

# THE POLITICAL CONSTRAINTS ON ALTRUISM\*

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## Abstract

Corruption in developing states diverts aid resources from the poor it is intended for, thereby reducing the effectiveness of foreign aid. Self-interest also guides politicians and donor agency officials in their aid disbursement decisions. While existing studies on foreign aid discuss unilateral corruption, this paper examines the interplay between corruption on part of the recipient and on part of the donor. The paper analyzes the patterns of bilateral aid allocation, in particular "selectivity" failure. We present a principal-agent model of electoral competition in which politicians make aid disbursement choices. The quality of institutions and policies, reflecting the part of aid diverted away from its intended destination and the rents obtained by the recipient regime, is shown to affect the equilibrium aid policy. We thus analyze the impact of the political process in the donor country on the recipient's institutional formation choices. We find that when voters hold extreme priors regarding the politicians' motivations, politicians cannot be punished or rewarded for good policy choice and choose to disburse aid for private interests, despite its ineffectiveness. Electoral competition becomes more effective in disciplining politicians and inducing aid selectivity when the citizens hold moderate priors, as politicians with career concerns may forgo ineffective aid in order to increase the probability of getting reappointed for an additional term. We derive the conditions under which the recipient government is incentivized to initiate rent-reducing reforms and strengthen public institutions so as to increase the probability of obtaining current and future aid.

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## 1. Introduction

Foreign aid is motivated by political, economic, and charitable considerations. A substantial amount of studies has attempted to examine the determinants of aid flows from rich to poor countries. A large part of the literature finds that bilateral aid is better explained by donor strategic interests, colonial history, and trade benefits rather than the intent of meeting the recipients' needs and pursuing economic development (Dudley and Montmarquette, 1976; McKinlay and Little, 1979; Schraeder, Hook and Taylor, 1998; Alesina and Dollar, 2000). Moreover, a key issue of the determinants of aid disbursement has been the quality of institutions and policies of the recipient countries. Established by Burnside and Dollar (2000) and the Monterrey Consensus (World Bank, 2002) aid should be "selective" in terms of institutions and policies, and should be targeted to countries in which they are sound, where it is more likely to be "poverty effective". While with respect to multilateral aid the results of the assessments of the extent of aid selectivity are controversial, a consistent finding is that the patterns of bilateral aid do not reflect a trend toward favoring sound economic and political institutions (Alesina and Weder, 2002; Dollar and Levin, 2006; Easterly, 2007).

More recently, studies that have focused on the perspective of the citizens of donor countries have shown that there is a consistently high level of public support for the principle of development aid. Nevertheless, the evidence suggests that public support for development assistance is highly contingent on perceptions of effectiveness, especially corruption (Otter, 2003; Chong and Gradstein, 2008; Hudson and van Heerde, 2009). Put another way, donor-country citizens support poverty efficient aid, namely aid which is selectively targeted to countries with a good policy and institutional environment. However, this contrasts the actual patterns of aid disbursements. Observing this paradox, we take up the question of why is aid not denied from corrupt governments, where it is appropriated, to ensure that citizens' tax money is not wasted?

In this paper, we argue that these observations can be explained by the way public policy is chosen in democracies. While the concern for the welfare of the poor is appropriate to describe the preferences of the citizens in donor countries, politicians and donor agency officials are believed to be guided by self-interest. This gives rise to

a conflict of interest<sup>1</sup> between the citizens and politicians in the donor country which is properly addressed in a political economy framework.

Aid may have beneficiaries other than the poor it is intended for. Among them are the aid-funded project officials, private contractors and procurement agents, both local and expatriates, who are awarded contracts when aid is disbursed. These groups can put pressure on donor decision makers to disburse aid, even when the conditions in the recipient country for aid success are far from present (Kanbur, 2000). The pressure may be in the form of improving the well-being of the decision makers, i.e., by providing bribes, future employment opportunities, or businesses in which the politician has financial interest<sup>2</sup>. (Villanger, 2006; Transparency International, 2003;2007).The purpose of this paper is to analyze the patterns of bilateral aid allocation, in particular, selectivity failure, when the determination of the recipient's institutional environment is determined endogenously. More closely related to this paper are the findings of Schudel (2008) that the responsiveness of donor states to corruption in recipient states depends on their own level of corruption: less corrupt donor states allocate more aid to less corrupt recipient states than to corrupt recipients, whereas corrupt donor states do not make such a clear distinction.

In our model, politicians have an incentive to disburse aid for private benefit. Even so, if disbursed in a good institution and policy environment, aid is likely to achieve poverty reduction and enhance the welfare of the citizens in the donor country, who care about the intended poor beneficiaries. We use an agency model of electoral competition in which voters are imperfectly informed and policy making takes place after the politician has entered office. Person and Tabellini (2000) refer to this type of models as "post-elections politics". There is asymmetric information in the sense that the incumbent politician has more information about the extent to which aid is allocated in favor of sound economic and political institutions than the citizens do. Furthermore, since the success of aid in alleviating poverty is stochastic, citizens observe only a noisy signal of whether it was warranted ex post. Thus, when they

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<sup>1</sup> A key finding of the literature on donors' motivations is that bilateral aid is more tied to donors' interests than multilateral aid. Thus, the principal-agent problem is less acute when aid is disbursed via multilateral agencies. Therefore, we focus only on bilateral aid.

<sup>2</sup> Lahiri and Raimondos-Moller (2000) consider another channel by which interest groups put pressure on donor countries politicians to disburse aid - by enhancing their reelection probability.

observe that the chosen aid policy was to disburse aid, they cannot tell whether the politician is acting in their interest or simply satisfying the interests of other beneficiaries from aid. Another source of asymmetric information is politicians' motivation. Politicians are assumed to be heterogeneous in their motivation, i.e., some being more susceptible to bribes and others not, and politicians' types are not observable by the citizens. Thus, by observing aid policy choices and aid's impact on the poor allows voters to only imperfectly infer the politicians' types using Bayes' rule. Our model suggests that under these conditions aid will sometimes be disbursed, even in cases in which it is ineffectively targeted to the poor. Such a behavior reflects weak reelection concerns of the politician and the absence of incentives to build good reputation. The a priori expected probability of getting reelected plays a key role. When voters hold extreme priors regarding the politicians' motivations, the political process becomes less effective in disciplining "bad" politicians, i.e., those susceptible to bribes. If the politician expects to lose the upcoming election, a bad outcome of aid cannot hurt him any further. The resulting incentive is to disburse aid for private benefit. Similarly, for a politician whose chances of reelection are favorable, the reputational damage of bad outcome of aid will be insignificant, luring him to disburse ineffective aid. When the citizens do not hold extreme priors, electoral competition becomes more effective in disciplining politicians, since the reputational penalty for misbehaving may be detrimental, and politicians with career concerns who want to get reappointed for an additional term may be induced to forgo aid when it is not justified from the citizens' perspective.

The model is extended to encompass endogenous institutional formation in the recipient country. Thus, the assumption underlying "aid selectivity", that the prevalent 'institutional environment' thought to affect the effectiveness of aid is an exogenous variable, is relaxed. Instead, we assume that the recipient government is aware of the political process in the donor country and reacts to the expected aid disbursement policy by choosing the quality of its institutions. We analyze the institutional formation choice under different scenarios and by comparing them we determine which scenario induces more institutional reform thereby making aid more effectively targeted towards the poor. We consider the case in which the donor-country incumbent politician can convey a fully revealing signal and uncover whether he is "good" or "bad", and the alternative situation in which the incumbent politician cannot

send such perfectly type-revealing signal reliably. By way of computer calculations we show that under the imperfect information scenario, monotone changes in the reputation of the donor-country politician can result in discontinuous and at times non-monotonic changes in the optimal institutional formation equilibrium.

Our main aim is to construct a model which explains some persistent patterns of inefficient allocation of aid. We do that by establishing the link between the political conditions in the donor country and the recipient's incentives to initiate institutional reforms. Our comparative analysis focuses on the impact of the incumbent politician's initial reputation, captured by the a priori probability that he will be reelected, on the recipient's motivation to enact rent-reducing reforms. The recipient's incentives to initiate institutional reforms are twofold. The first one is to become more eligible for aid, and the second is to help a "bad" politician get reelected. It is shown that if the donor-country incumbent politician is "good", reforms may take place, provided the incumbent politician enjoys sufficient popularity from the electorate. If a "bad" politician is in office, then the two aforementioned incentives are strong for moderate priors but become weaker the more extreme the priors are. Finally, for low levels of popularity of the donor-country politician, if a "bad" politician is in office, then incomplete information is shown to be superior (with respect to institutional reform) to perfect information, yet if there is "good" politician in office the opposite holds. This result is reversed if the incumbent politician enjoys high levels of political support.

The remainder of this paper is organized as follows. Section 2 surveys the relevant literature. Section 3 outlines the model and shows that aid may be disbursed despite its poor ineffectiveness. Section 4 considers the effect of the political process in the donor country on the formation of the institutional environment in the recipient country. A brief conclusion is given in section 5.

## **2. Related Literature**

The present paper is part of the literature on the political economy of foreign aid which provides explanation so as to why aid, which is ineffectively targeted to poverty alleviation, is repeatedly disbursed. Much of the criticism on foreign aid have focused on the recipient government failure, relating aid effectiveness to political

regimes (Boone, 1996), to the widespread level of corruption and other types of rent-seeking activities (Svensson, 2000), or to powerful lobby groups that can divert aid away from its intended target and block reforms (Lahiri and Raimondos-Moller, 2004). This strand in the aid literature assumes that humanitarian orientated donors faces governments of poor countries with different degrees of poverty aversion. It is assumed that the implementation of the donors' conditions (*'effort'*), or alternatively, the degree of altruism (*'type'*), are private information of the recipient government, posing a principal-agent problem. Mechanism design could, at least to a certain extent, solve the principal-agent problem (Azam and Laffont, 2003; Calmette and Kilkenny, 2002), but this requires strong commitment ability by the donor. Without such a commitment technology, aid disbursements are partly guided by the needs of the poor, resulting in low effort on the part of the recipient governments to alleviate poverty. Svensson (2000) shows how altruistic donors end up in the Samaritan's dilemma because the recipient has no incentives to implement conditions to reduce poverty when the amount of aid is determined by the level of poverty (See also: Pedersen, 2001). Mosley et al. (1995) model the relationship between the donor and recipient as a bargaining game and find that there will always be some slippage on the conditions even if the recipient has agreed to their implementation in the first round.

Some of the literature, more closely related to our paper, has considered domestic politics in the donor country as the source of the continuation of ineffective aid. Lahiri and Raimondos-Moller (2000) illustrate how aid lobbying can take place by ethnic groups in the donor countries to allocate aid to their country of origin. They point out that when governments of donor countries are subject to political contributions of immigrants from aid recipient countries, the ethnic composition of the country, rather than other criteria, will determine the aid allocation in equilibrium. Villanger (2006) shows how the influence of third parties on the donor–recipient relationship can be crucial to the donors' disbursement decision. In his model private business interests serve as an illustration of the third parties. Companies have incentive to put pressure on the donor to disburse aid, even in cases the donors' conditions are not implemented. If the donor finds maintaining a good relationship with the domestic company more important than maintaining conditionality, the recipient need not implement the conditions to receive aid, and conditionality fails. Kanbur (2000) provides further documentation of such experiences. Our model accounts for this

structure of influence and analyzes it under the political constraints imposed by electoral competition. Our model begins suggesting a pathway which explains finding that donor countries, that have signed on to the "Monterrey Consensus" and endorsed the view that sound governance is necessary for aid to be used effectively, fail to target their aid disbursements towards countries with stronger economic institutions and policies. The current paper should be viewed as complementary to this literature.

Moreover, our paper also examines the decision of the recipient regime to limit its own rent-seeking opportunities by developing the public institutions, which among other things, channel aid to its intended destination. Some literature has considered the impact of aid on the quality of public institutions. Thus, institutions and the consequent effectiveness of the use of aid resources are endogenously determined in response to the aid disbursement policy. Theoretically-wise, aid may potentially improve or destroy the quality of institutions. On the positive side, aid channeled to governments with clear development agendas can be used to improve the quality of the civil service, strengthen policy and planning capacity and establish strong central institutions. In instances in which aid is granted within schemes which provide incentives to maintain good policies and institutions it may promote institutional development (Azam and Laffont, 2003; Calmette and Kilkenny, 2002). In fact, a large part of the aid granted by the international financial institutions, most prominently the World Bank and the IMF, is associated with supporting reforms, many times structuring aid to sustain food governance and fight corruption in low income countries. Tavares (2003) finds evidence for such a conditionality effect, when the results of his econometric analysis show that foreign aid decreases corruption, suggesting that aid inflows may potentially have a beneficial effect on corruption, if allocated with the purpose of improving the recipient's institutions.

On the other hand, aid flows, and the way aid is programmed, may create disincentives to improve governance and in fact weaken the state institutions. The appropriation of foreign aid, and the rent seeking behavior associated with it, is contingent on weak dysfunctional institutions. Svensson (2000) shows how aid flows may plague a country with rampant rent-seeking resulting in adverse development consequences. He describes the impact of aid on the political equilibrium of social groups competing over common-pool resources. The different groups of the economy have common access to the government's budget. Individuals can increase their

consumption by performing rent seeking activities to appropriate the revenue of the government. The welfare cost of doing that is the decline in the amount of local public goods provided. A large inflow of aid increases the incentive to deviate from cooperative conduct leading to an increase in rent-seeking activities that is costly in aggregate terms, which may result in decline of welfare.

Others have pointed out that foreign aid provides a windfall of resources to recipient countries and may result in the same disincentives to build local institutions and a social contract with the population as documented in the “curse of natural resources” literature. (see Ross, 1999; Karl, 1997; Birdsall and Subramanian, 2004). Moss, Petterson and Van de Walle (2006) argue that aid can have many of the same dysfunctional effects as natural resources; that is, there can be an ‘aid curse’ as well that might create perverse incentives and lead to anti-developmental outcomes. They find that states which can raise a substantial proportion of their revenues from the international community are less accountable to their citizens and under less pressure to maintain popular legitimacy. Djankov, Montalvo and Reynal-Querol (2008) find that foreign aid has a negative impact on institutions. For comparison, they also measure the effect of oil rents on political institutions and find that aid is a bigger curse than oil. Rajan and Subramanian (2007) argue that foreign aid may reduce the need for taxes of governments and, therefore, be associated with weak governance. Knack (2001) finds that some forms of aid, namely technical assistance, erode bureaucratic quality and the rule of law. Reinnika and Svensson (2004) analyze the extent to which the foreign aid for education purposes actually reached the schools. They find that schools on average received only 13% of the grants received by the government. In extreme cases the extent of the rent seeking activities could lead to a civil conflict (see Maren, 1997).

Our approach to modeling the political process in the donor country is consistent with the formal literature on the political economy of inefficient policies in democracies. It builds on the strand in the literature that focuses on reputational concerns of politicians who care about getting reelected. In such models, electoral competition serves as means of disciplining politicians with privately known intrinsic attributes. Politicians may be heterogeneous in different aspects, such as motivation, i.e., willingness to accept bribes or steal taxes, competence, ideology, etc., or some combination of these. Policies are chosen after the politician is in office. Yet voters



may choose not to reappoint a misbehaving politician who has failed to please them. The roots of these models have been planted by the seminal works by Barro (1973) and Ferejohn (1986) on moral hazard in politics, which were further developed by Austen-Smith and Banks (1989). In their two period moral hazard model, the voters' strategy of reelecting the incumbent depends on the observed policy outcome relative to the platform upon which the incumbent was initially elected. Banks and Sundaram (1993) study a setting in which the voters, trying to hold the politician accountable for the policy outcome, face adverse selection problems. Banks and Sundaram (1996) add term limits to allow more general voting strategies. Rogoff and Sibert (1988) and Rogoff (1990) have argued that the incumbents' incentives to appear competent induce them to create electoral cycles. This pre-electoral strategic behavior stems from the notion that politicians perform better in elections by abstaining from rent extraction or attempt to signal their competence through specific policy decisions, which may reduce or enhance the voters' welfare. Basely and Case (1995) study the role of yardstick competition in disciplining bad policy makers. Coate and Morris (1995) show that "bad" politicians may use 'sneaky' methods of redistribution towards special interests rather than cash payments, so as to avoid reputation damage. Dur (2001) and Beniers and Dur (2007) show that policy makers may stick to inefficient policies for reputational reasons, since repealing a policy signals incompetence. Biglaiser and Mezzetti (1997) study the incentives of an elected official to undertake an observable discrete project in the first period. The value of the project depends on the incumbent's ability (initially unknown to everybody) and a random shock and thus the implemented projects reveal information about the qualities of the official. The paper focuses on the issue of whether undertaking the project is a good or bad signal to the electorate about the incumbent's ability.

### **3. The Model**

#### *3.1 Set up*

There are two countries in the model, a donor country and a recipient country. In the donor country there are two agents, a politician and a homogenous electorate, i.e., identical citizens. We consider a two period agency model of electoral competition, where politicians who differ in their motivations, may be held

accountable for their aid policy choices in the elections held at the end of the first period. The recipient of the aid funds is the government of the poor country. Our description begins with the citizens.

### 3.1.1 *The citizens and efficient allocation of aid*

The citizens are assumed to derive positive utility from the beneficial consequences of foreign aid, i.e., from the impact of aid on the level and incidence of poverty. A desirable outcome from the citizens' perspective is poverty reduction<sup>3</sup>, denoted by  $pr$ . We assume that the citizens are represented by the utility function  $v(pr)$ , satisfying the standard assumptions, in particular monotony. When disbursed, aid may either be successful or unsuccessful in attaining poverty reduction. For simplicity and without loss of generality, it is assumed that the poverty reduction space is binary,  $pr \in \{\overline{pr}, \underline{pr}\}$ , denoting the cases of successful and unsuccessful poverty reductions, respectively. Aid disbursement is also assumed to be a binary decision,  $A_t = 1$ , denoting the event in which an entire aid package is disbursed and  $A_t = 0$ , when it is withheld, where  $t = 1, 2$  is a time index. In the paper, we consider mixed strategies, i.e. a set of probability distribution over  $A_t$ , which can be interpreted as disbursing a fraction of the size of the aid budget  $A$ . In this case, aid becomes continuously variable. Let us normalize the citizens' benefit in the event in which aid fails to alleviate poverty to zero,  $v(\underline{pr}) = 0$ , and assume that the value the citizens assign to a good economic outcome in the aid-recipient country is  $v(\overline{pr}) = v > 0$ . Aid is financed through taxation levied on the citizens at a cost  $C^4$ , with  $v - C > 0$ . We can thus specify the citizens' utility function by:

$$(1) \quad W = \begin{cases} y + v(pr) - C & A = 1 \\ y & A = 0 \end{cases},$$

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<sup>3</sup> Poverty is a multi-dimensional phenomenon and desirable outcomes of aid may be such as an increase in the number of people lifted out of poverty, reduction in baby mortality rate or increase of the number of people with access to clean water or basic health and other public services. Poverty reduction encompasses all these different measures

<sup>4</sup> It may very well be that  $C > A$  due to administrative costs of raising the aid fund and dead-weight losses.

where  $y$  is the citizen's income, which is exogenously given<sup>5</sup>.

It has been widely recognized that the effectiveness of aid depends to a large extent on the nature of the recipient government and institutions. Aid resources may be diverted away from the targeted poor through corruption, bureaucratic incompetence, appropriative policies, and dysfunctional institutions, thereby resulting in little impact on poverty alleviation. We follow Chong and Gradstein (2008) and use a simple way of capturing the institutional attributes of the recipient government by assuming that only a fraction  $\varepsilon \in [0,1]$  of the aid transfer reaches its designed destination.

The probability of a successful impact of aid on poverty reduction depends on whether aid to governments translates into aid to poor people. Thus, for each institutional environment,  $\varepsilon$ ,  $q(\varepsilon) \in [q, \bar{q}]$  denotes the probability of a successful outcome, and  $1 - q(\varepsilon)$  is the probability of an unsuccessful one. The probability of aid success is thus a mapping of the quality of institutions in the recipient country to the probability of a good economic outcome,  $q(\varepsilon) = [1,0] \times [q, \bar{q}]$ , which, like the standard assumptions of a production function, is assumed to be twice continuously differentiable, with  $q'(\varepsilon) > 0$ ,  $q''(\varepsilon) < 0$ , and  $\lim_{\varepsilon \rightarrow 0} q'(\varepsilon) = \infty$ . In accordance with, standard economic literature, the diminishing returns assumption of  $\varepsilon$  is crucial for internal solution of the model.

