

Reputation Concerns in Aid Conditionality

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January 2007

Abstract: This paper models the role of reputation of donors and recipients in the context of conditional aid. The reputation of the donor institution is a public good for the different country departments that constitute it. When the disbursement decision is centralized, the decision maker internalizes the effects of each action on all country departments in terms of the institution's reputation and denies the committed funds to non reforming recipients. When the disbursement decision is decentralized, the decision maker only considers the effects on its own department and the committed funds are disbursed independently of the recipient's reform effort. Recipients also care about their reputation and the signal they want to send depends on the probability to have the contract renewed in a non monotonic way. According to the model, the best way to induce reforms in recipient countries is to centralize the disbursement decision and to sign one stage contracts with possibility (but not certainty) of renewal.

JEL Classification: O19, D82, D73

Keywords: Aid Conditionality, Reputation, Enforcement

¹ I am very grateful to Jean-Paul Azam, Martial Dupaigne and Guido Friebel for useful comments and suggestions. All errors and omissions are mine.

1. Introduction

An important part of the aid given by the international financial institutions is conditional on a number of reforms that have to be implemented by the government of the recipient country. After signing a conditional aid contract and before receiving (part of) the aid, the recipient government is supposed to take actions like fighting corruption, improving public sector governance, reducing inflation, privatizing ill state enterprises, liberalizing prices, etc. This type of aid, given in the form of grants or low interest loans, is called Policy-Based Lending at the World Bank and Poverty Reduction and Growth Facility at the IMF. The instrument of conditionality was severely criticized for a number of different reasons: it is ineffective at improving policies in recipient countries, the content of the conditions is often inappropriate and their number too important, it is not sustainable in the sense that the recipient can undo the reforms as soon as the lending stops, and finally, it infringes on the sovereignty of the borrowing countries (World Bank, (2005)). This paper is related to the first critique, the ineffectiveness of conditionality.

There is no doubt indeed that conditional aid has been ineffective at improving policies and/or governance in the recipient countries. Easterly (2005) finds that the prevalence of one or more extreme macroeconomic distortions in developing countries did not decrease as adjustment lending accumulated. Burnside and Dollar (2000) show that aid has no impact on policies in the recipient countries. Killick et al (1998) and Dijkstra (2002) show that the recipient governments comply only with the conditions which serve their best interest. Dollar and Svensson (2000) show that the success or failure of reforms depends only on domestic political-economy forces. This list is not exhaustive and to our knowledge, there is no empirical study having found a positive and significant impact of conditionality on policy reform. So why don't borrowing governments comply with conditionality?

The recipient government is an agent who signs a contract by which she is supposed to provide a costly effort (reform) in exchange of remuneration (aid). When this agent decides not to provide the effort, it can only be for two reasons. Either the cost of the effort is not compensated by the remuneration; or she expects to get the remuneration without providing the effort. The first reason is not valid without the second; otherwise the contract would not have been signed in the first place. Thus, a government that signs a conditional aid contract and does not respect it necessarily expects to get the money without effort, at least with some probability. An agent rationally expects to get the remuneration without providing the effort if

she observed that previous agents dealing with the same principal got their remuneration without providing effort. This is what seems to be happening with conditional aid.

Indeed, large empirical evidence suggests that most of the time, grants and loans are disbursed by the international financial institutions even if the contractual reforms are not implemented by the borrowers. William Easterly, in “The Elusive quest for growth”, describes many quite incredible cases in which aid continued to flow to governments that made no reform efforts at all. To cite just some examples, Zambia received twelve adjustment loans from the World Bank and the IMF between 1980 and 1994, yet Zambia had inflation above 40 % every year except two from 1985 to 1996; Mauritania had an average black market premium of above 100 % for every year over the 1982 to 1989 period but received six IMF and World Bank loans during that period; Pakistan received twenty two adjustment loans between 1970 and 1997, all of which had as a condition reducing the budget deficit, yet the deficit remained stuck at 7% of GDP during that period. Svensson (2003) finds that there is no significant relationship between the share of committed funds disbursed and the estimated reform effort. The World Bank (1992) found that although the compliance rate of conditions was of 50%, the release rate of loans was nearly 100% and Dreher (2002) states that the World Bank almost never cancels programs, even when non compliance is obvious. The natural question that comes to one’s mind is why donor institutions disburse important amounts of money to governments who do not respect “their part of the deal”?

The literature has brought a number of explanations to this phenomenon. The first explanation is “Samaritan’s dilemma” (e.g. Coate, and Morris (1995)). The donor keeps delivering funds because it cares about the poor people and withholding resources would worsen the situation of those most in need. The more altruistic a donor is, the harder it is for it to cut funds to non reforming recipients (Svensson, (2000) (a)), Federico, (2001)). The second, less altruistic explanation, is that cutting aid may lead to a situation in which the recipient is unable to service its old debts. Then rather than cease lending and incur a costly default, it may be optimal for the donor to continue lending, rolling over debt until lower cost relief becomes available (Ramcharan, (2003)). Moreover, leaving a country at an unsustainable level of debt would undermine donor’s credibility in the eyes of the lenders and thus threaten the donor’s ability to raise new aid revenues (Easterly (2002) (b)). The third explanation is that donor institutions are subject to pressure from a number of contractors that have an interest in funds being released. Indeed, there is empirical evidence international aid is often given for geo-political reasons and that a large part of it is tied (Alesina and Dollar (2003), Berthélemy (2004)). This means that donors are subject to pressure by lending

governments for political interests and by firms for commercial interests. Villanger (2003) provides a theoretical model showing how firms may induce donors to disburse funds in the absence of reforms. The fourth explanation is donors' need to demonstrate their own success. As development impact is difficult to prove, donors focus on lending volume and the number of loans (Easterly (2002) (b)). When global citizens have imperfect information about the donor's ability as a monitor or as an adviser, donors have an incentive to continue lending more often than is socially desirable in order to keep their reputation as a good monitor (Marchesi and Sabani (2005)). Last but not least is the career concerns explanation. In most donor institutions, large unused resources are likely to lead to smaller budgets the following years and to worse career perspectives for the managers in charge of the respective projects (Svensson (2003)).

Whatever explanation we bite, one thing is sure: it is costly for the international financial institutions to deny aid to recipients that do not respect their part of the contract. The mere fact that donors prefer to continue disbursing funds to non reforming recipients instead of denying aid to them would not be a problem if the donors disposed of a commitment technology that would "tie their hands" when the disbursement decisions were taken. But the empirical evidence described above shows that it is not the case. Aid is (almost) always delivered, irrespective of the recipient's reform effort.

The obvious consequence of this behavior is that recipients anticipate that they will get the money in any case and do not make (costly) reform efforts. Thus, if punishing non reforming recipients is costly for the donors in the short run, not punishing them is costly in the long run, because it leads to lack of reforms and thus a small impact of aid on growth² and on the quality of life of the poor in recipient countries. Of course, some recipient governments would never accept to reform, even if they previously observed aid denial by the donor to non reforming recipients. In these countries, aid conditionality cannot do much. The international community has to wait for reform to come from the inside. But this is probably not true of all governments of the developing world. Some of them may accept to reform if they had credible threats of donor withdrawal from their country in case of continued bad economic policies. For these countries, aid conditionality might have worked had it been properly applied by the donors.

² Burnside and Dollar (2000) brought evidence that aid had no impact on growth in bad policy environments Hansen and Tarp (2000) find a robust aid-growth link even in countries with bad policy environments, but they agree that economic policies have an impact on the marginal productivity of aid.

