international NGOs grew by 19.3 per cent during the decade. See Epstein and Gang (2005) for an analysis of the role of NGOs in the aid process.

[2] See McGillivray *et al.* (2005) for a review and analysis of the empirical work surrounding this change. Also see Heckelman and Knack (2005) for an argument that aid retards economic liberalization.

[3] See Mavrotas and Villanger (2006) for an alternative characterization of this process.

the aid allocation decision where the donor government has announced that good governance is the criterion for receiving aid. Potential recipients must compete for the aid funds. The structure of the competition, we shall see, is important to the donor in terms of achieving good governance, and to the recipients in terms of what they receive. Potential recipients view aid as part of their overall programme. The governments, represented by their leaders, are after all the presumed beneficiaries of bad governance. Those implementing policy (the government or the leader) are explicit rent-seekers who consider aid as part of the total 'package' available to them.

In section 2, which constitutes the bulk of the paper, we present our model and our major results. Section 3 examines the possibility of a poverty trap. Section 4 takes up another implementation of the model, the role of NGOs. Section 5 concludes.

2   The model

Consider the case where there exist m countries, each wanting to obtain aid from the same donor. We assume that aid, A, is not determined endogenously; the donor has a fixed level of funds, A, to give as aid. The US Congress, for example, could determine the optimal amount to donate with regard to other budgetary items. After determining the optimal amount of total aid, donors then decide how it should be divided among potential recipients. An aid agency might first decide what the regional allocations should be, and then how much each country within a region receives.

Each country has a leader who benefits from receiving aid. Note that the marginal benefit each leader receives may vary over countries as each leader/country may have different objectives or abilities in obtaining utility from the aid it receives. In order to simplify our model, we assume that each leader benefits differentially from aid received, and the marginal benefit from each aid dollar is constant in each country but differs among countries. Denote by n_i the marginal benefit a leader of country i can receive from a dollar of aid. It is not clear which of the leaders have more to gain. Namely, if n_i is greater or smaller than n_j for all $j \neq i$. One can think of winning aid in probabilistic terms. The probability that leader/country i wins the contest and receives aid is equal to Pr_i. The expected benefit a country/leader i receives in this competition equals $Pr_i A n_i$. One can also look at Pr_i as the proportion of total aid that this leader/country receives. To simplify, we generally talk about proportions of total aid obtained and not probabilities of winning aid, keeping in mind that the two are equivalent.[4]

In order to receive aid, the donor decides that potential recipient countries must invest in quality governance. The more one invests, the higher is the chance of receiving aid. This is aid's effectiveness—its ability to draw funds that would have been spent elsewhere to targeted objectives. In some sense this is the opposite of how we usually think of aid being fungible, when we discuss the leakage of aid from targeted objectives. Here we can think of fungible domestic funds and revenue helping the country's leader

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[4] Although mathematically equivalent, they are conceptually distinct. In the two scenarios we present below, one naturally lends itself to a discussion in terms of the probability of winning aid, while the intuition for the other is better when thinking about the proportion of aid obtained. Proportions and probabilities are isomorphic only under risk neutrality, which is assumed.

raise the quality of governance. Since the total amount of aid available is fixed, the greater the ability of the leader to shift expenditures, the greater the opportunity for quality governance. Obviously, good governance is only one of many goals that donors may define, but we keep with the recent literature in presuming that the donor chooses governance as the goal on the assumption that this ensures proper spending of aid funds. Good governance itself is a rather amorphous goal, difficult to measure and consisting of many dimensions.

We denote by x_i the amount of effort and investment in quality governance by a leader/country i. Effort, x_i, can be seen as the number or quality of changes in a country (x_i can be a measurable index of change). The investments made by all leaders/countries, x_i, determine the proportion of the aid obtained (or the probability of winning the contest).[5]

We assume that investment in quality governance is costly to the leader. Investment in quality governance decreases the power of the leader; for example, the leader will have less control and as a result obtain fewer and smaller bribes. Therefore, the leader sees investment in quality governance as a reduction in his utility. However, investment in quality governance is part of a contest among countries to obtain aid. While the utility of the leader declines as more investment in good governance takes place, the potential for receiving aid funds raises the leader's expected utility.