The expected net gain of the citizens from aid disbursement, for a given aid-success-probability,  $q(\varepsilon)$ , is:

$$(2) \quad \Delta(\varepsilon) = E(W(A=1)) - W(A=0) = q(\varepsilon)v - C, \quad \text{where } \frac{\partial \Delta(\varepsilon)}{\partial \varepsilon} > 0. \quad ^6$$

**ASSUMPTION 1.** *There exists  $\hat{\varepsilon} \in [0,1]$ , where  $\hat{\varepsilon}$  is defined by  $\Delta(\hat{\varepsilon}) = 0$ <sup>7</sup>.*

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<sup>5</sup> Note that the citizen is constrained by his budget, hence  $y - C \geq 0$ ; i.e., the aid budget,  $C$ , cannot exceed the income of the citizens.

<sup>6</sup> More explicitly,  $\Delta(\varepsilon) = q(\varepsilon)v(\overline{pr}) + (1 - q(\varepsilon))v(\underline{pr}) - C$ , where recall that  $v(\overline{pr}) = v$  and  $v(\underline{pr}) = 0$ .

<sup>7</sup> The critical value of  $\hat{\varepsilon}$  can also be defined by:  $\Delta(\hat{\varepsilon}) = \alpha$ , where  $\alpha$  is a constant, reflecting the performance standard required by the citizens. The greater  $\alpha$ , the higher the threshold,  $\hat{\varepsilon}$ , which is set by the citizens.

This assumption states that (i) when a high enough portion of the aid transfer is expected to reach its intended destination, the citizens are willing to disburse aid. This occurs in countries which their governments exhibit a minimal level of institutional quality,  $\hat{\varepsilon}$ . Otherwise, (ii) the citizens would prefer to withhold aid, because  $\Delta(\varepsilon < \hat{\varepsilon}) < 0$ <sup>8</sup>. Thus, from the citizens' perspective, the optimal aid-giving choice can be summarized by:

$$(3) \quad A_t(\varepsilon) = \begin{cases} 1, & \text{if } \varepsilon \geq \hat{\varepsilon} \\ 0, & \text{if } \varepsilon < \hat{\varepsilon} \end{cases}$$

Thus, the citizens require that aid is granted only to poor countries with a minimal level of government efficacy. Note that such a recipient type defines the critical probability of aid success,  $\hat{q} = q(\hat{\varepsilon})$ , for which the citizens are willing to pay  $C$ . Equation (3) formalizes the idea of "country selectivity" of aid, which states that aid should be allocated to countries with a good policy and institutional environment, avoiding corrupt autocrats (Burnside and Dollar, 2000). Equation (3) captures the donor's decision of whether or not to engage in a certain country and establishes the notion of efficient allocation of aid.. In order to avoid analytical complexity, we do not address the decision about the amount of aid to countries having passed the eligibility test.

However, such efficient allocation of aid, and the corresponding effective poverty alleviation, is inconsistent with the evidence that donors have continued to give ineffective aid. Countries with bad governance and rampant corruption which should have been penalized and possibly disqualified from receiving foreign aid, continue receive aid (Alesina and Weder, 2002). Moreover, Collier and Dollar (2002) argue that reallocation of aid flows to poor countries with sound management would lift 10 million more per year out of poverty<sup>9</sup>. This paper seeks to explain the observed divergence from the efficient allocation of aid implied by Equation (3).

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<sup>8</sup> Note that the citizens require that aid is effective *on average*; while in a specific occurrence it might either succeed or fail,  $\overline{pr}$  or  $\underline{pr}$ .

<sup>9</sup> Dreher, Mölders and Nunnenkamp (forthcoming) find that ODA provided by the Swedish government is subject to several flaws at the eligibility test stage; something which tends to compromise its effectiveness.

### 3.1.2 Two Types of Politicians

The task of aid giving is carried out by politicians or donor organizations<sup>10</sup>. While an altruistic motive for aid giving is a reasonable description of the citizens' preferences, their representatives tend to exploit their power in order to appropriate resources for themselves. Strategic and economic self-interest have been shown to play a role both in bilateral aid (Alesina and Dollar, 2000) and in multilateral donor agencies (Vaubel, 1991; 1996). Nonetheless, we follow the standard assumption in the foreign aid literature that the conflict of interest arises when rent-seeking political representatives are delegated the task of disbursing bilateral aid.

In each of the two periods of the model there is a politician in office who decides whether to disburse aid,  $A_t = 1$ , or deny it,  $A_t = 0$ . Aid disbursement may embed private benefits which can be extracted by the politician (Villanger, 2006; Kanbur 2000). Let us assume that disbursing aid provides the politician with a rent of  $R$ . Politicians are heterogeneous in only one dimension, their motivation<sup>11</sup>. For simplicity, consider two types of politicians,  $i = g, b$ , denoting "good" and "bad" politicians, respectively. The good politician's interests align with the citizens', while the bad politician also cares about the private rents obtained from disbursing aid. Formally, the politicians' utility functions are  $U_g(\Delta(\varepsilon))$ , of a good politician, monotonically increasing only in the welfare of the citizens, and  $U_b(\Delta(\varepsilon), R)$ , of a bad politician, which monotonically increases in both its arguments. Politicians discount the future according to the discount rate  $\delta$ .

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<sup>10</sup> There has been a steady increase in attempts to bypass national governments and deliver aid funds directly through local and foreign nongovernmental organizations (NGOs). The perceived advantages of NGOs in reaching the poorest have increasingly been disputed (Drehre, Mölders and Nunnenkamp, forthcoming). Unfortunately, many NGOs show some of the same behavior as In addition, many NGOs already get money from official aid agencies, so the line between NGO and GO is not always clearly defined. Therefore it is not surprising that NGOs often engage in the same types of behaviors as aid agencies.

<sup>11</sup> Politicians' motivation refers to his honesty, integrity and morality. It is defined as the intrinsic attribute that makes an individual refrain from behaving in opportunistic manner, like appropriating rents in various forms while in office. These play an important role in the electorate's voting decisions leading politicians to be very concerned about their public image, i.e., how their motivation is perceived by the citizens.

**ASSUMPTION 2:**  $U_b(\Delta(\varepsilon), R) > U_g(\Delta(\varepsilon)), \forall \varepsilon$ .

The bad politician always derives more benefit from disbursing aid. The assumption follows from simple intuition that a bad politician is more motivated to disburse aid because of private interests. This assumption holds when the utility function of the bad politician is additively separable in its arguments,  $U_b(\Delta(\varepsilon), R) = U_g(\Delta(\varepsilon)) + u(R)$ , which is a standard assumption in the electoral competition literature (see for instance: Beniers and Dur, 2005). The important implication of this assumption is that in every instance that a good politician will disburse aid so will a bad politician, while the reverse is not necessarily true.

**ASSUMPTION 3:**  $U_b(\Delta(\varepsilon), R) > U_b(0, 0), \forall \varepsilon$ .

This assumption becomes meaningful when  $\varepsilon < \hat{\varepsilon}$ , i.e., when aid is likely to be ineffective in promoting poverty reduction<sup>12</sup>. In this case, the bad politician's benefit from the rents extracted from aid disbursement more than offsets his loss of utility due to the loss of welfare of the citizens. In other words, giving aid is a dominant strategy for a bad politician if he is unconstrained by a political process.

**ASSUMPTION 4:**  $U_b(\Delta(\varepsilon), R) < U_b(0, 0) + \delta U_b(\Delta(\varepsilon), R), \forall \varepsilon$ .

This assumption allows for elections to play the role of disciplining the politician. It states that the bad politician will be better off if he forgoes aid in the first period and stays in office to the second period<sup>13</sup>. This assumption places the mechanism by which reelections may give a bad politician an incentive for good behavior, induced by the trade-off between current rents and the probability of getting reelected.

### 3.1.3 The Information Structure

The role of elections, as it is postulated in the current model, is to select a good politician for the second term. The citizens do not observe the incumbent politician's type directly. However, they have some initial estimate of the likelihood

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<sup>12</sup> Note that the assumption holds for every  $\varepsilon$ , even when aid is least likely to work,  $U_b(\Delta(\varepsilon = 0), R) > U_b(0, 0)$ .

<sup>13</sup> Note that in the second period the bad politician in office has no reelection considerations and therefore implements his unconstrained dominant strategy, disburses aid, implied by assumption 2.

that the politician is good,  $\lambda_I \in (0,1)$ . This prior reflects the politician's initial popularity, based on his performances in public and political activities other than aid disbursement. The citizen neither observes the realization of  $\varepsilon$ . While the recipient government's inefficiencies are private knowledge of the recipient, it is reasonable to assume that the politician has more information than the citizen about how well the aid transfers are targeted. Although it is reasonable to assume that the politician's information with respect to the recipient's type is also incomplete (Welzmann, 2009), in order to economize on the notations, we assume that the politician is fully informed, while the citizens are uncertain of the realization of  $\varepsilon$ . However the citizens assign a probability to each realization according to the c.d.f.  $\Pi(\varepsilon)$  over  $\varepsilon \in [0,1]$ , with the probability density function  $\pi(\varepsilon)$ .

At the end of each period, the citizens observe the aid policy chosen by the incumbent politician and its impact on the poor in the poor country. Note that the citizens cannot deduce the politician's type from observing the first period record due to the noise in the poverty reduction outcome. This is because the outcome is not only affected by  $\varepsilon$ , but also by a random shock; even when  $\varepsilon = 1$ , implying that the entire aid transfer is allocated to meet the goal of poverty reduction, it may still fail to do so with probability of  $1 - \bar{q}$ .<sup>14</sup> None the less, experience accumulated in the first period provides the citizens with a signal from which they can imperfectly infer the politician's type. That is, the aid-giving decision and the development outcome are used by the citizens to update their initial estimate of the likelihood that the politician is 'good'. If the politician is removed in the elections, the probability that the opponent politician who replaces him will be good is  $\lambda_O$ , a random variable drawn from the known c.d.f.  $G(\lambda_O)$ , smoothly increasing in  $\lambda_O$ . For simplicity and without loss of generality, it will be assumed that  $\lambda_O$  is uniformly distributed, i.e.,  $G'(\lambda_O)$  is constant.

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<sup>14</sup> If the institutional environment had been the sole determinant of the poverty reduction outcome, the citizens would have been able to observe the politician's type without an error after the first period and there would have been no scope for type signaling.

### 3.2 The Political Game in the Donor Country

At the beginning of the game nature chooses the identity of the incumbent politician,  $i \in (g, b)$ , privately observed by the politician. As previously mentioned, the game has two periods. Each period the politician in office implements an aid policy,  $A_t \in \{0, 1\}$ . If aid is disbursed,  $A_t = 1$ , then its impact on poverty reduction is witnessed and declared as either a success,  $\overline{pr}$ , or a failure,  $\underline{pr}$ . Before the politician decides which aid policy to implement, he observes the recipient's type, which thereby determines the likelihood of aid success and the citizens' expected gain from aid disbursement and whether it is in the citizens' interest to do so ex-ante. After implementation, the citizens fully observe the first period record which consists of the chosen policy and its effect on poverty reduction. He uses it to update his beliefs that the politician is good, applying Bayes' rule and obtaining the posterior denoted by  $\hat{\lambda}_t$ . At the end of the first period elections are held. If the politician is removed from office, an opponent whose likelihood of being good,  $\lambda_o$ , is drawn from the c.d.f.  $G(\lambda_o)$ . The citizens vote for the candidate who is expected to give them the highest utility in the second period. The winning politician implements the second period aid policy,  $A_2 \in \{0, 1\}$ . The timing of the events is summarized in Table I.

- Insert Table I-

#### 3.2.1 Objectives and Strategies

The citizens' strategy is to specify a reelection rule. That is, to specify the probability that the incumbent is reelected for every observed first period record. We assume that this specification is consistent with Bayesian updating. Thus, the citizens take into account the signal provided by the first period aid policy, i.e., whether aid has been disbursed or not,  $A_1 \in \{0, 1\}$ , and its development outcome, encompassed by the aid's impact on poverty reduction,  $pr_1 \in \{\overline{pr}, \underline{pr}\}$ , and use Bayes' rule to temper their prior beliefs with accumulated experience in order to generate an updated posterior. We denote the updated posterior by  $\hat{\lambda}_t(A, pr)$ , and the elements which play a role in its determination are the aforementioned variables and functions:  $\lambda_t$ ,  $q(\varepsilon)$ ,  $\Pi(\varepsilon)$ , and  $G(\cdot)$ .



After the citizen's beliefs are shaped and the posterior,  $\hat{\lambda}_I(A_1, pr)$ , is obtained, the optimal reelection probability is decided upon. The citizens compare their posterior with the estimate of the probability that the oponent is of a 'good' type,  $\lambda_O$ , a random variable drawn from the aforementioned c.d.f.  $G(\lambda_O)$ . Thus, for every track record, the citizens' best response strategy, namely determining the incumbent politician's probability of being reelected is given by  $\Pr(\hat{\lambda}_I(A_1, pr) \geq \lambda_O) = G(\hat{\lambda}_I)$ .

The politician has two aid-giving decisions to make, one in the first period, and another in the second period, should he get reelected. In the second period, the politician is a lame duck and has no reelections considerations. His strategy is a rule which translates his type and the realization of  $\varepsilon$  to an aid-giving decision,  $\sigma$ , which is the probability of selecting an aid police, disbursing or withholding aid,  $A \in \{0,1\}$ . We use the notion of mixed strategies in which the politician's choices are regulated by probabilistic rules over the pure strategy space. Denote the probability that the politician will provide aid, as a function of  $i$  and  $\varepsilon$ , by  $\sigma_{A_2}^i(\varepsilon)$ , where  $A_2 \in \{0,1\}$  and  $i \in \{g,b\}$ , with  $\sigma_0^i(\varepsilon) + \sigma_1^i(\varepsilon) = 1, \forall i$ .

In the first period the politician faces a more complex decision since there is a tradeoff between current benefits and the probability of wining the elections, which will provide him with the utility of being in office in the second period. The politician knows that his chosen aid policy and its outcome will signal his type to the citizens, and may affect the outcome of the electoral contest, where he faces an opponent. The politician's strategy in the first period is a rule that specifies an aid-giving decision to each politician's type and each realization of  $\varepsilon$ , anticipating the impact of his decision on the citizens' choice of the probability that he will get reelected. Thus, the probability of providing aid in this case is  $\sigma_A^i(\varepsilon, \lambda_I, q(\varepsilon), \Pi(\hat{\varepsilon}), G(\cdot))$ .

**DEFINITION.** *The pair of aid-giving decision and citizens' belief functions,*

*$\langle \sigma_A^i(\varepsilon), \hat{\lambda}_I(A, pr) \rangle$  is a Perfect Bayesian Equilibrium (PBE) if<sup>15</sup>:*

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<sup>15</sup> The opponent is also a player. Prior to assuming office, the opponent has not revealed his type yet and therefore plays according to his expected type.

1. *the incumbent politician's strategy is best response to the citizens' optimal reelection rule, i.e., his aid-giving decision,  $\sigma_A^i(\cdot)$ , is optimal given its anticipated effect on the citizens' beliefs and consequent strategy.*
2. *the citizens' beliefs are best response to every politician's aid policy,  $\sigma_A^i$ ; i.e., the posterior  $\hat{\lambda}_i(A, pr)$  is consistent with the aid policy and its impact. We assume Bayesian rational voters, who use Bayes' rule to update their beliefs. Given these beliefs, the citizens optimally specify the probability that they will reelect the incumbent;*

### 3.3 Political Equilibrium

Backwards induction is used to find the Perfect Bayesian Equilibrium of this game. We consider both pure and mixed strategies and show under what conditions aid will be disbursed in each period. In this section we analyze the aid-giving decision problem faced by an incumbent politician in the second, and therefore the last, period he is in office. The subsequent section derives the conditions under which the incumbent politician disburses aid in the first period.

#### 3.3.1 *Lame duck - Solution of the second period*

In the last period of the game the politician has no reelection considerations and behaves in an unconstrained way. If the politician in office is good,  $i = g$ , then his aid policy is in line with the citizens' preferences, given by equation (3). The 'good' politician's indirect utility in the second period is therefore,

$$(4) \quad U_g^*(\varepsilon) = \text{Max}(U_g(\Delta(\varepsilon)), U_g(0)).^{16}$$

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<sup>16</sup> More explicitly,  $U_g^*(\varepsilon) = \begin{cases} U_g^*(\Delta(\varepsilon)) & \varepsilon \geq \hat{\varepsilon} \\ U_g^*(0) & \varepsilon < \hat{\varepsilon} \end{cases}$ .

In case the politician is 'bad',  $i = b$ , assumption 3 yields the result that aid is always granted in the second period, regardless the value of  $\varepsilon$ . This thereby determines the 'bad' politician's second period utility,

$$(5) \quad U_b(\Delta(\varepsilon), R).$$

Thus, we can summarize the decision over  $A_2$  by,

$$(6) \quad A_2^i(\varepsilon) = \begin{cases} 1 & (i = b) \cup (i = g \cap \varepsilon \geq \hat{\varepsilon}) \\ 0 & \text{otherwise} \end{cases}.$$

### 3.3.2 Efficient Aid Allocation by the Good Politician

Note that the aforementioned assumptions may give rise to an inefficient behavior of a 'good' politician. The reason is that he may want to be in office in the second period in order to implement an efficient policy. Consider the event in which  $\varepsilon \geq \hat{\varepsilon}$ , where aid is effective on average and efficient behavior calls for aid disbursement. In this case, the probability of failing to alleviate poverty, although low, still exists. Thus, if the 'good' politician's choices are in the best interest of the citizens, i.e., he delivers aid, then he enjoys the high expected benefit in the first period. In terms of his reelection probability, the risks of aid failure and thereby a loss of reputation still exists. The implication is that a 'good' politician's optimal choice may be to randomize his aid giving choices, i.e., choose an optimal probability of aid giving.

In order to simplify the analysis and avoid reelection considerations that may drive a *good* politician to behave *inefficiently*, i.e., opposite of what equation (3) prescribes, we make the following assumption.

**ASSUMPTION 4:** (i)  $U_g^*(\Delta(\varepsilon)) > U_g(0) + \delta U_g^*(\Delta(\varepsilon))$ ,  $\forall \varepsilon \geq \hat{\varepsilon}$ , and

(ii)  $U_g^*(0) > U_g(\Delta(\varepsilon)) + \delta U_g^*(0)$ ,  $\forall \varepsilon < \hat{\varepsilon}$ .

This assumption ensures a persistent efficient behavior of a 'good' politician. The condition which guarantees that the 'good' politician will behave efficiently is twofold. First, it asserts that whenever  $\varepsilon \geq \hat{\varepsilon}$ , his utility from serving the best interest of the citizen and disbursing aid is greater than forgoing aid in the first period and staying in office to the second period in which he implements his optimal policy

choice. Equivalently, the first part of assumption 4 states that the 'good' politician's loss of utility from forgoing aid in the first period is greater than the discounted value of his utility from giving aid in the period that follows. That is,  $U_g^*(\Delta(\varepsilon)) - U_g(0) > \delta U_g^*(\Delta(\varepsilon))$ . Note that Assumption 2 assures that this part of Assumption 4 is satisfied for a 'bad' politician as well. Second, the other side of the efficient play has to meet the condition that in the event of an ineffective aid,  $\varepsilon < \hat{\varepsilon}$ , the politician prefers foregoing aid to giving aid in his first period and then not giving aid in the second. Equivalently:  $U_g^*(0) - U_g(\Delta(\varepsilon)) > \delta U_g^*(0)$ , the foregone utility from giving ineffective aid exceeds the discounted utility of not giving ineffective aid in the period that follows. This group of events is where the 'good' and the 'bad' politicians may depart in their behavior.

