On the Delegation of Aid Implementation to Multilateral Agencies

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Abstract

Some multilateral agencies implement aid projects in a broad range of sectors, with aid disbursements showing a strong overlap with those of bilateral donors. Why do donors delegate sizable shares of their aid to non-specialized agencies for implementation? This paper develops a game theoretic model to explain this puzzle. Donors delegate aid implementation to strengthen aid selectivity, incentivizing policy improvements in recipient countries, which in turn improves the development effectiveness of aid. Aid delegation is optimal for donors who disagree on the optimal distribution of aid precisely when an agency represents the average donor. In the model, politicized and non-selective bilateral aid can coexist with selective aid implemented by a multilateral agency funded by those same bilateral donors. Empirical evidence focusing on aid from the World Bank's International Development Administration (IDA) is consistent with the model's predictions.

Keywords: Foreign aid; trust funds; aid selectivity; multilateral agency

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1 Introduction

Most bilateral donors transfer a considerable share of their aid budgets to other agencies for implementation. These implementing agencies include multilateral institutions such as the World Bank, IMF, the European Union (EU), and various UN agencies, as well as national and international NGOs, other bilateral donors, and more recently "vertical" or sector-specific funds such as the GAVI Alliance and the Global Fund.

The impact of aid can be enhanced by delegating implementation to specialized agencies that plausibly have comparative advantages in specific sectors or problems: e.g., the Global Fund specializes on the fight against AIDS, tuberculosis and malaria, and GAVI on immunization in poor countries. However, delegation of aid also occurs to agencies that are much less specialized. In fact, the aid disbursements of some multilateral agencies look very similar to those of the average bilateral donor. These agencies run simultaneous projects in a broad range of sectors such as public health, education, government and civil society, and operate in the same recipient countries as their bilateral counterparts. When we calculate how closely a donor's aid allocation resembles the aid allocation of the average donor, some multilateral agencies show some of the largest overlap. In fact, the World Bank's fund for assisting low-income countries (the International Development Administration, or IDA) is the top donor in terms of sectoral overlap, as 80% of its budget disbursed across sectors coincides with the disbursements of the typical bilateral donor. Thus, contrary to the theory of comparative advantage and specialization in aid implementation, some multilateral agencies stand out by how similar their aid disbursements are when comparing them to the average bilateral donor. The question then arises of why do bilateral donors delegate aid implementation to non-specialized multilateral agencies (MLs)?

We provide a model that can explain this puzzle, and present evidence consistent with the model's predictions. The model shows that donors delegate aid implementation to non-specialized agencies because their aid allocations across recipient countries are more selective in terms of policies and poverty levels. The main comparative advantage of MLs is their aid selectivity, rather than sectoral or even country expertise. Policy selectivity provides an incentive for recipients to improve their policies, in turn increasing the development effectiveness of aid. The model shows that bilateral donors are better off delegating aid to a ML even when they are purely altruistic and care only about the public good in recipient countries, but disagree on how that good should be distributed across recipients. Key for our result to hold is that the ML searches some middle ground among disagreeing donors. The fact that the ML represents the *average* donor is precisely what makes aid delegation to it beneficial for bilateral donors. In our setup, aid

selectivity - in terms of both policy and poverty - emerges endogenously and is credible, as it is the solution to the ML's optimization problem.

The model produces another insight that we believe is of interest: there is no need for aid allocations of *all* donors to be policy selective. This paper shows that if one sufficiently large donor is policy selective in its aid allocations, there is no need for other donors to be policy selective. The point is that having more aid allocated in a policy-selective (as opposed to non-policy selective) way does not necessarily give recipient countries stronger incentives to improve policies. This result emerges not simply out of a technical curiosity of the model but because the donors' aid allocation rule obtained in equilibrium is both poverty and policy selective. Allocating more aid competitively among recipients according to policy quality does not necessarily translate into stronger incentives for policy improvements, because donors are also poverty selective, i.e. they want to reduce inequality among recipients. As a sufficiently large donor that is policy selective in its aid allocations, the ML produces a public good for all other donors, as it provides recipients with the maximal incentive to improve their policies even when bilateral donors allocate their remaining aid budgets in ways that are non-policy selective, e.g. based on political, commercial, or other interests.

The existing literature points to two main reasons why donors may delegate aid to multilateral agencies. First, MLs have better information or expertise (Rodrik, 1996); second, relationships between MLs and recipient countries are less politicized (Milner, 2006). We add a third explanation, by showing that donors are better off delegating aid implementation to the ML even in cases where it has no technological advantage in aid implementation, and where aid implemented by bilateral donors is not politicized. We show that donors that care about the public good in poor countries, but disagree about the optimal distribution of public goods among those countries, are better off delegating all or some of their aid budgets to a multilateral agency that searches for the middle ground among disagreeing donors. Furthermore, if bilateral aid is politicized, then the motive for delegation is even stronger. In our model, politicized aid is not effective if it is not accompanied by aid delegated to the ML. In equilibrium, politicized bilateral aid can coexist with multilateral aid, while still giving recipients maximal incentives to improve their policies.

Aid delegation has been studied in a game theoretic framework in Svensson (2000) and Hagen (2006). In their models, aid is never policy selective without an exogenous commitment device as policy has no impact on aid effectiveness. In the setup proposed here, policy influences aid effectiveness, which makes policy selective aid possible. However, the strategic interplay between donors can greatly reduce policy selectivity, hence the motive to delegate aid to a multilateral agency. In the models by Svensson (2000) and Hagen (2006), delegation of aid to a mul-

tilateral agency occurs in equilibrium because of a difference in poverty aversion between the ML and the donor. In our model, the ML's equilibrium aid allocation is both more poverty and policy selective as compared to the bilateral donors' allocations. In Svensson (2000), for example, the ML's aid allocation is less poverty selective as it is assumed to be less poverty averse.

A second noteworthy difference is that our model has two donors whereas the models in Svensson (2000) and Hagen (2006) have only one donor. This is important because maximizing the public good across recipient countries benefits all donors. However, if donors disagree with respect to the distribution of the public good across recipients, then the presence of the other donor reduces or removes policy selectivity in each donor's aid allocation. Our point is that with one donor aid is always policy selective, but with two and more donors, it may not be. The role of the ML then is to produce that public good for all donors which occurs if it represents the average donor in the game. Thus, our model can explain why it is optimal for donors with very different motives for aid-giving to delegate aid implementation to the same multilateral agency. Svensson (2003) develops a game theoretic model that studies aid conditionality where policy – as in the paper here – affects aid effectiveness. In that setup the optimal aid allocation is policy selective if a donor disburses aid to more than one recipient. However, the previous observation made related to the number of donors also applies to Svensson (2003), as he studies the case with one donor only. Also, note he does not study aid delegation to multilateral agencies.

The remainder of the paper is organized as follows: Section 2 describes the sectoral composition of aid disbursements of bilateral donors and compares it with some selectively chosen multilateral agencies. Section 3 introduces the game theoretic model explaining why delegation to non-specialized agencies is optimal for bilateral donors. Section 4 presents empirical evidence pertaining to the World Bank's International Development Administration (IDA)that supports some of the predictions made by our theory. Finally, Section 5 concludes.

2 Overlap in Aid Disbursements

In analyzing overlap of donors' aid allocations, we use data provided by the Creditor Reporting System (CRS) published by the OECD on a regular basis. This detailed dataset reports aid disbursements and sectoral attributions (through "purpose" codes) at the project level. We use the data from 2007 onwards, as the data are more comprehensive in recent years, and sectoral data are missing for many observations in the years before 2007.

In our analysis we include 16 sectors: education; health and population pol-

Table 1: Budget Shares across Sectors

Sector	Average Budget Shares: 2010	2011	2012
Government and Civil Society	17.6 (14.4)	17.9 (15.7)	18.4 (15.5)
Education	16.8 (11.7)	16.4 (11.1)	18.7 (11.5)
Health and Population Policy	12.4 (13.7)	13.2 (15.1)	14.0 (15.7)
Other Multisector	7.9 (6.4)	6.4 (5.5)	6.4 (5.2)
Transport and Storage	6.9 (12.2)	7.9 (12.6)	5.8 (13.5)
Agriculture, Forestry, and Fishing	6.9 (6.7)	8.6 (6.8)	8.5 (6.1)
General Budget Support	6.7 (5.0)	5.6 (4.2)	4.5 (3.4)
Water and Sanitation	6.5 (7.7)	6.1 (8.2)	5.8 (8.0)
Other Social Infrastructure and Services	5.6 (4.7)	6.0 (3.6)	6.1 (3.8)
Energy Generation and Supply	4.4 (7.3)	4.3 (7.5)	4.4 (8.5)
Environmental Protection	3.3 (5.5)	3.1 (5.2)	2.7 (3.6)
Banking, Financial Services, Business and Other Services	2.2 (2.5)	1.8 (1.7)	1.7 (2.3)
Industry and Construction	1.2 (1.0)	1.2 (1.7)	1.2 (1.7)
Communication	0.8 (0.4)	0.6 (0.4)	0.8 (0.5)
Trade	0.6 (0.4)	0.8 (0.4)	0.7 (0.6)
Mineral Resources and Mining	0.3 (0.3)	0.3 (0.2)	0.3 (0.2)

Budget shares across sectors is calculated for 25 DAC members. This table reports the average of these shares across donors for the years 2010, 2011, and 2012. Shares of total disbursements across sectors reported in parenthesis. Data Source: Credit Reporting System (OECD).

icy; water and sanitation; government and civil society; other social infrastructure and services; transport and storage; communication; energy generation and supply; banking, financial services, business and other services; agriculture, forestry, and fishing; industry and construction; mineral resources and mining; trade; environmental protection; other multi-sector; and finally general budget support. We exclude debt relief efforts, humanitarian and emergency aid efforts, administrative costs, and refugee costs in donor countries, as these forms of aid do not match the forms of aid conceptualized in our model. We are interested in forms of aid that directly affect the public good in recipient countries in non-emergency situations.

