

Moral Hazard and Reputation in Development Assistance

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Abstract

This paper considers conditional development assistance and investigates the conditions under which the donor finds it profitable to invest in reputation. Past experience has shown that conditionality failed at enhancing aid effectiveness. The reason for such a failure is the behavior of the donor countries that tend to yield to the aid disbursement pressure they are constantly facing. Clearly there is a lack of commitment to suspend aid when the conditions agreed upon for aid disbursement are not met. The paper considers a setting in which there are uncertainty about the donor as well as the recipients types. This uncertainty is combined to a moral hazard problem due to a shock that adversely hits the recipient economy. In this context we use the Kreps-Wilson (1982) framework to study how and when reputation can serve as a commitment device that balances the disbursement pressure and lead to recipients compliance as well as to donors enforcement of such a contract.

Keywords: development aid, aid effectiveness, conditional aid contracts, reputation building, commitment, disbursement pressure

JEL classification: F35; C73; O19; L14

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1. Introduction

In a previous paper, Sraieb (2012), I showed that inertia plays an influential role among the determinants of aid allocation to recipient countries. The literature has identified bureaucracy as a fundamental cause of such inertia². McGillivray and White (1993) explain this relation arguing that from the aid bureaucracy perspective, allocating aid among a large sample of developing countries, identifying and weighting up the relative importance a range of often competing factors ..., deciding which form the aid should take, engaging in consultation with other government departments and aid lobby groups and so on is a complicated and onerous task. Turning to the previous year allocations, and marginally adjusting is an expedient way of coping with this task. The danger of such phenomenon comes from its ability to undermine aid effectiveness in terms of generating growth and alleviating poverty. Indeed, donor country usually put conditions on the release of aid. These conditions are intended to enhance aid effectiveness in the recipient country and may consist in imposing political, social, or economic reforms. This is aid conditionality. According to Stokke (1995), these conditions have to be met by the recipient as a prerequisite for entering into an aid agreement or for keeping up aid. Conditions on aid delivery can target more respect of human rights in the recipient country, freeing markets, promoting political and civil liberties, effectively fighting corruption, enhancing good governance, etc.

We end up with a dilemma where in the one hand, the donor imposes conditionality in order to foster aid effectiveness but on the other hand conditionality undermines it because of the inertia characterizing the donor decisions. Indeed, inertia implies releasing aid regardless of the recipient compliance with conditionality. This problem is highly amplified by the behavior of most donor countries that tend to yield to the disbursement pressure they usually face.

The literature has investigated the reasons behind such a disbursement pressure³. Different actors are responsible including private sector representatives,

²According to Wildavsky (1964), the principal influence on the budget for any spending agency in the current year is last year's budget. Mosley (1985) states that this is even stronger in the case of aid than of other categories of public expenditure, since most of the aid announced consists of money committed several years in advance to the support of particular projects. The empirical literature accounting for inertia includes Boschini and Olofsgard (2007), Furuoka (2008), Carey (2007), Lai (2003), Apodaca and Stohl (1999) and Fielding (2010).

³Berlinschi (2010) surveyed these reasons citing some authors among which Svensson (2000a) who argues that cutting external funds to a developing country may increase poverty rates, undermining altruistic donors objectives. Ramcharan (2003) ascertains that downsizing aid may lead to an impossibility of debt servicing by the recipient, and thus to revenue losses for the donor. Stone (2004) and Kilby (2009) argue that donors may face disbursement pressure from politicians with commercial and geopolitical interests in the recipient country. They may also have to resist lobbying from firms that have activities depending on the release of aid (Kanbur 2000