### 3.3.3 Rational Bayesian Voters

While the behavior of the politician in office in the second period was simply determined by the types of the politician and the recipient, the aid-disbursement decision in the first period is more complicated, as elections take place at the end of it. The citizens will determine whether to reappoint the incumbent politician for another term or to vote him out of office in favor of an opponent. The citizens are better off with a 'good' politician in power. Thus, they use the record of the politician to update their prior probability that the politician in office is 'good'.

In this section we show how the citizens' posterior beliefs,  $\hat{\lambda}_l$ , are generated in response to the politicians' aid-giving choices and after the first period record is observed. Recall that by Assumption 4, the good politician is non-strategic and allocates aid efficiently, that is, he disburses aid according to Equation (3). Thus the strategic interaction is only between the citizens and the 'bad' politician, whose strategy is given by  $\sigma_1^b$ . Also, by combining Assumptions 2 and 4, the 'bad' politician is more motivated to disburse aid. That is, he disburses aid in the events that a 'good' politician disburses aid, i.e., whenever  $\varepsilon \geq \hat{\varepsilon}$ , but may also disburse aid in other cases, where  $\varepsilon < \hat{\varepsilon}$ . The citizens are aware of the incentives of the alternative politicians and use the first period record to generate the posterior,  $\hat{\lambda}_l(A, pr)$ . There are three possible

track records:  $(1, \overline{pr})$ ,  $(1, \underline{pr})$ ,  $(0,0)$ . The structure of information from which the citizens update their beliefs is illustrated in Figure I.

- Insert Figure I -

For every  $\sigma_1^b$ , the citizens generate the following posteriors:

$$(7) \quad \hat{\lambda}_I(1, \overline{pr}) = \frac{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon + (1-\lambda_I) \left[ \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon + \sigma_1^b \int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)q(\varepsilon)d\varepsilon \right]},$$

$$(8) \quad \hat{\lambda}_I(1, \underline{pr}) = \frac{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon}{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon + (1-\lambda_I) \left[ \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon + \sigma_1^b \int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon \right]},$$

$$(9) \quad \hat{\lambda}_I(0,0) = \frac{\lambda_I \Pi(\hat{\varepsilon})}{\lambda_I \Pi(\hat{\varepsilon}) + (1-\lambda_I)(1-\sigma_1^b)}.$$

### 3.3.4 Politicians' first period Payoff Space

The incumbent politician anticipates the response of the citizens. Thus, for each politician's type,  $i \in \{g, b\}$ , and each first period aid decision,  $A_1 \in (1,0)$ , we can specify the politician's payoffs,  $V_A^i$ . The two possibilities in the case that  $i = b$  are the following:

$$(10) \quad V_0^b = U_b(0,0) + \delta G(\hat{\lambda}_I(0,0))U_b(\Delta(\varepsilon), R), \quad \text{if } i = b \text{ and } A_1 = 0,$$

$$(11) \quad V_1^b = U_b(\Delta(\varepsilon), R) + \delta h(\varepsilon, \hat{\lambda}_I)U_b(\Delta(\varepsilon), R), \quad \text{if } i = b \text{ and } A_1 = 1,$$

where,

$$(12) \quad h(\varepsilon, \lambda_I) = q(\varepsilon)G(\hat{\lambda}_I(1, \overline{pr})) + (1-q(\varepsilon))G(\hat{\lambda}_I(1, \underline{pr})).^{17}$$

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<sup>17</sup> For a good politician the expected utility from each pure strategy choice is given by:

The function  $h$  describes the expected probability that the politician will be reelected if he disburses aid. Note that  $h$  depends on the politician's initial popularity,  $\lambda_I$ , which affects the posteriors  $\hat{\lambda}_I(1, \underline{pr})$  and  $\hat{\lambda}_I(1, \overline{pr})$ , and on the institutional nature of the government of the recipient country,  $\varepsilon$ , which determines the effectiveness of aid,  $q(\varepsilon)$ . The variables  $\lambda_I$  and  $\varepsilon$  are of interest in the comparative statics analysis conducted in section 3.3.8. An increase in the prior  $\lambda_I$ , positively affects the posterior for all track records, i.e., for all aid-giving decisions and outcomes. Note that a change in the quality of the recipient government, i.e., an change in  $\varepsilon$ , is not observed by the citizens and therefore does not affect the way in which the citizens' beliefs are updated, after having observed the record of the first period. It does, however, affect the probability of occurrence of each updated belief,  $\hat{\lambda}_I(1, \underline{pr})$  or  $\hat{\lambda}_I(1, \overline{pr})$ . The rest of the properties of function  $h$  are given by:  $h_\varepsilon, h_{\lambda_I}, h_{\varepsilon\lambda_I} > 0$  and  $h_{\lambda_I\lambda_I}, h_{\varepsilon\varepsilon} > 0$ <sup>18</sup>.

### 3.3.5 The Bad politician's first period optimal strategy

Let us now derive the first period equilibrium strategies of the politicians,  $\{\sigma_A^b(\bullet), \sigma_A^g(\bullet)\}$ . Recall that assumption 4 assures an efficient behavior of a 'good' politician and the bad politician is the only strategic player. The incumbent politician chooses the probability of disbursing aid in order to maximize his expected utility,

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$$\text{if } i = g \text{ and } A_1 = 0: \quad V_0^g = U_g(0) + \delta G(\hat{\lambda}_I(0,0))U_g^*(\varepsilon),$$

$$\text{and if } i = g \text{ and } A_1 = 1: \quad V_1^g = U_g(\Delta(\varepsilon)) + \delta h(\varepsilon, \hat{\lambda}_I)U_g^*(\varepsilon).$$

<sup>18</sup> Note that the sign of the derivative,  $h_\varepsilon = q'(\varepsilon)[G(\hat{\lambda}_I(1, \overline{pr})) - G(\hat{\lambda}_I(1, \underline{pr}))]$  depends on the sign of the square brackets, i.e., on the relationship between  $\hat{\lambda}_I(1, \overline{pr})$  and  $\hat{\lambda}_I(1, \underline{pr})$ . In accordance with straightforward intuition, the former is greater than the latter. When aid is disbursed, namely the first period record is  $A_1 = 1$ , then, relative to the probability of aid failure, the probability of aid success for a 'good' politician is greater than the probability of aid success for a 'bad' politician. Formally, the

following inequality:  $\frac{\int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon} > \frac{\int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon}$ , clearly holds, because  $q(\varepsilon)$  is a strictly increasing function of  $\varepsilon$ .

anticipating citizens' response, consistent with each strategy. Thus the politician chooses his optimal strategies by solving the following:

$$(13) \quad \underset{\sigma_0^b, \sigma_1^b}{Max} \quad EU = \sigma_0^b \cdot V_0^b + \sigma_1^b \cdot V_1^b,$$

$$\text{where: } \sigma_0^b + \sigma_1^b = 1.$$

In order to simplify the notations, we henceforth oppress the politician's type index and impose the equality  $\sigma_1^b = 1 - \sigma_0^b$ . We therefore remain with the bad politician's aid policy choice  $\sigma = \sigma_1^b$ , the probability of disbursing aid. The politician's maximization problem can be rewritten as:

$$(13)' \quad \underset{\sigma}{Max} \quad EU = (1 - \sigma) \cdot V_0^b + \sigma \cdot V_1^b,$$

Assumption 3 provides the bad politician with an incentive to act opportunistically, although Assumption 2, may allow reelection considerations to play the role of disciplining him, and induce an efficient behavior. Thus, in the event that  $i = b$ , the politician either behaves in an unconstrained way, i.e., maximizes the his utility in the first term without any reelection considerations, always plays  $A_1 = 1$ , or foregoes aid when it is not likely to have a desired outcome on the poor in order to get reelected<sup>19</sup>.

We now turn to emphasize the bad politician's inefficient behavior, by deriving the threshold which induces the pure strategy equilibrium to the political game: "always give aid". Afterwards we consider the more general mixed strategy political equilibrium and in section 3.3.8 we combine the results.

### 3.3.6 The Pure Strategy Equilibrium: "Bad politician always gives aid"

We now show that the politician's maximization problem has a pure strategy equilibrium. While the mixed strategies equilibrium always exists, we derive the conditions under which the (pure) strategy: "always give aid" emerges, i.e., when the 'bad' politician chooses  $\sigma^* = 1$ , the asterisk denoting an equilibrium strategy. Note

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<sup>19</sup> Recall that assumptions 1 and 4 remove the possibility that the 'bad' politician will forgo efficient aid in order to increase the probability of getting reelected.

that playing according to this pure strategy profile is clearly a deviation from the efficient aid allocation policy, as given by (3). Also note that the opposite pure strategy, "never give aid", is never optimal and thus does not exist in equilibrium. If in equilibrium the 'bad' politician chooses  $\sigma^* = 0$ , then by disbursing aid he reveals himself as a 'good' politician and gets reelected with certainty. This is clearly a beneficial change of strategy, for every parameter value of the problem, and therefore  $\sigma^* = 0$  cannot be equilibrium.

Thus, we state that

**PROPOSITION 2:** *Under Assumptions 1 to 3, there exists  $\tilde{\lambda}_l(\varepsilon) \in (0,1)$  such that if the politician's initial reputation,  $\lambda_l$ , exceeds it, there is a unique Perfect Bayesian Equilibrium in which the bad politician always chooses  $\sigma = 1$ . The good politician behaves efficiently, according to Assumption 4.*

**Proof.** By definition of the sequential game, in equilibrium, the citizen's beliefs have to be consistent with the politician's equilibrium strategy. When we substitute  $\sigma = 1$  into the citizen's (Bayesian) updating rule and generate the posteriors for each of the three possible track records, we obtain:

$$(14) \quad \hat{\lambda}'_l(1, \overline{pr}) = \frac{\lambda_l \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\lambda_l \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon + (1-\lambda_l) \left[ \int_{\varepsilon=0}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon \right]},$$

$$(15) \quad \hat{\lambda}'_l(1, \underline{pr}) = \frac{\lambda_l \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon}{\lambda_l \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon + (1-\lambda_l) \left[ \int_{\varepsilon=0}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon \right]},$$

$$(16) \quad \hat{\lambda}'_l(0,0) = \frac{\lambda_l \Pi(\hat{\varepsilon})}{\lambda_l \Pi(\hat{\varepsilon}) + (1-\lambda_l) \overbrace{(1-\sigma)}^0} = 1.$$

The function  $h$ , which represents the probability of getting reelected when the bad politician plays according to the strategy "always give aid", is now defined, for given  $\varepsilon$  and  $\lambda_l$ , by  $h'$  where:

$$(17) \quad h'(\varepsilon, \lambda_l) = q(\varepsilon)G(\hat{\lambda}'_l(1, \overline{pr})) + (1-q(\varepsilon))G(\hat{\lambda}'_l(1, \underline{pr})) =$$



$$q(\varepsilon)G \left( \frac{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon + (1-\lambda_I) \left[ \int_{\varepsilon=0}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon \right]} \right) + (1-q(\varepsilon))G \left( \frac{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon}{\lambda_I \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon + (1-\lambda_I) \left[ \int_{\varepsilon=0}^1 \pi(\varepsilon)(1-q(\varepsilon))d\varepsilon \right]} \right)$$

The function  $h'$  defines the expected probability that the politician will be reelected if he *always* provides aid. Similarly to the function  $h$ , given in (12), it depends on his initial popularity and on the institutional nature of the government of the recipient country. Here too, it is an increasing and concave function of both.

Define  $\tilde{\lambda}_I(\varepsilon)$ , as the threshold level of  $\lambda_I$ , which represents the minimum level of initial popularity which guarantees that the politician gets reelected. Note that for every  $\varepsilon$  there is a different threshold. Formally,  $\tilde{\lambda}_I(\varepsilon)$  is derived from the condition that the politician is indifferent between giving aid and not giving aid:

$$(18) \quad V_1^b = U_b(\Delta(\varepsilon), R) + \delta h'(\varepsilon, \tilde{\lambda}_I) U_b(\Delta(\varepsilon), R) = U_b(0,0) + \overbrace{\delta G(\hat{\lambda}_I'(0,0))}^1 U_b(\Delta(\varepsilon), R) = V_0^b.$$

Rearranging and isolating  $h'$ , we obtain the following:

$$(19) \quad h'(\varepsilon, \tilde{\lambda}_I) = \frac{U_b(0,0) + \delta U_b(\Delta(\varepsilon), R) - U_b(\Delta(\varepsilon), R)}{\delta U_b(\Delta(\varepsilon), R)} = 1 - \frac{U_b(\Delta(\varepsilon), R) - U_b(0,0)}{\delta U_b(\Delta(\varepsilon), R)}.$$

Assumptions 2 and 3 and the properties of  $h'$  with respect to its arguments,  $\varepsilon$  and  $\lambda_I$ , guarantee that such a value,  $\tilde{\lambda}_I$ , exists and is an element of  $(0,1)$ .

■□■

The intuition for proposition 1 is that if the politician is popular enough he is willing to disburse aid despite the penalty to his reputation and transfer aid. The citizens cannot perfectly infer the politician's type.

Note that this equilibrium is unique and that there is no lower threshold of  $\lambda_I$  which induces the pure strategy equilibrium  $\sigma = 1$ . Even when  $\lambda_I \rightarrow 0$  and the probability of getting reelected approaches zero, the pure strategy  $\sigma = 1$ , which in this case is interpreted as "disburse aid (and enjoy the private benefits it embeds) and run",

although intuitively appealing<sup>20</sup>, is not an equilibrium. We show point by contradiction. If it had been an equilibrium, then by forgoing aid the politician would reveal himself as a 'good' politician and would get reelected with certainty. Recall from Assumption 3 that  $U_b(\Delta(\varepsilon), R) < U_b(0,0) + \delta U_b(\Delta(\varepsilon), R)$ ,  $\forall \varepsilon$ , that is, the 'bad' politician would be willing to forgo aid in order to survive the elections to the second period, implying that this would be a beneficial deviation from  $\sigma = 1$ , asserting the singularity of the threshold. We can also illustrate this point analytically. As  $\lambda_I \rightarrow 0$  the probability of being reelected after having disbursed aid approaches zero, namely  $h'(\varepsilon, \lambda_I) \rightarrow 0$ . At the same time  $\lim_{\lambda_I \rightarrow 0} \hat{\lambda}'_I(0,0) = 1$ . Equation (18) and assumption 3 imply that in the first period, the politician's payoff from forgoing aid is greater than his payoff from disbursing aid - a contradiction.

The following corollary is immediate:

**COROLLARY 1.** *The threshold  $\tilde{\lambda}_I(\varepsilon)$  is decreasing and convex in  $\varepsilon$ :*

$$(i) \hat{\lambda}_I(\varepsilon) = [0,1] \times \left[ \bar{\lambda}_I, \hat{\lambda}_I \right], (ii) \frac{d\hat{\lambda}_I(\varepsilon)}{d\varepsilon} < 0, (iii) \frac{d^2\hat{\lambda}_I(\varepsilon)}{d\varepsilon^2} > 0.$$

**Proof.** See Appendix.

■□■

Corollary 1 states that higher levels of  $\varepsilon$ , i.e., a better institutional environment in the aid recipient country, reduces the reputation threshold that assures aid disbursement by a 'bad' politician. Intuitively, as  $\varepsilon$  increases, the probability that aid will succeed increases and consequently aid becomes more effective on average. This results in a direct increase in the politician's utility when he disburses aid, as his utility function also captures the citizens' interests. But the increased  $\varepsilon$ , also increases the probability of getting reelected if the politician disburses aid,  $h$ . Thus, disbursing aid is less risky for the politician's reputation and the initial reputation threshold,  $\tilde{\lambda}_I$ , declines. Recall the property of diminishing marginal effect of  $\varepsilon$  on the probability that aid will result in poverty reduction. Consequently, each increase in  $\varepsilon$  leads to a smaller decline in  $\hat{\lambda}_I$ .

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<sup>20</sup> In the mixed strategy equilibrium we show that if  $\lambda_I \rightarrow 0$  then  $\sigma \rightarrow 1$ .

### 3.3.7 The Mixed Strategy Equilibrium

If the bad politician's initial reputation is lower than the threshold,  $\lambda_I < \tilde{\lambda}_I$ , then the pure strategy equilibrium collapses. In this case, the politician's loss of reputation due to disbursing aid with probability 1 is too great compared with the current benefit of disbursing aid in the first period; thus he reduces the probability of disbursing aid and his optimal strategy is mixed. We now solve the politician's maximization problem given in (13)' to obtain the first period equilibrium strategy,  $\sigma$ . More explicitly the politician's expected utility, i.e., his target function is given by,

$$(20) \quad EU = (1 - \sigma) \cdot U_b(0,0) + \sigma \cdot U_b(\Delta(\varepsilon), R) + \delta U_b(\Delta(\varepsilon), R) \cdot f(\sigma),$$

where,  $f(\sigma) = (1 - \sigma) \cdot G(\hat{\lambda}_I(0,0)) + \sigma \cdot h(\varepsilon, \hat{\lambda}_I)$  is the probability that the incumbent politician will be reelected, i.e., the likelihood of being in office in the second period. Note that it is comprised of the probability of getting reelected when aid is not disbursed,  $G(\hat{\lambda}_I(0,0))$ , and the probability of getting reelected when aid is disbursed,  $h(\varepsilon, \hat{\lambda}_I)$ , multiplied by the politician's corresponding strategies.

The FOC to this problem implicitly yields  $\sigma^*(\varepsilon, \lambda_I)$ , and is given by,

$$(21) \quad \frac{\partial EU}{\partial \sigma} = U_b(\Delta(\varepsilon), R) - U_b(0,0) + \delta U_b(\Delta(\varepsilon), R) f_\sigma = 0,$$

from which we can establish the following proposition:

**PROPOSITION 2:** *If  $\lambda_I < \tilde{\lambda}_I$ , then the mixed strategy equilibrium has the following properties:*

(i) *the incumbent politician chooses  $0 < \sigma^*(\varepsilon, \lambda_I) < 1$ .*

(ii)  *$\sigma^*$  monotonically increases with  $\varepsilon$ ,  $\frac{d\sigma^*(\varepsilon, \lambda_I)}{d\varepsilon} > 0$ .*

(iii) *if  $\lambda_I \rightarrow 0$  or  $\lambda_I \rightarrow 1$ , then  $\sigma^* \rightarrow 1$ , with*

$$\frac{\partial \sigma^*}{\partial \lambda_I} > 0, \text{ if and only if } \lambda_I > \lambda_I^r, \text{ otherwise } \frac{\partial \sigma^*}{\partial \lambda_I} < 0, \text{ where } \lambda_I^r \text{ satisfies } \frac{\partial^2 EU}{\partial \sigma \partial \lambda_I} = 0.$$

**Proof.** See Appendix.

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First, Proposition 2(i) states that the politician always chooses  $\sigma^* > 0$ . The intuition is that if  $\sigma^* = 0$ , i.e., the bad politician never disburses aid, then by disbursing aid a politician reveals himself as a good politician and gets reelected with certainty. Therefore,  $\lim_{\sigma \rightarrow 0} f_\sigma > 0$ , and increasing  $\sigma^*$  to a positive value is strictly superior to never disbursing aid. Thus, by disbursing aid, the politician enjoys the double benefits of increased probability of getting reelected and the private benefit of disbursing aid. Proposition 2(ii) states that an increase in the institutional quality in the recipient country, implying that a larger fraction of the aid transfer actually reaches the poor, increases the politician's incentives to disburse aid.