Table 1 shows budget shares across sectors for the average bilateral donor between 2010 and 2012.[1] Notably, the sectors "Government and Civil Society" and "Education" have consistently the highest average budget share narrowly followed by "Health and Population Policy." Notice that these measures, however, do not imply that these three sectors account for most aid disbursements. In parenthesis, we report sector shares of total aid disbursements of all donors. For example, in 2012 "Education" received only 11.5% of total aid disbursements whereas "Health and Population Policy" with 15.7% received the most funds. Likewise, "Transport and Storage" received 13.5% of total aid disbursements whereas its share is only

[1]We include all the current 29 DAC members except the European Union, Poland, Slovak Republic, and Slovenia.

Table 2: Global Budget Shares

Donor	Donors' Share in Global Budget: 2010	2011	2012
JPN	15.7 (145)	13.2 (142)	13.8 (142)
USA	14.8 (140)	14.0 (135)	12.8 (136)
IDA*	14.0 (79)	13.7 (80)	13.1 (81)
IEU	8.5 (149)	13.2 (143)	15.0 (142)
FRA	6.7 (134)	7.2 (130)	7.2 (137)
DEU	5.9 (137)	6.5 (132)	5.9 (128)
GLF	3.5 (98)	2.9 (97)	3.5 (99)
GBR	3.1 (123)	2.9 (120)	3.2 (129)
ADB*	2.6 (27)	2.4 (30)	2.4 (29)
AfDF*	2.1 (38)	2.4 (39)	2.2 (39)
IMF*	1.9 (37)	1.9 (29)	1.9 (29)
ESP	1.7 (113)	1.1 (114)	0.6 (95)
AUS	1.6 (103)	1.5 (114)	1.7 (122)
DNK	1.4 (89)	1.3 (84)	1.2 (72)
AFESD	1.4 (12)	1.1 (11)	1.1 (12)
NOR	1.4 (103)	1.2 (106)	1.2 (107)
NLD	1.3 (88)	1.2 (85)	0.8 (79)
CAN	1.2 (123)	1.2 (124)	1.1 (114)
KOR	1.1 (133)	1.1 (133)	1.2 (133)
SWE	1.1 (102)	1.2 (105)	1.0 (109)

Global budget shares reported for the years 2010, 2011, and 2012 exclude debt relief efforts, humanitarian and emergency aid efforts, administrative costs, and refugee costs in donor countries. The number of recipient countries with positive aid disbursements from a donor reported in brackets. * indicates a donor using an official allocation formula with policy- and poverty measures. Data Source: Credit Reporting System (OECD).

5.8% for the average donor. The difference between these numbers in Table 1 emerges because of differences in priorities between small and large donors. Smaller donors seem to value "Education" more than "Health and Population Policy."

There are substantial differences in terms of the size of donors measured by their overall disbursements. Table 2 shows global budget shares for the top 20 bilateral and multilateral donors. What is striking is that two out of the top four donors are multilateral donors: IDA and the European Union combined disburse nearly 30% of all aid. There are other multilateral agencies in this list, however, with substantially smaller aid disbursements. The Global Fund disburses about 3.5% of the global budget and the IMF 1.8%. As expected, the US and Japan lead the ranking in terms of donor size. However, Japan is ranked as a larger donor than the USA in 2010 and 2012 because of the adjustments we make. Removing the bilateral aid that is channelled through multilateral agencies (trust funds) and excluding debt relief, humanitarian and emergency aid changes the ranking of the

two donors. Without these adjustments, the US is the largest bilateral donor.

In brackets we indicate the number of recipient countries of a donor in a year. Many donors disburse aid to a large number of recipients. These figures confirm observations made elsewhere pointing out the extent of aid fragmentation among donors (e.g. Knack and Rahman, 2007; Djankov, Montalvo, and Reynal-Querol, 2009; Annen and Kosempel, 2009; Annen and Moers, 2012). Noticeable, though is the small number of recipients for IDA given its size relative to other donors, suggesting that among IDA-recipient countries, IDA may be a very large and important donor.

To assess this issue more precisely, we rank donors in terms of their size in all IDA-recipient countries and calculate a z-score for the average rank of every donor between 1960 and 2012 using DAC disbursement data (DAC Table 2A).[2] A larger z-score indicates a higher-ranked (i.e. relatively large) donor. Figure 1 plots the z-score for IDA and the USA, the two donors with the largest average scores across all years. We find that IDA has the largest z-score in every year since 1984, and either the largest or second largest z-score in every year since 1975. In IDA-recipient countries, therefore, IDA is a top donor in terms of size. For example,

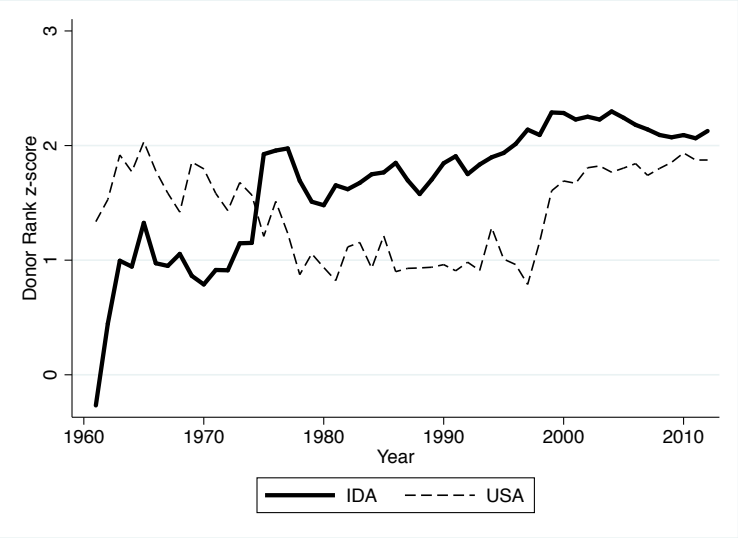

Figure 1: The vertical axis shows the z-score of the average rank of IDA and the USA across IDA-recipients in a given year in terms of its share in aid disbursements. Aid disbursements exclude debt relief, humanitarian -, and food aid. A larger z-score indicates a better ranked (larger) donor. Data Source: DAC, Table 2a (OECD).

[2]We use a z-score instead of just the average rank because the number of donors has changed across years.

Table 3: Donor Ranking in Sectoral Aid Allocation Overlap

Rank	Donor	OL over Sectors	OL over Recipients	OL over Sectors and Recipients
1	IDA	79.4 (78.8)	49.1 (58.3)	32.1 (38.0)
2	IEU	69.8 (65.7)	53.3 (60.1)	30.4 (33.7)
3	Avg. BD	68.3 (67.6)	40.2 (42.0)	23.9 (25.0)
4	ADB	66.4 (67.1)	21.3 (26.9)	10.9 (13.4)
5	IDB	60.2 (56.8)	8.9 (5.9)	6.0 (4.7)
6	AfDF	54.3 (55.6)	33.7 (41.6)	18.3 (22.2)
7	OFID	47.8 (46.6)	43.8 (48.8)	12.9 (14.2)
8	UNICEF	47.4 (47.8)	54.2 (57.4)	31.3 (33.5)
9	KFAED	45.9 (39.3)	23.9 (25.8)	4.9 (5.4)
10	BADEA	44.8 (45.3)	28.6 (34.3)	8.2 (9.8)
11	WFP	42.0 (41.6)	39.9 (44.7)	15.9 (18.2)
12	UNDP	41.7 (41.1)	57.1 (60.7)	21.6 (22.5)
13	AFESD	30.1 (24.7)	5.4 (2.7)	1.8 (0.9)
14	OSCE	27.9 (27.0)	7.5 (8.6)	2.2 (2.3)
15	WHO	13.6 (14.1)	54.2 (59.0)	12.0 (13.1)
16	UNFPA	12.9 (13.8)	58.7 (61.0)	11.9 (13.0)
17	GLF	12.9 (13.8)	50.9 (54.3)	10.8 (12.3)
18	GAVI	12.9 (13.8)	26.8 (32.5)	5.0 (6.2)
19	NDF	7.7 (7.7)	30.7 (37.6)	2.9 (3.8)
20	IMF	6.4 (6.9)	20.9 (26.0)	2.9 (3.5)
21	GEF	6.2 (6.4)	45.9 (54.5)	3.8 (4.0)
22	UNECE	5.0 (5.3)	0.3 (1.3)	0.0 (0.1)

OL measures the overlap in budget-shares across three dimensions: 'Sector,' 'Recipient,' and 'Recipient-Sector.' OL is measured by 100 minus the sum of the differences between budget shares of ML i across a dimension and the average of budget shares of all *bilateral* donors (Pedersen Index). The measures reported above are averages between 2007 and 2012. Debt relief efforts, humanitarian and emergency aid efforts, administrative costs, and refugee costs in donor countries are excluded. Donor overlap measures among IDA-recipient countries reported in brackets. Avg. BD lists OLs for the average bilateral donor. Data Source: Credit Reporting System (OECD).

since 2000, IDA has been on average the largest donor in 37% of its recipient countries, and it has been one of the top three donors in 80% of its recipient countries relative to all bilateral donors, including the US and Japan. Thus, IDA is a very significant donor in the (approximately) 80 IDA-eligible countries, which include most of the world's low-income countries.