Given the lax behavior of the donors so far, one could logically infer that for these institutions, the short run cost of punishing a non reforming recipient exceeds the long run benefit of inducing reform (with some probability) in future recipient countries. This is kind of striking. If the lives of millions of people could be improved due to better governance and/or better economic policies in their countries, it should be worth resisting the short term temptation to disburse. To our knowledge, the literature has not brought any light on this puzzle. We think that one possible explanation is the fact the future benefits of funds denial are not completely internalized by the decision makers. Indeed, the donor organizations are divided into many country departments, each country department being in charge of a subset of the projects. The cost denying committed funds to a recipient who does not reform is born by the country department in charge of the project, whereas its benefits, a “tougher” reputation for the donor organization, profit to all the departments. Thus there is a public good problem which leads to under investment in reputation in donor institutions.

This paper uses a theoretical model in order to bring some insights on the role of reputation (that of the donor, but also that of recipients) in conditional aid contracts. In this sense we have some similarities with Ramcharan (2003). There are two new ideas in this paper though. First, we give an explanation to the lack of investment in reputation of big donor institutions. Second, we show that the recipient’s incentives to reform are affected by the probability of having the contract renewed in a non monotonic way. The paper is constructed as follows. Section 2 presents the model. Section 3 provides the equilibrium strategies of the donor and the recipients under different assumptions about the institutional setting. Finally, section 4 is a discussion on some practical issues related to conditionality.

2. The Model

One donor institution meets two recipients of aid sequentially. The objective of the donor is to induce a particular reform in the recipient countries. The objective of the recipients is to obtain aid without reforming.

More precisely, the game goes as follows. In period 1 the donor deals with recipient 1 and in period 2 the donor deals with recipient 2. The interaction with each the recipient consists of three steps. First, a conditional aid contract is signed. By signing the contract, the recipient agrees to implement a particular reform and the donor agrees to deliver an amount of aid in exchange. Second, the recipient decides whether or not to implement the reform and this decision is observed by the donor. Third, the donor decides whether or not to deliver aid. We suppose that if the reform is implemented by the recipient, aid always disbursed, while if

it is not implemented, the donor may choose to deliver the money anyway or to punish the recipient by denying the funds. Thus, the donor has a weak commitment power, similarly to Federico (2001). The actions of recipient 1 and the donor are observed by recipient 2. In period 2, the three steps are repeated with recipient 2.

In order to introduce the possibility for the donor to build a reputation, we need to assume that there is some uncertainty about its type. The simplest way to do this is to suppose that the donor may be of two types, which we will call tough and soft. The payoffs of each type are given in Table 1. The situation in which the recipient respects the contract is the preferred one by both donor types and gives both types a payoff of 1. If the recipient does not respect the contract and is not punished, both donor types get a 0 payoff. If the recipient does not respect the contract and is punished, the money will be used for a different project with a value a for both donors, but in addition the soft donor will bear a cost $b > a$ for not disbursing the committed funds. Thus the only difference between a tough donor and a soft donor is that when the contract is not respected by the recipient, the tough donor prefers to punish while the soft donor prefers to disburse. The recipient does not observe the type of the donor but puts a prior p_0 on the donor being tough. The assumption that the donor's type is private information seems quite plausible. Indeed, the government of the recipient country is probably not informed of all the incentives (related to career evolution, pressure from firms or altruistic motivations) that affect the managers payoff when they decide on the disbursement.

The payoff of recipient i , $i=1, 2$ is r_i if she respects the contract, 0 if she does not respect the contract and is punished and 1 if she does not respect the contract and is not punished. To keep things simple we suppose that r_i can only take two values: \bar{r} and \underline{r} , where $\underline{r} < 0 < \bar{r} < 1$. Thus, for recipients of type \bar{r} , reforming is costly but the money from aid compensates this cost. For recipients of type \underline{r} , the money from aid does not compensate the cost of reforming., for example because the rents they have from the current situation are higher than the benefits they would obtain from aid. We will call recipients of type \bar{r} “low cost” recipients and those of type \underline{r} “high cost” recipients, where the “cost” refers to how much rents they loose if they implement the reform desired by the donor. The donor does not observe r_i , but it is common knowledge that $r_i = \bar{r}$ with probability q_0 and $r_i = \underline{r}$ with probability $1 - q_0$. The assumption that the governments' payoff from implementing the reforms is private information may be justified by the fact that the government is the only one

to know the exact value of the rents it is extracting from the current situation. These rents may come from corruption and all kinds of support offered by the groups that profit from the current situation. A different justification is the fact that the effects of a particular reform may differ a lot from one country to another, depending on cultural factors and on many local conditions. It seems reasonable to assume that the recipient government has more information about the way the reform will work in her country and about its socio-economic consequences than some (even very bright) economist of an international financial institution. If the two recipients are two different countries, it is natural to assume that the r_i s are independent.

Table 1: Per period payoffs

	Reform & Disbursement	No reform	
		Disbursement	No disbursement
Soft donor $(1 - p_0)$	1	0	$a - b < 0$
Tough donor (p_0)	1	0	$a \in (0;1)$
Low Cost Recipient (q_0)	$\bar{r} \in (0;1)$	1	0
High Cost Recipient $(1 - q_0)$	$\underline{r} < 0$	1	0

We suppose that the payoff of the recipient without the contract is 0: the same payoff as in the case where the contract is signed but the recipient makes no reform and gets no aid. In other words, the mere fact of signing the contract does not by itself influence the recipient's payoff. The contract will always be accepted³, as the recipient can get at least 0 by signing and then not respecting the contract.

The total payoff of the donor is the discounted sum of the per-period payoffs. The discount factor is δ .

Our basic model is a simplified version of Kreps and Wilson's 1982 modeling of a long lived monopoly fighting entrants, but we add several ingredients to their model. First, we consider the possibility that the long lived player is composed of several units which take their decisions independently (section 3.2). Second, we study the possibility for the long lived player to keep the same short lived player from one period to the other or choose to interact with a new short lived player (section 3.3.2). This assumption is not realistic for an incumbent firm fighting entrants, which was the motivation of Kreps and Wilson's paper, but seems reasonable for a donor interacting with recipient countries. Finally, we compute the equilibrium in the case where both players are long lived without converting to a continuous time version (section 3.3).

3. Equilibrium

We look for the perfect Bayesian equilibria of this two-period game. We need to compute the optimal strategies of the donor in periods 1 and 2 and the optimal strategies of recipients 1 and 2. The problem is solved by backward induction. We denote by q_1 the updated probability that recipient 1 is the low cost type once its action in period 1 was observed and by p_1 the updated probability that the donor is tough once its action in period 1 was observed.

The donor has to take a decision (punish or disburse) only when the recipient does not reform, as we supposed that reform is always followed by disbursement. It is obvious that the tough donor will always punish non reform. Indeed, punishing gives a higher present payoff than disbursing and can only increase the probability of reform the following period⁴. The soft donor will not punish in period 2 because punishing gives a lower present payoff than disbursing and the game ends after period 2.

Recipient 2 does not respect the contract if it is the high cost type. If it is the low cost type, it respects the contract if and only if $\bar{r} > 1 - p_1$.

We are left to find the optimal strategies of the soft donor in period 1 and of recipient 1. We do this under different institutional assumptions. (the strategies described above do not depend on these assumptions).

³ We follow the convention in contract theory by assuming that the agent accepts the contract when she is indifferent

⁴ This is true as long as we exclude "unplausible beliefs" in which recipient 2 revises downwards the probability that the donor is tough after observing punishment, see Kreps and Wilson (1981).