When  $\varepsilon$  changes, so does the probability of aid success, which affects the 'bad' politicians via two channels. First, it affects the citizens' expected utility from aid disbursement, which is a factor in the 'bad' politician's utility function. Second, it affects the probability of conveying a signal that the politician is 'good', which consequently changes the politician's reelection probability in the event that aid is disbursed. This latter effect is how elections may work to indirectly discipline the 'bad' politician. That is, although the weight the politician assigns to the citizens' utility relative to the private benefits it aid disbursements embed, may be low, reelection considerations may lead him to internalize the costs and benefits the citizens incur when aid is disbursed. Proposition 2(iii) points out to the non-monotone impact of the politician's initial reputation on the probability of aid disbursement. In order that the politician's choice: to withhold aid, will be an equilibrium, it has to be that the expected future benefits of aid outweigh the current loss of withholding aid. The politician's initial reputation,  $\lambda_t$ , determines how influential the politician's first period actions are on the probability he will be reelected and enjoy the future benefits of disbursing aid. Consider the case of a low level of  $\varepsilon$ , where aid is likely to be ineffective in helping the poor and efficiency calls for withholding aid. In this case, aid disbursement is likely to signal to the citizens that the incumbent politician is 'bad'. If the politician is already extremely unpopular, and will probably be voted out of office in the elections, he cannot be rewarded for withholding aid, and chooses to transfer aid with a very high probability (although not 1)<sup>21</sup> so as to obtain the private

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<sup>21</sup> See the analysis in the previous section.

benefits it embeds. In this case, an increase in  $\lambda_I$  implies that the politician could be rewarded for withholding aid and thus gives him an incentive to forgo aid so as to be reelected and the function  $\sigma^*(\varepsilon, \lambda_I)$  decreases in  $\lambda_I$ . The opposite occurs when  $\lambda_I$  is large enough. Then the more popular the politician is, the more he is willing to risk the penalty to his reputation, and the incentive to disburse ineffective aid in order to obtain personal benefits in the first period increases. For this range, the function  $\sigma^*(\varepsilon, \lambda_I)$  increases in  $\lambda_I$ .

### 3.3.8 Combining the results obtained in Propositions 1 and 2 and Corollary 1:

The results obtained in Propositions 1 and 2 and Corollary 1, can be observed in Figure II, in which a graph of a typical  $\sigma^*(\lambda_I; \varepsilon)$  is shown. The example illustrated in the Figure II is based on the following parameter values:  $A = C = 1$ ,  $v = 1.4$ ,  $q(\varepsilon) = 0.1 + \frac{2\sqrt{\varepsilon}}{3}$ , thereby determining  $\hat{\varepsilon} = 0.849$ , for the critical fraction of the transfer that the citizen requires in order to transfer aid. The distributions  $\Pi(\varepsilon)$  and  $G(\lambda_O)$  are assumed to be homogenous and continuous. The politician is characterized by the following utility function and discount factor:  $U(\Delta(\varepsilon), R) = \Delta(\varepsilon) + 1.07$ ,  $U(0, 0) = 0.2$ ,  $\delta = 0.95$ .

Figure II reveals that for a given value of  $\varepsilon$ , lower than the minimum required by the citizens, the equilibrium probability of disbursing aid is a U-shape function of the politician's initial reputation. If the citizens' prior is not very extreme, low or high, then the electoral competition process becomes effective in disciplining the 'bad' politician and inducing an efficient aid policy choice. Consider the case of an extremely unpopular politician. The citizens are likely to ignore any signal provided by the aid policy choice and vote the incumbent out of office. Thus, the expected reward for an efficient behavior, namely forgoing aid, is very small. An increase in  $\lambda_I$  will increase the expected reward for a policy choice which is in line with the citizens' interest and inversely affect the probability of disbursing aid. Similarly, if the citizens believe that the politician is 'good' with an extremely high likelihood, then they are not likely to punish him for a bad signal and reduce the probability that he will be reappointed in the elections. In this case, a decline in  $\lambda_I$  will increase the politician's

incentive to forgo the current benefits of disbursing aid in order to get reelected becomes stronger. For an effective impact of the political competition process on the politician's aid policy choice, the  $\lambda_I$  - values should be high enough, but not too high.

- Insert Figure II -

Figure II also illustrates how the politician's first period aid policy choice depends on the institutional environment in the recipient country,  $\varepsilon$ . It can be seen that as  $\varepsilon$  increases, the threshold level of the politician's initial reputation which ensures that aid disbursement,  $\tilde{\lambda}_I(\varepsilon)$ , decreases as well as the  $\sigma^*$  increases for every  $\lambda_I$ . That is, if institutions in the recipient country are such that guarantee that a larger fraction of the aid transfer reaches its intended destination then the bad incumbent is more motivated to provide aid.

The effect of a change in the institutional environment in the recipient country on the aid disbursement decision, corresponding to Figure II, is shown in Table II.

- Insert Table II -

Column 1 shows the different fractions of the aid transfer that may reach the poor. Column 2 calculates the likelihood of aid success for each of the fractions. Column 3 illustrates the corresponding reputation threshold which ensures aid disbursement,  $\tilde{\lambda}_I$ . Next, columns 4 and 5 describe the coordinate of the point in which the curves in Figure II attain the minimum probability of disbursing aid. Column 4 is the value of the  $\lambda_I$  for which its affect on  $\sigma^*$  goes from negative to positive and lastly column 5 is the corresponding lowest probability of disbursing aid. The first four rows appear in Figure II.

#### **4. The Formation of Public Institutions in the Aid Recipient Country**

We now turn to address the question of how does the political process in the donor country affect the formation of institutions and policies in the recipient country? In this section we make use the results obtained in the previous section in

order to analyze the recipient government's optimal choice of its type, i.e., the determination of the value of  $\varepsilon$ . This process takes place prior to the stage of the political process in the donor country surrounding the aid disbursement decision. A key assumption is that institutional quality choices are credible and irreversible, implying that when the political game is played in the donor country, the recipient's 'institutional environment', is viewed by the politician and the citizens as an exogenous variable thought to affect the efficiency of aid.

Going back to the model, we consider now the stage in which the recipient government optimally chooses to form its type, anticipating its impact on the outcome of the political process surrounding the aid-disbursement decision in the donor country. Supported by evidence, it is reasonable to assume that the recipient government is not a benign social welfare maximizer, but rather a self-interested agent, who derives a positive utility from the fraction of the aid disbursement he appropriates. We assume that the recipient derives negative utility from choosing sound policies and installing good institutions, as they limit his rent-seeking opportunities, not only in appropriating aid funds but also in other sectors of the economy. That is, improving the quality of institutions and policies implies enacting rent-reducing economic reforms which embeds a marginal disutility of  $\gamma$  for the recipient.

Thus, the recipient government is assumed to choose  $\varepsilon$  in order to maximize the following quasi-linear utility function,

$$(22) \quad U_R = E \left[ \sum_{t=1}^2 \delta_R^{t-1} \cdot \mu_t((1-\varepsilon) \cdot A_t) \right] - \gamma \varepsilon ,$$

where the recipient's per-period utility from aid is monotonically increasing and concave in  $\varepsilon \cdot A$  with  $\mu(1)=0$  and  $\mu(0)=\bar{\mu}$  and  $\delta_R$  is the recipient's discount factor.

Note that if the probability of aid disbursement is not associated with the political process in the donor country, i.e., the poor country always receives aid with a constant probability, denoted by  $\eta_t$ , then the recipient government solves:

$$(23) \quad \text{Max}_{\varepsilon} \sum_{t=1}^2 \eta_t \cdot \delta_R^{t-1} \cdot \mu((1-\varepsilon) \cdot A_t) - \gamma \varepsilon ,$$

by choosing poor institutional quality and pursues appropriative policies, i.e.,  $\varepsilon = 0$ , rendering aid to be ineffective for helping the poor. However, in our model, aid disbursement is conditional on donor-country domestic political factors as well as recipient's institutional quality. We now turn to examine how these variables interact in the type formation stage.

#### 4.1 Aid conditional on the politics in the donor country

In the previous section, the political process in the donor country has been shown to affect the probability of disbursing aid. Moreover, this probability depends, among other factors, on the recipient's type and on the incumbent politician's initial reputation for being a 'good' politician. We denote the probability of obtaining aid in each period by  $\eta_t(\varepsilon; \lambda_t)$ . As before, once the institutions have been formed, in the type formation stage, they are fully observed by the politician; however the citizens attach a probability  $\pi(\varepsilon)$  to the event that the recipient is a  $\varepsilon$  type. Note that the recipient's choice of  $\varepsilon$  is irreversible and maintained throughout the two periods that follow in which the political process in the donor country takes place.

The process that the game follows can be illustrated using Figure I. The recipient is assumed to be aware of the subsequent political process in the donor country, and thus he is familiar with Figure I. For an exogenously given level of  $\lambda_t$ , the recipient can choose any  $\varepsilon$ . Graphically, the recipient can choose any point on the vertical line corresponding to  $\lambda_t = \lambda_t'$ , thereby determining on which iso-value curve  $\sigma(\varepsilon; \lambda_t)$  to be. He decides on  $\varepsilon$  so as to maximize his utility.

The recipient now maximizes,

$$(24) \quad \text{Max}_{\varepsilon} U_R = \sum_{t=1}^2 \eta_t(\varepsilon; \lambda_t) \cdot \delta_R^{t-1} \cdot \mu((1-\varepsilon) \cdot A_t) - \gamma \varepsilon.$$

The properties of  $\eta_t(\varepsilon; \lambda_t)$  and its implications for the type formation stage are discussed extensively in the section which follows. However, note that if the probability of obtaining aid continuously increases in  $\varepsilon$ , then the problem has an internal solution. Holding the size of the aid transfer constant each period, and defining  $\eta(\varepsilon) = \eta_1 + \delta_R \eta_2$  as the discounted probability of obtaining aid in both periods, the recipient's maximization problem becomes,



$$(25) \quad \underset{\varepsilon}{\text{Max}} U_R = \eta(\varepsilon) \cdot \mu((1-\varepsilon) \cdot A) - \gamma\varepsilon.$$

The first order condition to this problem is given by

$$(26) \quad \eta_\varepsilon(\varepsilon)\mu((1-\varepsilon) \cdot A) = \gamma - \eta(\varepsilon) \cdot \mu_\varepsilon((1-\varepsilon) \cdot A),$$

where the LHS is the marginal benefit from undertaking institutional reforms and improving governance. It is a result of the increased probability of obtaining aid in both periods. The RHS is the regime's marginal cost of reforming which results from the rent-reduction in other sectors of the economy and the forgone share of the aid transfer. Differentiation of (26) reveals that the second order conditions which must hold for the equilibrium to exist is:

$$(27) \quad \eta_{\varepsilon\varepsilon}(\varepsilon)\mu((1-\varepsilon) \cdot A) + 2\eta_\varepsilon(\varepsilon) \cdot \mu_\varepsilon((1-\varepsilon) \cdot A) + \eta(\varepsilon)\mu_{\varepsilon\varepsilon}((1-\varepsilon) \cdot A) < 0.$$

Note that  $\mu_{\varepsilon\varepsilon}((1-\varepsilon) \cdot A) > 0$ , so that for this condition to hold,  $\mu((1-\varepsilon) \cdot A)$  cannot decrease very dramatically, i.e., it has to be that the value of  $\mu_{\varepsilon\varepsilon}((1-\varepsilon) \cdot A)$  is not too high.

Before we characterize the probability of obtaining aid in both periods, in light of the political process in the donor country, notice that  $\eta(\varepsilon)$  is a function of the probabilities  $h$ ,  $h'$  and  $G(\hat{\lambda}_I(0,0))$  are evaluated taking into account the incumbent politician's optimal play,  $\sigma^*(\varepsilon, \lambda_I)$ . This implies that in this section these probabilities are defined by the following functions  $h^*(\varepsilon, \lambda_I, \sigma^*(\varepsilon, \lambda_I))$ ,  $h'^*(\varepsilon, \lambda_I, \sigma^*(\varepsilon, \lambda_I))$ ,  $G(\hat{\lambda}_I^*(0,0)) = \text{func}(\lambda_I, \sigma^*(\varepsilon, \lambda_I))$ . That is, the first two depend on  $\varepsilon$  and  $\lambda_I$  not only directly but also indirectly, through their effect on  $\sigma^*$ . Also, the probability of getting reelected in the event aid is withheld,  $G(\hat{\lambda}_I^*(0,0))$ , depends not only on  $\lambda_I$  (directly and indirectly), but also on  $\varepsilon$  (only indirectly). Note that these effects are countervailing.

For the type formation problem to receive an internal solution, it is essential to assume that the dominant effect is the direct effect<sup>22</sup>. That is, the properties of the

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<sup>22</sup> For instance, in the case of a mixed strategy, the derivative of the probability of getting reelected when aid is disbursed with respect to  $\varepsilon$  is  $h_\varepsilon(\varepsilon, \lambda_I, \sigma^*(\varepsilon, \lambda_I)) = h_\varepsilon + h_\sigma \sigma_\varepsilon^*$ . The two components on the RHS imply that an improvement in the institutional quality of the recipient country will (i) increase the probability that aid will have a positive impact on the welfare of the poor and will therefore increase the probability that the incumbent politician is good. However, (ii) it will also increase the propensity of a bad politician to disburse aid and as a result aid provision will be a stronger signal that the politician is bad. We assume that the former is greater and that the sign of this derivative is positive.

probabilities remain unchanged, despite some offsetting effects. For expositional convenience, we oppress the asterisks.

#### 4.2 Analysis of the Properties of $\eta_t(\varepsilon; \lambda_t)$ : A Two Threshold Model

The analysis of the political process in the donor country expresses two thresholds values of  $\varepsilon$ , resulting in a split of the unit interval to three ranges:  $[0, \tilde{\varepsilon}(\lambda_t))$ ,  $[\tilde{\varepsilon}(\lambda_t), \hat{\varepsilon})$  and  $[\hat{\varepsilon}, 1]$ . The first threshold is defined by assumption 1, which establishes the existence of some critical value  $\hat{\varepsilon}$ , satisfying  $\Delta(\hat{\varepsilon}) = 0$ . It implies that if the quality of public institutions in the recipient country is greater than the minimum required by the citizens, then disbursing aid is efficient, ex ante, from the citizens' perspective. Assumption 4 states that if  $i = g$ , then for  $\varepsilon \geq \hat{\varepsilon}$  the 'good' politician, who acts in the interest of the citizens disburses aid in the first period; all the more, aid will be disbursed if a 'bad' politician is in office. Whether the incumbent politician gets reelected or not, the elected politician in office in the second period also disburses aid, regardless of his type. Thus, the recipient guarantees aid disbursement for every  $\varepsilon \in [\hat{\varepsilon}, 1]$ . Clearly, once  $\varepsilon = \hat{\varepsilon}$  there is no further incentive to enact institutional reforms, as it will only increase the recipient's costs. Thus, we can determine an upper bound of  $\hat{\varepsilon}$ , i.e.,  $\varepsilon \in (0, \hat{\varepsilon})$ , from which the recipient derives the reservation utility,  $U_R(\hat{\varepsilon}) = (1 + \delta_R) \cdot \mu((1 - \hat{\varepsilon}) \cdot A) - \gamma \hat{\varepsilon}$ , assumed to be strictly positive.

The second threshold is concerned with the strategic interaction with the 'bad' politician and is calculated from Proposition 1. Proposition 1 states that the critical reputation of a 'bad' politician, which induces certain disbursement of aid, depends on the condition of the institutions in the recipient country, expressed formally by  $\tilde{\lambda}_t(\varepsilon)$ . This implies that for some exogenously given  $\lambda_t$ , there exists a value  $\tilde{\varepsilon}$ , which guarantees aid disbursement by a bad politician in the first period. Formally,  $\tilde{\varepsilon}$  satisfies

$$(28) \quad \tilde{\lambda}_t(\tilde{\varepsilon}) = \lambda_t.$$

Using the inverse function of (28), it follows that

$$(29) \quad \tilde{\varepsilon} = \tilde{\varepsilon}(\lambda_t),$$

which defines a mapping of the 'bad' politician's initial reputation to the minimal institutional quality the recipient government is required to provide in order to induce certain aid disbursement by a 'bad' politician. The interpretation of  $\tilde{\varepsilon}$  is the exact minimum of institutional quality which induces a bad politician to provide aid in the first period with probability 1, because for every  $\varepsilon \geq \tilde{\varepsilon}(\lambda_I)$ , a 'bad' politician optimally chooses  $\sigma^* = 1$ . In the event that  $\varepsilon < \tilde{\varepsilon}$ , then  $\tilde{\lambda}_I$  exceeds  $\lambda_I$ , and the pure strategy equilibrium collapses; the bad politician chooses an optimal probability of disbursing aid smaller than 1,  $\sigma^* < 1$ .

Note also that there is a unique critical value  $\tilde{\lambda}_{I \min}$ , such that for all  $\lambda_I$ -values below it, the recipient cannot impose the pure strategy equilibrium  $\sigma^* = 1$ . Formally,

$$(30) \quad \tilde{\lambda}_{I \min} = \lim_{\varepsilon \rightarrow \hat{\varepsilon}} \tilde{\lambda}(\varepsilon) .$$

Note also that assumption 2, imposes an upper bound restriction on  $\tilde{\varepsilon}(\lambda_I)$ , since it must be that  $\hat{\varepsilon} \geq \tilde{\varepsilon}(\lambda_I)$ ,  $\forall \lambda_I$ . That is, an institutional quality in the aid recipient country which induces aid disbursement by a good politician, also assures aid disbursement by a bad one, although the reverse is not necessarily true.

From the above it follows that we can distinguish between the following situations according to the political equilibrium in donor country, which essentially depends on the institutional quality choice of the recipient:

- (a) *Partial Aid Disbursement.* This is the case in which the donor country politician's initial reputation is too low,  $\lambda_I < \tilde{\lambda}_{I \min}$ , and the recipient cannot choose  $\varepsilon$  so as to ensure aid disbursement by a bad politician, unless he chooses  $\varepsilon = \hat{\varepsilon}$ . That is, the middle range,  $[\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon})$ , vanishes since  $\tilde{\varepsilon}(\lambda_I) = \hat{\varepsilon}$  and therefore  $\varepsilon \in [0, \tilde{\varepsilon}(\lambda_I))$ . The only feasible political equilibrium in the donor country is one with a mixed strategy.
- (b) *Complete Aid Disbursement.* In this case the donor-country politician is popular enough and the pure strategy equilibrium is feasible, namely  $\lambda_I \geq \tilde{\lambda}_{I \min}$ . Thus, given that the recipient government determines an institutional quality of at least  $\tilde{\varepsilon}(\lambda_I)$ , aid will be disbursed by a bad

politician in the first period. Note that  $\varepsilon = \hat{\varepsilon}$ ,  $\forall \lambda_I$ , also belongs to this group.

- (c) *Incomplete Aid Disbursement.* This is the case where the donor country politician is popular enough and the recipient can determine an institutional quality which will ensure aid disbursement by a bad politician. However, if the recipient optimally chooses to enact less reforms than the minimum required,  $\varepsilon < \tilde{\varepsilon}(\lambda_I)$ , this consequently yields the mixed strategy political equilibrium in the donor country, when a 'bad' politician is in office.

Figure III maps the three situations of the model in the  $(\lambda_I, \varepsilon)$  space. Following the parameterization used in this paper, Figure III depicts the threshold level of institutional quality which separates between certain and uncertain aid disbursement,  $\tilde{\varepsilon}(\lambda_I)$ , and distinguishes between each of the events. Recall from the previous section numerical analysis that,  $\hat{\varepsilon} = 0.849$ , implying that for such institutional quality, aid is disbursed by both good and bad politicians. The value of  $\tilde{\lambda}_{I\min}$  is calculated by  $\lim_{\varepsilon \rightarrow 0.849} \tilde{\lambda}(\varepsilon)$  which yields approximately 0.75. Different values of the mapping  $\tilde{\varepsilon}(\lambda_I)$ , in its downward sloping part, can be obtained from the Table 1 using the third and the first columns (from the left).

- Insert Figure III -

Certain aid disbursement cannot occur when the condition  $\lambda_I \geq \tilde{\lambda}_{I\min}^*$  does not hold, which corresponds to region (a), that lies to the left of the vertical line  $\lambda_I = \tilde{\lambda}_{I\min}$ . In this case,  $\sigma^* = 1$  cannot occur and the only solution that sustains is  $\sigma^* < 1$ . If however the condition  $\lambda_I \geq \tilde{\lambda}_{I\min}^*$  holds, certain aid disbursement is possible. The downward sloping part of the curve  $\tilde{\varepsilon}(\lambda_I)$  separates between the values of  $\varepsilon$ , which induce certain aid disbursement, namely the region lying above the curve, marked by (b), and the institutional qualities for which aid is disbursed with a probability less than 1, graphically lying under the curve  $\tilde{\varepsilon}(\lambda_I)$  and marked by (c).