To assess sectoral specialization of multilateral agencies relative to bilateral donors, we compare measures of the sectoral distribution of aid disbursements between the two. We focus on multilateral agencies with more than 1% of the global share of ODA, but include a few smaller, specialized agencies for illustrative purposes.

We calculate the sectoral overlap for ML i at time t by

$$\mathrm{OL}_{it} = 1 - \frac{\sum_s \left| \frac{a_{ist}}{a_{it}} - b_{st} \right|}{2}, \tag{1}$$

where a_{ist} is aid disbursed by ML i in sector s in year t, a_{it} is all aid disbursed by ML i in year t. b_{st} is the average share of aid disbursements in sector s in year t by all bilateral donors as shown in Table 1. We calculate OL_{it} for bilateral donors as well, but we then calculate the share of bilateral donors – b_{st} – for all bilateral donors other than this donor. We also produce similar measures for recipient overlap, i.e., with s indexing recipient countries in (1), and recipient-sector overlap, i.e. with s indexing sector-recipient pairs in (1). Table 3 shows the results.

This table reveals that there are two types of multilateral agencies, in terms of their overlap. On the one hand, most agencies have either low sectoral or low geographic overlap (or both) with the average bilateral donor. For vertical funds such as the Global Fund (GLF), GAVI, and Global Environment Facility (GEF) the overlap is between 13% and 6%, meaning that only 13 to 6 percent of their budget overlaps with the budget of the typical bilateral donor. These agencies strongly specialize in only one sector, whereas the typical bilateral donor disburses aid in a highly fragmented fashion across many sectors (see Table 1). Other donors, such as the regional development banks (RDBs, including AsDF and AfDF), have low geographic overlap with the typical bilateral donor. On the other hand, there are several agencies that exhibit very little specialization. In fact, IDA has the largest sectoral overlap: 80% of its budget allocation coincides with the budget allocation of the typical bilateral donor. Its overlap in terms of recipient countries is somewhat smaller, because IDA's aid is limited by its eligibility rules to about 80 mostly low-income countries. Nevertheless, its overlap with the typical bilateral donor is still larger than the one for the typical bilateral donor and those for the U.S., U.K. and Japan. If we calculate overlap in aid only among the IDA-eligible countries, IDA's overlap increases to about 60%, which is the third largest overlap after Germany (DEU) and the European Union (IEU). When we measure overlap in aid for sectoral-recipient pairs, IDA has a higher overlap (32%) than the typical bilateral donor (24%). When it is calculated only for aid to IDA-eligible countries, IDA's overlap increases to 38%. Only two bilateral donors (Germany and Norway) have a higher overlap than this. Among multilateral donors, IDA has the highest overlap in two out of the three dimensions. The EU has a higher overlap in terms of recipients. In contrast, sectoral-recipient overlap is far lower (as low as 3 or 4%) for some of the vertical funds. The overlap is relatively high for some UN agencies such as the UNDP, but they disburse much lower amounts of "core" multilateral aid than do IDA and the regional development banks; most of the aid

they administer is technically bilateral aid as it is earmarked by donors.

To summarize, we see some large multilateral agencies that are among the top donors in most of its recipient countries, and these agencies exhibit a strong overlap in terms of their aid disbursements with the average bilateral donor. In fact, IDA ranks higher than all but a few bilaterals on any measure of overlap we calculated. This finding raises the important question of why donors delegate a substantial part of their aid budgets to non-specialized multilateral agencies? In addition, why is aid delegation so extensive that some of these non-specialized multilateral agencies become top donors in the recipient countries they choose to operate? Finally, among the non-specialized agencies, why are core (unearmarked) contributions to some MLs, such as IDA, so much higher than to others, such as the UNDP? In the following we develop a game theoretic model that can explain these observations.

3 The Model

There are two donors, indexed by $i = 1, 2$, each with an aid budget of $b_i > 0$. The donors' problem is to allocate that budget between two aid recipient countries, indexed by $j = 1, 2$. Let $a_i = (a_{i1}, a_{i2})$ be donor i's aid allocation, where a_{ij} denotes donor i's aid disbursed to recipient country j. We assume throughout the paper that $a_{ij} \geq 0$. Let A_j be total aid given to recipient j, that is $A_j = a_{1j} + a_{2j}$. We call $a = (a_1, a_2)$ an aid allocation. We assume throughout this paper that donors are altruistic as they allocate aid to maximize a public good such as poverty reduction, education, maternal health, or disease control in each aid-receiving country. Aid may include any of the sectors described in Table 1. Preferences of donors are different, however, as each donor may weigh public goods across recipients differently. If G_j denotes the public good in recipient country j, then donor i's utility is given by

$$v_i = \alpha_{i1} G_1(A_1) + \alpha_{i2} G_2(A_2), \tag{2}$$

where $\alpha_{i1} + \alpha_{i2} = 1$. We assume that donors have conflicting preferences in how they weigh public goods across countries:

Assumption 1. *Assume that* $\alpha_{2j} = 1 - \alpha_{1j}$.

Note that we can capture a situation of no conflict by setting $\alpha_{1j} = 0.5$. Otherwise, donor preferences are in conflict. Without any loss of generality we assume that $\alpha_{11} \geq 0.5$. Asymmetry in their preferences is largest if $\alpha_{11} = 1$. In that case, each donor cares only for one recipient country, with one donor for each recipient. Assumption 1 can easily be justified. For example, the colonial history of

many donors can explain such conflicting biases, as donors may favor their former colonies. Empirical studies on aid allocation have indeed shown that colonial ties matter (e.g. Alesina and Dollar, 2000; Rajan and Subramanian, 2008).

Each of the two recipient governments $j = 1, 2$ chooses its policy $p_j \in [0, 1]$. Policy p_j affects the allocation of recipient j's resources r_j and total receipts of foreign aid A_j to the production of a public good G_j. Total resources for recipient j equal $R_j = r_j + A_j$. The public good equals

$$G_j = f(p_j R_j).$$

We think of p_j as 'control of corruption.' The larger p_j, the more of a country's resources are used for the production of a public good. We assume that f is a strictly positive and concave function, where $f'(0) > 1$ and $f'(r_j) < 1$. These assumptions assure an interior solution to the recipient's optimization problem. Note that G_j is a pure public good as aid by either player increases G_j.

Recipient j uses the fraction p_j of all resources R_j to produce the public good, G_j, and the other part of the resources, $(1 - p_j)R_j$, are public funds used for j's private gain, i.e. lucrative salaries, corruption, embezzlement, etc. Assume that the government cares for both the public and the private good, where recipient j's utility is given by

$$u_j(p_j) = G_j + (1 - p_j)R_j.$$

A recipient government maximizes u_j by choosing p_j. Note that u_j is the objective function of the government in an aid recipient country, which is different from the objective function of the general public. We assume that the general public in country j cares about the public good G_j. It follows that donors care about the well-being of the general public.

With $A_j = 0$, the recipient j's first-order condition equals

$$f'(p_j r_j) = 1.$$

Let the policy p_j in the no-aid situation be denoted p_j^N. Notice an important comparative statics result: more resources, $r'_j > r_j$, lead to a worse policy as $f'_j = 1$ implies that $p_j r_j = p'_j r'_j$.[3]

With $A_j > 0$, the recipient's first-order condition equals

$$[f'_j - 1](R_j + p_j A'_j) + A'_j = 0, \tag{3}$$

when allowing for the possibility that the donors' aid allocations depend on policy, i.e. $A_j = A_j(p)$. If we have that $A'_j > 0$, then the donor's aid allocation is 'policy selective' as a better policy leads to more aid. Studying equation (3) more carefully is instructive. The insights are summarized in the following proposition:

[3]To shorten notation, we replace $f'(x_j)$ by f'_j.

Proposition 1. *Without policy selectivity, i.e.* $A'_j = 0$*, aid is ineffective as aid does not increase the public good* G_j*. Aid strictly worsens policy* p_j*.*

Proof. We can see immediately that if $A'_j = 0$, then (3) reduces to $f'_j = 1$. Thus, in this case the public good is the same as in the case without aid. Let $p^o_j(A_j)$ be the policy with non-policy selective aid, A_j. The condition $f'_j = 1$ implies that $p^o_j(A_j) = \frac{r_j}{r_j + A_j} p^N_j$. Since $A_j > 0$, $p^o_j(A_j) < p^N_j$. □

In this model, donors face a Samaritan's Dilemma. It is often said that aid allocations of bilateral donors reflect primarily political and commercial motives, suggesting that allocations will be insensitive to recipients' policy choices (e.g. Alesina and Dollar, 2000). If so, the model predicts that aid is ineffective. Any impact aid has on G is fully crowded out by a reduction in the recipient's optimal policy. Aid merely increases the recipient governments' private good. Note that in our setup, aid is fully fungible. Even if aid revenues are nominally earmarked for producing the public good, the government will divert an equivalent amount of domestic resources from public good production to the private good.