We consider two cases:

i)   All of the aid goes to one country only. Here we assume that the donor country gives aid to the country that invests the most effort in quality governance; and

ii)   Aid is divided proportionally according to the investment in quality governance made by each of the leaders of the different countries.

To simplify we assume that quality governance has a fixed marginal cost of unity for each unit of quality governance invested by the leader. Thus, the expected net payoff (surplus) for the risk-neutral leader of a country is:

$$E(w_i) = \text{Pr}_i\, A\, n_i - x_i \ \forall\ i = 1, 2, ..., m. \tag{1}$$

For now we assume that the proportion of aid obtained in the contest (or the probability of winning the contest) satisfies the following conditions:

i)   The sum of the proportions of the aid obtained equals one, $\displaystyle\sum_{i=1}^{m} \text{Pr}_i = 1$;

ii)   As leader/country i increases its effort in quality governance, it obtains a higher proportion of the aid, $\dfrac{\partial\, \text{Pr}_i}{\partial\, x_i} > 0$;

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[5]   Just because one invests in good governance does not mean that it is achieved. Moreover, some countries may obtain good governance with smaller investments than other countries. Noting these two caveats, we assume that investment in good governance is synonymous with achieving good governance.

iii)   As leader of country *j*, the opponent of the leader of country *i*, increases efforts in quality governance, the proportion of aid that the leader of country *i* obtains, decreases $\frac{\partial \Pr_i}{\partial x_j} < 0$. Finally,

iv)   The marginal increase in the proportion of aid obtained from the contest decreases with the investment in quality governance, $\frac{\partial^2 \Pr_i}{\partial x_i^2} < 0$ (this inequality ensures that the second-order conditions for maximization are satisfied).[6]

The leaders of the countries engage in a contest over quality governance in order to obtain aid from the donor country. We assume a Nash equilibrium outcome. Each country determines the level of its quality governance x_i so that its expected payoff, $E(w_i) \ \forall \ i = 1, 2, .., m$, is maximized. The first order condition for maximization is given by:

$$\frac{\partial E(w_i)}{\partial x_i} = \frac{\partial \Pr_i}{\partial x_i} A n_i - 1 = 0_i \ . \tag{2}$$

Equation (2) is satisfied if and only if:

$$\frac{\partial \Pr_i}{\partial x_i} = \frac{1}{A n_i} \ . \tag{3}$$

Thus, given that the proportion has decreasing marginal utility with respect to the level of quality governance, we obtain that the country with the higher marginal benefit from a dollar of aid will invest more effort in quality governance. For example, if the leader of country 1 has the higher marginal benefit from a dollar of aid compared to the leader of country 2, $n_1 > n_2$, then country 1 will determine its effort in quality governance, x_1, such that the marginal proportions are $\frac{\partial \Pr_1}{\partial x_1} < \frac{\partial \Pr_2}{\partial x_2}$, in order to increase its proportion of the aid received. The leader that has a higher marginal benefit from winning the contest will invest the highest amount of effort in quality governance.

To simplify and without loss of generality assume that:

$$n_1 \geq n_2 > n_3 \geq ... \geq n_m \tag{4}$$

This assumption simply states that there are leaders from at least two countries who have higher marginal benefit compared to leaders of all other countries.