First, in order to illustrate the main idea of this paper, we distinguish between centralized and decentralized donors (section 3.1. and 3.2. respectively). By a centralized donor we mean that the same decision unit is in charge of the disbursement decision for both recipients. By a decentralized donor we mean that the donor is composed of two decision units, each being in charge of one recipient. The per-period payoff of each decision unit is the one given in Table 1. In the centralized case, the decision maker has a two period horizon. Thus he will take into account the effects of his action in period 1 on his payoffs in periods 1 *and* 2. In the decentralized case, each of the two decision makers has a one period horizon. Thus, the manager in charge of recipient 1 will only consider the effects of his action on his payoff in period 1.

Second, in order to have a richer and a more realistic analysis, we add the possibility for the donor of having a repeated interaction with the same recipient (section 3.3). This will allow for reputation building for the recipient too and will help us understand the way the length of the contract may influence the recipient's incentives to reform.

3.1. Centralized donor

Suppose first that the disbursement decision is centralized in the donor institution and that the interaction with each recipient is one shot. Denote by \tilde{q} the probability that the donor meets a low cost type recipient in period 2. At the moment of deciding on the disbursement, the donor has observed recipient 1's action, so he has updated the probability that recipient 1 is the low cost type. But as recipients 1 and 2 are two different countries, the updated information about the type of recipient 1 is not useful for the donor so $\tilde{q} = q_0$. We keep the notation \tilde{q} in Result 1 because it also applies to cases where $\tilde{q} \neq q_0$.

Result 1. When the disbursement decision is centralized, the soft donor punishes no reform in

period 1 with probability 1 if $\begin{cases} b - a < \delta\tilde{q} \\ \bar{r} > 1 - p_0 \end{cases}$, with probability $\alpha = \frac{p_0\bar{r}}{(1-p_0)(1-\bar{r})}$ if $\begin{cases} b - a < \delta\tilde{q} \\ \bar{r} < 1 - p_0 \end{cases}$

and with probability 0 if $b - a > \delta\tilde{q}$.

Proof: see the Appendix.

Result 1 shows that when the disbursement decision is centralized, the soft donor denies aid to recipient 1 in case of non reform if the cost of denying aid, $b - a$, is low enough

and the probability of meeting a low cost recipient next period, q_1 , is high enough. The intuition behind this result is the following. Punishment is worth only if it induces reform in the following period with a sufficient probability. Only recipients of type \bar{r} may be persuaded to reform. Thus, costly punishment will be chosen by the donor in period 1 only if the recipient 2 is likely to be of type \bar{r} .

The main point of this result is that in the absence of a formal commitment technology, the wish to be perceived as tough (which increases p_1 and thus the probability of reform in period 2) serves as a commitment device for the soft donor.

The equilibrium strategy of recipient 1 is given in Result 2.

Result 2. When the donor is centralized, the high cost recipient does not reform in period 1.

The low cost recipient reforms if $\begin{cases} b - a > \delta q_0 \\ \bar{r} > (1 - p_0) \end{cases}$ or $\begin{cases} b - a < \delta q_0 \\ \bar{r} > 1 - \sqrt{p_0} \end{cases}$.

Proof: see the Appendix

The high cost recipient has no reason to reform, as reforming and receiving aid brings them a lower payoff than not reforming and receiving no aid. The low cost recipient prefers reforming and receiving aid to not reforming not receiving aid, but he only reforms when he expects to be punished with a probability which is high enough.

Two periods are enough to illustrate the role of reputation as a commitment device for the donor. The more there are periods (i.e. recipients), the more a donor should be willing to invest in its reputation, because the more it has to gain from being perceived as tough. Thus, all other things equal, the bigger is a donor, the more it should punish non reforming recipients. International Financial Institutions like the World Bank or the IMF are involved in a huge number of projects all around the world but it is rare that they don't deliver committed funds to a non reforming recipient. If we admit the assumptions of our model, which are not very restrictive, this is kind of puzzling. A direct explanation of this behavior would be that for these institutions, punishing is too costly relatively to its expected benefits. A more subtle explanation is given in the following section.

3.2. Decentralized donor

Donor agencies like the World Bank are divided into a number of country departments, each being in charge of a part of the projects. Country departments are headed

by managers, who take the decision of disbursing or not the funds to the countries they are in charge of. When country managers take a decision of this type, they probably do not take into account the effects of this decision on the future projects of the other departments. But the behavior of one country department affects the output of a different country department if the country departments of the same donor agency have a common reputation in the eyes of the recipients. In that case, donor's reputation is a public good for country managers. When each manager takes the disbursement decision independently, there will be free riding in equilibrium.

In order to model this, we suppose that the donor agency is composed of two independent country departments, each department being in charge of one recipient. The donor organization allocates a budget for each recipient and it is the country department that decides on disbursing that budget.

We suppose that each country department (or manager) has the same per period payoff as the donor. Maybe this assumption is a bit strong. It seems reasonable to assume that country managers prefer to disburse money than to punish recipients due to the career concerns discussed above. Moreover, managers are personally subject to pressure from different actors that have an interest in funds being disbursed (Kanbur (2000), Thomas (2002)). It is less obvious that country managers do get higher payoffs when the contracts are respected by the recipients (in terms of improved career perspectives, personal satisfaction or whatever). This may actually be an additional explanation of the lack of punishments. But in order to focus on the free riding problem due to the multiplicity of managers, we suppose that the (per project) payoff of each manager or country department are aligned with that of the donor.

As the two managers work for the same donor organization, the rules governing their career evolution are likely to be the same. Thus, either both of them incur a cost when punishing a recipient or none of them does. Observing the behavior of one manager gives information about the types of the other managers working for the same donor agency⁵.

We assume that recipients know whether the disbursement decision is taken at a centralized level or at the country department level.

⁵The collective reputation of the managers of the same organisation is thus related to a common trait, which is the payoff in case of punishment. For a different modelling of collective reputations, see Tirole (1996).

Result 3. When the disbursement decision is decentralized, the soft donor does not punish. Recipient 1 does not reform if it is the high cost type and reforms if and only if $\bar{r} > 1 - p_0$ if it is the low cost type.

Proof. In a soft donor organization, disbursing brings a higher present payoff than punishing. Each manager has a one period horizon so none of them punishes. Recipient 1 anticipates this and respects the contract if $r_1 > p_0 \times 0 + (1 - p_0) \times 1 \Leftrightarrow r_1 > 1 - p_0$. The last inequality is never satisfied if $r_1 = \underline{r}$.

End of the proof.

When the decision is centralized, the effects of the decision on the future projects are taken into account by the decision maker. Punishing is optimal if the cost of punishing is compensated by the fact that recipient 2 is more likely to respect the contract if he observes punishment in period 1. In some cases (i.e. when the recipient 1 is of type \bar{r} and $\bar{r} > 1 - p_0$) the cost of punishing is not even incurred because the credible threat of punishment induces respect of the contract by recipient 1. When the decision is decentralized, the cost of punishing recipient 1 is born by manager 1 while its potential benefits go to manager 2. Obviously, manager 1 will not be willing to incur that cost. As the probability of being punished is lower, recipient 1 is less likely to respect the contract. At the end of period 1 the type of the donor is revealed ($p_1 = 0$) and recipient 2 does not respect the contract either.

Remark. In our model each country department has a one period horizon and therefore it does not recur to costly punishing. In reality, country departments are in charge of more than one project so they do care about the impact of their decisions on the reputation of the institution. Still, they only take into account a small subset of donor's projects, so the level of punishment is always suboptimal.

A policy implication of this result is to have more centralization of the disbursement decisions in donor agencies. This structural reform was already suggested by Svensson (2003), but for two different reasons. In that paper, centralization increases the opportunity cost of aid and allows inferring information about shocks in recipient countries.