Notice there are two implicit assumptions that drive this result. First, a recipient's resources and aid are perfect substitutes in the same ratio, no matter whether aid is used to produce the public good G or the recipient's private good, i.e. corruption. Second, utility is linear in the private good. In the recipient's utility function, one extra dollar to the private good increases u_j at a constant rate. This assumption implies that there are no income effects for the public good G. Both assumptions can be justified: If donor governments work closely with recipient governments and essentially delegate the implementation of aid to them, then a dollar implemented by the recipient government will have the same impact no matter whether it comes from the recipient's own resources or from a donor.

The second assumption seems stronger, but in the end all we need is that the income effect of the private good for the recipient government is stronger than the income effect for the public good. Given the tremendous inequality observed in many developing countries, stagnating public goods combined with ever increasing wealth of the elite, the recipient's utility function plausibly captures some aspects of reality. However, even if one disagrees with this assessment, the point we want to make is that increasing recipient governments' resources through aid inflows will not necessarily increase their provision of public goods through income effects. At a minimum, augmenting government resources needs to be combined with some other mechanism to ensure an increased provision of the public good, and the study of such an alternative mechanism is precisely the subject of this paper.

3.1 Aid Selectivity

Aid selectivity is such a mechanism. Aid selectivity can emerge endogenously in our setup for donors that maximize the public good G across recipients, if donors can observe policy and resource levels before making their aid allocations. Selectivity occurs in terms of poverty and policy, where poverty can be measured by r_j and policy by p_j. Thus, throughout the paper we will assume that donors decide on their aid allocations to recipients *after* they observe the recipient's policy choice.

Assumption 2. *Aid allocation decisions to recipients are made after perfectly observing recipients' policy choices p.*

Assumption 2 ensures that donors in fact are able to make their aid allocations conditional on policy. We will say that aid is policy selective if aid allocations positively depend on policy, i.e. $\frac{\partial a_{ij}}{\partial p_j} > 0$. In order to exactly pin down the donor's optimal aid allocation decision, we assume the following technology:

Assumption 3. *We assume a Cobb-Douglas production technology for the production of the public good G_j:*

$$G_j = (p_j R_j)^{\beta},$$

where $\beta \in (0, 1)$.

Consider now a donor's optimization problem given Assumption 3. Donor i maximizes v_i subject to the constraint that $a_{i1} + a_{i2} \leq b_i$ given p. Solving donor i's optimization problem yields

$$a_{ij}(p) = \max[0, \min[b_i, \frac{b_i + \tilde{R}_{-j} - \tilde{R}_j \rho_{ij}}{1 + \rho_{ij}}]], \tag{4}$$

where $\rho_{ij} \equiv \left(\frac{1-\alpha_{ij}}{\alpha_{ij}}\right)^{\frac{1}{1-\beta}} \left(\frac{p_{-j}}{p_j}\right)^{\frac{\beta}{1-\beta}}$, $\tilde{R}_j = r_j + a_{-ij}$ and the subscript $-j$ indicates the other player than j. This aid allocation rule, derived endogenously from our setup, has the following properties:

- First, it is 'poverty selective' as

$$\frac{\partial a_{ij}}{\partial \tilde{R}_j} = -\frac{\rho_{ij}}{1 + \rho_{ij}} < 0.$$

  In fact, for an unbiased donor i, i.e. $\alpha_{i1} = 1/2$, the optimal aid allocation equalizes resources, R_1 and R_2, across recipients if recipients choose identical policy levels (provided the donor has a sufficiently large budget). This property also implies that if recipient j receives more aid from the other donor, then it is optimal for donor i to reduce its aid. This is expected, as G is a public good among donors.

- Second, the rule is 'policy selective.' We obtain

$$\frac{\partial a_{ij}}{\partial p_j} \equiv a'_{ij} = \frac{R\rho_{ij}\beta}{p_j(1+\rho_{ij})^2(1-\beta)} > 0, \tag{5}$$

  where $R \equiv R_1 + R_2$. We observe that policy selectivity depends on total resources, and not on the aid budget per se.

- Third, policy selectivity depends on the preference parameter α_{ij}. It increases or decreases in α_{ij} depending on α_{ij} and relative policy levels.[4]

- Fourth, if $\tilde{R}_j = \tilde{R}_{-j} = 0$ and $\alpha_{ij} = 1/2$, then the aid allocation rule used by the donor is equivalent to a Tullock contest allocation rule, where the aid budget is allocated according to

$$a_{ij} = \frac{p_j^{\frac{\beta}{1-\beta}}}{p_1^{\frac{\beta}{1-\beta}} + p_2^{\frac{\beta}{1-\beta}}} b_i.$$

  We believe this is an interesting result as we provide a setup in which the well-studied Tullock contest function emerges endogenously and is not simply assumed, as in most of the literature on contests.[5] Notice that if $\beta = 1/2$, then the standard Tullock function is obtained. The larger β, the more 'competitive' is the donor's allocation rule. This gives a new interpretation for the 'randomness parameter' of the Tullock contest function. The lower the diminishing returns in the impact function, the more competitive (i.e. less random) is the contest. Even if $\tilde{R}_j = \tilde{R}_{-j} \neq 0$, the allocation-rule produces some sort of a contest among recipients for foreign aid in terms of policy.

We can conclude that a donor maximizing the public good G across recipients will allocate aid competitively, where the allocation rule amounts to a contest for aid among recipients in terms of their policy choices. Notice that all of these observations apply only if a_{ij} is part of an interior solution. We will analyze the impact of corner solutions on this analysis below. In our model, donors can commit to policy- and poverty-selective aid because the donor faces more than one recipient.

[4] Differentiating a'_{ij} with respect to α_{ij} yields $-\frac{R\beta\rho_{ij}(1-\rho_{ij})}{p_j(1-\beta)^2\alpha_{ij}(1-\alpha_{ij})(1+\rho_{ij})^3}$.

[5] An exception is the literature on the microfoundation of contest functions. For example, Corchón and Dahm (2011) propose a utility function for a social planner where a Tullock contest success function comes out as the utility maximizing allocation rule. For an overview on the micro foundation of contest success functions, see Jia, Skaperdas, and Vaidya (2013).

3.2 Delegation of Aid Implementation

Instead of implementing all of their aid through their own agencies, donors can delegate implementation of some or all of their aid budgets to a multilateral agency (ML). In many respects we model ML the same way as we model a bilateral donor, but with one important exception: ML's preferences are assumed to be a compromise among the conflicting preferences of bilateral donors.

Assumption 4. *We assume that ML maximizes the average payoff of the two donors,* $(v_1 + v_2)/2$.

Note that maximizing the utility specified in Assumption 4 is equivalent to maximizing

$$v_m = G_1 + G_2. \tag{6}$$

We believe that Assumption 4 is reasonable. As Milner (2006) states:

> "For instance, the World Bank resembles a global cooperative, which is owned by member countries, and in which control is shared by these members. The size of a country's shareholding depends on the size of the country's economy relative to the world economy. Together, the largest industrial countries (the Group of Seven) have about 45 percent of the shares in the World Bank. Thus the rich countries have a good deal of influence over the Bank's policies and practices. The United States has the largest shareholding, at about 17 percent, which gives it the power to veto any changes in the Bank's capital base and Articles of Agreement (85 percent of the shares are needed to effect such changes). According to the Bank, however, virtually all other matters, including the approval of loans, are decided by a majority of the votes cast by all members of the Bank. Hence even if the United States has an effective veto, it still cannot decide aid matters on its own; it must compromise with the other members of the Board, the Bank's collective principal, a fact which would seem to give the Bank greater latitude."

According to Gwin (1997, p. 243), factors limiting the exercise of U.S. influence include the potential effect on financial markets of politicized lending decisions, foreign policy advantages to being insulated from tough loan decisions, and the centrality of "burden sharing" as a U.S. policy goal. Moreover, the U.S. is not the only donor country that sometimes uses its influence on the Bank's executive board to pursue its national interests.

ML implements its allocated budget simultaneously with the donors after observing the recipient's policy choice p. Let $a_m = (a_{m1}, a_{m2})$ be ML's aid allocation.

Let m_i be donor i's aid budget that is delegated to ML. Thus, for each donor i we have that $b_i \geq m_i + a_{i1} + a_{i2}$. In terms of timing, we assume that the aid delegation decision is made before donors observe policy.

Assumption 5. *Donors $i = 1, 2$ make their aid delegation decision m_i before observing recipients' policy choices p.*

Combined with Assumption 2, Assumption 5 produces the following timing of the game. First, bilateral donors simultaneously decide on the budget to delegate to ML, m_i, for $i = 1, 2$. Second, recipients observe m_i, and simultaneously choose policy p_j for $j = 1, 2$. Donors and ML observe p, and simultaneously choose aid allocations a_i, for $i = 1, 2, m$.

We will proceed in two steps. First, we will assume aid delegation and analyze the consequences of it, and then we will show that it is indeed optimal for donors to delegate aid budget to ML.

3.2.1 Exogenous Delegation

We can establish the following result:

Proposition 2. *Assume $m_1 = b_1$ and $m_2 = b_2$, and assume a total aid budget $b_1 + b_2$ that is sufficiently large. Then, $a_m = (\frac{b_1+b_2+r_2-r_1}{2}, \frac{b_1+b_2+r_1-r_2}{2})$ and $p = (p^M, p^M)$ is the unique Subgame Perfect equilibrium outcome in this game. The following holds for p^M:*

i. $p^M > p^o(\frac{b_1+b_2+r_{-j}-r_j}{2})$ for all $j = 1, 2$, which implies that aid is effective. Aid increases the public good G_j for all $j = 1, 2$. Recall that $p^o(x)$ denotes the optimal policy with non-policy selective aid x.

ii. Donor i reducing m_i by $\epsilon > 0$ and disbursing the aid unconditionally to a recipient does not affect p^M provided ML's budget, $m_1 + m_2$, remains sufficiently large.