whether domestic or foreign. All of these actors argue for the release of aid tranches both because of fears of what macroeconomic disruption would do to the business climate in general and the effect on the poor in the recipient country in particular. Moreover, Some of the actors have specific contracts with the aid recipient government which were unlikely to be paid on time if the government did not in turn get the money (Kanbur 2003, pp. 5). The donor country agencies in charge of managing aid might as well be another source of pressure pushing toward aid continuation when they also take into account the urge to disburse all the aid in order to avoid budget resizing in the following years. Lastly, conditionality can also be undermined due to competition among donors that fosters the pressure toward aid release. All the mentioned reasons point to the difficulty for donors to face pressure pushing toward aid payment. There wouldn't be a problem had the recipients used aid efficiently. Unfortunately, this is not always the case. Hence, donors have to resist the short term disbursement pressure and envisage aid suspension. Of course the credibility of such a threat depends on the donor reputation, i.e. its determination (as perceived by the recipient countries) to enforce threats and punish misuse of aid.

With the disbursement pressure having such an impact on aid allocation, the question arises on the effectiveness of conditionality. One might ask whether conditional aid policies could survive. Past experience had shown that recipients do not implement many of the conditions specified in aid arrangements with donors. Kanbur (2003) reports very appealing real experiences that witness how difficult could aid termination be, even in the event of breaching the conditions of aid arrangement. The most striking example of such situation is the experience reported by Kanbur (2003) describing a curious mating ritual performed by Kenya with its aid donors. *The steps are: one, Kenya wins its yearly pledges of foreign aid. Two, the government begins to misbehave, backtracking on reform and behaving in an authoritarian manner. Three, a new meeting of donor countries looms with exasperated foreign governments preparing their sharp rebukes. Four, Kenya pulls a placatory rabbit out of the hat. Five, the donors are mollified and the aid is pledged. The whole dance starts again.*

What is described here is a situation where recipients misbehavior foster an already complicated problem resulting from the donors tendency to yield to the disbursement pressure. Considering aid donors weakness when confronted to such

and Villanger 2003). Easterly (2002) mentions that reduced aid disbursements may undermine donor image and prestige, since the quantity of money disbursed is often used as a measure of success by the donors. Marchesi and Sabani (2007) argue that suspending a program may hurt donor reputation as a program designer. Finally, Vaubel (1996) and Frey (1997) sustain that in bureaucracies failure to spend the entire budget is likely to decrease the department future budgets, undermining its power and prestige.

a pressure, this paper examines whether donors reputation, as a commitment device, can help solving the problem. Precisely, I investigate the conditions under which reputation concerns induce donors and recipients to respect conditional aid contracts.

The contribution of this paper is twofold. First, using the framework of Kreps-Wilson (1982), we adapt the model to investigate the issue of conditionality in the development aid context. we consider a setup where an aid donor and two recipient countries interact repeatedly to provide development aid for some agreed reforms. Second, moral hazard is introduced in the model via a shock to the recipient economy that is private information. When she decides on the disbursement, the donor country knows whether the reform was successful or not. However, she is unable to distinguish the exact cause of failure, if any (low effort or bad state of nature). Introducing moral hazard in the model would account for the inherent risk of punishing not only intrinsic bad behavior but also good pupils that are subject to an external shock. For the donor, the incentives to suspend aid are driven by the motivation to build a reputation for being tough (in order to induce compliance with the conditionality).

Papers dealing with informational problems and conditionality in the development aid context include Murshed (2009), Svensson (2000), Ramcharan (2002 and 2003), Azam and Laffont (2003), Martens (2005), Killick (1995) and Isopi and Mattesini (2006 and 2010). At my best knowledge no study in the field has combined reputation concerns and moral hazard issues. For instance, Berlinschi (2010), inspired by Ramcharan (2003), examines reputation concerns in the context of development aid without accounting for information problems other than the uncertainty of players about their mutual types. Moreover, the paper focuses solely on multilateral agencies that are known to have different behavior and motivations toward aid allocation than individual countries. In the general context of international financial markets, Ianularo (2008) studies the coordination problems among creditors and considers how moral hazard with reputation could undermine or promote coordination. In addition to the divergence in focus, we depart from this paper by considering a new ingredient to the model, the uncertainty of donor countries about the recipients type (and hence their payoffs). Moreover, we open for parametrizing the probability of occurrence of a shock to the recipient economy. Furthermore, and more importantly, since the author considers a different context, he is not concerned with the disbursement pressure that is central to our context. Our paper is an attempt to overcome the above mentioned limits by developing a model that investigates the effectiveness of development aid and the conditions under which reputation could serve as a commitment device inducing donors to enforce conditional aid arrangements and recipient countries to comply with such arrangements.