So far we have assumed that the interaction with each recipient was one shot. In reality, donor-recipient relationships are often long lasting ones. Many development projects are disbursed in several stages, each stage being defined by a number of actions to be taken by the recipient and an amount of money to be disbursed (multi-tranche operations). Additionally, over the past few years, the World Bank has been using a programmatic approach for its policy-based lending, which consists of a series of single-tranche operations with the same recipient. If the costs of implementing reforms are recipient's private information, in a repeated relationship the behavior of the recipient will give the donor some information about this cost. Consequently the optimal strategies of the recipient should take into account the effects of their actions on donor's beliefs, i.e. reputation effects. Section 3.3 models this situation.

3.3. Repeated interaction with the same recipient

Suppose now that the donor may interact several times with the same recipient. We distinguish between two cases. In the first case the contract is signed in advance for two periods with the same recipient (section 3.3.1). In the second case the contract is signed for one period but may be renewed at the end of the period (section 3.3.2). The first case corresponds to multi-tranche operations while the second is somewhat similar to the programmatic adjustment lending approach.

In the following we suppose that the disbursement decision is centralized, unless we specify it differently.

3.3.1. Two period contract

A conditional aid contract is signed for two periods between the donor and a recipient government. At the end of each period, the donor observes if the recipient implemented the reforms specified by the contract and decides whether to deliver the corresponding funds (tranche). All payoffs are the same as in the original model, the only difference being the fact that the recipient is the same in both periods⁶. We denote by δ' the recipient's discount factor (up to now we supposed the recipients had a one period horizon so we did not need to specify their discount factor).

⁶ In reality, the level of effort demanded and the value of the funds released varies for the different stages of the contract, We suppose for simplicity that they are constant

When deciding whether to disburse the funds in period 1, the donor has already observed the recipient's action (reform or no reform) so q_0 has been updated to q_1 using Bayes' rule and the recipient's equilibrium strategy. The main difference with the previous section is that q_1 is now useful information for the donor, as in period 2 the donor will be dealing with the same recipient. Thus $\tilde{q} = q_1$ and it can easily be seen that in period 1 the donor's strategy is the one described in Result 1, with $\tilde{q} = q_1$.

As the donor punishes only if \tilde{q} is high enough (see Result 1), the recipient would like to be perceived as being the high cost type. This was not the case in the previous section, as the probability of being punished did not depend on the donor's beliefs about the current recipient but on her beliefs about the future recipients (we had $\tilde{q} = q_0$). Thus we expect the recipients to reform less often in order to signal a high cost type.

Result 4. When the contract is signed for two periods with the same recipient and when the disbursement decision is centralized, in period 1 the high cost recipient does not respect the contract. The low cost recipient respects the contract with probability 1 if

$$\bar{r} > \frac{(1-p_0)(1+\delta^r)}{1+\delta^r(1-p_0)}; \text{ with probability } \gamma = \frac{q_0\delta - (b-a)}{q_0\delta - q_0(b-a)} \text{ if } \begin{cases} b-a < \delta q_0 \\ 1 - \sqrt{p_0} < \bar{r} < \frac{(1-p_0)(1+\delta^r)}{1+\delta^r(1-p_0)} \end{cases} \text{ and}$$

with probability 0 otherwise.

Proof: see the Appendix

Comparing Results 2 and 4, we see that the recipient is less likely to reform (i.e. reform occurs for a lower set of parameter values) when the contract continues the following period than when it stops at the end of the period. This is due to two reasons. The first reason is the incentive described above: the wish to signal a bad type in order to dissuade the donor from punishing. The second reason can be seen from the presence of the discount factor δ^r in the conditions. The higher δ^r , the less is the recipient likely to respect the contract in period one. The intuition behind this second effect is the following. By not reforming in period one the recipient may learn that the donor is soft, which would give him the opportunity to obtain a very high expected payoff in period two by not reforming and being sure that she will not be punished. By reforming, the recipient learns nothing about the donor so she cannot get such a high expected payoff in period 2.

In order to isolate these two effects, we can compute the recipient's strategies when $\delta^r = 0$, i.e. when the second effect does not exist. In this case the low cost recipient respects the contract with probability 1 if $\bar{r} > 1 - p_0$, with probability $\gamma = \frac{q_0\delta - (b-a)}{q_0\delta - q_0(b-a)}$ if

$$\begin{cases} b - a < \delta q_0 \\ 1 - \sqrt{p_0} < \bar{r} < 1 - p_0 \end{cases} \text{ and with probability 0 otherwise. Thus, when } \begin{cases} b - a < \delta q_0 \\ 1 - \sqrt{p_0} < \bar{r} < 1 - p_0 \end{cases}, \text{ the}$$

recipient randomizes if the contract is continues next period and reforms with probability 1 if the contract is not one shot. This difference in strategies is uniquely due to the will to signal a high cost type in order to dissuade the donor from punishing. Note also that when $\delta^r > 0$ and

$$\begin{cases} b - a < \delta q_0 \\ 1 - p_0 < \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)} \end{cases} \text{ the recipient randomizes when the contract continues next}$$

period and reforms with probability one when the contract is one shot. This time the difference in strategies is due to the second effect.

Up to now we have supposed that the disbursement decision was centralized in the donor institution. But as we have seen in section 3.2, the behavior of the donor and consequently that of the recipient is quite different when the disbursement decision is decentralized⁷. Result 5 gives the equilibrium strategies for the donor and the recipient in the decentralized case.

Result 5. When the disbursement decision is decentralized and the contract repeated next period with the same recipient, the soft donor does not punish. The high cost recipient does not respect the contract. The low cost recipient respects the contract if and only if

$$\bar{r} > \frac{(1 - p_a)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$$

Proof: see the Appendix

If we compare Results 5 and 3, we see that when the disbursement decision is decentralized, reform is more likely when the contract is one shot. This is only due to the second effect mentioned above. Indeed, as the strategy of the soft donor does not depend on

⁷ In section 2, recipients 1 and 2 were two different countries. By “decentralized decision” we meant that a different country department was in charge with each recipient. In this section, the recipient is the same in both periods. By decentralized decision we mean that two different managers are in charge of the project in periods 1 and 2.

its beliefs about the recipient (a decentralized donor never punishes), it is useless to signal a high cost type, but finding out that the donor is soft remains useful, unless $\delta^r = 0$. Indeed, note that for $\delta^r = 0$ the recipient's strategy is the same as in Result 3.

So far we have analyzed two extreme cases: the case where the contract continues in period 2 with probability 0 and the case where it continues with probability 1. We have seen that the recipient is more likely to reform in the first case. In the next section we study an intermediary situation, in which the contract may or may not continue next period, at the discretion of the donor.

3.3.2. One period, renewable contract

Suppose now that the contract is only signed for period one. In period two the donor may choose to renew the contract with the same recipient or turn to a different recipient. So the game is slightly modified, as the donor's strategy consists not only of the decision to punish or not in periods one and two, but also of the decision to change or not the recipient at the end of period one.

The donor will turn to a different recipient in period two if she expects to get a higher payoff by doing that. As the low cost recipient is more likely to reform, the donor prefers to deal with this type of recipients. The probability of having a low cost type recipient the next period is equal to q_1 if the donor keeps the same recipient and q_0 if the donor chooses a new recipient. Thus, it is obvious that the donor will choose a new recipient if $q_1 < q_0$, keep the same recipient if $q_1 > q_0$ and be indifferent if $q_1 = q_0$. When the donor is indifferent, we suppose that she changes the recipient if there was no reform and keeps the same recipient if there was reform⁸.

Thus, the probability of interacting with a low cost recipient in period two is equal to $\max(q_1, q_0)$ and the donor's equilibrium strategy is the one given in Result 1, with $\tilde{q} = \max(q_1, q_0)$.