2.1 Aid given to one country only

We now describe the situation where the donor gives all the aid to only one country. We assume the extreme situation in which all the aid goes to the country that has undertaken

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6   The function $\Pr_i(.)$ is usually referred to as a contest success function (CSF). The functional forms of the CSF's commonly assumed in the literature satisfy these assumptions (see Nitzan 1994).

the greatest investment in quality governance. In other words, the leader that invests in the highest level of quality governance will receive the donor's entire aid allocation, A. The contest success function in this case is the all-pay auction where the country that invests the highest amount in quality governance wins all the aid; however, those that do not win, cannot revert to lower quality governance. While some part of the quality governance is reversible, not all of it is reversible. To simplify we assume that none of the investment in quality governance is reversible.

The contest success function (CSF), the probability of winning the aid, under the all-pay auction where only one country obtains aid is given by[7]

$$
\Pr_i = \begin{cases} 1 & \text{if } x_i > x_j \ \forall i \neq j \\ \dfrac{1}{k} & \text{if } i \text{ ties for the high bid with } (k-1) \text{ others} \\ 0 & \text{if } x_j > x_i \ \forall i \neq j \end{cases} \tag{5}
$$

It can be verified that there exists a unique symmetric Nash equilibrium as well as a continuum of asymmetric Nash equilibria. In any equilibrium, countries 3 through m invest zero effort in quality governance activities with probability one (see Baye, Kovenock and de Vries 1993), so that only the two countries whose leaders have the highest marginal benefit from aid will participate.

> ***Result 1***: *In the contest under which aid goes to one country only, just the two countries that have the highest marginal benefit from the aid will invest in quality governance.*

This contest is, therefore, good only if we have a small number of countries competing for aid. Otherwise we obtain that from the m countries, only two participate in the contest and thus only two will invest effort in quality governance.

We conduct our analysis further for two leaders of two countries, leader 1 and leader 2. Without loss of generality, assume that the marginal benefit of leader 1 from aid is greater than that of the leader of country 2, $n_1 > n_2$. It is clear, therefore, that leader 1 is able to make larger investments in quality governance than leader 2. However, it is not clear how much each leader will invest in equilibrium. We can thus view the investments in quality governance as bids by the leaders. It is a standard result that there are no pure strategy equilibria in all-pay auctions (Hillman and Riley 1989; Ellingsen 1991; and Baye, Kovenock and de Vries 1993). It is also a standard result that there is no equilibrium in pure strategies in all-pay auctions. Suppose leader 2 bids $0 < x_2 \leq n_2$. Then the first leader's optimal response is $x_1 = x_2 + \varepsilon < An_1$ (i.e., marginally higher than x_2). But then $x_2 > 0$ cannot be an optimal response to $x_1 = x_2 + \varepsilon$. Also, it is obvious that $x_1 = x_2 = 0$ cannot be an equilibrium. Hence, there is no equilibrium in pure strategies. There is a unique equilibrium in mixed strategies given by the following cumulative distribution functions (see Hillman and Riley 1989; Ellingsen 1991, and Baye, Kovenock and de Vries 1993),

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[7] Under this scenario, thinking in terms of the probability of winning the contest enhances our intuition.

$G_1(x_1) = \frac{x_1}{n_2}$ for $x_1 \in [0, n_2)$ and $G_2(x_2) = 1 - \frac{n_2}{n_1} + \frac{x_2}{An_1}$ for $x_2 \in [0, n_2)$. The equilibrium c.d.f.'s show that leader 1 bids uniformly on $[0, n_2]$, while leader 2 puts a probability mass equal to $(1 - n_2/n_1)$ on $x_2 = 0$. The expected quality governance investments are equal to

$$E(x_1) = \int_0^{n_2} x_1 dG_1(x_1) = \frac{An_2}{2} \text{ and } E(x_2) = \int_0^{n_1} x_2 dG_2(x_2) = \frac{An_2^2}{2n_1}.$$ Note that in the all-pay auction we can think of the designation 'leader' as probabilistic—i.e., the stronger player is more likely to win the contest.