The paper is organized as follows: setup of the model is described in Section 2. Section 3 examines the reputation building mechanism and characterizes the perfect Bayesian equilibria. Section 4 concludes.

2. A two-period model

In this section, we introduce a simple dynamic model to analyze the agent behavior and the conditions under which donors reputation for being strong can be built. I also examine the extent to which reputation of aid donors can be used as a commitment device to enforce conditional aid contracts.

We consider a game in which three players are opposed. A sufficiently patient aid donor (a country) that lasts two periods and that meets a different recipient in each period⁴. Both recipients are assumed to be short lived agents that last one period. At the beginning of each period of the game, the aid donor proposes a conditional aid contract to a recipient country. The contract specifies a reform to carry out in exchange for an amount of aid⁵. If the recipient refuses the contract she gets nothing. While if she accepts, nature intervenes in the game by drawing a type for the donor. The donor can be either strong or soft depending on her ability to resist the disbursement pressure she is constantly facing. Then, the recipient is called upon to move and chooses either to exert effort when carrying out the reform or not. When moving the recipient does not distinguish the type of donor she is facing. We denote β_1 the prior belief of the recipient about the donor being strong in period 1. This belief is the probability that nature puts a strong donor in front of the recipient. Furthermore, we assume that the recipient action is not observed by the donor who has only a prior (q) about the recipient shirking (not exerting effort).

At this level, we consider the possibility for the recipient economy to be subjected to an external shock. The occurrence of such a shock is a private information to the recipient. The donor has only a prior about the shock realization. We denote by θ the probability of no shock. If no shock occurs and the recipient exerts effort, the reform succeeds. The donor, then credibly commits to disburse aid. However, when the reform fails, the soft donor cannot commit to suspend aid. Notice that the reason for the reform failure could be either bad luck or low effort (or both). At this level, the donor has than to decide about disbursing or suspending aid (hereafter, D or S). This action is made without knowing the exact cause of the

⁴We assume, for simplicity, that the donor discounts equally the present and the future. This assumption will not have a qualitative impact on the results.

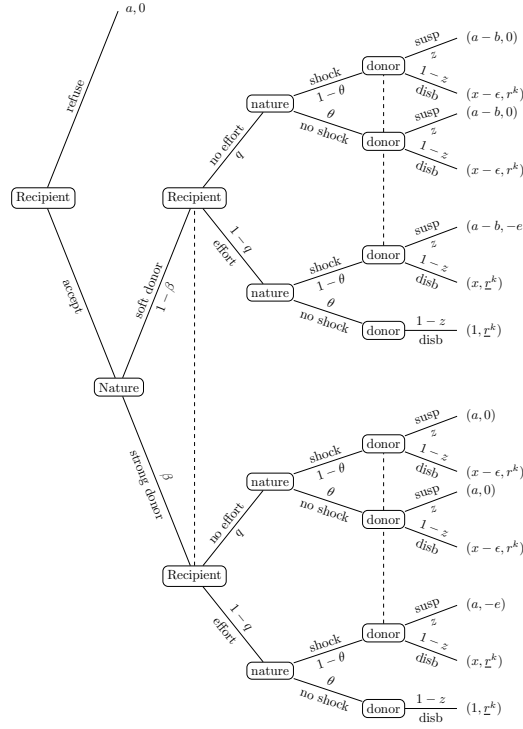
⁵Both recipient countries are supposed to receive the same sector specific development aid. This assumption is meant to avoid situations where , by definition, reputation of the donors does not matter