Figure III is closely related to Figure II. Both figures illustrate the relationship between a given pair  $(\lambda_I, \varepsilon)$  and the corresponding  $\sigma^*$ , although Figure II shows this relationship in the  $(\lambda_I, \sigma^*)$  space, for given values of  $\varepsilon$ , while in Figure III the mapping is in the  $(\lambda_I, \varepsilon)$  space, where the areas of the different values of  $\sigma^*$  are marked, broadly separating between the cases of pure strategy equilibrium,  $\sigma^* = 1$ , and the mixed strategy equilibrium,  $\sigma^* < 1$ .

Our next step is to find the solution to the recipient's type formation problem and find the optimal institutional quality (for the recipient),  $\varepsilon^*$ . Each section is followed by a sensitivity analysis of the solution to changes in the parameter  $\lambda_I$ .

### 4.3 Complete information

As a preliminary, we start by analyzing the behavior of the aid recipient government under the assumption that the type of the donor politician in office in the first period is observed by the recipient without an error. That is, we assume that the incumbent politician in the donor country can credibly convey his type to the leader of the recipient country. This assumption is suitable to describe a more general group of circumstances in which the recipient leader is better informed than the donor country citizens regarding the type of the politician in office.

#### 4.3.A Institutional Formation When A 'Good' Politician is in Office, $i = g$

In the case that the incumbent politician in the donor country is 'good', the probability of aid disbursement in both periods is given by:

$$(31) \quad \eta(\varepsilon; \lambda_I) = \eta_1 + \delta_R \eta_2 = \begin{cases} 1 + \delta_R & \varepsilon \geq \hat{\varepsilon} \\ 0 & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ \delta_R \cdot [1 - G(\hat{\lambda}_I(0,0))] (1 - \lambda_O) & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases} .$$

In the first period, the recipient can only obtain the aid transfer if the quality of the institutions meets the minimum required by the citizens, i.e.,  $\varepsilon \geq \hat{\varepsilon}$ . In this case, whether the incumbent politician gets reelected or not, the elected politician for the second period also disburses aid, regardless of his type. In the event that  $\varepsilon \in [\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon})$ , forgoing aid perfectly reveals that the politician is good, resulting in a triumph in the elections and denial to transfer aid. Thus, if the incumbent politician is of a good type

and the recipient chooses any  $\varepsilon \in [\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon}]$ , aid is not disbursed in either period. Lastly, if the recipient chooses any  $\varepsilon \in [0, \tilde{\varepsilon}(\lambda_I))$ , the good incumbent politician forgoes aid in the first period, but may lose the elections with probability  $[1 - G(\hat{\lambda}_I(0,0))]$ , and be replaced by a bad politician with probability  $(1 - \lambda_O)$ , who will disburse aid in the second period.

The recipient's expected utility is explicitly given by,

$$(32) \quad U_R(\varepsilon; \lambda_I) = \begin{cases} (1 + \delta_R)((1 - \varepsilon) \cdot A) - \gamma\varepsilon & \varepsilon \geq \hat{\varepsilon} \\ -\gamma\varepsilon & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ \delta_R \cdot [1 - G(\hat{\lambda}_I(0,0))] (1 - \lambda_O) \mu((1 - \varepsilon) \cdot A) - \gamma\varepsilon & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases}$$

The solution to the maximization of (33) with respect to  $\varepsilon$  yields:

$$(33) \quad \varepsilon^* = \begin{cases} \hat{\varepsilon} & \varepsilon \geq \hat{\varepsilon} \\ \tilde{\varepsilon}(\lambda_I) & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ 0 & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases}$$

The intuition underlying the choice of the lower bound of each range is that the marginal utility from reforms is always negative. Consider for instance, the lower range,  $\varepsilon \in [0, \tilde{\varepsilon}(\lambda_I))$ . The recipient's marginal utility from improving the quality of the state institutions is given by  $(1 - \lambda_O) \cdot \delta_R \cdot \left\{ [1 - G(\hat{\lambda}_I(0,0))_\varepsilon] \mu((1 - \varepsilon) \cdot A) + [1 - G(\hat{\lambda}_I(0,0))] \mu_\varepsilon \right\} - \gamma < 0$ , resulting in the optimal institutional quality  $\varepsilon^* = 0$ . In this case, rent-reducing reforms are costly for three reasons. First, it embeds the reduction of rent proceeds from other sectors of the economy; second, it reduces the fraction of aid the recipient appropriates; and third, it reduces the likelihood that the 'good' politician, who is in office, will lose the elections, and with some probability be replaced by a 'bad' one<sup>23</sup>.

With respect to determinacy, evaluating the recipient's utility for each one of the solutions, by substituting the solutions into the recipient's utility function, allows us to determine which of the solutions is the optimal one. Note that  $\varepsilon^* = 0$  is always superior to  $\varepsilon^* = \tilde{\varepsilon}(\lambda_I)$ , for which the recipient's utility is negative,  $-\gamma\tilde{\varepsilon}(\lambda_I)$ , and

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<sup>23</sup> The reason for the last effect is as follows. An increase in  $\varepsilon$  results in an increase in  $\sigma^*$  and therefore not disbursing aid becomes a stronger signal for being of the 'good' type, which increases the probability of being reelected.

therefore the recipient chooses the condition of the institutions out of the binary set  $\{0, \hat{\varepsilon}\}$ , according to  $\varepsilon^* = \max\{U_R(\varepsilon=0, \lambda_I), U_R(\hat{\varepsilon}, \lambda_I)\}$ . Specifically, the recipient chooses  $\hat{\varepsilon}$  if and only if  $U_R(\hat{\varepsilon}) \geq U_R(0)$ , or more explicitly, when the following condition holds:

$$(34) \quad (1 + \delta_R)\mu((1 - \hat{\varepsilon})A) - \gamma\hat{\varepsilon} \geq \delta_R(1 - \lambda_O) \left[ 1 - G(\hat{\lambda}_I(0, 0)) \right]_{\varepsilon=0} \mu(A),$$

otherwise  $\varepsilon^* = 0$ . The RHS of (35) is a decreasing function of the donor-country incumbent politician's initial popularity,  $\lambda_I$ , and determines which of the solutions holds.

**PROPOSITION 3.** *If  $i = g$ , then under the assumptions that  $(1 + \delta_R)\mu((1 - \hat{\varepsilon})A) - \gamma\hat{\varepsilon} > 0$ , and  $(1 + \delta_R)\mu((1 - \hat{\varepsilon})A) - \gamma\hat{\varepsilon} < \delta_R(1 - \lambda_O)\mu(A)$ , there exists a  $\bar{\lambda}_I \in (0, 1)$  for which (35) holds with equality. If  $\lambda_I$  exceeds  $\bar{\lambda}_I$ , then  $\varepsilon^* = \hat{\varepsilon}$  is an equilibrium of the type formation stage. Otherwise,  $\varepsilon^* = 0$ .*

**Proof.** Immediate.

■□■

Proposition 3 states that if the politician in donor country is 'good', then provided that he enjoys from enough political support at home, then the recipient may have an incentive to create effective institutions. The intuition for this result is simple. The recipient knows that when  $\lambda_I$  is high the incumbent politician will get reelected with a high probability, and the only way to obtain aid is by choosing  $\varepsilon^* = \hat{\varepsilon}$ . However, if  $\lambda_I$  is low, the good politician is likely to lose the upcoming elections, and with some probability will be replaced by a 'bad' one, who will disburse aid in the second period, even when  $\varepsilon^* = 0$ . Moreover, for  $\varepsilon \in [0, \tilde{\varepsilon}(\lambda_I))$  institutional reform will adversely affect the probability of receiving aid and thus the recipient government is with an incentive to be appropriative and to forgo any institutional reform.

Note that if the conditions specified in Proposition 3 are not satisfied, then the recipient constantly chooses one of the corner solutions, . If  $U_R(\hat{\varepsilon}) \geq U_R(0)$ ,  $\forall \lambda_I \in [0, 1]$ , then the recipient's optimal choice is given by the line  $\varepsilon = \hat{\varepsilon}$ . If for all values of  $\lambda_I$  the inequality sign is reversed, then the recipient's optimal choice will always be a straight line along the horizontal axis.

The result obtained from Proposition 3 is conveniently shown in Figure 4, where the  $\bar{\lambda}_l = 0.7$ . For all the examples we choose the following parameter values and functional forms:  $\delta_R = 0.95$ ,  $\mu_t((1-\varepsilon) \cdot A_t) = \phi(1-\varepsilon)^\beta$ , where  $\phi$ ,  $\beta$  and  $\gamma$  will be assigned different values, where  $\phi, \gamma > 0$  and  $0 < \beta < 1$ , to consider recipients with different motivations to enact institutional reforms so as to obtain the aid transfer. The interpretation of  $\phi$  and  $\gamma$  is straightforward, whereas the parameter  $\beta$  determines the marginal loss of rents from reforms, with a greater value implying that the marginal utility from the share of appropriated rents diminishes more slowly.

- Insert Figure IV -

#### 4.3.B.1 Type formation when a bad politician is in office, $i = b$

We now turn to analyze the recipient's choice in the event that in the first period a 'bad' politician is in office, i.e.,  $i = b$ . The task again is to find the discounted probability of aid disbursement in both periods, represented by the function  $\eta(\varepsilon)$ . Here too, this probability is evaluated differently for the three aforementioned ranges of  $\varepsilon$ . We analyze the probability of aid disbursement in each period separately and then sum them up so as to solve the recipient's institutional formation problem.

Under the assumption that the politician in office is bad, the probability of aid disbursement in the first period is given by,

$$(35) \quad \eta_1(\varepsilon; \lambda_l) = \begin{cases} 1 & \varepsilon \geq \hat{\varepsilon} \\ 1 & \tilde{\varepsilon}(\lambda_l) \leq \varepsilon < \hat{\varepsilon} \\ \sigma(\varepsilon) & \varepsilon < \tilde{\varepsilon}(\lambda_l) \end{cases}$$

where for  $\varepsilon \geq \hat{\varepsilon}$ , in the first period the both the good and the bad politicians disburse aid, and thus the recipient is granted the aid transfer with probability 1. If the recipient chooses any  $\varepsilon$  in the range  $[\tilde{\varepsilon}(\lambda_l), \hat{\varepsilon})$ . Only the 'bad' incumbent politician, who is in office disburses aid in the first period with certainty. When  $\varepsilon < \tilde{\varepsilon}$  the bad politician's first period pure strategy "always give aid",  $\sigma^* = 1$ , no longer sustains, and we turn to the mixed strategies solution, where he chooses the optimal probability of disbursing aid according to  $\sigma^*(\varepsilon, \lambda_l)$ , as established by proposition 2 in the previous section.



The analysis of the probability of obtaining aid in the second period follows a similar pathway and is given by,

$$(37) \quad \eta_2(\varepsilon; \lambda_I) = \begin{cases} 1 & \varepsilon \geq \hat{\varepsilon} \\ \sigma(\varepsilon)[h(\varepsilon; \lambda_I) + (1-h(\varepsilon; \lambda_I))(1-\lambda_O)] + (1-\sigma(\varepsilon))[G(\hat{\lambda}_I(0,0)) + (1-G(\hat{\lambda}_I(0,0)))(1-\lambda_O)] & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ \sigma(\varepsilon)[h(\varepsilon; \lambda_I) + (1-h(\varepsilon; \lambda_I))(1-\lambda_O)] & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases}$$

Again if  $\varepsilon \geq \hat{\varepsilon}$  and the recipient provides the minimal institutional quality to induce aid disbursement by both 'good' and 'bad' politicians, aid will be disbursed in the second period with probability 1, regardless of the type of the politician who wins the elections. For every  $\varepsilon \in [\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon})$  aid will be disbursed in the second period if and only if there is a 'bad' politician in office. This occurs if in the first period there will be a 'bad' politician, who will disburse aid and either be reelected or be voted out of office but be replaced by another bad politician. The corresponding probabilities of these two events are  $h(\varepsilon)$  and  $(1-h(\varepsilon))(1-\lambda_O)$ . If there will be a good politician in the first period, he will withhold aid, a step which will reveal his type and grant him the second term in office. Lastly, when  $\varepsilon < \tilde{\varepsilon}$  then a 'bad' politician disburses aid only with probability  $\sigma < 1$ , and withholds aid with the complementary to 1 probability. Again, in the event that aid will be disbursed in the first period, the politician will be reelected or replaced by another 'bad' politician with the probability:  $h(\varepsilon) + (1-h(\varepsilon))(1-\lambda_O)$ . However, the bad politician in office will deny aid in the first period with probability  $(1-\sigma)$ . In this case he will be reelected with probability  $G(\hat{\lambda}_I(0,0))$ . The probability that he will lose the elections and will be replaced by a 'bad' politician, the case which guarantees aid disbursement in the second period, is given by  $[1-G(\hat{\lambda}_I(0,0))](1-\lambda_O)$ .

The sum of the discounted probabilities of obtaining aid in both periods is thus given by:

$$(36) \quad \eta(\varepsilon; \lambda_I) = \begin{cases} 1 + \delta_R & \varepsilon \geq \hat{\varepsilon} \\ 1 + \delta_R [h(\varepsilon; \lambda_I) + (1-h(\varepsilon; \lambda_I))(1-\lambda_O)] & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ \sigma(\varepsilon)[1 + \delta_R (h(\varepsilon; \lambda_I) + (1-h(\varepsilon; \lambda_I))(1-\lambda_O))] + (1-\sigma(\varepsilon))\delta_R [G(\hat{\lambda}_I(0,0)) + (1-G(\hat{\lambda}_I(0,0)))(1-\lambda_O)] & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases}$$

Finally, substituting (36) into (25) and optimizing with respect to  $\varepsilon$  yields the following First Order Condition corresponding to each of the ranges of  $\varepsilon$ ,

(37)

$$\varepsilon^* = \begin{cases} \hat{\varepsilon} & \varepsilon \geq \hat{\varepsilon} \\ \delta_R \lambda_O h'_\varepsilon(\varepsilon^\dagger) \cdot \mu((1-\varepsilon^\dagger) \cdot A) = \gamma - \eta(\varepsilon^\dagger) \cdot \mu_\varepsilon((1-\varepsilon^\dagger) \cdot A) & \tilde{\varepsilon}(\lambda_I) \leq \varepsilon < \hat{\varepsilon} \\ \left\{ \begin{array}{l} \sigma_\varepsilon(\varepsilon^\ddagger) \left[ 1 + \lambda_O \delta_R (h(\varepsilon^\ddagger) - G(\hat{\lambda}_I(0,0))) \right] + \\ \lambda_O \delta_R [\sigma(\varepsilon^\ddagger) h_\varepsilon(\varepsilon^\ddagger) + (1-\sigma(\varepsilon^\ddagger)) G(\hat{\lambda}_I(0,0))_\varepsilon] \end{array} \right\} \mu((1-\varepsilon^\ddagger) \cdot A) = \gamma - \eta(\varepsilon^\ddagger) \cdot \mu_\varepsilon((1-\varepsilon^\ddagger) \cdot A) & \varepsilon < \tilde{\varepsilon}(\lambda_I) \end{cases}$$

where  $\varepsilon^\dagger$  and  $\varepsilon^\ddagger$  denote the recipient's optimal choice for the segments  $[\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon}]$  and  $[0, \tilde{\varepsilon}(\lambda_I))$ , respectively, and  $h'(\cdot)$ ,  $h(\cdot)$  and  $G(\hat{\lambda}_I(0,0))$  are evaluated for  $\sigma^*(\varepsilon, \lambda_I)$ . Equation (37) provides a good illustration of the underlying incentives for the determination of the institutional quality. The impact of initiating reforms on the objective function of the recipient can be decomposed to three marginal effects. On the cost side, there are two effects; the first is the marginal loss of rent proceeds due to the reduction of rent-seeking opportunities captured by,  $\gamma$ , and the second effect is via the reduction in the appropriated fraction of the aid transfer. On the benefit side, the effect of enacting reforms is via the gain from the increased probability of obtaining aid. Equation (37) clearly shows under what circumstances each of the incentives is at play. Once the recipient provides the critical minimum institutional quality which secures aid from both good and bad politicians throughout both periods, namely by choosing  $\varepsilon^* = \hat{\varepsilon}$ , there is no incentive to increase  $\varepsilon$  any further, since it will result only in costly limiting of rent expropriation. For any  $\varepsilon \in [\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon})$ , the motivation to increase  $\varepsilon$  to any  $\varepsilon > \tilde{\varepsilon}(\lambda_I)$  stems from the incentive to help a bad politician get reelected, since only a bad politician will disburse aid in the second period. The term on the LHS of the middle range of (37) corresponds to this effect. For any  $\varepsilon$  in the range  $[0, \tilde{\varepsilon}(\lambda_I))$  the incentive to enact institutional reforms is amplified by an additional factor. To be precise, the underlying incentive to determine any  $0 \leq \varepsilon < \tilde{\varepsilon}(\lambda_I)$  is not only a result of the will to help a 'bad' politician get reelected, but is also meant to induce him to provide aid in the first period, captured by the first term in the curly parenthesis on the LHS of the lower range of (37). Moreover, it can be easily verified that  $\lim_{\sigma^\ddagger \rightarrow 1} \varepsilon^\ddagger = \varepsilon^\dagger$ , that is, the middle and lower ranges in (37) unite in the event that  $\varepsilon \geq \tilde{\varepsilon}(\lambda_I)$ .

From the above it follows that:

**LEMMA 1.** *The corresponding solutions to each of the regions (a)-(c) in the  $(\lambda_I, \varepsilon)$  space are given by:*

(a) *For any  $\lambda_I < \tilde{\lambda}_{I\min}$ ,  $\varepsilon^\ddagger$  is the only feasible solution,*

*and for  $\lambda_I \geq \tilde{\lambda}_{I\min}$  (b) If  $\varepsilon^\ddagger \geq \tilde{\varepsilon}(\lambda_I)$ , then  $\varepsilon^\ddagger = \varepsilon^\dagger$ ,*

*and (c) If  $\varepsilon^\ddagger < \tilde{\varepsilon}(\lambda_I)$ , then  $\varepsilon^\ddagger > \varepsilon^\dagger$ , and  $\varepsilon^\ddagger$  is the corresponding solution.*

Lemma 1 describes the actual solutions that occur in each of the previously introduced situations, (a)–(c). For low  $\lambda_I$ -values, specifically when  $\lambda_I \geq \tilde{\lambda}_{I\min}$ , corresponding to region (a) in Figure III,  $\varepsilon^\dagger$  is undefined and the only solution that sustains is  $\varepsilon^\ddagger$ . The donor-country politician's initial reputation,  $\lambda_I$ , is too low and the recipient cannot choose  $\varepsilon \in [0, \hat{\varepsilon})$  to ensure aid disbursement in the first period. Thus, the only feasible solution is  $\varepsilon^\ddagger$ , where there is a *Partial Aid Disbursement*, corresponding to the mixed strategy political equilibrium in the donor country.

If the condition  $\lambda_I \geq \tilde{\lambda}_{I\min}$  holds, then certain aid disbursement is possible. Both the situations labeled as (b) and (c) are possible, implying that the choice of  $\varepsilon \geq \tilde{\varepsilon}(\lambda_I)$  induces *Complete Aid Disbursement* and any choice of  $\varepsilon < \tilde{\varepsilon}(\lambda_I)$  results in *Incomplete Aid Disbursement*. It follows from Lemma 1 that if  $\varepsilon^\ddagger \geq \tilde{\varepsilon}(\lambda_I)$ , then the solution is characterized by  $\varepsilon^\ddagger = \varepsilon^\dagger$ , and occurs in the region marked by (b). Alternatively, if  $\varepsilon^\ddagger < \tilde{\varepsilon}(\lambda_I)$ , then  $\varepsilon^\ddagger$  is undefined and the solution is characterized by  $\varepsilon^\ddagger$ , which lies underneath the curve  $\tilde{\varepsilon}(\lambda_I)$  in the region marked by (c).