Proof. ML maximizing its payoff v_m allocates aid using the allocation rule described in (4) with $\rho_{mj} = \left(\frac{p_{-j}}{p_j}\right)^{\frac{\beta}{1-\beta}}$. Given that recipients both choose the same policy level p^M, the allocation-rule equalizes resources such that $R_1 = R_2 = R/2$ (poverty selectivity). The allocation $a_m = (\frac{b_1+b_2+r_2-r_1}{2}, \frac{b_1+b_2+r_1-r_2}{2})$ achieves this result, and it is feasible given the budget $b_1 + b_2$. Given this allocation rule, recipient 1 can assure it receives half of total resources, $R/2$, by choosing $p_1 = p_2$. This choice yields the payoff

$$\tilde{u}_1(p_2) = (p_2(R/2))^\beta + (1 - p_2)(R/2).$$

On the other hand, for recipient 1 to attract more resources, it needs to choose a policy $p_1 > p_2$. In this case the payoff equals

$$\hat{u}_1 = (p_1(r_1 + a_{m1}(p_1, p_2))^{\beta} + (1 - p_1)(r_1 + a_{m1}(p_1, p_2)).$$

Let $\hat{u}_1(p_2)$ be the value function, i.e. $\hat{u}_1$ evaluated at the optimal choice $p_1(p_2)$ given p_2. Optimization implies that $\hat{u}_1(p_2) \geq \tilde{u}_1(p_2)$, as recipient 1 can always achieve $\tilde{u}_1$ by choosing $p_1 = p_2$. However, since the donors' allocation rule establishes symmetry if $p_1 = p_2$, both recipients must earn the same payoff in equilibrium. Therefore, policies must be identical in equilibrium and policies must be chosen such that

$$\hat{u}_1(p_2) = \tilde{u}_1(p_2) \quad \text{and} \quad \hat{u}_2(p_1) = \tilde{u}_2(p_1). \tag{7}$$

Condition (7) states that policy levels are chosen such that neither recipient can benefit by unilaterally increasing policy any further given the other recipient's policy choice.

Given $R_1 = R_2 = R/2$ and $p_1 = p_2 = p^M$, a'_{mj} described in (5) reduces to $\frac{R\beta}{4p^M(1-\beta)} > 0$. Substituting into (3) and simplifying yields

$$f'_j = -\frac{\beta}{p^M(2-\beta)} + 1 < 1. \tag{8}$$

$f'_j < 1$ implies that the public good is larger as compared to the situation when there is no aid or when aid is non-policy selective. There exists a $p^M > p^o(\frac{b_1+b_2+r_{-j}-r_j}{2})$ so that (8) either holds with equality or with inequality in which case $p^M = 1$. Given the aid allocation rule (4) that equalizes resources, and given that (8) depends on total resources and not on a_{mj}, it follows that if (8) holds for one recipient then it will also hold for the other recipient. The outcome described in the proposition is consistent with all players' first-order conditions in this game being satisfied. In addition, it is straightforward to show that second-order conditions are satisfied. However, the first-order conditions described in (8) are necessary but not sufficient conditions. If ML's aid budget is too small, each recipient has a beneficial deviation in playing p^N instead of p^M, given that the opponent plays p^M. The Kuhn-Tucker conditions identify a local but not a global maximum. Thus, ML's aid budget needs to be sufficiently large in order to make participation in the contest for aid individually rational. We have assumed that the budget is sufficiently large. Statement (ii) in Proposition 2 directly follows from the observation that (8) depends on total resources and not on the aid allocation itself. A reduction of ML's budget does not change total recipient resources if donors disburse the entire budget and ML equalizes resources across recipients, which they do in equilibrium. □

If ML does not have a sufficiently large budget, then the equilibrium of the game will be in mixed strategies. However, it is beyond the scope of this paper to describe these strategies, and it is not even clear whether it is possible to describe these strategies.[6]

Notice that by choosing $p_1 = p_2$, a recipient government can always assure half of the total resources R, and in equilibrium recipients each end up with that amount. As a result both recipient governments would be better off if they can collude in choosing a policy level smaller than p^M (collusion). However, such an agreement is not implementable as each recipient has an incentive to unilaterally increase the policy level above the agreed level, for any agreement that tries to implement a policy level smaller than p^M. However, for all possible agreements, where $p_1 = p_2$, there is a policy level above which each recipient is strictly deterred from increasing policy any further than the opponent. This is precisely the policy level obtained in equilibrium. The equilibrium policy level is 'the end of the race.' In other words, for $p_2 > p^M$, $p_1(p_2) < p_2$ and for $p_2 < p^M$, $p_1(p_2) > p_2$. The equilibrium occurs where both recipients are no longer willing to 'outbid' the opponent in competing for more aid.

Property (ii) in Proposition 2 in our view is surprising and deviates from typical contests studied in the literature: giving ML a higher budget while keeping total resources constant will not affect policies p when ML has an aid budget that is sufficiently large. This property also implies that there is no need for *all* donors to be 'policy selective:' If there is one large enough donor with policy selective aid allocations, then all other donors can benefit from this mechanism and allocate their remaining aid unconditionally. The policy selectivity of aid by this one donor creates a public good for all other donors. Notice that this property of the equilibrium emerges because ML's allocation rule combines both policy selectivity and poverty selectivity. A poverty-selective donor is inequality averse and aims to equalize resources provided policy levels are identical.

There are large returns to policy selective aid: For example, if $\beta = 0.5$, $r_1 = 40$, $r_2 = 30$, and $m_1 + m_2 = 60$, then the public good with non-policy selective aid equals 0.5. With policy selective aid, the public good is nearly ten times as large, namely 4.7, and policy increases from the no-aid policy level of 0.00625 to 0.37. If the donor were able to implement all of its aid to produce the public good without aid being diverted to produce the private good (no aid fungibility), then the public good would be equal to 4.5. Thus, policy selectivity not only mitigates aid fungibility but it also gives recipients an incentive to invest more of their own resources into the production of the public good G.[7] Notice that both recipients

[6] So far, nobody has managed to pin down mixed strategies when they emerge in Tullock contests, except for the case when the contest is identical with an all-pay auction.

[7] Cordella and Dell'Ariccia (2007) find a similar result when analyzing the benefits of

are better off taking part in the contest for aid. Recipient 1's payoff in the no-aid situation equals 40.25 whereas its payoff in the equilibrium described above equals 42.36. Since recipient 1 has more resources than recipient 2, it receives less aid in equilibrium. This implies that if it is rational for this recipient to participate in the contest for aid then it is also rational to do so for recipient 2. This numeric example shows that a contest for aid can give recipients strong incentives to improve policy. If β increases to 0.9, then recipients' incentives to invest in the public good without aid are reduced and the public good equals 0.387 instead of 0.5 as before. However, the contest for aid now is substantially more competitive. In fact, the FOCs produce $p^M = 1$ as a solution. However, this is not an equilibrium as recipients have an incentive to deviate to the no-aid policy level given the opponent plays $p^M = 1$. However, if $r_1 = 35$, $r_2 = 25$, and $m_1 + m_2 = 60$, then $p^M = 1$ is the unique equilibrium outcome in this game. Compared to before, total resources remain at 120. Thus, given total resources in an economy, there is always a distribution of resources in terms of r_1, r_2, and aid budgets such that policy choices are part of a pure strategy equilibrium in the game.[8]

3.2.2 Endogenous Delegation

Proposition 2 assumes delegation. We need to show that donors are indeed better off delegating aid to ML. The case for delegation is immediately apparent if $\alpha_{11} = 1$. In this case, donor 1 cares only about the public good for recipient 1, and donor 2 only cares for the public good for recipient 2. With these preferences, donor 1 allocates all of its budget to recipient 1, and donor 2 allocates all its budget to recipient 2, no matter policies p. Thus, in equilibrium the public good is identical to the public good in the no-aid situation and policy is strictly worse. Proposition 1 applies as aid is not policy selective. Delegating aid to ML will clearly make each donor better off, despite the fact that ML will allocate positive amounts of aid to both recipients and donors only care about one recipient. In the other extreme when $\alpha_{11} = 1/2$, donors are indifferent between delegating or not delegating aid. In this case, both donors want to equalize resources if policies are identical across recipients as is the case with ML.

Consider now what happens when $\alpha_{11} > 1/2$. For illustrative purposes we assume that $r_1 = r_2$ and $b_1 = b_2 \equiv b$, i.e. we have perfect symmetry. The 'no-outbid' payoff defined above, given p_2, changes to

$$\tilde{u}_1(p_2) = (\theta p_2(r_1 + b))^\beta + (1 - \theta p_2)(r_1 + b),$$

'conditional aid' as opposed to 'project aid.'