Based on these studies, we can obtain equilibrium expected investment in quality governance, equilibrium probabilities and expected payoffs. In the case of only two leaders, the probability of winning becomes:

$$\text{Pr}_i = \begin{cases} 1 & if \quad x_i > x_j \\ 0.5 & if \quad x_i = x_j \\ 0 & if \quad x_j > x_i \end{cases} \tag{6}$$

The expected investment in quality governance for each country is given by:

$$E(x_1^*) = A\frac{n_2}{2} \text{ and } E(x_2^*) = A\frac{n_2^2}{2n_1}. \tag{7}$$

The equilibrium probability of winning the aid for each country equals:

$$\text{Pr}_1^* = \frac{2n_1 - n_2}{2n_1} \text{ and } \text{Pr}_2^* = \frac{n_2}{2n_1}. \tag{8}$$

The expected equilibrium payoff for each country equals:

$$E(w_1^*) = A(n_1 - n_2) \text{ and } E(w_2^*) = 0. \tag{9}$$

In equilibrium, the total amount of quality governance carried out by both countries (assuming one can add the components) equals:

$$E(X^*) = E\left(x_i^* + x_j^*\right) = A\frac{n_2^2 + n_2 n_1}{2n_1} = A\frac{n_2(n_2 + n_1)}{2n_1}. \tag{10}$$

Identical marginal benefits from aid

Let us consider the case in which both leaders have the same marginal benefit from a dollar of aid:

$$n_1 = n_2 = n \tag{11}$$

The investment of each in quality governance equals:

$$E(x_1^*) = A\frac{n}{2} = E(x_2^*) \qquad\qquad\qquad\qquad\qquad\qquad (12)$$

The probability of winning aid by each of the countries equals one-half, the expected payoff for each leader is zero and the total invested in quality governance by both countries together equals the value of aid to the leaders of the countries:

$$\text{Pr}_1^* = \text{Pr}_2^* = \frac{1}{2} \ , \ E(w_1^*) = E(w_2^*) = 0 \ \text{ and } \ X^* = An \ . \qquad\qquad (13)$$

2.2 Aid proportionate to the governance quality of each country

Here we consider the case where the leaders of the countries compete with one another in a contest in which no one wins all the aid. In the general case, there are *m* countries competing against one another. Later in this paper we compare our two case scenarios with each other: *only one country gains the entire aid* with *the case where each receives a proportion of the aid*. In the scenario where only one country gets all the aid, as indicated above, only the leaders of the two countries with the highest marginal benefit from a dollar of aid will compete. In the case we discuss below, the number of competing countries has a strong effect on the expected payoffs and on the total amount of resources invested in activities to increase governance quality. It can be shown that as the number of countries increases, both the expected amount of resources invested in quality governance and expected payoffs of the leaders of the countries may increase or decrease. This will depend on the relative levels of the marginal benefit of aid of competing leaders of the countries (Baye, Kovenock and de Vries 1993; Che and Gale 1998; Epstein and Nitzan 2005a, 2005b). As a result of this, and as we wish to compare our results in this type of situation to the one presented above, we restrict our analysis to two leaders competing for aid.

Each country under this contest for aid will receive a proportional amount of funds relative to the amount invested in quality governance. We assume that the contest is characterized by the Tullock (1980) contest success function (see also Lockard and Tullock 2001):

$$\text{Pr}_i = \frac{x_i}{x_j + x_i} \ \ for \ \ \forall j \neq i \ . \qquad\qquad\qquad\qquad (14)$$

This function states that each country receives aid proportional to its investment in quality governance relative to the investment made in quality governance by the competing country.