Thus, the question of determinacy amounts to asking whether, for a given  $\lambda_I$ , the correspondence  $\varepsilon^\ddagger(\lambda_I)$  provides the recipient with a utility higher than the reservation utility,  $U_R(\hat{\varepsilon})$ , defined as the utility obtained if the recipient decides not to play strategically, but instead cooperates with the donor's reform goals and channels enough money to its intended destination. Formally, the recipient solves the following

$$\varepsilon^* = \arg \max_{\varepsilon \in [0, \hat{\varepsilon}]} \{U_R(\hat{\varepsilon}), U_R(\varepsilon^\ddagger)\}.$$

The optimal institutional quality is shown in Table III for different values of  $\lambda_I$ . Among the determinants of which solution actually holds, we single out the initial reputation of the donor country politician, our measure of the political climate in the

donor country. The subsequent section analyzes the sensitivity of the solution to the parameter  $\lambda_I$  in more detail. As shown in Column 1 for all values of  $\lambda_I$  below  $\tilde{\lambda}_{I\min} = 0.75$ , the critical value  $\tilde{\varepsilon}(\lambda_I)$  is equal to  $\hat{\varepsilon} = 0.849$ , and for higher values of  $\lambda_I$ ,  $\tilde{\varepsilon}(\lambda_I)$  declines. Column 2 shows the correspondence  $\varepsilon^*(\lambda_I)$  and Column 3 calculates the resulting utility. The table computes the same values for three types of recipients, whose preferences are characterized by different values of  $\phi$ ,  $\beta$ , and  $\gamma$ : the marginal cost of institutional reform,  $\gamma$ , is normalized to 1, while high values of  $\phi$  and  $\beta$  reflect relatively high importance to aid which declines slowly with the increase in the quality of the state institutions, low values of  $\phi$  and  $\beta$ , capturing relatively high importance to aid which rapidly declines with the implementation of reforms, and the intermediate case. In each case, the reservation utility that the recipient can assure to obtain by choosing  $\hat{\varepsilon} = 0.849$ , thereby securing aid disbursement in both period is calculated below the corresponding rows.

- Insert Table III -

Note that there are circumstances under which corner solutions may arise for the different ranges of  $\varepsilon$ , that is the equilibrium level of  $\varepsilon$  will be at the bounds of the aforementioned ranges. A general explanation as to why the corner solution  $\hat{\varepsilon}$  may arise, follows strong incentives to enact rent-reducing reforms. More explicitly, the marginal loss of rents in other sectors in the economy,  $\gamma$ , should be relatively low. Also, the utility from the fraction of the aid received,  $\mu((1-\varepsilon) \cdot A)$ , has to be relatively high, nevertheless it should diminish slowly, i.e. the value of the expression  $\mu_\varepsilon((1-\varepsilon) \cdot A)$  should be low, captured by a high value of  $\phi$  and a low value of  $\beta$ , respectively. Oppositely, the probability of obtaining aid should be low, however the marginal effect of  $\varepsilon$  on the probability of aid disbursement should be high.

The corner solution  $\hat{\varepsilon}$  is of limited practical interest as aid recipient poor countries are notorious for their weak institutions and rampant corruption. Another corner solution, more realistically reasonable, is  $\varepsilon^* = \tilde{\varepsilon}(\lambda_I)$ , i.e., when the recipient chooses to limit his appropriation through extractive institutions to the minimum which guarantees aid disbursement in the first period by the 'bad' politician in office. From (37) it is evident that this corner solution holds when  $\varepsilon^\dagger \leq \tilde{\varepsilon}(\lambda_I)$  or  $\varepsilon^\ddagger \geq \tilde{\varepsilon}(\lambda_I)$ .

Lemma 1 implies that in this case it must be that  $\varepsilon^\dagger = \varepsilon^* = \tilde{\varepsilon}(\lambda_I)$ . This corner solution arises when there is a strong incentive to reduce the institutional quality when the bad politician plays the pure strategy "always disburse aid" and a strong incentive to undertake reforms when he chooses to play in a mixed strategy. The reason which can account for that lies in the values of  $\sigma_\varepsilon^*$  and  $h_\varepsilon$ . As noted above, only the latter affects the decision over  $\varepsilon^\dagger$ , however both expressions affect the choice of  $\varepsilon^*$ . Thus,  $\tilde{\varepsilon}(\lambda_I)$  will be the equilibrium if institutional reforms have a strong impact on the probability of aid disbursement in the first period, reflected by a high value of  $\sigma_\varepsilon^*$ , while enacting institutional reforms has to have a weak impact on the probability of reelection when the politician disburses aid, i.e. the value of  $h_\varepsilon$ , is small. A closer enquiry of the determinants of the effect of  $\varepsilon$  on  $\sigma(\varepsilon)$  reveals that the requirement is that the intrinsic utility that the bad politician derives from the citizens' welfare will be relatively high, i.e., the bad politician will be relatively altruistic. The reason is that  $\sigma(\varepsilon)$  is affected by  $\varepsilon$  via two channels: (1) through the probability of getting reelected  $h(\varepsilon)$ , which is assumed to have a moderate slope, and (2) via the intrinsic utility the politician derives from the welfare of the citizens,  $\Delta(\varepsilon)$ , which has to be a steeply increasing function of  $\varepsilon$ .

#### 4.3.B.2 Comparative Statics when $i=b$ :

Having discussed some properties of the type formation equilibrium when the incumbent politician in the donor country is 'bad', we shall now carry out a comparative statics exercise with respect to the incumbent politician's initial reputation, i.e., we shall examine how changes in the parameter  $\lambda_I$  affect the formation of institutions and policies. Formally, the task is to establish the sign of

$$\frac{\Delta \varepsilon^*}{\Delta \lambda_I}.$$

The result is stated in the following proposition:

#### **PROPOSITION 4:**

*An increase in the politician's popularity,  $\lambda_I$ , will*

- (i) *have no impact on the type formation choice when  $\varepsilon \geq \hat{\varepsilon}$ .*

(ii) lead to an institutional improvement, i.e.,  $\frac{\partial \varepsilon^*}{\partial \lambda_I} > 0$ , if and only if  $\lambda_I < \lambda_I^k$ ,

otherwise  $\frac{\partial \varepsilon^*}{\partial \lambda_I} < 0$ , where  $\lambda_I^k$  satisfies:

(38)

$$\left. \begin{aligned} & \sigma_{\varepsilon \lambda_I} \left[ 1 + \lambda_O \delta_R (h - G(\hat{\lambda}_I(0,0))) \right] + \\ & \lambda_O \delta_R \left[ \sigma_{\varepsilon} (h_{\lambda_I} - G(\hat{\lambda}_I(0,0))_{\lambda_I}) + \sigma_{\lambda_I} (h_{\varepsilon} - G(\hat{\lambda}_I(0,0))_{\varepsilon}) + \sigma h_{\varepsilon \lambda_I} + (1 - \sigma) G(\hat{\lambda}_I(0,0))_{\varepsilon \lambda_I} \right] \Big|_{\lambda_I = \lambda_I^k} = 0 \end{aligned} \right.$$

**Proof.** Computer calculations. ■□■

Analytically, the effect of the donor country politician's initial reputation,  $\lambda_I$ , on the choice of  $\varepsilon$  depends on the second order mixed derivative,  $\eta_{\varepsilon \lambda_I}$ , which is equated to zero in (38)<sup>24</sup>. While the effect is non-monotonic and is therefore determined by means of computer calculations, we can provide some intuition to the boundary cases in which  $\lambda_I \rightarrow 0$  and  $\lambda_I \rightarrow 1$ . The initial reputation of the donor country incumbent politician affects the extent to which institutional reforms will induce aid disbursement. Clearly, in the corner solution  $\varepsilon^* = \hat{\varepsilon}$  there is no strategic interaction and there is no response to changes in the initial reputation. However, recall that the underlying motivation to initiate institutional reforms for any  $\varepsilon \in [\tilde{\varepsilon}(\lambda_I), \hat{\varepsilon}]$ , stems from the incentive to help a bad politician get reappointed, and for any  $0 \leq \varepsilon < \tilde{\varepsilon}(\lambda_I)$  it is also a result of the will to induce the incumbent politician to provide aid in the first period. For extremely low levels of  $\lambda_I$ , i.e., as  $\lambda_I \rightarrow 0$ , the probability of getting reelected also approaches zero and the effect of increased  $\varepsilon$  on the probability of getting reelected will be attenuated. Conversely, for extremely high levels of  $\lambda_I$ , that is when  $\lambda_I \rightarrow 1$ , the probability of getting reelected is extremely high, regardless of the level of  $\varepsilon$ , and again the incentive to enact reforms vanishes.

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<sup>24</sup> Total differential of the of the FOC reveals that  $\frac{d\varepsilon^*}{d\lambda_I} = -\frac{\partial^2 U_R / \partial \varepsilon \partial \lambda_I}{\partial^2 U_R / \partial \varepsilon^2}$ , where the denominator is

always negative and therefore the sign is determined by the nominator, given in (38).

The same logic applies to  $\varepsilon^*$  in the segment  $[0, \tilde{\varepsilon}(\lambda_I)]$ , where the incentive to increase  $\varepsilon$  in order to induce aid disbursement in the first period also plays a role. When  $\lambda_I \rightarrow 0$  as well as  $\lambda_I \rightarrow 1$ , the bad incumbent politician disburses aid in the first period with very high probability, i.e.,  $\sigma^* \rightarrow 1$  and there is no incentive to enact institutional reforms so as to induce aid disbursement in the first period, that is  $\varepsilon^* \rightarrow 0$ .

Maintaining the parameterization used in the previous sections, we carry out the comparative statics exercise by means of computer calculations. Equation (39) and Lemma 1 define the curve  $\varepsilon^* = \psi^*(\lambda_I)$  (where  $\varepsilon^\dagger = \psi^\dagger(\lambda_I)$  is its private case) as well as  $\varepsilon = \hat{\varepsilon}$ , which correspond to the different solutions that may occur. Figure V illustrates the effect of an increase in the popularity of the donor-country politician on the institutional formation equilibrium under three different scenarios.

In the first scenario, depicted in Figure V(a) which corresponds to the parameter values in the left columns in Table III, the recipient assigns a high value to the appropriated aid proceeds, relatively to costs incurred when rent-reducing reforms are enacted, resulting in generally high levels of  $\varepsilon^*$ . The four different segments, marked  $(\alpha)$  -  $(\delta)$ , correspond to the optimal choices of  $\varepsilon^*$ , given varying values of  $\lambda_I$ . Segment  $(\alpha)$  corresponds to low levels of  $\lambda_I$  for which the mixed strategy political equilibrium holds in the donor country. When  $\lambda_I \rightarrow 0$ , the recipient's incentives to reform are weak since the incumbent politician disburses aid with a very high probability. As  $\lambda_I$  increases, the political process in the donor country becomes more effective in disciplining the politician and he tends to withhold aid to countries with low quality institutions. This creates an incentive to enact reforms so as to obtain the aid transfer, all the more for a recipient who is assumed to derive a lot of utility from the appropriated share of the aid transfer. Segment  $(\alpha)$  is therefore positively sloped and steep. Note also, from Table III that along this segment the recipient's utility decreases. Segment  $(\beta)$  corresponds to higher  $\lambda_I$ -values, yet lower than the critical value  $\tilde{\lambda}_{I\min} = 0.75$ . The great utility ascribed to aid, brings the recipient to determined a high institutional quality and choose  $\hat{\varepsilon}$ , which will ensure aid from both 'good' and 'bad' politicians. Clearly, this segment is horizontal since there is no further incentive to increase  $\varepsilon$  beyond  $\hat{\varepsilon}$ . The discontinuity at  $\lambda_I^a$ , the donor-country politician's reputation for which the recipient chooses  $\hat{\varepsilon}$ , is explained as by the discontinuity of

$\eta(\varepsilon, \lambda_I)$  in the neighborhood of  $\hat{\varepsilon}$ . Consider a movement along segment  $(\alpha)$  towards the point of intersection between segments  $(\alpha)$  and  $(\beta)$ , i.e.,  $\lim_{\lambda_I \rightarrow \lambda_I^1} \varepsilon^* = \hat{\varepsilon}$ . This implies that the costs of reform for the recipient are (almost) the ones corresponding to  $\hat{\varepsilon}$ . However,  $\eta(\varepsilon, \lambda_I)$  may be lower than  $1 + \delta_R$ , the discounted probability of ensuring aid receipt in both periods. Therefore the recipient prefers to be on the horizontal segment,  $(\beta)$ , at some point before the intersection. Above the critical value, i.e., when  $\lambda_I \geq \tilde{\lambda}_{I \min} = 0.75$ , the pure strategy equilibrium is possible and the recipient can obtain aid if he determines  $\varepsilon \geq \tilde{\varepsilon}(\lambda_I)$ , which is indeed the case in the scenario we are dealing with. Recall that the incentive to do determine any  $\varepsilon$  strictly greater than  $\tilde{\varepsilon}(\lambda_I)$  is related to the impact that institutional improvements will have on probability that the politician will get reelected when he provides aid, i.e.,  $h_\varepsilon$ . It turns out (and it is easily verifiable) that there is complementarity between  $\lambda_I$  and  $\varepsilon$ , in the sense that as  $\lambda_I$  increases the marginal effect of  $\varepsilon$  on the probability of reelection when aid is disbursed increases, i.e.,  $h_{\varepsilon \lambda_I} > 0$ , providing a stronger incentive to reform. In segment  $(\gamma)$ , corresponding to the range  $[\tilde{\lambda}_{I \min}, \lambda_I^b]$ , the values of  $\lambda_I$  are too low, as well as the values of  $\tilde{\varepsilon}(\lambda_I)$  are too high, so as to induce  $\varepsilon > \tilde{\varepsilon}(\lambda_I)$ , resulting in the equilibrium institutional formation  $\varepsilon^* = \tilde{\varepsilon}(\lambda_I)$ . However, when  $\lambda_I > \lambda_I^1$  this incentive becomes significant, as described by segment  $(\delta)$ , and the recipient's optimal institutional formation choice for the range  $\lambda_I \in [\lambda_I^b, 1]$  is above the critical minimum  $\tilde{\varepsilon}(\lambda_I)$ . As  $\lambda_I$  approaches the value 1, this incentive fades out and converges to  $\varepsilon^* = \tilde{\varepsilon}(\lambda_I)$ .

Figures V(b) and V(c) illustrate the recipient's optimal choice of  $\varepsilon$  for lower valuations of the appropriated aid funds, relatively to the marginal cost of institutional reform. The parameter configuration is the one used for the columns on the middle and the right in Table III. In figure V(b) the recipient never chooses to reform to meet the donor country citizen's requirement. Moreover, the institutional quality is  $\varepsilon^* < \tilde{\varepsilon}$  when  $\tilde{\lambda}_I < \tilde{\lambda}_{I \min}^*$  and  $\varepsilon^* = \tilde{\varepsilon}(\lambda_I)$  for the range  $\lambda_I \in [\tilde{\lambda}_{I \min}, 1]$ . In figure III(c) the importance of aid to the recipient is even lower, resulting in a low institutional quality, with  $\varepsilon^* < \tilde{\varepsilon}(\lambda_I)$  for the range  $[\tilde{\lambda}_{I \min}, \lambda_I^c]$ , implying that, despite its feasibility, the incentives to secure aid in the first period are too weak to do so.



- Insert Figures V(a), V(b) and V(c) -

#### 4.4 Institutional formation under incomplete information

In this section, we assume that the donor-country incumbent politician cannot convey a reliable signal to the recipient and reveal his type. As a result the recipient does not perfectly observe the type of the politician in the donor country. Instead, we undertake the reasonable assumption that the recipient is exposed to the similar information channels by which the citizens in the donor country obtain their prior. Thus, the citizens and the recipient should have correlated priors. To simplify matters, we assume these are the same. That is, the recipient expects that the incumbent politician is good with the a priori probability  $\lambda_I$  and assigns the probability  $(1-\lambda_I)$  to the situation event in which the politician is bad.

The interesting question is how will changes in  $\lambda_I$  affect the recipient's optimal choice of the institutional quality under the new assumption. The result is formally stated as:

**PROPOSITION 6.** *Under the assumptions that  $(1+\delta_R)\mu((1-\hat{\varepsilon})A)-\gamma\hat{\varepsilon} > 0$ , and  $(1+\delta_R)\mu((1-\hat{\varepsilon})A)-\gamma\hat{\varepsilon} < \delta_R(1-\lambda_O)\mu(A)$ , an increase in  $\lambda_I$  results in a discontinuous and even a none-monotone increase in  $\varepsilon^*$ , with  $\lim_{\lambda_I \rightarrow 0} \varepsilon^* = 0$  and  $\lim_{\lambda_I \rightarrow 1} \varepsilon^* = \hat{\varepsilon}$ .*

**Proof.** Computer calculations.

■□■

The intuition underlying the result stated in Proposition 6 is a simple extension of the previous sections. Under uncertainty, the probability of obtaining aid in both periods becomes:  $\lambda_I \cdot \eta(\varepsilon; \lambda_I)_{i=g} + (1-\lambda_I) \cdot \eta(\varepsilon; \lambda_I)_{i=b}$ , where  $\eta(\varepsilon; \lambda_I)_{i=g}$  and  $\eta(\varepsilon; \lambda_I)_{i=b}$ , are explicitly given in (31) and (36), and  $\lambda_I$  and  $(1-\lambda_I)$  are the weights given to each event, respectively, where the former is  $i = g$  and the latter is  $i = b$ . Thus, changes in  $\lambda_I$ , in addition to the effects corresponding to each event separately, as described in the preceding sections, also affects the likelihood of the occurrence of each event. For low  $\lambda_I$ -values, the uninformed recipient expects that the politician is in fact 'bad', and

behaves in line with the description carried out in section 4.3.A. As  $\lambda_I$  increases the probability that the incumbent politician is actually 'good' increases as well and the weight assigned to the optimal behavior described in section 4.3.B, with  $\lambda_I \rightarrow 1$  implying that the recipient acts according to the belief that he faces a 'good' politician in the donor country resulting in  $\varepsilon^* = \hat{\varepsilon}$ .

Figure VI illustrates these results for different parametric configuration, as specified below. Figure VI(a) corresponds to a recipient who greatly values the appropriated aid proceeds and Figure VI(b) describes a recipient with less preference for the rents aid embeds. In the two figures there is a value of  $\lambda_I$ , denoted by  $\lambda_I^{\S}$ , for which the recipient starts behaving the way he does when he faces a 'good' politician. That is, the when  $\lambda_I$  becomes high enough, there is a switch of beliefs from  $i=b$  to  $i=g$ . Since the interaction with a 'good' politician is characterized by an extremist behavior of the recipient we will see sudden changes when there is a beliefs switch at  $\lambda_I = \lambda_I^{\S}$ . In Figure VI(a) this occurs when  $\lambda_I^{\S}$  is greater than the critical value  $\bar{\lambda}_I$ , for which the recipient switches from  $\varepsilon=0$  to  $\varepsilon=\hat{\varepsilon}$ , when he faces a 'good' politician. Thus, for  $\lambda_I$ -values below  $\lambda_I^{\S}$ , the optimal institutional quality is an increasing function of  $\lambda_I$ . When  $\lambda_I$  approaches  $\lambda_I^{\S}$ , a gradual increase in the belief that the politician is 'good' induces a sudden shift in the institutional quality choice and the recipient enacts reforms to ensure certain aid disbursement. In Figure VI(b) the recipient values the appropriated aid by less and therefore  $\bar{\lambda}_I$  is higher; moreover,  $\lambda_I^{\S} < \bar{\lambda}_I$ . In this case, when  $\lambda_I$  exceeds  $\lambda_I^{\S}$  and the perception that a 'good' politician is in office becomes stronger, the recipient is dis-incentivized to reform, resulting in a non-monotonic effect of  $\lambda_I$  on  $\varepsilon^*$ . At the critical value  $\bar{\lambda}_I$  the equilibrium suddenly flips to  $\varepsilon = \hat{\varepsilon}$ .

- Insert Figures VI(a) and VI(b) -

#### 4.5 Comparison between complete and incomplete information

Having analyzed the recipient's institutional formation solution under both complete and incomplete information, we shall now compare the two situations using Figures IV, V and VI. The interesting question that we shall address is under which of

the informational structures are public institutions more likely to undergo reforms, rendering aid to be more effective in helping the poor and implying that the citizens of the donor country are better off?