⁸ We could alternatively suppose that the donor randomizes when she is indifferent. With this alternative assumption, the basic results would still be true, but a bit less strong because the game would have multiple equilibria for some parameter values.

We can see that in this case the soft donor punishes in period 1 if q_1 or q_0 is high enough. Even if the current recipient is likely to be of the high cost type (low q_1), the donor may still punish in order to induce a different recipient to respect the contract in period 2. Thus the first perverse incentive described in the previous section, i.e. the wish to send a bad signal in order to dissuade the donor from punishing, will not work here.

Define $r_1 \equiv \frac{2 - \delta^r(1 - p_0) - \sqrt{\delta^{r^2}(1 - p_0)^2 + 4p_0}}{2}$. Result 6 gives the recipient's

equilibrium strategy in period 1.

Result 6. . When the contract is signed for one period and is renewable and when the disbursement decision centralized, the low cost recipient respects the contract if $\begin{cases} b - a < \delta q_0 \\ r_1 < \bar{r} \end{cases}$

or $\begin{cases} (1 - p_0)(1 - \delta^r) < \bar{r} \\ b - a > \delta q_0 \end{cases}$. The high cost recipient respects the contract if $\begin{cases} b - a < \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases}$ or $\begin{cases} \underline{r} > -\delta^r(1 - p_0) \end{cases}$

$$\begin{cases} b - a < \delta q_0 \\ r_1 < \bar{r} < 1 - p_0 \\ \underline{r} > (1 - p_0)(1 - \delta^r - \frac{p_0 \bar{r}}{(1 - p_0)(1 - \bar{r})}) \end{cases}$$

Proof: see the Appendix

If we compare Results 2 and 6, we see that when the disbursement decision is centralized, the contract is respected more often when it can be renewed than when it is one shot. We saw in the previous section that the contract is respected more often when it is one shot than when it lasts two periods because of two perverse incentives. Those perverse incentives do not work here. For the recipient, it is useless to signal a bad type because this would decrease q_1 but not q_0 , so it would not dissuade the soft donor from punishing. It is equally useless to learn that the donor is soft, because when no reform is observed, the donor chooses a new recipient the following period so the benefits of having learned that the donor is soft would go to a different recipient. Moreover, there is an additional incentive to respect the contract: the will to send a good signal in order to have the contract renewed. This last incentive explains why the high cost recipient may also respect the contract in period 1.

Result 7 gives the recipient's strategy in period 1 with a decentralized donor.

Result 7. When the contract is one shot and renewable and the disbursement decision decentralized, the soft donor does not punish. The high cost recipient does not respect the contract and the low cost recipient respects the contract if and only if $\bar{r} > (1 - p_0)(1 - \delta^r)$.

Proof: See the Appendix

If we compare Results 3 and 7, we see that the contract is respected for a larger set of parameter values when it can be renewed than when it is one shot. This is because the low cost recipient wants to send a good signal in order to have the contract continue next period, and we can see that this is no longer true when $\delta^r = 0$.

3.4. Synthesis

In this section we give a synthesis of the Results 1 to 7. Table 2 in the Annex summarizes the main findings. For all combinations of parameter values, it gives the probability that the low cost recipient respects the contract in periods one and two respectively, when the contract is one shot, when it lasts two periods and when it lasts one period but can be renewed and for each case, with a centralized and a decentralized donor institution. For example, when $1 - p_0 < \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$ and $b - a < \delta q_0$, with a two period contract the low cost recipient randomizes in period 1 if the donor is centralized and does not reform if the donor is decentralized, while with a one period renewable contract she reforms with probability one whatever the type of the donor.

We can see from Table 2 that the probability of having the contract renewed next period affects the likelihood of reform in a non monotonic way. Indeed, when the contract can be renewed at the discretion of the donor (probability of renewal between 0 and 1), the set of parameter values such that the contract is respected in equilibrium is the largest. When the contract is one shot (probability of renewal equal to 0), this set of parameters is lower. Finally, when the contract continues next period (probability of renewal equal to 1), this set of parameters is the lowest. We can also see from this table that the probability of reform is higher when the donor is centralized, whatever the length of the contract. With these

observations and having in mind that the high cost recipient only reforms when the donor is centralized and the contract is signed for one period and is renewable, we can state:

Proposition. Recipient governments are the most likely to reform when they are dealing with a centralized donor and when they sign single stage, renewable contracts. They are the least likely to reform when they are dealing with a decentralized donor and when they sign multi-stage contracts.

The fact that the decision is centralized makes credible the threat of punishing and the fact that the budget is not committed in advance for several periods makes credible the threat of not renewing the contract. These two credible threats induce recipients to respect the contract more often.

The conclusions of this theoretical model of reputation building are somewhat consistent with some recent the empirical evidence on the effectiveness of aid conditionality. Koeberle and Malesa (2005) note using OED ratings that the percentage of satisfactory operations is higher with single-tranche adjustment loans than with multiple tranche operations. World Bank's own experience with the programmatic approach suggests that it has been robust and effective in a wide range of country circumstances (World Bank, (2005)). Reputation concerns are certainly not the whole story in explaining the effectiveness or ineffectiveness of aid conditionality, but it seems likely that they're part of it and one should take them into account when designing the contracts for the different actors involved.

4. Concluding Remarks

After more than 20 years of experimentation of aid conditionality, it seems to become a consensus that this method does not work in improving economic policies and/or governance in the developing countries. We think that inferring that conditionality does not work from the experience of the last two decades is a bit unfair. How can we say if conditionality works if it was rarely applied the way it was supposed to work (no reform-no disbursement)? This paper gives several hints in improving the effectiveness of aid conditionality.

First, we suggest that the disbursement decisions should be taken at a central level in the international financial institutions. This would allow the decision maker to internalize the effects of each decision on all the projects of the institution. Denying committed funds to a government who does not respect the contract is difficult because of all kinds of pressure that is put on the decision maker, but disbursing funds to that government undermines the

reputation of the donor and decreases its leverage in all the future programs. An optimal choice can only be taken at a central level because of the public good nature of the institution's reputation. This would (at least partially) solve the donor's enforcement problem, which is, in our view, one of the main causes of the ineffectiveness of aid conditionality.

Second, we suggest that multi stage contracts should be replaced by single stage, renewable contracts. With multiple tranche contracts, two perverse incentives decrease the probability of reform compared to the case where each contract is one shot. In the first stages, the recipient wants to send a bad signal in order to dissuade the donor from punishing. Indeed, the donor uses costly punishment only if it induces reform the following period. As the high cost recipients cannot be persuaded to reform, punishment will not be used against them. Moreover, with long contracts, the potential benefits of not reforming are high because learning that the donor is soft is a guarantee to obtain aid without reform in the following periods. These two perverse incentives vanish if the contract is one shot or if it can be renewed at the discretion of the donor. In the last case, an additional positive incentive increases the probability of reform: the will to send a good signal in order to have the contract renewed. Because of these incentives, related to informational asymmetries, the probability of having the contract renewed affects the probability of reform in a non monotonic way. Reform is most likely when the probability of having the contract renewed is between 0 and 1 (donor's discretion), it is less likely when this probability is 0 (one shot contracts) and the least likely when this probability is 1 (multi stage contracts).

The policy implications described above are based on a theoretical model, with reasonable assumptions in our view, but, obviously reality is much more complex. As usual, one should be cautious about the real consequences of implementing policies derived from a theoretical model. We discuss some of the possible issues below.