[8]This statement can be proven easily. For $r_j = 0$ for $j = 1, 2$ each recipient is strictly better off to participate in the contest for aid. The equilibrium is unique and in pure strategies in this case.

where $\theta = \left(\frac{1-\alpha_{11}}{\alpha_{11}}\right)^{\frac{1}{\beta}} < 1$ if $\alpha_{11} > 1/2$. In order to keep all of the aid from donor 1, recipient 1 needs to choose a policy p_1 that is at least $\theta p_2 < p_2$. In contrast, for recipient 1 to attract some positive amount of aid from donor 2, it needs to choose a policy level that is strictly larger than $\frac{1}{\theta} p_2 > p_2$. 'Outbidding' becomes more costly as now policy needs to increase by at least $(\frac{1}{\theta} - \theta)p_2$ in order for recipient 1 to attract some aid from donor 2. This implies that the policy level needed to deter recipient 1 from outbidding will be reduced. With $\alpha_{11} = 1/2$, recipient 1 is just indifferent between 'outbidding' and 'not-outbidding' if $p_2 = p^M$. With $\alpha_{11} > 1/2$, recipient 1 is strictly better off not outbidding if $p_2 = p^M$, as $\tilde{u}_1$ strictly increases and $\hat{u}_1$ strictly decreases as a result of this change in α_{11}. Thus, now recipient 2 can lower its policy p_2 without being outbid. Lowering p_2 will increase both $\tilde{u}_1$ and $\hat{u}_1$, and recipient 2 can do so until condition (7) is met. Thus, policy levels in equilibrium will be strictly below p^M.

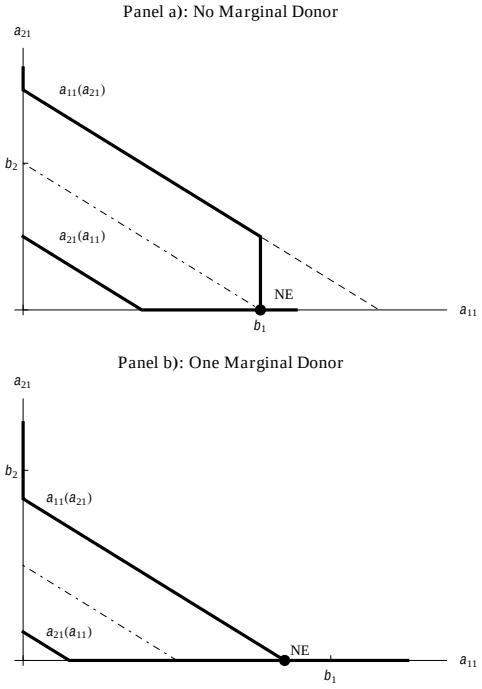

Figure 2: The figure graphs best-response functions $a_{11}(a_{21})$ and $a_{21}(a_{11})$ in the last subgame for donor 1 and 2 respectively given policies p. Both donors are assumed to have a budget of 20. In Panel a), the Nash equilibrium in the subgame (NE) is $a = ((20, 0), (0, 20))$. In Panel b), NE in the last subgame is $a = ((17, 0), (3, 20))$. Here, donor 1 is the marginal donor as it allocates a positive amount of aid to both recipients. The dot-dashed line indicates the optimal aid amount that would be allocated by ML.

The last stage of the game in this symmetric case is depicted in Figure 2 in Panel a) for recipient 1 when assuming that recipients have chosen identical policy levels. The Nash equilibrium in this last subgame is donor 1 giving all its budget to recipient 1, and recipient 1 receiving zero aid from donor 2. As just discussed, there may still be 'policy selectivity' in this case as recipients deter each other from attracting aid from the other donor if α_{11} is not too large. For a large enough α_{11}, starting to attract aid from the other donor will not be beneficial given $p_2 = p^o(b)$. In this case Proposition 1 applies. But if p_2 satisfying (7) is larger than $p^o(b)$, then although donors may end up playing corner solutions in the last subgame, there is still some policy selectivity in the aid allocation as recipients need to deter each other from attracting some aid from the other donor. However, it is clear that in this case policy choices can no longer be in pure strategies. For example, given that recipient 2 chooses p_2 that satisfies (7), recipient 1's optimal choice equals $p_1 = \theta \bar{p}_2$. But given this choice, recipient 2 can increase its payoff by lowering p_2. With p_2 now substantially lower, recipient 1 has a beneficial deviation in outbidding recipient 2 to attract some aid from donor 2, which in turn makes it beneficial for recipient 2 to increase p_2 again, etc. Nevertheless, both donors will be made strictly better off by delegating enough budget to ML so that it can establish $p = (p^M, p^M)$ as the unique equilibrium outcome.

So far we have assumed a symmetric situation where in expected terms there will be no marginal donor (i.e. both donors will play corner solutions) as depicted in Panel a) in Figure 2. In contrast, if there is enough asymmetry in the game in terms of resources and budget given some α_{11}, then in the last subgame we will end up in a situation as depicted in Panel b). In this panel, donor 1 ends up being the marginal donor given policy choices p, as this donor allocates positive amounts of aid to both recipients. This donor's aid allocation is policy selective. In this situation, donor 1's utility is maximized given policies p, whereas donor 2's utility is not. However, this conclusion ignores the fact that the difference in the allocation rule between donor 1 and ML affects policies p. As a result, donor 1 may be better off delegating aid to ML.

Recipient j's first-order condition given donor 1's allocation-rule equals:

$$f_j' - 1 = -X_j,$$

where $X_j = \frac{\rho_{1j}\beta}{p_j(1-\beta+\rho_{1j})}$. Recall that $\rho_{1j} = \left(\frac{p_{-j}}{p_j}\right)^{\frac{\beta}{1-\beta}} \left(\frac{1-\alpha_{1j}}{\alpha_{1j}}\right)^{\frac{1}{1-\beta}}$. Implicitly differentiating recipient j's first-order condition with respect to α_{1j} yields

$$\frac{\partial p_j}{\partial \alpha_{1j}} = -\frac{\rho_{1j} p_j (R + (1-\beta+\rho_{1j})^2 G_j)}{\alpha_{1j}(1-\alpha_{1j})(R\rho_{1j}(1+\rho_{1j}) + (1-\beta+\rho_{1j})^3 G_j)} < 0. \tag{9}$$

We observe that at $\alpha_{11} = 1/2$,

$$\frac{\partial p_1}{\partial \alpha_{11}} \equiv p_1' = -\frac{\partial p_2}{\partial \alpha_{11}} \equiv -p_2',$$

given that the allocation-rule equalizes resources and the public good in this case. An increase in α_{11} decreases p_1, i.e. the policy effort of the 'favored' recipient, and increases p_2. The total resources devoted to production of the public good in recipient 1, $p_1 \frac{1}{1+\rho_{11}} R$, strictly decrease in α, as

$$\frac{\partial (p_1 R_1)}{\partial \alpha_{11}} = \frac{R}{1+\rho_{11}} \left(p_1' - \frac{p_1 \rho_{11}'}{1+\rho_{11}} \right) < 0.$$

See the Appendix for a proof of this claim. Finally, we can show that with $\alpha_{11} > 1/2$, $G_1 > G_2$. Assume not and $G_1 = G_2$. Then, $p_1 R_1 = p_2 R_2$. Since $R_1 = \frac{1}{1+\rho_{11}} R$ and $R_2 = \frac{\rho_{11}}{1+\rho_{11}} R$, identical public goods imply $p_1 = \rho_{11} p_2$. Substituting into the expression for ρ_{11} and solving for ρ_{11} yields $\rho_{11} = \frac{1-\alpha_{11}}{\alpha_{11}} < 1$. Substituting into X_1 and X_2 yields $X_1 = \frac{\alpha\beta}{p_2(1-\alpha\beta)}$ and $X_2 = \frac{\alpha\beta}{p_2(1-\beta(1-\alpha))} < X_1$ if $\alpha > 1/2$. Also, identical goods imply that $f_1' - 1 = f_2' - 1$, which cannot hold in equilibrium given $X_1 > X_2$. Since ρ_{11} decreases in p_1 and increases in p_2, X_1 increases and X_2 decreases in ρ_{11}, and f_1' increases and f_2' decreases in ρ_{11}, it must be the case that $p_1 > \rho_{11} p_2$. Thus, we can infer that in equilibrium $G_1 > G_2$ if $\alpha_{11} > 1/2$. All of these observations taken together imply that donor 1's payoff, v_1^*, decreases in α_{11}. This payoff equals:

$$v_1^* = \tilde{\alpha}_{11}(p_1(\alpha_{11})(r_1 + a_{11}(\alpha)))^\beta + (1 - \tilde{\alpha}_{11})(p_2(\alpha_{11})(r_2 + a_{12}(\alpha_{11})))^\beta.$$

Using the Envelope Theorem, we observe that

$$\frac{\partial v_1^*}{\partial \alpha_{11}} = \beta \left(\frac{\tilde{\alpha}_{11} G_1 p_1'}{p_1} + \frac{(1 - \tilde{\alpha}_{11}) G_2 p_2'}{p_2} \right).$$

If $\alpha_{11} = 1/2$, then $G_1 = G_2$, $p_1 = p_2$, $p_1' < 0$, and $p_1' = -p_2'$ so that $\frac{\partial v_1^*}{\partial \alpha_{11}}$ reduces to $\frac{\beta G_1 p_1'}{p_1}(1 - 2\tilde{\alpha}_{11}) < 0$. Thus, delegating aid to ML must increase donor 1's utility given that $\tilde{\alpha}_{11} > 1/2$. Notice, however, that $\alpha_{11} = 1/2$ does not maximize donor 1's payoff. Ideally, this donor would delegate aid to an agency with $\alpha < 0.5$. However, this agency in contrast would then ideally delegate aid to another agency with $\alpha > 0.5$. Only a donor with $\alpha = 0.5$ cannot benefit by delegating aid to another agency that has distinct preferences. We interpret this property of the model as a rationale for ML to represent the average donor.