The results obtained from observation of Figures VI, V(c) and VI are formally stated as:

**PROPOSITION 7:** *If  $i = b$ , then complete information is preferable when  $\lambda_I$ -values are low, and incomplete information is preferable when  $\lambda_I$ -values are high.*

*The opposite holds if  $i = g$ .*

**Proof.** Immediate.

■□■

The intuition to these results is straightforward. It has been shown that if the recipient knows that he is interacting with a 'bad' donor-country politician, then for low  $\lambda_I$ -values the recipient has an incentive to enact some reforms so as to affect the politician's aid disbursement decision and his chances of being reelected. Alternatively, if the recipient knows that he is facing a 'good' politician in the donor country, then for low  $\lambda_I$ -values the recipient acts according to the prediction that the politician will be voted out of office and will be replaced by a 'bad' one and has no incentive to improve the quality of the state institutions. Moreover, any partial reform, namely,  $\varepsilon < \hat{\varepsilon}$ , may help the 'good' politician get reappointed and aid will be withheld throughout both periods. Under uncertainty, the recipient takes the weighted average of the two circumstances, implying that the optimal institutional quality shifts downwards compared with the event that  $i = b$ , i.e.,  $\varepsilon_{\text{uncertainty}}^* < \varepsilon_{i=b}^*$ , however it shifts upwards in the event that  $i = g$ ,  $\varepsilon_{\text{uncertainty}}^* > \varepsilon_{i=g}^*$ . The opposite holds for high  $\lambda_I$ -values. Knowing that  $i = b$  leads the recipient to reduce the institutional quality, while under uncertainty he assigns a high weight to the event that the donor-country politician is 'good', which thereby induces him to enact institutional reforms. For extremely high values of  $\lambda_I$ , the recipient believes that  $i = g$  with a very high probability, which provides him with a strong incentive to reform, and  $\varepsilon^* = \hat{\varepsilon}$ .

## 5. Conclusions

A focal question in the aid literature concerns why ineffective aid is continuously disbursed. The observation that the effectiveness of aid in promoting growth depends on the institutional environment and the policy regimes of recipient countries, has inspired the “aid selectivity” approach to inter-country aid allocation. Despite the declarations and statements, the evidence that donors' assistance is now targeted to countries with sound institutions and policies, has been under dispute. The controversy is around the improvement of multilateral agencies, while there is no disagreement that bilateral donors are not guided by policy selectivity in their aid allocation decisions. In this paper, we explain the divergence from efficient allocation of aid by addressing the donor country politics using a political economy model of electoral competition. The model is then extended to consider the effect of the donor country political process on the way by which institutions are formed in the recipient country.

The results in this paper suggest that "poverty efficiency" of the allocation of aid depends on the political climate in the donor country. The paper has analyzed the politicians' incentives to disburse aid in a two period model of electoral competition in which politicians have private benefits from aid disbursement and voters are imperfectly informed. We find that when voters hold extreme priors regarding the politicians' motivations, the impact of the first period experience on their voting decision is negligible. Politicians cannot be punished or rewarded for pursuing efficient aid policy choices and tend to disburse aid despite its ineffectiveness. Electoral competition becomes more effective in disciplining politicians and inducing aid selectivity when the citizens hold moderate priors. In this case voters take into account the signal provided by the chosen first period aid policy and its impact on the welfare of the poor and use Bayes' rule to temper their prior beliefs with accumulated experience. Since the reputational penalty for a misbehaving politician may be detrimental, politicians with career concerns who want to get reappointed for an additional term, may forgo ineffective aid.

The regime in the recipient country is aware of the political process in the donor country and can affect the equilibrium aid disbursement choices by its behavior. The extension of the model to analyze how institutions in the recipient country are formed in response to the political process in the donor country, allows us

to identify the conditions which determine whether the recipient is likely to be a successful reformer (Uganda, Ghana) , a non-reformer (Nigeria, Congo) or a mixed-reformer (Cote d'Ivoire, Kenya, Zambia). We examine how the political climate in the donor country affects the institutional formation of the recipient country under three assumptions: (i) the incumbent politician in the donor country is 'good', (ii) the incumbent politician in the donor country is 'bad'; and (iii) the recipient is uncertain with respect to the type of the donor-country incumbent politician. For each of these cases, we investigate how changes in the a priori probability of getting reelected affect the regime's optimal choice of institutional quality. We find that in the case that the recipient observes that the donor-country incumbent politician is 'good', then provided that the politician enjoys sufficient political support in the donor country, the recipient will have an incentive to undertake the required reforms so as to obtain aid. In the case that the recipient is aware that the incumbent politician in the donor country is motivated by private benefit concerns, there is a non-monotone impact of the donor-country politician's initial reputation on the recipient's incentives to enact institutional reforms. The recipient's incentive to enact rent-reducing reforms is determined by the impact of reforms on the likelihood that aid will be disbursed. When the donor-country citizens hold extreme priors with respect to the politicians' motivations, the avenue for affecting the political equilibrium in the donor country is blocked. First, the results of the elections are (almost) predetermined and second the incumbent politician disburses aid with a very high probability and therefore the likelihood that aid will be disbursed is irresponsive to the reforms. However, when the citizens hold moderate priors and the political process becomes effective in disciplining the politician and reforms affect the politician's aid policy as well as his reelection probability. Thus, the recipient has an incentive to form high quality institutions in order to increase the probability of obtaining aid. When the recipient cannot reliably observe the motivation of the donor-country motivation, the institutional quality choice is a weighted average of each of the above cases, where the weights are the beliefs assigned to each event.

Comparing the complete and incomplete information scenarios allows us to make a normative inference. We find that if the incumbent politician in office is relatively less susceptible to private interests ('good') and suffers from low political support, then the recipient would have more incentive to enact institutional reforms

under uncertainty rather than under the case in which the donor-country politician's type is revealed. However, if the politician has a high initial reputation, then the ability to reliably convey the politician's type would result in better institutional quality, which will make aid better targeted to the poor and consequently the donor-country citizens will also be better off. Finally, the opposite holds when the politician in office is motivated primarily by self interests ('bad'); namely, full information is preferable, provided that the politician is unpopular, while if the politician enjoys a high reputation, then under uncertainty the welfare of the poor and the donor-country citizens will be greater.

Several possible extensions of the preceding model might be envisaged. First, it should be noted that the current model considers a rather simplified version of aid allocation decision making with a single recipient and a single donor. The model can be further extended to the inclusion of more than one recipient country and to the question of how the donor allocates aid among multiple recipients. Second, while the mixed strategies considered in the preceding model can be viewed as the fraction of the aid transfer being disbursed, making aid a continuously variable, the model can be extended so as to address the endogenous determination of the size of the aid transfer. Another limitation of the model is that we ignore the possibility of disbursing aid multilaterally and only focus on the choice from the binary action space: disburse bilateral aid vs. withhold aid. The action space can be extended to include three possibilities: bilateral aid, multilateral aid, and no aid, with different considerations surrounding each action.

## APPENDICES

*Appendix A: Proof of Corollary 1*

Part (i): Obtaining the bounds is straightforward, where the lower bound satisfies:

$$(A.1) \quad h'(\varepsilon = 1, \tilde{\lambda}_I) = 1 - \frac{U_b(\Delta(\varepsilon), R) - U_b(0, 0)}{\delta U_b(\Delta(\varepsilon), R)}.$$

Note that if  $\tilde{\lambda}_I = 0$  then the probability of getting reelected is zero,  $h' = 0$ , and therefore it must be that  $\tilde{\lambda}_I > 0$ . Likewise, the lower bound is,

$$(A.2) \quad h'(\varepsilon = 0, \tilde{\lambda}_I) = 1 - \frac{U_b(\Delta(\varepsilon), R) - U_b(0, 0)}{\delta U_b(\Delta(\varepsilon), R)}.$$

Note that  $h'(\varepsilon = 0, \lambda_I) = qG(\hat{\lambda}'_I(1, \overline{pr})) + (1 - q)G(\hat{\lambda}'_I(1, \underline{pr})) > 0$ . If  $\tilde{\lambda}_I = 1$ , then  $h' = 1$  and therefore it must be that  $\tilde{\lambda}_I < 0$ .

Part (ii): We must show that  $\frac{d\tilde{\lambda}_I}{d\varepsilon} < 0$ . Since  $\tilde{\lambda}_I$  is defined implicitly from equation (21) we use total difference. Let us first rewrite (21):

$$(A.3) \quad F(\varepsilon, \tilde{\lambda}_I) = h'(\varepsilon, \tilde{\lambda}_I) + \frac{U_b(\Delta(\varepsilon), R) - U_b(0, 0)}{\delta U_b(\Delta(\varepsilon), R)} = 1.$$

The partial derivatives with respect to each of the arguments of  $F$  are:

$$(A.4) \quad \begin{aligned} \frac{\partial F}{\partial \varepsilon} &= \frac{\partial h'(\varepsilon, \tilde{\lambda}_I)}{\partial \varepsilon} + \frac{\frac{\partial U_b(\Delta(\varepsilon), R)}{\partial \varepsilon} \delta U_b(\Delta(\varepsilon), R) - \delta \frac{\partial U_b(\Delta(\varepsilon), R)}{\partial \varepsilon} [U_b(\Delta(\varepsilon), R) - U_b(0, 0)]}{[\delta U_b(\Delta(\varepsilon), R)]^2} \\ &= \frac{\partial h'(\varepsilon, \tilde{\lambda}_I)}{\partial \varepsilon} + \frac{\delta \frac{\partial U_b(\Delta(\varepsilon), R)}{\partial \varepsilon} U_b(\Delta(\varepsilon), R)}{[\delta U_b(\Delta(\varepsilon), R)]^2} > 0, \end{aligned}$$

and

$$(A.5) \quad \frac{\partial F}{\partial \tilde{\lambda}_I} = \frac{\partial h'(\varepsilon, \tilde{\lambda}_I)}{\partial \tilde{\lambda}_I} > 0.$$

Both terms in (A.4) are positive resulting the positive sign of the expression (see footnote 11, where it is established that  $h'$  has the same properties of  $q(\varepsilon)$  w.r.t.  $\varepsilon$ ).

Thus, we can establish from  $\frac{\partial F}{\partial \varepsilon} d\varepsilon + \frac{\partial F}{\partial \tilde{\lambda}_I} d\tilde{\lambda}_I = 0$  that

$$(A.6) \quad \frac{d\tilde{\lambda}_I}{d\varepsilon} = - \left( \frac{\partial F}{\partial \varepsilon} / \frac{\partial F}{\partial \tilde{\lambda}_I} \right) < 0.$$

Part (iii): In order to characterize the second order behavior the goal is to establish the sign of  $\frac{\partial(d\tilde{\lambda}_I/d\varepsilon)}{\partial \varepsilon}$ . More explicitly it is given by:

$$(A.7) \quad \frac{\partial(d\tilde{\lambda}_I/d\varepsilon)}{\partial \varepsilon} = \frac{\partial - \left( \frac{\partial F}{\partial \varepsilon} / \frac{\partial F}{\partial \tilde{\lambda}_I} \right)}{\partial \varepsilon} = - \frac{F_{\varepsilon\varepsilon} F_{\tilde{\lambda}_I} - F_{\tilde{\lambda}_I\varepsilon} F_{\varepsilon}}{(F_{\tilde{\lambda}_I})^2}$$

Let us find the signs of each of the factors on the nominator of the term in the RHS of (A.7). Before we derive (A.4) w.r.t.  $\varepsilon$ , we first simplify the notations:

$$(A.4)' \quad F_{\varepsilon} = h'_{\varepsilon} + \frac{\delta U_{\varepsilon} U}{(\delta U)^2} = h'_{\varepsilon} + \frac{U_{\varepsilon} U}{\delta U^2},$$

where the second order derivative is given by

$$(A.8) \quad F_{\varepsilon\varepsilon} = h'_{\varepsilon\varepsilon} + \frac{(U_{\varepsilon\varepsilon} U + (U_{\varepsilon})^2) \delta U^2 - 2\delta U U_{\varepsilon} U_{\varepsilon} U}{[\delta U^2]^4} \\ = h'_{\varepsilon\varepsilon} + \frac{\delta U_{\varepsilon\varepsilon} U^3 + \delta U^2 U_{\varepsilon}^2 - 2\delta U^2 U_{\varepsilon}^2}{[\delta U^2]^4} = h'_{\varepsilon\varepsilon} + \frac{\delta U_{\varepsilon\varepsilon} U^3 - \delta U^2 U_{\varepsilon}^2}{[\delta U^2]^4} < 0.$$

Recall that  $h'$  has the same properties as  $q(\varepsilon)$ , since the term in the square brackets is positive, and thus  $h'_{\varepsilon\varepsilon} = q''(\varepsilon) [G(\hat{\lambda}_I(1, \overline{pr})) - G(\hat{\lambda}_I(1, \underline{pr}))] < 0$ . This is because there are diminishing returns of  $\varepsilon$ .

We shall also simplify the notations of (A.5):

$$(A.5)' \quad \frac{\partial F}{\partial \tilde{\lambda}_I} = h'_{\tilde{\lambda}_I}$$

Let us derivative it w.r.t.  $\varepsilon$ :

$$(A.9) \quad \frac{\partial^2 F}{\partial \tilde{\lambda}_I \partial \varepsilon} = F_{\tilde{\lambda}_I \varepsilon} = h'_{\tilde{\lambda}_I \varepsilon} = \\ \frac{\partial \left\langle q'(\varepsilon) [G(\hat{\lambda}_I(1, \overline{pr})) - G(\hat{\lambda}_I(1, \underline{pr}))] \right\rangle}{\partial \lambda_I} = q'(\varepsilon) \frac{\partial G}{\partial \hat{\lambda}_I} \left[ \frac{\partial(\hat{\lambda}_I(1, \overline{pr}))}{\partial \lambda_I} - \frac{\partial(\hat{\lambda}_I(1, \underline{pr}))}{\partial \lambda_I} \right].$$



Note that Bayes' rule is increasing and concave in the probability of "success" (in our context identifying the 'good' politician) and recall from footnote 11 that  $\hat{\lambda}_l(1, \overline{pr}) > \hat{\lambda}_l(1, \underline{pr})$ . Thus the marginal effect of the initial reputation is smaller for the term on the left. We have therefore established that,

$$(A.10) \quad \frac{\partial \left( \frac{d\tilde{\lambda}_l}{d\varepsilon} \right)}{\partial \varepsilon} = \frac{\partial \left( - \frac{\frac{\partial F}{\partial \varepsilon}}{\frac{\partial F}{\partial \tilde{\lambda}_l}} \right)}{\partial \varepsilon} = - \frac{F_{\varepsilon\varepsilon} F_{\tilde{\lambda}_l} - F_{\tilde{\lambda}_l\varepsilon} F_{\varepsilon}}{(F_{\tilde{\lambda}_l})^2} > 0.$$

■□■

**Appendix B: Proof of Proposition 2**

Part (i): Equation (23) gives the FOC to the politicians maximization problem. We show that this FOC satisfies the *strict single crossing condition*. In order to show that, let us evaluate at the extremes the first order derivative of  $f$  w.r.t  $\sigma_1^b$ :

$$(B.1) \quad f_\sigma = -G(\hat{\lambda}_I(0,0)) + (1-\sigma) \cdot G'_{(0,0)} \frac{\partial \hat{\lambda}_I(0,0)}{\partial \sigma} + h + \sigma \cdot h_\sigma.$$

which may be positive or negative. We shall show that it starts positive and winds up negative. Evaluation of the first derivative of  $f$  at the extremes yields the following:

$$(B.2) \quad \lim_{\sigma \rightarrow 0} f_\sigma = -\lambda_I + G'_{(0,0)} \lambda_I (1 - \lambda_I) \cdot +1 = (1 - \lambda_I)(1 + G'_{(0,0)} \lambda_I) > 0$$

$$(B.3) \quad \lim_{\sigma \rightarrow 1} f_\sigma = -1 + h' < 0$$

The first order derivative of  $f$  is sometimes positive sometimes negative, i.e.,  $f$  is concave. This implies the necessary condition for a solution is satisfied. We can now evaluate the FOC at the extremes:

$$(B.4) \quad \lim_{\sigma \rightarrow 0} \frac{\partial EU}{\partial \sigma} = \frac{U_b(\Delta(\varepsilon), R) - U_b(0,0)}{\delta U_b(\Delta(\varepsilon), R)} + f_\sigma > 0,$$

and

$$(B.5) \quad \lim_{\sigma \rightarrow 1} \frac{\partial EU}{\partial \sigma} = \frac{U_b(\Delta(\varepsilon), R) - U_b(0,0)}{\delta U_b(\Delta(\varepsilon), R)} + h' - 1.$$

It is straightforward to verify that the FOC obtains the corresponding values:

$$(B.6) \quad \frac{\partial EU}{\partial \sigma} = \frac{U_b(\Delta(\varepsilon), R) - U_b(0,0)}{\delta U_b(\Delta(\varepsilon), R)} + f_\sigma > 0,$$

and

$$(B.7) \quad \frac{\partial EU}{\partial \sigma} = \frac{U_b(\Delta(\varepsilon), R) - U_b(0,0)}{\delta U_b(\Delta(\varepsilon), R)} + h' - 1.$$

The implication of (B.6) is that the politician never optimizes at  $\sigma = 0$  and we can establish that:  $\sigma > 0$ . Also note that equation (B.7) shows that the pure strategies equilibrium, analyzed in the previous section is a private case of the mixed

strategies equilibrium. Note that (B.7) may be greater, smaller or equal to 0, depending on  $h'$ . Recall that  $h'(\varepsilon, \lambda_I)$  increases in both its arguments. Therefore if  $\varepsilon$  and  $\lambda_I$  are high so that the inequality:  $h'(\varepsilon, \tilde{\lambda}_I) \geq 1 - \frac{U_b(\Delta(\varepsilon), R) - U_b(0, 0)}{\delta U_b(\Delta(\varepsilon), R)}$  holds, then the politician chooses a pure strategy of  $\sigma = 1$ . If the inequality sign reverses direction, then the politician optimizes by mixing.

Note also that the second order condition requires that  $\delta U_b(\Delta(\varepsilon), R) f_{\sigma\sigma} < 0$ , i.e.,  $f_{\sigma\sigma} < 0$ . First note that  $\frac{\partial \hat{\lambda}_I(0, 0)}{\partial \sigma} > 0$ , i.e., if the probability that a bad politician will disburse aid increases, then not disbursing aid is a stronger signal of being a good politician. Note that the second derivative is positive as well,  $\frac{\partial^2 \hat{\lambda}_I(0, 0)}{\partial \sigma^2} > 0$ . Also, by the properties of Bayes' rule, specifically the fact that it is decreasing and concave in the probability of "failure" (in our context identifying the 'bad' politician) and on the relationship between the posteriors  $\hat{\lambda}_I(1, \overline{pr}) > \hat{\lambda}_I(1, \underline{pr})$ , as explained in footnote 11, the marginal effect of  $\sigma$  on the posterior in each of the events is always negative and the smaller the posterior the smaller the marginal effect, in absolute value, i.e., bigger,  $\frac{\partial \hat{\lambda}_I(1, \overline{pr})}{\partial \sigma} < \frac{\partial \hat{\lambda}_I(1, \underline{pr})}{\partial \sigma} < 0$ . The derivative of (B.8) w.r.t.  $\sigma$ , after rearranging terms, is given by

$$(B.8) \quad f_{\sigma\sigma} = [2h_\sigma + \sigma \cdot h_{\sigma\sigma}] + \left[ -G'_{(0,0)} \left( \frac{\partial \hat{\lambda}_I(0,0)}{\partial \sigma} \right) + (1-\sigma) \cdot G'_{(0,0)} \frac{\partial \hat{\lambda}_I^2(0,0)}{\partial \sigma^2} \right].$$

The task now is to show that the sign of each of the square brackets is negative. It is evident that the sign is determined by the comparison between the first derivative and the second derivative of each of the posteriors. The key to the proof here is that since we are dealing with probabilities, fractions, the first derivative is always greater than the second derivative in absolute value. Consider, for example, the term in the square brackets on the left. It can be expressed more explicitly using the definition of  $h$ :

$$(B.9) \quad 2 \frac{\partial G}{\partial \hat{\lambda}_I} \left[ q(\varepsilon) \frac{\partial (\hat{\lambda}_I(1, \overline{pr}))}{\partial \sigma} + (1-q(\varepsilon)) \frac{\partial (\hat{\lambda}_I(1, \underline{pr}))}{\partial \sigma} \right] +$$

$$\sigma \frac{\partial G}{\partial \hat{\lambda}_I} \left[ q(\varepsilon) \frac{\partial G}{\partial \hat{\lambda}_I} \frac{\partial^2 (\hat{\lambda}_I(1, \overline{pr}))}{\partial \sigma^2} + (1-q(\varepsilon)) \frac{\partial^2 (\hat{\lambda}_I(1, pr))}{\partial \sigma^2} \right],$$

or alternatively,

(B.9)'

$$q(\varepsilon) \frac{\partial G}{\partial \hat{\lambda}_I} \left[ 2 \frac{\partial (\hat{\lambda}_I(1, \overline{pr}))}{\partial \sigma} + \sigma \frac{\partial^2 (\hat{\lambda}_I(1, \overline{pr}))}{\partial \sigma^2} \right] + (1-q(\varepsilon)) \frac{\partial G}{\partial \hat{\lambda}_I} \left[ 2 \frac{\partial (\hat{\lambda}_I(1, pr))}{\partial \sigma} + \sigma \frac{\partial^2 (\hat{\lambda}_I(1, pr))}{\partial \sigma^2} \right].$$

The expression in the square brackets on the left is equal to:

$$(B.10) \quad -2 \frac{\lambda_I(1-\lambda_I) \left[ \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon \right]^2 \int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)q(\varepsilon)d\varepsilon}{\left[ \int_{\varepsilon=\hat{\varepsilon}}^1 \pi(\varepsilon)q(\varepsilon)d\varepsilon + (1-\lambda_I)\sigma \int_{\varepsilon=0}^{\hat{\varepsilon}} \pi(\varepsilon)q(\varepsilon)d\varepsilon \right]^3} < 0,$$

and is strictly negative. The same can be done for all of the other posteriors,  $\hat{\lambda}_I(1, \underline{pr})$  and  $\hat{\lambda}_I(0,0)$ , establishing that  $f_{\sigma\sigma} < 0$ . Figure B.I(a) provides a graphical illustration of  $f_{\sigma}$  as a function of  $\sigma$ . Figure B.I(b) shows that the second order derivative is always negative.