A first thing to note is the way centralization could work in practice. A central decision unit should be in charge of all the disbursement decisions. The country or project managers would have to report their observation of the recipient's action to this central unit, who would then decide on the disbursement. Then the pressure to disburse would no longer be born by the managers. But it could be that the same reasons that lead to disbursement pressures become incentives for the manager to misreport their observations, and namely to report that the recipient is making reform efforts when it is not. One should then find the right incentives in order to have good information transmission from the managers. A noteworthy theoretical article about the advantages and disadvantages of a centralized organization compared to a decentralized one in terms of information transmission is Alonso et al (2008).

A second thing to note is that in our model the donor (manager) perfectly observes the implementation of the reform before disbursing the funds. This is not always the case. The implementation of some policies may only be observed with some noise or with a delay and the exactitude of the observation may depend on the effort provided by the manager. When there is some doubt about the implementation of the conditionality by the recipient, other issues need to be taken into account, such the choice between denying funds to a recipient that has made reform efforts and delivering funds to a recipient that has made no effort. An interesting paper in this respect is Prendergast (2003), which shows that bureaucracies inefficiently accede to consumer demands in order to avoid complains. Indeed, a recipient that has made no effort will never complain for having been given the funds, while a recipient that was unfairly punished may do so. This may be an additional explanation of the lack of enforcement of conditionality. But in this paper we are referring to the numerous cases in which governments openly hostile to all policy reforms received important amounts of aid. If the decision maker in the donor institution internalized the effects of his action on the donor's reputation, such cases should be avoided.

One of our policy implications suggests that the donor should not engage for long periods in order to credibly threaten the recipients with not renewing the contract in case of no effort from their part. But the uncertainty on whether the contract will be renewed may undermine the recipient government's ability to plan expenditures for longer periods. This is not really a problem if the reform effort is perfectly observable because then the renewal of the contract and the aid delivery would only depend on the government so it would be perfectly predictable. But this may be a problem if reform is not perfectly observable, because then the delivery of aid would also depend on some uncontrollable variables.

Another remark concerns the recipient's payoff and more precisely how it would be affected if the policy implications of the model were applied. If by recipient we mean the recipient government or the agent that bears the costs of the reform and (at least partially) profits from the money from aid, the payoff of this agent is highest when the donor is decentralized and when the contract is established in advance for several periods, because in that case the probability of being punished is very low. But if by recipient we mean the population of the recipient country, they may either benefit or loose from having a centralized donor and short period renewable contracts. If their government is one which would never reform, having a centralized donor makes things worse as the population would not benefit from reforms, nor from aid. If the government is one which would reform if it were sure that

no aid would be delivered otherwise, the population would be better off, as they would profit from both aid and reforms.

Obviously, the last remark is true only if the reforms demanded by the donor are appropriate and actually lead to higher growth and less poverty. Unfortunately, it is not always true. In “Globalization and its discontents”, Joseph Stiglitz describes many cases in which the policies imposed by international institutions made things worse in recipient countries, because they were either not adapted to the particular situation of the recipient country, either imposed in a bad timing, or just very unfair. Policies taken from the Washington Consensus were often imposed to all developing countries, with little consideration of the differences in economic structures between the regions of the world. Of course, if policies are badly chosen, a lax donor is better for everyone because these badly chosen policies will not be implemented. A related problem is that conditional aid contracts contain too many conditions. The recipient governments are asked to do too many things and they end up doing nothing, or at least wasting resources away from priorities. The donors should concentrate on what is really important.

Finally, an important element about conditionality is what is called “ownership” of the program. Representatives of the recipient government should participate actively in the process of formulating conditionality, for two important reasons. The first reason is that the local government knows much better the cultural, social and economic specificities of the region than an (even very talented) economist from an international financial institution. Putting together the education and experience of good economists and the knowledge of the country’s specificities by the government may avoid imposing inappropriate economic policies. The second reason why the government should actively participate in formulating conditionality is that it would not feel it is losing its sovereignty and that policies are imposed to him from abroad. This would increase its commitment to the policies and the probability to continue in that direction once the project is over. The literature indicates that the form of the dialogue between the international institutions and the government is quite important. Persuasion is more likely to be effective in promoting compliance when the persuader does not lecture or demand but instead acts out principles of serious deliberative argument. Creating a non confrontational atmosphere where national agents can reconsider their views works better (Checkel, 2000). If we push the ownership reasoning a bit further, one might think that the recipient government should be the only one to decide how the money from aid should be spent. Indeed, if the donor’s objective is to help poor countries, why not let them spend the money the way they desire, and not according to the donor’s

vision of what is good and what is bad? If the money from aid were destined to the recipient government, conditionality would not make much sense. The persons receiving the money would perfectly be able to maximize their utility under the budget constraint, without any advice from the World Bank. But aid is supposed to benefit to all the citizens of the recipient country and especially to the poor. If we are not sure that the government represents the interests of the poor and more generally the long term interests of the country, it is legitimate to have a word to say on how the money is spent. But as we said before, conditions should be chosen very carefully, with regard to the specificities of the developing country and with a real participation of the recipient government.

Appendix

Denote by p_1^0 , p_1^p and p_1^{np} the updated probabilities at the end of period 1 that the donor is tough following reform, no reform and punishment and no reform and disbursement respectively. Denote by q_1^r and q_1^{nr} the updated probabilities at the end of period 1 that recipient 1 is low cost following reform and no reform respectively.

Proof of Result 1

Let's look for a pooling equilibrium in which both donor types punish with probability 1 in period 1. Then $p_1^p = p_0$ and p_1^{np} represents out of equilibrium beliefs. We can choose whatever $p_1^{np} \leq 1 - \bar{r}$ in order to sustain this equilibrium. The soft donor will not deviate if punishment induces respect of the contract by the low cost recipient ($\bar{r} > 1 - p_0$) and if it brings a higher expected benefit than no disbursement ($a - b + \delta q_0 > 0$). Let's look for a separating equilibrium in which only the tough donor punishes in period 1. Then $p_1^p = 1$ and $p_1^{np} = 0$. The soft donor will not deviate if $a - b + \delta q_0 < 0$. Finally, let's look for a mixed equilibrium in which the soft donor punishes with probability $\alpha < 1$. Then

$p_1^p = \frac{p_0}{p_0 + (1 - p_0)\alpha}$ and $p_1^{np} = 0$. The low cost recipient must randomize after observing punishment, which requires $\bar{r} = 1 - p_1^p \Rightarrow \alpha = \frac{p_0 \bar{r}}{(1 - p_0)(1 - \bar{r})}$. Following punishment, the

recipient respects the contract with probability β such that $a - b + \delta q_0 \beta = 0 \Leftrightarrow \beta = \frac{b - a}{\delta q_0}$.

$\alpha < 1$ requires $\bar{r} < 1 - p_0$ and $\beta < 1$ requires $b - a < \delta q_0$.

End of the Proof.

Proof of Result 2

The probability of being punished, π_1 is computed from the equilibrium strategies of the donor given in Result 1. Recipient 1 has a one period horizon so she respects the contract if and only if $r_1 > 1 - \pi_1$. As $r_1 < 0$, the high cost recipient does not respect the contract, whatever the value of π_1 . The low cost type respects the contract if $\bar{r} > 1 - \pi_1$. When $\begin{cases} b - a < \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases}$,

$\pi_1 = 1$ so she respects the contract. When $\begin{cases} b - a < \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases}$, $\pi_1 = \frac{p_0}{1 - \bar{r}}$, so she respects the contract if $\bar{r} > 1 - \sqrt{p_0}$. Finally, when $b - a > \delta q_0$, $\pi_1 = p_0$ so she respects the contract if $\bar{r} > 1 - p_0$.

End of the Proof.

Proof of Result 4

Consider the separating equilibrium in which only the low cost type recipient respects the contract in period 1. Then $q_1^r = 1$ and $q_1^m = 0$, so only the tough donor punishes no reform.