The expected net payoff (surplus) for the risk-neutral leader of country *i* is thus given by

$$E(w_i) = \text{Pr}_i \ A \ n_i - x_i = \frac{x_i}{x_i + x_j} A \ n_i - x_i \quad \forall i \neq j, \ i, j = 1, 2 \ . \qquad (15)$$

The first-order condition, as stated in Equation (2) that ensures that the leaders of the countries maximize their expected payoff, is given by

$$\frac{\partial E(w_i)}{\partial x_i} = \frac{x_j}{\left(x_i + x_j\right)^2} \, An_i - 1 \; = \; 0 \quad \forall \, i, j = 1, 2 \; i \neq j. \tag{16}$$

Denote by x_i^* $\quad \forall \, i, j = 1, 2 \; i \neq j$ the Nash equilibrium outcome of the contest. Solving (16) for both leaders using a Nash equilibrium, we obtain that the level of quality governance activities of each country participating as equals

$$x_1^* \; = \; A \frac{n_1^2 n_2}{\left(n_1 + n_2\right)^2} \quad and \quad x_2^* \; = \; A \frac{n_1 n_2^2}{\left(n_1 + n_2\right)^2} \quad . \tag{17}$$

Therefore, in a Nash equilibrium, the proportion of aid obtained by each of the countries in this contest[8] equals

$$\mathrm{Pr}_1^* = \frac{n_1}{n_1 + n_2} \quad and \quad \mathrm{Pr}_2^* = 1 - \mathrm{Pr}_1^* = \frac{n_2}{n_1 + n_2} \quad . \tag{18}$$

From (17) and (18) we obtain that the expected equilibrium payoff for each leader equals

$$E\!\left(w_1^*\right) = \; A \frac{n_1^3}{\left(n_1 + n_2\right)^2} \quad and \quad E\!\left(w_2^*\right) = A \frac{n_2^3}{\left(n_1 + n_2\right)^2} \quad . \tag{19}$$

And finally, assuming we can add up the amounts of effort invested in quality governance of the countries, we can calculate the total amount of effort invested together by both countries in quality governance. In the literature this measure is called rent dissipation. In our contest it tells us how much effort the leaders in the countries have invested in quality governance in order to increase the proportion of aid obtained from the donor country.

We denote this total effort invested in quality governance in equilibrium by X^*:

$$X^* \; = \; x_i^* + x_j^* = A \frac{n_1 n_2}{n_i + n_j} \quad . \tag{20}$$

Identical marginal benefits from aid

In the case in which the leaders of the countries are symmetric in terms of their marginal benefit from aid, i.e., $n_1 = n_2 = n$ (as in (11)), we obtain that the level of investment in quality governance of each of the countries will be identical and equal to:

$$x_1^* = x_2^* \; = \; \frac{n}{4} A \quad . \tag{21}$$

The Nash equilibrium proportion of the aid obtained by each of the countries will be equal to one-half:

$$\Pr_1^* = \Pr_2^* = \frac{1}{2} \ . \tag{22}$$

The expected equilibrium payoff to each leader equals:

$$E(w_1^*) = E(w_2^*) = \frac{n}{4} A \ , \tag{23}$$

and finally the total effort invested in quality governance in equilibrium equals:

$$X^* = \frac{n}{2} A \ . \tag{24}$$

2.3 Comparing proportional aid and aid to one country

We now wish to compare these two types of contests both from the perspective of the donor and the leaders of the recipient countries. The donor is concerned with the level (the quantity and intensity) of the quality of governance in potential recipient countries. It wishes to find a contest that will maximize the amount of quality governance for a given level of aid. The receiving leaders wish to have a contest that will maximize their expected net payoffs. Let us therefore compare both systems and see which is better from the perspective of the donor and of the leaders of the receiving countries.

Identical marginal benefit from aid

Let us first compare the two situations in the scenario where both leaders have the same marginal benefit from aid, $n_1 = n_2 = n$.