failure. Both failure and success of the reform are observable by all the agents. We assume that the donor chooses to suspend aid with a probability (z) if the reform is a failure⁶. Suspending aid in this context corresponds to canceling all (or part) of the allocated aid to the project. While aid disbursement means the release of all (or most) of the agreed funds. We add an additional ingredient to this structure by assuming that the recipients, also, can be of two types; a motivated, open to reforms type of recipient (hereafter, high type or type h) and a non-reform oriented type (low type or type l). We denote both types by (k , $k \in \{h, l\}$). These types are a private information to the recipient and the donor has only a prior about them⁷. Let α_t be the prior belief that the recipient is high type at the beginning of period t ⁸. The high type recipient is a country that gets more from the reform compared to the low type recipient. This assumption is motivated by the existence of well established institutions and a rooted administrative structure that tend to advantage the high type country in terms of easiness of the reform (know how, less social opposition, etc) and the benefit that can be extracted from it. Notice that since agents types are private information, the only information agents have when called upon to move in period 1 are priors about the type of the opponent. In period 2 however, the agents updates these beliefs in light of what they have previously observed.

⁶Our main concern is the disbursement pressure faced by the donor. We then focus of the soft donor behavior since we assume that the strong donor can resist it and commit to suspend aid after a reform failure and to disburse funds upon a reform success.

⁷The prior belief of the recipient will then be indexed by k . We assume that in period 1, there are no reasons to believe that the two recipient types form different priors about the donor being strong. This amounts to say that $\beta_1^h = \beta_1^l = \beta_{t=1}$, where $t = 1$ refers to the period under consideration.

⁸Since we have that the donor is unable to infer the type of the recipient from the reform result and since we consider a different recipient in each period, we will have that the updated belief of the donor about the recipient type is equal to the prior belief in each period.



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In order to describe the payoffs, let's examine first the interaction with the strong donor (see figure 1). First, if the contract is accepted and the reform succeeds (the recipient of type k puts in effort and no shock occurs), the strong donor receives a payoff of 1 and the recipient gets (\underline{r}^k) . The variable (\underline{r}^k) is the type (k) recipient's payoff (r^k) net of the cost of high effort exerted (\bar{e})⁹. We assume for simplicity that the cost of low effort is null: ($\underline{e} = 0$)¹⁰. However, if the reform fails although effort is exerted (i.e. failure because of a shock), the recipient of type (k) payoff is either (\underline{r}^k) or $(-e)$ depending on the donor strategy. The payoff to the

⁹We assume that $(\underline{r}^k > 0)$: the benefit from the reform to the recipient of type k exceeds the cost of high effort to implement the reform.

¹⁰This means that the payoff to the recipient net of the cost of low effort is such that $(\bar{r}^k = r^k)$. In addition, (\bar{e}) will then be denoted (e) .

donor is (x) if she disburses or (a) if she suspends aid¹¹.

Second, if the recipient does not exert effort, the payoff to the recipient of type (k) is (r^k) or (0) depending on the donor strategy. The payoff to the strong donor is either $(x - \varepsilon)$ if she disburses aid or (a) if she suspends. The variable (ε) corresponds to a loss in utility incurred by the donor due to shirking. We assume that $(0 < x - \varepsilon < x < a < 1)$. For the soft donor, the payoffs are the mirror image of those of the strong donor except of the payoffs corresponding to aid suspension. These are now $(a - b)$ where (b) is the cost of resisting the disbursement pressure¹². The payoff $(a - b)$ assumes that the soft donor cannot resist the disbursement pressure. Her utility is decreased by the cost of resisting the pressure to release aid. Hence the commitment problem¹³. In all the paper along, we assume that the donor (both types) can commit to disburse money upon success of the reform but the weak donor cannot commit to suspend funds if the reform is unsuccessful (disbursement pressure)¹⁴. In period 2, the donor faces a new recipient. The second recipient observes the donor behavior in period 1 and updates her beliefs about the donor type accordingly. The game in period 2 has the same strategies and information structure available to the players.