This is an equilibrium if $\begin{cases} \bar{r} + \delta^r \bar{r} > p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ \bar{r} > 1 - p_0 \end{cases}$ or

$\begin{cases} \bar{r} + \delta^r(1 - p_0) > p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ \bar{r} < 1 - p_0 \end{cases}$. These two systems give $\bar{r} > \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$.

Consider the pooling equilibrium in which no recipient respects the contract in period 1. Then $q_1^m = q_0$ and q_1^r represents out of equilibrium beliefs, but these beliefs do not matter because when the contract is respected the donor disburses the funds whatever her beliefs and in period 2 the donor's optimal strategy does not depend on her beliefs. The cases where the soft donor punishes are those given in Result 1, with $\tilde{q} = q_0$. This is an equilibrium if

$\begin{cases} \bar{r} + \delta^r \bar{r} < p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ b - a > \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases}$ or $\begin{cases} \bar{r} + \delta^r(1 - p_0) < p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ b - a > \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases}$

or $\begin{cases} \bar{r} + \delta^r \bar{r} < p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ b - a < \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases}$ or

$\begin{cases} \bar{r} + \delta^r(1 - p_0) < p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ b - a < \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases}$ with $\alpha = \frac{p_0 \bar{r}}{(1 - p_0)(1 - \bar{r})}$.

These four systems simplify to $\begin{cases} b - a > \delta q_0 \\ \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)} \end{cases}$ or $\begin{cases} b - a < \delta q_0 \\ \bar{r} < 1 - \sqrt{p_0} \end{cases}$.

Consider the mixed equilibrium in which type \bar{r} respects the contract with probability $1 - \gamma < 1$ in period 1. Then $q_1^{nr} = \frac{q_0 \gamma}{q_0 \gamma + (1 - q_0)}$ and $q_1^r = 1$. In such an equilibrium, the donor must randomize in period 1, so that punishment induces reform by the low cost recipient in period 2 while no punishment induces no reform. So $b - a = \delta q_1^{nr} \Rightarrow q_1^{nr} = \frac{b - a}{\delta}$. This gives

$$\gamma = \frac{(1 - q_0) \frac{b - a}{\delta}}{q_0 \left(1 - \frac{b - a}{\delta}\right)}. \quad \gamma < 1 \text{ requires } b - a < \delta q_0. \text{ The soft donor punishes with probability } \tilde{\alpha}.$$

If $\bar{r} > 1 - p_0$, the condition is

$$\bar{r} + \delta^r \bar{r} = p_0(0 + \delta^r \bar{r}) + (1 - p_0)\tilde{\alpha}(0 + \delta^r \bar{r}) + (1 - p_0)(1 - \tilde{\alpha})(1 + \delta^r), \quad \text{which gives}$$

$$\tilde{\alpha} = \frac{(1 - p_0)(1 + \delta^r) - \bar{r}(1 + \delta^r - \delta^r p_0)}{(1 - p_0)(1 + \delta^r - \delta^r \bar{r})}. \quad \tilde{\alpha} > 0 \text{ requires } \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r - \delta^r p_0}.$$

$p_1^p = \frac{p_0}{p_0 + (1 - p_0)\tilde{\alpha}} > p_0$. Thus $\bar{r} > 1 - p_0 \Rightarrow \bar{r} > 1 - p_1^p$ so punishment is followed by

reform and no punishment is followed by no reform as $p_1^{np} = 0$. If $\bar{r} < 1 - p_0$ the condition is

$$\bar{r} + \delta^r(1 - p_0) = p_0(0 + \delta^r \bar{r}) + (1 - p_0)\tilde{\alpha}(0 + \delta^r \bar{r}) + (1 - p_0)(1 - \tilde{\alpha})(1 + \delta^r) \quad \text{which gives}$$

$$\tilde{\alpha} = \frac{(1 - p_0) - \bar{r}(1 - p_0\delta^r)}{(1 - p_0)(1 + \delta^r - \delta^r \bar{r})}. \text{ We have to insure that } \bar{r} > 1 - p_1^p, \text{ which is equivalent to}$$

$\bar{r}^2 - 2\bar{r} + (1 - p_0) < 0$. As $\bar{r} < 1 - p_0$, we need $\bar{r} > 1 - \sqrt{p_0}$. So we have a mixed equilibrium

$$\text{if } \begin{cases} b - a < \delta q_0 \\ 1 - \sqrt{p_0} < \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)} \end{cases}$$

Finally, it is easy to check that there are no equilibria in which the high cost recipient respects the contract.

End of the Proof

Proof of Result 5

The proof that the soft donor does not punish is the same as in Result 2. So $\pi_1 = p_0$. The high cost recipient respects the contract in period one if $\underline{r} + \delta^r(1 - p_0) > p_0(0 + 0) + (1 - p_0)(1 + \delta^r)$, which is never satisfied. The low cost recipient

respects the contract if
$$\begin{cases} \bar{r} + \delta^r \bar{r} > p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ \bar{r} > 1 - p_0 \end{cases}$$
 or

$$\begin{cases} \bar{r} + \delta^r(1 - p_0) > p_0(0 + \delta^r \bar{r}) + (1 - p_0)(1 + \delta^r) \\ \bar{r} < 1 - p_0 \end{cases}, \text{ which give } \bar{r} > \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}.$$

End of the Proof

Proof of Result 6

Contrarily to the previous cases, the recipient of type \underline{r} might also respect the contract in period 1, as this will allow him to have the contract renewed and give the possibility to get aid without reforming next period.

Let's look for a pooling equilibrium in which both types respect the contract with probability 1 in period 1. Then $q_1^r = q_0$ and q_1^{nr} represents out of equilibrium beliefs. We choose whatever $q_1^{nr} \leq q_0$ to sustain such an equilibrium. So $\max(q_1, q_0) = q_0$. From the equilibrium behavior of the donor given in Result 1, with $\tilde{q} = \max(q_1, q_0)$, we have the

following conditions insuring no deviation for both recipient types:
$$\begin{cases} \bar{r} + \delta^r \bar{r} > 0 \\ \underline{r} + \delta^r(1 - p_0) > 0 \\ b - a < \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases}$$
 or

$$\begin{cases} \bar{r} + \delta^r(1 - p_0) > (1 - p_0)(1 - \alpha) \\ \underline{r} + \delta^r(1 - p_0) > (1 - p_0)(1 - \alpha) \\ b - a < \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases} \text{ with } \alpha = \frac{p_0 \bar{r}}{(1 - \bar{r})(1 - p_0)} \text{ or } \begin{cases} \bar{r} + \delta^r \bar{r} > (1 - p_0) \\ \underline{r} + \delta^r(1 - p_0) > 1 - p_0 \\ b - a > \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases} \text{ or}$$

$$\begin{cases} \bar{r} + \delta^r(1-p_0) > 1-p_0 \\ \underline{r} + \delta^r(1-p_0) > 1-p_0 \\ b-a > \delta q_0 \\ \bar{r} < 1-p_0 \end{cases} . \text{ These four systems finally give the conditions: } \begin{cases} b-a < \delta q_0 \\ \bar{r} > 1-p_0 \\ \underline{r} > -\delta^r(1-p_0) \end{cases} \text{ or}$$

$$\begin{cases} b-a < \delta q_0 \\ r_1 < \bar{r} < 1-p_0 \\ \underline{r} > (1-p_0) \left(1 - \delta^r - \frac{p_0 \bar{r}}{(1-p_0)(1-\bar{r})} \right) \end{cases} .$$