Under the contest when aid goes to one country only, we obtain from (12) and (13):

$$E(x_1^*) = E(x_2^*) = A\frac{n}{2} \ , \ \Pr_1^* = \Pr_2^* = \frac{1}{2} \ , \ E(w_1^*) = E(w_2^*) = 0 \ \text{ and } \ X^* = An. \tag{25}$$

Under a contest in which each obtains a proportional amount of aid relative to their investment in governance quality we obtained from (21)-(24):

$$x_1^* = x_2^* = A\frac{n}{4} \ , \ E(w_1^*) = E(w_2^*) = A\frac{n}{4} \ , \ \Pr_1^* = \Pr_2^* = \frac{1}{2} \ , \ X^* = A\frac{n}{2} \ . \tag{26}$$

It is clear, therefore, that in both cases the probability/proportion of aid received by each country is identical to fifty per cent. Each country in the case in which all the aid goes to one country invests more resources in quality governance while each of the leaders of the countries has a higher expected payoff under the relative system under which each country receives aid proportionate to their investment effort in quality governance. The more one invests, the higher the chance of receiving aid. The more fungible that non-aid funds are, the easier it is for the leader of a country to turn the governance system

9

around and embark on a path towards higher quality. Therefore, requiring that a country has better quality governance helps channel resources appropriately. Since the total amount of aid is fixed, the situation that maximizes the quality of governance increases the flexibility of non-aid funds. It is important to notice that even if only one country receives aid, both countries are investing in quality governance so the return to aid is from the two countries competing for the funds.

Since the donor wishes to maximize quality governance and the leaders of the countries wish to maximize expected payoffs we obtain,

Result 2: *In the case of an identical marginal benefit from each dollar of aid for the leaders of the country, the donor country will prefer the system under which the aid will all go to only one country, while the leaders of the receiving countries will prefer that each country obtain the proportion of aid relative to its governance quality.*

Marginal benefit from aid is not identical

Now let us consider the case in which the marginal benefits of the leaders from aid are not identical and that leader 1 has a higher marginal benefit than leader 2, $n_1 > n_2$.

In the case where all the aid goes to one country, for the country that invests in the highest level of quality governance, we obtain from (7)-(10) that expected investment in quality governance, the probability of winning the aid, the expected net payoff of the leaders and the total investment in quality governance equal,

$$E\left(x_1^*\right) = A\frac{n_2}{2} \,,\; E\left(x_2^*\right) = A\frac{n_2^2}{2n_1} \,;\qquad \Pr_1^* = \frac{2n_1 - n_2}{2n_1} \,,\;\; \Pr_2^* = \frac{n_2}{2n_1} \,;\qquad (27)$$

$$E\left(w_1^*\right) = A\left(n_1 - n_2\right) \,,\; E\left(w_2^*\right) = 0 \,;\quad \text{and}\quad E\left(X^*\right) = A\,\frac{n_2\left(n_2 + n_1\right)}{2n_1} \;.$$

On the other hand under the contest where each country receives aid in proportion to its investment in quality governance, we obtain from (17)-(20) that the investment in quality governance, the probability of winning the aid, the expected net payoff of the leaders and the total investment in quality governance equal,

$$x_1^* = A\frac{n_1^2 n_2}{\left(n_1 + n_2\right)^2} \,,\; x_2^* = A\frac{n_1 n_2^2}{\left(n_1 + n_2\right)^2} \;;\quad \Pr_1^* = \frac{n_1}{n_1 + n_2} \,,\;\; \Pr_2^* = \frac{n_2}{n_1 + n_2} \,;\quad (28)$$

$$E\left(w_1^*\right) = A\frac{n_1^3}{\left(n_1 + n_2\right)^2} \;;\; E\left(w_2^*\right) = A\frac{n_2^3}{\left(n_1 + n_2\right)^2} \qquad\qquad \text{and}$$

$$X^* = x_i^* + x_j^* = A\frac{n_1 n_2}{n_i + n_j} \;.$$

3 The Donor

Let us start by analysing the relationship between the two contests from the donor's perspective. In order to receive aid, the donor decides that the receiving countries must invest in quality governance.