The following proposition summarizes the discussion:

Proposition 3. *Donors $i = 1, 2$ are strictly better off delegating aid to ML for any $\alpha_{11} \in (1/2, 1]$. Full delegation, i.e. $m_1 = b_1$ and $m_2 = b_2$, can be supported as an equilibrium outcome in this game.*

Notice, however, that Proposition 2 applies. That is, generically the game will have multiple equilibria as delegating less than b_i can also be an equilibrium provided that ML's budget remains sufficiently large. We can conclude that in all cases, whether there is sufficient symmetry in which case we have no marginal donor (Panel a) in Figure 2), or whether there is asymmetry so that there is a marginal donor (Panel b) in Figure 2), donors are better off delegating all aid to ML.

4 Empirical Evidence

Our empirical evidence, both qualitative and quantitative, focuses on the International Development Administration (IDA), the World Bank's fund for providing grants and concessionary loans to low-income countries. In Section 2 we identified IDA as the multilateral agency with the largest sectoral overlap and as one of the largest donors. According to our model, both of these conditions are necessary for making aid delegation beneficial for bilateral donors. The model has shown it is optimal for bilateral donors to delegate aid if ML represents the middle ground among disagreeing donors. Thus, we should observe that ML's aid allocations coincide with the average bilateral donor. We have seen that IDA exhibits the largest sectoral overlap among all donors (see Table 3), which is consistent with our hypothesis that IDA represents the 'average donor.'

Second, our main result hinges on the fact that ML has a sufficiently large budget. We have already presented evidence that IDA is a very large donor: among IDA-recipient countries, IDA is the largest donor, ranked in the top 3 among 80% of its recipient countries. As noted by Kapur, Lewis, and Webb (1997, p. 1133): "With the formation of IDA, the World Bank became an aid agency. Within less than two decades it would become the world's leading, and most influential, single such provider of development assistance"

Third, the model implies that IDA is viewed by any one donor as a public good benefiting all donors. If so, there will be incentives for any one donor to free ride on the contributions of others, and we should observe negotiations and agreements among donors to fund IDA. In fact, IDA replenishments are the subject of often-intense negotiations among donors every three years, and "burden sharing" (i.e. "contributing fair shares to a collective effort") has long been the major theme of these negotiations (Kapur, Lewis, and Webb, 1997; World Bank, 1995; Kanbur, Sandler, and Morrison, 1992, pp. 76). For the U.S., the launching of IDA "provided

a way to get other developed countries to begin to share more of what had come to be seen as the aid burden" (Gwin, 1997, p. 206). Although no exact formula over determination of "fair shares" has ever been widely accepted, negotiations have centered on aggregate GDP, aggregate bilateral aid budgets, and other variables (World Bank, 1995).

Fourth, consistency with the model implies that this large ML fund, viewed by the donors as a public good focused on providing development-oriented aid, would be entrusted to a donor-dominated international organization rather than to the UN system with its one-nation one-vote decision-making institutions. In the model, donors and the general public share the objective function of maximizing the public good, but recipient governments' objective function also includes private goods, i.e. corruption. Donors therefore would not make sizeable contributions to an ML fund dominated by recipient governments. In the debate over creating a new ML development fund in the early 1950s, the developing countries and a few developed one supported a proposal to attach it to the UN. However, "it was natural for the larger Western countries, which would be expected to provide most of the taxpayer funding for the new initiative, to shy away from a one-flag, one-vote location in favor of a Bretton Woods site where the program could be more readily controlled" (Kapur, Lewis, and Webb, 1997, p. 1124; Hout, 2007, p. 46). Moreover, attaching the fund to the World Bank was seen from the beginning as a mechanism for more effectively leveraging economic policy reforms in low-income countries (Kapur, Lewis, and Webb, 1997, p. 1124). Of the two non-specialized ML agencies, core contributions to IDA in recent years have been about 40 times as large as those to the UNDP, and most funding for the UNDP and more specialized UN development agencies is earmarked by individual donors for programs in particular countries, sectors and subsectors.

Fifth, since donors delegate aid to ML in the model because of better aid selectivity, we should observe that IDA's aid allocations are more policy and poverty selective than aid allocations by bilateral donors. Support by the U.S. and other donors for the multilateral development banks enabled them to "depoliticize foreign assistance and avoid strains" in their relations with developing countries" (Gwin, 1997, p. 213). In 1964 eligibility for IDA resources was limited to low-income members, and this restriction has remained in force since, with few exceptions. "Economic performance," sometimes defined in terms of "absorptive capacity" for aid, or in terms of macroeconomic, structural and human development policies, has also influenced IDA's country allocations since its early years. Beginning in 1977, these policy-based criteria for each country were assigned numerical ratings, eventually evolving into today's Country Policy and Institutional Assessments (CPIA). Over time, the ratings process became more formal and rigorous, and the methods for determining allocations made more transparent. The

allocation formula is by design both policy and poverty selective, but the donor representatives to IDA have occasionally adjusted the relative weights given to policy and to poverty considerations, as well as the weights assigned to different aspects of policy (World Bank, 1989, 2001). The emphasis on policy was increased during the 1980s, coinciding with the rise of structural-adjustment lending, and again in the late 1990s as a consensus emerged on the importance of public sector management and governance.

Although the IDA allocation formula in recent decades has been both poverty and policy selective, the Bank's staff, management and Executive Directors retain sufficient discretion in designing and approving grants and loans that the formula by itself does not ensure selectivity in actual disbursements (Hout, 2007, p. 47). Moreover, it does not by itself allow a comparison with bilateral aid. We therefore test the hypothesis that IDA aid is selective, in absolute terms and in comparison with bilateral aid, using a recipient-year panel dataset for the 1977-2012 period.

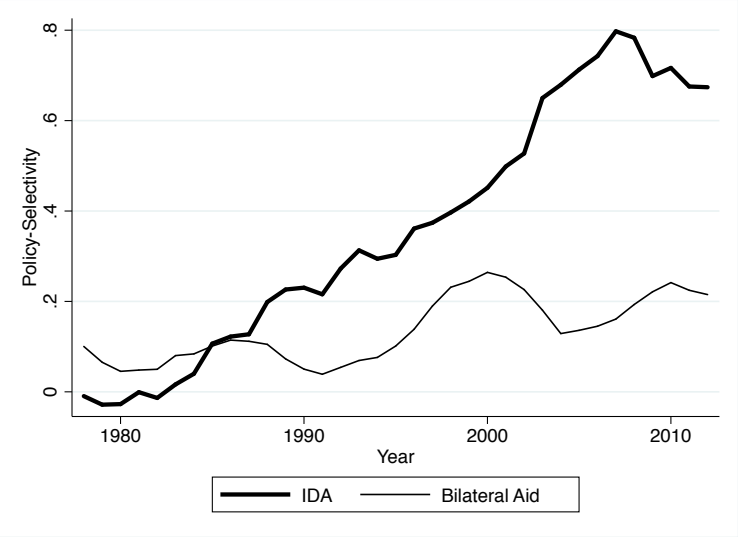

Figure 3: Policy Selectivity of IDA vs. Bilateral Aid

Equation (4) specifies the aid allocation rule of donors maximizing aid impact across recipients. The allocation rule depends on relative levels of policy and poverty across recipients. Our measures of policy and poverty are the same as those used by the World Bank in its country allocations of IDA funds. Poverty is measured by (low) GNI per capita in current USD, using the Atlas method to smooth the effects of exchange rates. Policy is measured using the World Bank's Country Policy and Institutional Assessments (CPIA), updated annually by Bank staff with expertise in the relevant countries and sectors. The CPIA content and

methodology has changed somewhat over time. To maximize comparability over time, we use the overall CPIA rating (averaging over all of its component indicators on macro and structural policies, policies for improving human development and equity, and on public sector management), and calculate z-scores from the ratings for each year. The z-scores thus indicate each country's distance from that year's mean rating. By this procedure, we eliminate any effects of changes in the CPIA content and methodology over time, while minimizing any loss of information in the ratings relevant to how IDA was allocated in each year. Because IDA resources are essentially fixed for any given year, allocations can be viewed as a zero-sum contest among recipients in each individual year, so it is a country's rating relative to others' that matters, not its absolute score.