Let's look for a separating equilibrium in which only the low cost type reforms in period 1. Then $q_1^{nr} = 0$ and $q_1^r = 1$, so following no reform, $\tilde{q} = \max(q_1, q_0) = q_0$. The

$$\text{conditions insuring no deviation are } \begin{cases} \bar{r} + \delta^r \bar{r} > 0 \\ \underline{r} + \delta^r(1-p_0) < 0 \\ b-a < \delta q_0 \\ \bar{r} > 1-p_0 \end{cases} \text{ or } \begin{cases} \bar{r} + \delta^r(1-p_0) > (1-p_0)(1-\alpha) \\ \underline{r} + \delta^r(1-p_0) < (1-p_0)(1-\alpha) \\ b-a < \delta q_0 \\ \bar{r} < 1-p_0 \end{cases}$$

$$\text{with } \alpha = \frac{p_0 \bar{r}}{(1-\bar{r})(1-p_0)} \text{ or } \begin{cases} \bar{r} + \delta^r \bar{r} > (1-p_0) \\ \underline{r} + \delta^r(1-p_0) < 1-p_0 \\ b-a > \delta q_0 \\ \bar{r} > 1-p_0 \end{cases} \text{ or } \begin{cases} \bar{r} + \delta^r(1-p_0) > 1-p_0 \\ \underline{r} + \delta^r(1-p_0) < 1-p_0 \\ b-a > \delta q_0 \\ \bar{r} < 1-p_0 \end{cases} . \text{ These four}$$

$$\text{systems simplify to } \begin{cases} \bar{r} > 1-p_0 \\ b-a < \delta q_0 \\ \underline{r} < -\delta^r(1-p_0) \end{cases} \text{ or } \begin{cases} b-a < \delta q_0 \\ r_1 < \bar{r} < 1-p_0 \\ \underline{r} < (1-p_0) \left(1 - \delta^r - \frac{p_0 \bar{r}}{(1-p_0)(1-\bar{r})} \right) \end{cases} \text{ or } \begin{cases} \bar{r} > 1-p_0 \\ b-a > \delta q_0 \end{cases}$$

$$\text{or } \begin{cases} (1-p_0)(1-\delta^r) < \bar{r} < 1-p_0 \\ b-a > \delta q_0 \end{cases} .$$

Let's look for a pooling equilibrium in which no recipient respects the contract in period 1. Then $q_1^{nr} = q_0$ and q_1^r represents out of equilibrium beliefs. We can choose whatever $q_1^r \geq q_0$ to sustain such an equilibrium. Following no reform, $\tilde{q} = \max(q_1^{nr}, q_0) = q_0$.

The conditions on the parameters insuring no deviation are
$$\begin{cases} \bar{r} + \delta^r \bar{r} < 0 \\ \underline{r} + \delta^r (1 - p_0) < 0 \\ b - a < \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases} \quad \text{or}$$

$$\begin{cases} \bar{r} + \delta^r (1 - p_0) < (1 - p_0)(1 - \alpha) \\ \underline{r} + \delta^r (1 - p_0) < (1 - p_0)(1 - \alpha) \\ b - a < \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases} \quad \text{with} \quad \alpha = \frac{p_0 \bar{r}}{(1 - \bar{r})(1 - p_0)} \quad \text{or} \quad \begin{cases} \bar{r} + \delta^r \bar{r} < (1 - p_0) \\ \underline{r} + \delta^r (1 - p_0) < 1 - p_0 \\ b - a > \delta q_0 \\ \bar{r} > 1 - p_0 \end{cases} \quad \text{or}$$

$$\begin{cases} \bar{r} + \delta^r (1 - p_0) < 1 - p_0 \\ \underline{r} + \delta^r (1 - p_0) < 1 - p_0 \\ b - a > \delta q_0 \\ \bar{r} < 1 - p_0 \end{cases} . \text{ These four systems simplify to } \begin{cases} b - a < \delta q_0 \\ \bar{r} < r_1 \end{cases} \quad \text{or} \quad \begin{cases} b - a > \delta q_0 \\ \bar{r} < (1 - p_0)(1 - \delta^r) \end{cases} .$$

Finally, it can be easily checked that there are no mixed equilibria in this game.

End of the proof

Proof of Result 7

The soft donor does not punish for the same reasons as in Result 2. Thus $\pi_1 = p_0$. The high cost recipient respects the contract if $\underline{r} + \delta^r (1 - p_0) > p_0 \times 0 + (1 - p_0) \times 1$, which is never

satisfied. The low cost recipient respects the contract if
$$\begin{cases} \bar{r} + \delta^r \bar{r} > p_0 \times 0 + (1 - p_0) \times 1 \\ \bar{r} > 1 - p_0 \end{cases} \quad \text{or}$$

$$\begin{cases} \bar{r} + \delta^r (1 - p_0) > p_0 \times 0 + (1 - p_0) \times 1 \\ \bar{r} < 1 - p_0 \end{cases} \quad \text{which jointly give } \bar{r} > (1 - p_0)(1 - \delta^r) .$$

End of the proof.

Table 2:Equilibrium probabilities that the low cost type reforms in periods 1 and 2

We have to consider two cases: $1 - \sqrt{p_0} < (1 - p_0)(1 - \delta^r)$ (A) and $1 - \sqrt{p_0} > (1 - p_0)(1 - \delta^r)$ (B) if we want to put an order on the different threshold values, but the conclusions are the same in both cases. (α , $\tilde{\alpha}$, β and γ are probabilities strictly lower than one defined in Results 1 to 7)

(A): $1 - \sqrt{p_0} < (1 - p_0)(1 - \delta^r)$

	Contract continues next period	$b - a < \delta q_0$		$b - a > \delta q_0$	
		centralized	decentralized	centralized	decentralized
$\bar{r} < r_1$	yes	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
$r_1 < \bar{r} < 1 - \sqrt{p_0}$	yes	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
$1 - \sqrt{p_0} < \bar{r} < (1 - p_0)(1 - \delta^r)$	yes	$(\gamma, (1 - \gamma)\tilde{\alpha})$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
$(1 - p_0)(1 - \delta^r) < \bar{r} < 1 - p_0$	yes	$(\gamma, (1 - \gamma)\tilde{\alpha})$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(1,0)$	$(1,0)$	$(1,0)$
$1 - p_0 < \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$	yes	$(\gamma, (1 - \gamma)\tilde{\alpha})$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	maybe	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
$\bar{r} > \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$	yes	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	no	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	maybe	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$

$$(B): 1 - \sqrt{p_0} > (1 - p_0)(1 - \delta^r)$$

	Contract continues next period	$b - a < \delta q_0$		$b - a > \delta q_0$	
		centralized	decentralized	centralized	decentralized
$\bar{r} < r_1$	yes	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
$r_1 < \bar{r} < (1 - p_0)(1 - \delta^r)$	yes	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
$(1 - p_0)(1 - \delta^r) < \bar{r} < 1 - \sqrt{p_0}$	yes	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(0, \alpha\beta)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(1,0)$	$(1,0)$	$(1,0)$
$1 - \sqrt{p_0} < \bar{r} < 1 - p_0$	yes	$(\gamma, (1 - \gamma)\tilde{\alpha})$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(1,0)$	$(0,0)$	$(0,0)$	$(0,0)$
	maybe	$(1,0)$	$(1,0)$	$(1,0)$	$(1,0)$
$1 - p_0 < \bar{r} < \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$	yes	$(\gamma, (1 - \gamma)\tilde{\alpha})$	$(0,0)$	$(0,0)$	$(0,0)$
	no	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	maybe	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
$\bar{r} > \frac{(1 - p_0)(1 + \delta^r)}{1 + \delta^r(1 - p_0)}$	yes	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	no	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$
	maybe	$(1,1)$	$(1,1)$	$(1,1)$	$(1,1)$

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