The total amount of expenditure on quality governance invested in the contest is higher under the relative generalized division of aid rather than the case that the aid goes all to one country if:

$$A\frac{n_2 n_1}{n_1 + n_2} > A\frac{n_2 \left(n_2 + n_1\right)}{2n_1} \quad . \tag{29}$$

Equation (29) holds if and only if:

$$n_1^2 - 2n_1\, n_2 - n_2 > 0. \tag{30}$$

From (30) we may conclude that the total amount invested in quality governance is higher under the relative system than with the system in which only one country receives the aid if

$$n_1 > n_2\left(1 + \sqrt{2}\right). \tag{31}$$

Since, by assumption, $n_1 \geq n_2$, the result indicates that in order for the relative system to be better for the donor country, the marginal benefit of a dollar of aid to the leader of country 1 has to be sufficiently larger than that of the other leader (more specifically it has to be more than twice as large). We summarize this result in the following proposition,

Result 3: *If the variance between the marginal benefit to the leaders of the countries is sufficiently large, i.e., $\frac{n_1}{n_2} > 1 + \sqrt{2}$, then the donor country will prefer the relative system under which the countries obtain aid relative to their investment in quality governance instead of the system in which all the aid goes to the country that invested the most in quality governance.*

3.1 The leaders of the countries

In order to analyse the preferences of the leaders of the countries who wish to obtain the aid, we must compare their expected payoffs under both systems. Remember that we assumed, without loss of generality, that leader 1 has at least as large a stake as leader 2 $(n_1 \geq n_2)$. The leaders of the countries prefer the aid system that generates for them the maximum expected equilibrium payoff, $E(w_i^*)$. Under the relative aid system, the expected equilibrium net payoff for leader 2 (the leader with the lower marginal benefit from aid) equals $E(w_2^*) = A\dfrac{n_2^{\,3}}{\left(n_1 + n_2\right)^2}$, while the expected equilibrium under the

system that aid goes to one country only equals zero, $E(w_2^*) = 0$. Therefore it is clear that:

Result 4*: The leader with the lower marginal benefit from aid will always prefer the proportional system under which each country receives aid proportional relative to the amount invested in quality governance.*

For the leader with the higher marginal benefit from aid, the expected equilibrium net payoff under the proportional system equals $E(w_1^*) = A \dfrac{n_1^3}{\left(n_1 + n_2\right)^2}$, while the expected equilibrium net payoff under the system of the single-country recipient equals $E(w_1^*) = A\left(n_1 - n_2\right)$. The expected payoff for leader 1 under the relative system is greater than that obtained under the other system if:

$$\frac{n_1^3}{\left(n_1 + n_2\right)^2} > n_1 - n_2 \; . \tag{32}$$

Equation (32) holds if and only if

$$n_1^2 - 2 n_1 n_2 - n_2 < 0 . \tag{33}$$

From Equation (33) we may conclude that the relative system is better for the leader with the higher marginal benefit if:

$$0 < n_1 < n_2\left(1 + \sqrt{2}\right). \tag{34}$$

In other words,

Result 5*: The leader with the higher marginal benefit prefers the relative system if the difference between the leader's marginal benefit is not sufficiently large,* $\dfrac{n_1}{n_2} < 1 + \sqrt{2}$.

The donor and the leader of the country with the higher marginal benefit from aid have conflicting preferences. However, the donor and the leader with the lower marginal benefit from aid have similar preferences with regard to the type of contest to hold.

3 Poverty trap

Now assume that the criteria for obtaining aid is not only how much the country invests in quality governance but also the level of its poverty. Let d_i be a parameter capturing how badly off the country is in terms poverty. We can think of d_i as the number of poor or a more formal measure of poverty, where an increasing d_i indicates greater poverty. In order to compare our results to the ones presented above, we restrict this analysis to the decentralized division of aid under which countries obtain aid in proportion to the

level of investment in governance quality (as well as the poverty level). We do not analyse this in the system where aid goes all to one country, as then we have to determine the criteria under which the 'best' wins. This will give us many different possibilities and we would get different results for each. Thus in order for us to be able to compare the results obtained earlier, we confine ourselves to the decentralized method under which each receives a proportion of the aid. Moreover, in order to add emphasis to our results, we consider the scenario where both countries have the same marginal benefit from aid, $n_1 = n_2 = n$. Again, the reason here is one of convenience and simplicity in comparing the results.