In testing the associations of poverty and policy with IDA disbursements, we control for population size, following the empirical literature on aid allocations (see Knack, Rogers, and Eubank, 2011). All three independent variables are lagged by one year. We obtain a measure of policy- and poverty selectivity by estimating the following model for every year between 1978 and 2012

$$\text{Grossaid}_{i,t} = \beta_o + \beta_1 \text{Policy}_{i,t-1} + \beta_2 \text{GNIpc}_{i,t-1} + \beta_3 \text{Population}_{i,t-1} + \epsilon_t,$$

where i indexes aid recipient countries and where per capita income and population are in log form so that the coefficients can be interpreted as elasticities. We run these regressions for IDA and for total bilateral aid separately. For an aid allocation to be policy- and poverty selective we expect $\beta_1 > 0$ and $\beta_2 < 0$ respectively. Figures 3 and 4 plot the estimation results. They show that IDA-aid has been always more policy selective from 1984 onwards, and it has always been more poverty selective than the typical bilateral donor. The difference in policy-selectivity increased markedly beginning in the late 1990s, coinciding with the publication of World Bank (1998) and a working paper version of Burnside and Dollar (2000), which both argued that aid is effective provided it is given to countries with a good policy environment. This message has been very influential among policy makers and development practitioners.[9]

This time-series variation in IDA selectivity can be used to provide further tests of whether donor behavior is consistent with the model. If IDA's major comparative advantage is in its aid selectivity, then we should observe donors making larger contributions to IDA, other things equal, during periods when aid from other donors is less selective. Table 4 provides some supportive evidence. The dependent variable is annual data on total contributions to IDA, for the period 1978-2012, as a share of total ODA (columns 1-4) or as a share of total core

[9]See Easterly (2003) for an insightful discussion of the impact of the Burnside and Dollar paper.

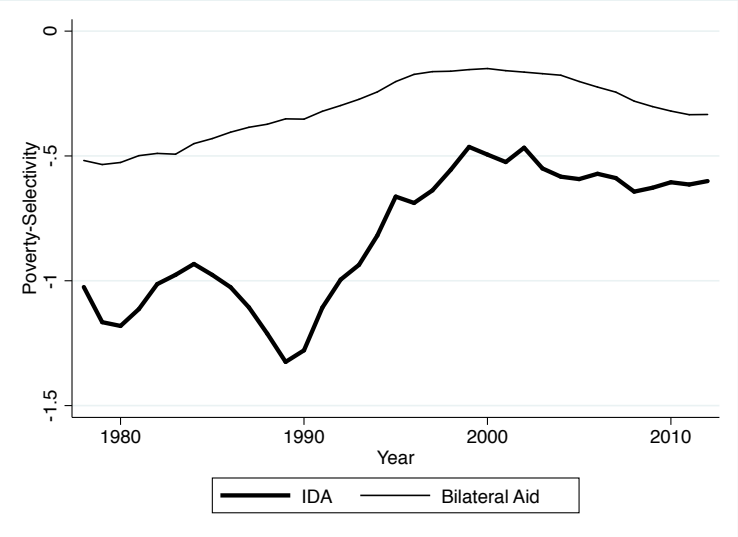

Figure 4: Poverty Selectivity of IDA vs. Bilateral Aid

contributions to multilaterals (columns 5-6). The independent variables are the (once-lagged) elasticity coefficients computed from annual regressions similar to those in Table 3, either for aid provided by the DAC bilaterals (columns 1, 3-6) or for all non-IDA aid (column 2). When aid from other donors is more policy selective - i.e. the elasticity of non-IDA aid with respect to the CPIA rating is lower - then IDA's comparative advantage in providing more policy-selective aid is weaker, and donors will have less reason to contribute to IDA. Thus, we expect the coefficient on (elasticity of) the CPIA rating in Table 4 to be negative, if selectivity is the key contribution of IDA to global development aid. The coefficient for CPIA is negative in all six regressions in Table 4, and is significant at the .1 level in most of them. With IDA's share of all ODA as the dependent variable, the CPIA coefficient is not significant, however, when we control for the elasticity of non-IDA aid with respect to population.

Because GNI per capita is an inverse measure of poverty selectivity, we expect a positive coefficient for it in the Table 4 regressions. When aid from other donors is less poverty selective - i.e. the elasticity of aid with respect to GNI per capita is less negative - then IDA's comparative advantage in providing more poverty-selective aid is accentuated. As predicted, the coefficient on (elasticity of) log GNI per capita in Table 4 is positive, and highly significant in the IDA/ODA regression. It is not significant when we use IDA/Multilateral ODA as our independent variable, but the coefficients have still the correct sign.

These results do not necessarily imply a causal relationship, of course, despite

lagging the independent variables by a year. Moreover, with only 35 observations, the results are not highly robust: GNI per capita and the CPIA rating are not significant in some regressions, and results (in further tests not shown in the table) turn out to be somewhat sensitive to the inclusion of a time trend. Nevertheless, the findings that donors contribute more to IDA during periods when it has stronger comparative advantages in poverty and policy selectivity are consistent with the logic of the model.

5 Conclusion

This paper contributes to the literature on aid effectiveness and on donors' motives for creating multilateral agencies. Contrary to the theory of comparative advantage and specialization in aid implementation, some multilateral agencies stand out by how similar their aid disbursements are when comparing it them to the average bilateral donor. The question then arises of why do bilateral donors delegate aid implementation to non-specialized multilateral agencies? In this paper we provide a model that can explain this puzzle, and present evidence consistent with the model's predictions. The model shows that donors delegate aid implementation to non-specialized agencies because their aid allocations across recipient countries are more selective in terms of policies and poverty levels. The main comparative advantage of MLs is their aid selectivity, rather than sectoral or even country expertise. The model shows that bilateral donors are better off delegating aid to the multilateral (ML) even then when they are purely altruistic and care only about the public good in recipient countries, but disagree on how that good should be distributed across recipients. Key for our result to hold is that ML searches some middle ground among disagreeing donors. The fact that ML represents the *average* donor is precisely what makes aid delegation to it beneficial for bilateral donors. Aid selectivity - in terms of both policy and poverty - emerges endogenously and is credible, as it is the solution to ML's optimization problem. Moreover, the model shows that if one sufficiently large donor is policy selective in its aid allocations, there is no need for other donors to be policy selective.

The paper also contributes to the literature on Tullock contests. Under certain assumptions, the aid allocation rule used by donors is equivalent to a Tullock contest allocation rule. In our model, the Tullock contest function emerge endogenously, rather than merely being assumed, as in most of the literature on contests.

We present empirical evidence consistent with the assumptions and predictions of the model, supporting our interpretation of IDA as a multilateral relied on by donors because of its comparative advantage in implementing policy and poverty

selective aid. Specifically, we establish that (1) IDA plausibly represents a middle ground among its donors' preferences, (2) it is sufficiently large to implement aid "contests," and (3) donors perceive it as a public good. Moreover, the model's assumptions are consistent with the fact that IDA was attached to a Bretton Woods institutions rather than to the UN, with its very different voting rules.

Data on aid disbursements for the 1977-2012 period confirm that IDA is much more policy and poverty selective than bilateral aid. Furthermore, we show that donor contributions to IDA are larger during periods when bilateral aid is less selective, i.e. when according to our model IDA's comparative advantage is enhanced.

The emergence of nontraditional donors such as China, along with pressures for voting reform in the World Bank and other MLs, can potentially undermine IDA's role as a dominant donor that is strongly poverty and policy selective in its aid allocations. Traditional donors' increasing use of trust funds at the World Bank (contributions earmarked for particular countries and/or sectors) is another potential threat. Further research could usefully investigate the extent to which World Bank trust funds reinforce or compensate for selectivity of IDA aid, and whether donors' contributions to trust funds partially "crowd out" their contributions to IDA. This is of importance because reduced aid selectivity lowers aid effectiveness as both, foreign aid and recipient country resources are used less effectively.

6 Appendix

Notice that

$$\rho'_{11} = -\frac{\rho_{11}(p_1 + (1-\alpha)\alpha p'_1)}{(1-\alpha)\alpha(1-\beta)p_1}.$$

This expression is smaller than zero if $p_1 + (1-\alpha)\alpha p'_1 > 0$. Substituting p' written out in (9) into this expression and simplifying yields

$$p_1 \left(1 - \frac{\beta\rho_{11}(R + G_1(1-\beta+\rho_{11})^2)}{R\rho_{11}(1+\rho_{11}) + G_1(1-\beta+\rho_{11})^3}\right).$$

For any given β, this expression is larger or equal to zero.

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Table 4: Aid Selectivity and IDA Aid Delegation

	(I)	(II)	(III)	(IV)	(V)	(VI)
Dependent Variable	IDA/ODA				IDA/Multilateral ODA	
Currency Units	Current USD	Current USD	Current USD	2012 USD	Current USD	2012 USD
Non-IDA Donor Group	DAC	Non-IDA	DAC	DAC	DAC	DAC
Log GNI per capita (lagged)	0.04***	0.07***	0.03***	0.03***	0.07	0.07
	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)	(0.04)
CPIA rating (z-score, lagged))	-0.05***	-0.10***	-0.01	-0.02	-0.10*	-0.11*
	(0.01)	(0.03)	(0.01)	(0.01)	(0.06)	(0.06)
Log of population (lagged)			-0.12***	-0.11***	-0.15	-0.16*
			(0.03)	(0.02)	(0.09)	(0.09)
N	34	34	34	34	34	34
R-squared	0.31	0.41	0.53	0.57	0.31	0.37
F statistic	11.06	15.48	13.66	17.79	4.65	7.09

Number of observations is 34 (years from 1979 through 2012). Dependent variable is total IDA contributions as a share of (equations I - IV) gross ODA disbursements or (equations V and VI) gross multilateral disbursements (not including the EU). Independent variables are coefficients from year-by-year regressions of recipients gross ODA (not including humanitarian aid, food aid, or debt relief) from all non-IDA donors (equation II) or from all DAC bilateral (including EU) donors (equations I, III-VI) on one-year lags of log GNI per capita, CPIA z-scores, and log of population. Heteroskedastic-robust standard errors are reported in parentheses below point estimates. Significance levels : $*$: 10 $**$: 5 percent $***$: 1 percent.