Before we prove parts (ii) and (iii), which are simply comparative statics analysis, let us totally differentiate the FOC:

$$(B.11) \quad f_{\sigma\lambda_I} \Delta\lambda_I + f_{\sigma\varepsilon} \Delta\varepsilon + f_{\sigma\sigma} \Delta\sigma = 0.$$

Part (ii): When  $\Delta\lambda_I = 0$ , equation (B.11) becomes  $\frac{\Delta\sigma_1^b}{\Delta\varepsilon} = -\frac{f_{\sigma\varepsilon}}{f_{\sigma\sigma}}$  and the task here is

to establish the sign of this expression. From the second order condition illustrated in the previous part of this appendix, the denominator is negative. The nominator is explicitly given by,

$$(B.12) \quad f_{\sigma\varepsilon} = h_{\varepsilon} + \sigma \cdot h_{\sigma\varepsilon},$$

where recall from the previous analysis that  $h_{\varepsilon} > 0$  and that

$h_{\sigma\varepsilon} = q'(\varepsilon) \frac{\partial G}{\partial \hat{\lambda}_I} \left[ \frac{\partial (\hat{\lambda}_I(1, \overline{pr}))}{\partial \sigma} - \frac{\partial (\hat{\lambda}_I(1, pr))}{\partial \sigma} \right] > 0$ , establishing that (B.12) is positive, proving

that the marginal effect of  $\varepsilon$  on the politician's choice is positive.

With the same parametric configuration used in the numerical example given in section 3.3.8, Figure B.I(c) illustrates this relationship.

- Insert Figures B.I(a), B.I(b), B.I(c) and B.I(d)

Part (ii): When  $\Delta\varepsilon = 0$ , equation (B.11) becomes  $\frac{\Delta\sigma_1^b}{\Delta\lambda_I} = -\frac{f_{\sigma_1^b\lambda_I}}{f_{\sigma_1^b\sigma_1^b}}$ . The sign of this

expression is determined by the sign of the nominator, which is given by,

$$(B.13) \quad f_{\sigma_1^b\lambda_I} = \frac{\partial G}{\partial \hat{\lambda}_I} \left[ -\frac{\partial \hat{\lambda}_I(0,0)}{\partial \lambda_I} + (1 - \sigma_1^b) \cdot \frac{\partial \hat{\lambda}_I^2(0,0)}{\partial \sigma_1^b \partial \lambda_I} + h_{\lambda_I} + \sigma_1^b \cdot h_{\sigma_1^b\lambda_I} \right]$$

The analytical solution to this problem is cumbersome and thus the sign of this expression is evaluated by means of the numerical simulations carried out in section 3.3.8. As shown in Figure B.I(d), the sign of  $f_{\sigma_1^b\lambda_I}$  changes with  $\lambda_I$  and for every  $\lambda_I$  smaller than some critical value,  $f_{\sigma_1^b\lambda_I} < 0$  implying that

$\frac{\Delta\sigma_1^b}{\Delta\lambda_I} = -\frac{f_{\sigma_1^b\lambda_I}}{f_{\sigma_1^b\sigma_1^b}} < 0$ , and vice versa. This establishes that  $\sigma$  is an U-shaped function

of  $\lambda_I$ .

■□■

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## TABLES

TABLE 1 – TIMING OF THE EVENTS OF THE GAME

0. Nature chooses the incumbent politician's type,  $i \in (g, b)$ , privately observed by politician.
1. Citizen observes a signal  $\lambda_I$ .
2. Politician observes the recipient's type,  $\varepsilon$ .
3. Politician implements aid policy,  $A_1 \in \{0, 1\}$ . In case  $A_1 = 1$ , aid effectiveness is observed,  $pr \in \{\overline{pr}, \underline{pr}\}$ .
4. Citizens observe the chosen policy and its impact,  $(A, pr)$ , and revise their prior probability that the politician is good. The posterior  $\hat{\lambda}_I$  is obtained.
5. Citizens and opponent observe a signal of opponent's type,  $\lambda_O$ .
6. Elections are held.
7. If opponent wins, Nature chooses his type,  $j \in (g, b)$ .
8. The elected politician in office implements aid policy,  $A_2 \in \{0, 1\}$ . In case  $A_2 = 1$ , aid effectiveness is observed,  $pr \in \{\overline{pr}, \underline{pr}\}$ .
9. The game ends.

Table II: Institutional environment and its effect on aid disbursement

$\varepsilon$	$q(\varepsilon)$	$\tilde{\lambda}_I$	$\lambda_{\min}^*$	$\sigma_{\min}^*$
0	0.100	0.997	0.823	0.092
0.1	0.311	0.923	0.770	0.674
0.2	0.398	0.888	0.730	0.797
0.3	0.465	0.858	0.700	0.856
0.4	0.522	0.832	0.700	0.891
0.5	0.571	0.808	0.700	0.913
0.6	0.616	0.786	0.700	0.929
0.7	0.658	0.765	0.700	0.941

Table III: Institutional Formation

$\lambda_I$	(1) $\tilde{\varepsilon}(\lambda_I)$	(2)a $\varepsilon^\dagger$	(3)a $U_R(\varepsilon^\dagger)$	(2)b $\varepsilon^\dagger$	(3)b $U_R(\varepsilon^\dagger)$	(2)c $\varepsilon^\dagger$	(3)c $U_R(\varepsilon^\dagger)$
0.3	0.849	0.33	130.54	0.23	75.34	0.04	68.38
0.4	0.849	0.47	126.49	0.32	73.13	0.06	66.96
0.5	0.849	0.63	124.64	0.43	72.31	0.08	65.58
0.6	0.849	0.82	123.86	0.48	72.16	0.09	64.45
0.7	0.849	0.84	123.65	0.78	72.09	0.12	64.15
0.8	0.535	0.58	136.9	0.52	79.79	0.14	66.28
0.9	0.163	0.31	144.4	0.17	85.13	0.12	77.61
0.99	0.001	0.2	161.86	0.01	95.18	0.01	94.72
Parameter Values:		$\phi = 17, \beta = 0.01$ $U_R(\hat{\varepsilon}) = 123.1$		$\phi = 10, \beta = 0.01$ $U_R(\hat{\varepsilon}) = 72.09$		$\phi = 5, \beta = 0.1$ $U_R(\hat{\varepsilon}) = 41.16$	

FIGURES

Figure I: The Citizen's Information Structure

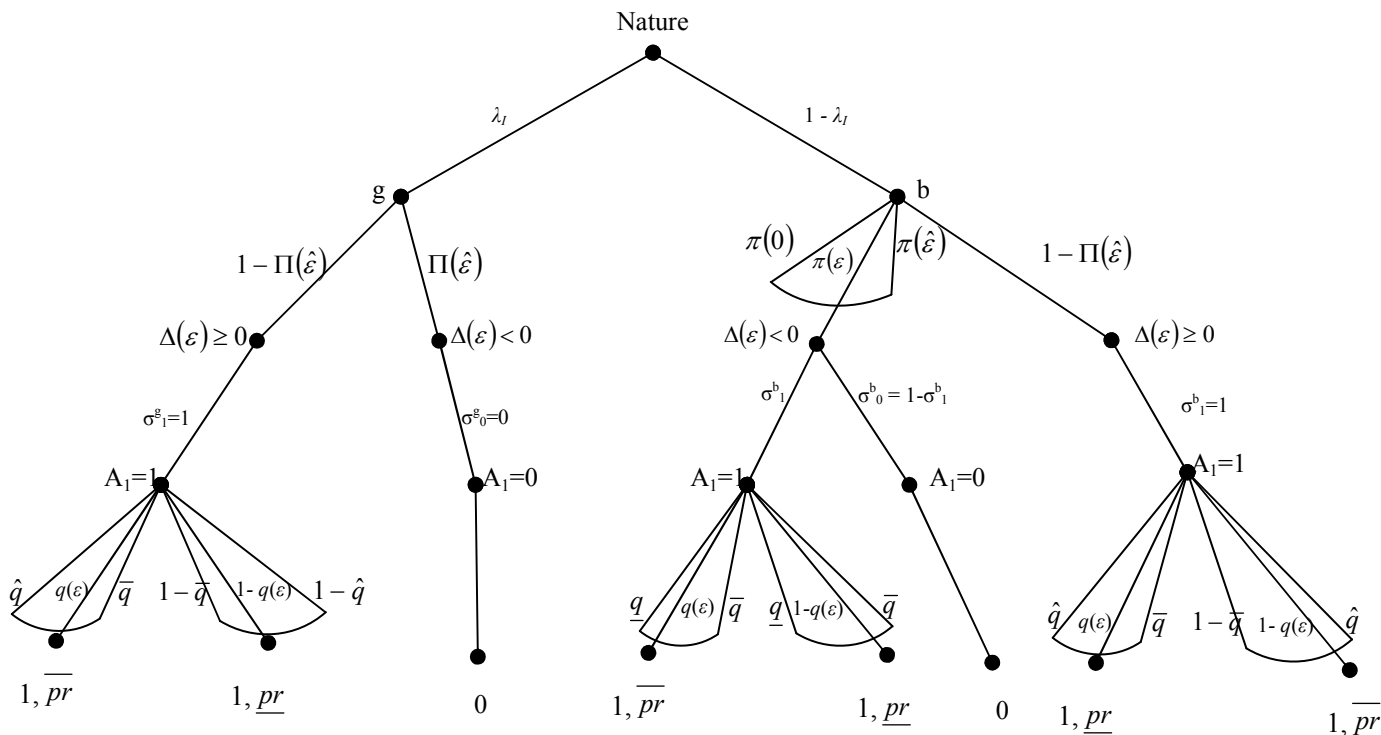
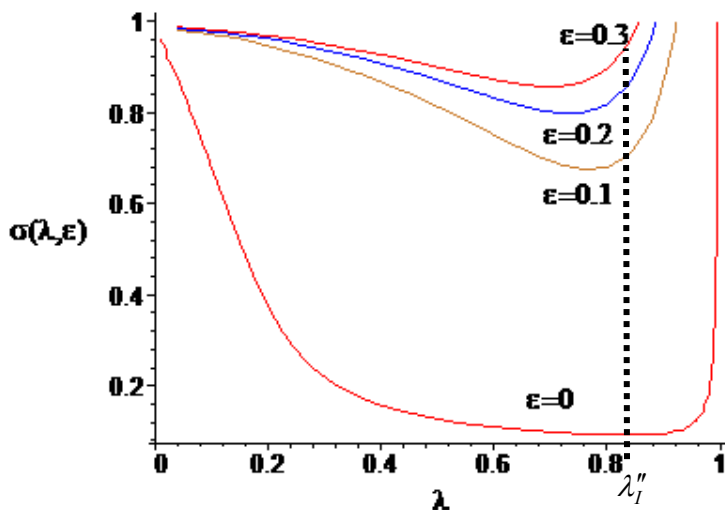
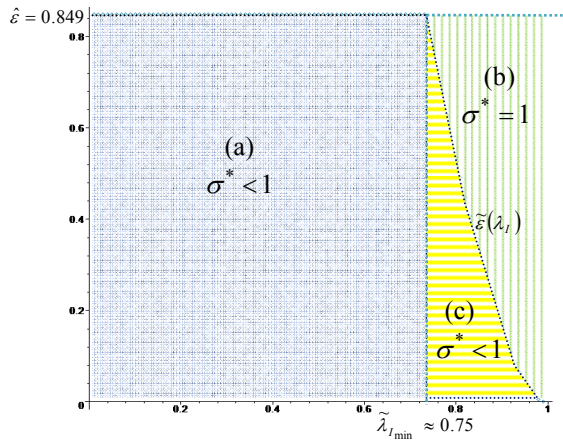


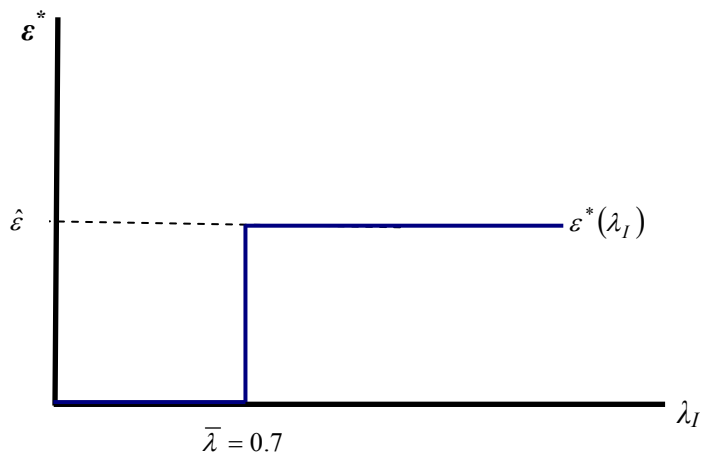
Figure II: Optimal Probability of Disbursing Aid As A Function of the Politician's Initial Reputation, For Different Recipient Institutional Environments



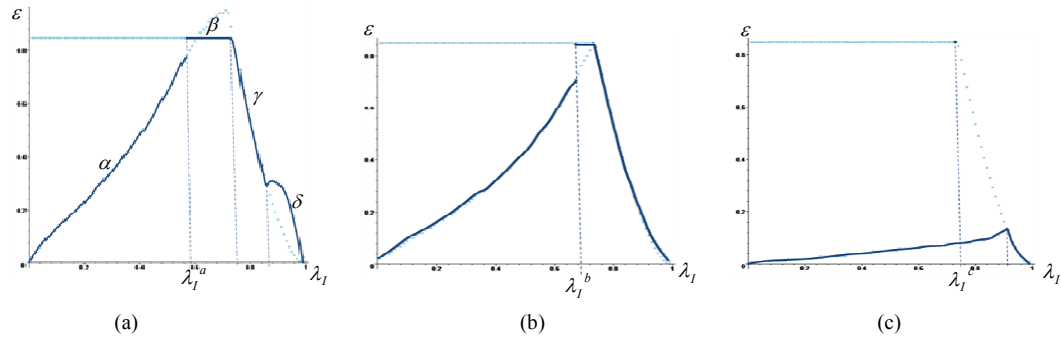
**Figure III: Different Political Situations Induced by Recipient's Institutional Formation**



**Figure IV: Institutional Formation when  $i = g$**



**Figure V: Optimal Institutional Quality When  $i = b$ , as a Function of the Donor-Country Politician's Initial Reputation.**



**Figure VI: Institutional Formation Under Incomplete Information**

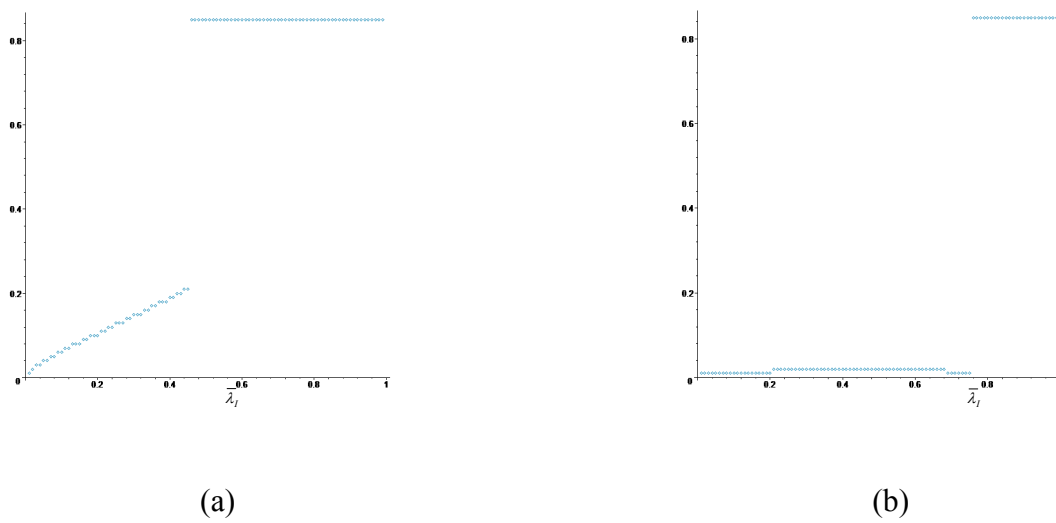
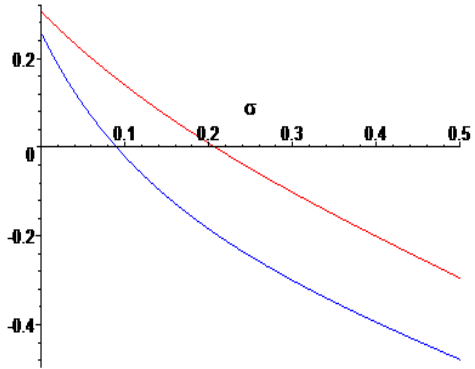
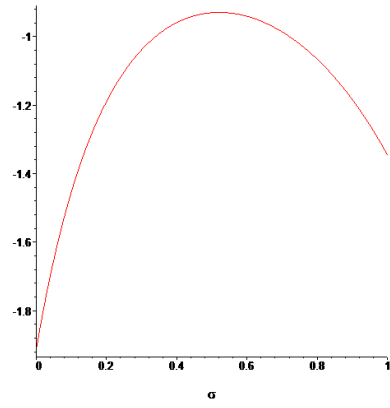
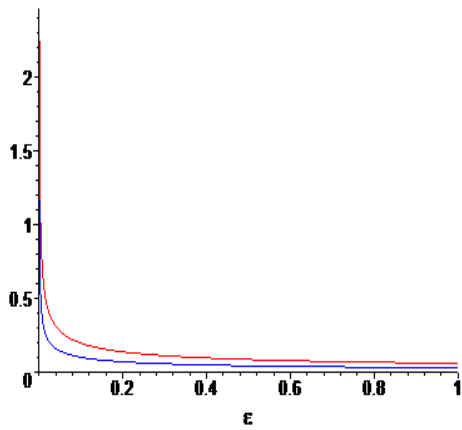




Figure B.I

Figure B.I(a):  $f_\sigma$ Figure B.I(b):  $f_{\sigma\sigma}$ Figure B.I(c):  $f_\sigma$ Figure B.I(d):  $f_{\sigma\sigma}$ 