Let the contest success function, the proportion of aid received by country i, be equal to,

$$\Pr_i = \frac{d_i x_i}{d_j x_j + d_i x_i} \quad for \ \forall j \neq i. \tag{35}$$

Under this contest for aid, each country will receive funds proportional to the investment in quality governance and the level of poverty. The donor allocates aid on the basis of the level of poverty (more poverty, more aid), making the probability of receiving aid increase with greater poverty. This contest success function is a variant of the Tullock (1980) contest success function (see also Epstein 2000).

Each leader of each country invests in governance quality, x_i, and decides whether to invest in poverty reduction (lowering d_i) or not (allowing poverty either to stay the same or increase). The expected net payoff of the leader of country i is given by:

$$E(w_i) = \frac{d_i x_i}{d_i x_i + d_j x_j} A \, n - x_i - d_j \quad \forall i \neq j, \ i,j = 1,2. \tag{36}$$

Solving the first-order conditions for both players, we obtain that the optimal investment in governance quality and in poverty (that is, having poverty increased) equals:

$$x_1^* = x_2^* = d_1^* = d_2^* = \frac{n}{4}, \tag{37}$$

and the probability of winning and the total expenditure on quality governance equals,

$$X^* = \frac{n}{2} \quad and \quad \Pr_1^* = \Pr_2^* = \frac{1}{2}. \tag{38}$$

As we can see from this example, the results in terms of the donor country are identical to those we obtain when there is no option to increase the proportion of aid received based on the poverty level (see (21)-(23)). In both cases the leaders of the countries invest the same amount of resources. Thus in the two cases, both leaders will receive the same proportion of aid, invest the same amount of resources in quality governance and at the same time spend effort and resources in a way that poverty increases (of course, one measure of good governance could be poverty reduction). In other words, such a policy driven by the donor country will increase poverty.

Result 6*: If the donor introduces a condition under which the portion of aid received by a country is a function of the poverty of a country, then this will induce the country to make investments that will increase poverty while at the same time increase resources invested in governance quality. Such a system will create a poverty trap, causing the leaders of the countries to invest in order to raise the poverty level to obtain a higher proportion of aid.*

4 NGOs verses donor countries

Now assume that countries that have a small amount of resources to donate will choose to do so directly to one country. On the other hand, NGOs may have more funds and, with returns to scale, be more able to give their resources to many countries, assuming that the donor and the NGO have the same goals. We may thus conclude:

Result 7*: In the case of m>2 countries competing for donor resources, the donor will take part of the resources and let two of the countries compete for it in the way that the one with the highest quality of governance receives all the funding. It will give the rest of the funding to NGOS who will divide the aid proportionate to the amount of resources invested by each of the countries.*

5 Conclusion

The donor may have a particular goal related to its aid programme, or it may be trying to satisfy multiple objectives. To achieve these goals, the donor may need to encourage change in recipient behaviour. Recipients, however, are not passive. They have objectives of their own; in particular, their leaders may have their own agendas. To simplify the discussion in this paper, we assume the donor government believes that its multiple goals can be achieved by first ensuring there is good governance in the recipient country—and by withholding aid until that time. What drives our model is the donors' desire for good governance and the local leaders' desire for long-term gain. Our main result is that the recipient who is most effective in governance and stands to benefit the most, has interests opposite that of the donor. We also single out the desire of the donor for poverty reduction, the consequence of which may be the development of a poverty trap. In order to continue to receive transfers based on poverty, a potential recipient government may deliberately allocate funds away from the poorest so as not to better their position. Incentives often work in non-obvious ways.

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