3. Reputation building equilibria

In order to put emphasis on the core problem (commitment of the soft donor), the model describes a game in which the incentives of the donor to suspend aid are driven by the motive to build a reputation for being strong. The strong donor always suspend aid (upon reform failure), while the soft donor disburses aid in period 2 (dominant strategy). In this section we derive the perfect Bayesian equilibria, defining strategies, beliefs and the rule to update them, whenever possible. We solve the game by backward induction separately in each period and we analyze the agents behavior. The aim is to derive the conditions under which reputation can be built and can help inducing donors to enforce aid arrangements and recipients to comply with them.

¹¹ (x) corresponds to the value to the donor of aid disbursed when effort is exerted but a shock occurs. We assume that $x < 1$. In words, the satisfaction derived from giving aid when no shock occurs is higher than the satisfaction from aid in the presence of a shock. If, in the same conditions, the donor suspends aid, the payoff is a . This corresponds to the donor valuation of the suspended funds, that could be used in other purposes or other aid programs. We assume $(x < a < 1)$.

¹²We assume that $(0 < b < a)$.

¹³We assume that both donor types have the same valuation of the aid suspended as well as of the cost of suspending them.

¹⁴We do not consider the cheap talk issue, where the donor commits to a plan but doesn't stick to it.

3.1. Behaviors in period 2

In period 2, if the contract is accepted, the soft donor has a dominant strategy. She disburses aid regardless of the reform result (we assume that $x \succ a - b$)¹⁵. The strong donor commits to disburse aid after a successful reform and suspends it only upon a failed reform (we assume that $(x \prec a)$). Recipient 2 of type k ; $k : \{h, l\}$, observes players behavior in period 1 and updates her beliefs about the strength of the donor (his ability to resist the disbursement pressure). Let this belief be denoted β_2^k . When recipient 2 exerts effort, she receives:

$$\pi_2^k(e) = \beta_2^k [\theta \underline{r}^k + (1 - \theta)(-e)] + (1 - \beta_2^k) [\theta \underline{r}^k + (1 - \theta) \underline{r}^k], \quad k : \{h, l\} \quad (1)$$

When no effort is exerted, her payoff is:

$$\pi_2^k(0) = (1 - \beta_2^k) [\theta r^k + (1 - \theta) r^k], \quad k : \{h, l\} \quad (2)$$

The type k recipient 2 prefers to exert effort when carrying out the reform if:

$$\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k \quad (3)$$

This implies that in period 2, recipient of type k has the following behavior rule¹⁶:

$$\begin{cases} \text{if } \beta_2^k \succ \tilde{\beta}^k & , \text{ recipient 2 exerts effort when reforming;} \\ \text{if } \beta_2^k \prec \tilde{\beta}^k & , \text{ no effort when carrying out the reform; and} \\ \text{if } \beta_2^k = \tilde{\beta}^k & , \text{ randomization (no effort with probability } p). \end{cases} \quad (4)$$

This results states that recipient 2 exerts effort only if her belief about meeting a strong donor is high enough. The strong donor always suspends aid upon a failed reform and the soft donor always disburses aid. Notice that the contract is always accepted¹⁷ by recipient 2. (see graph. 1)

Given this result, the behavior of the recipient in period 1 will depend only on her prior about the opponent type. The donor however, since she lasts two period and is concerned with reputation, behaves according to her beliefs about the recipient type in each period but also according to the expected reaction of the recipient in the second period. Put it differently, the donor is concerned with reputation, while the recipient is not.

¹⁵We then have: $(0 \prec a - b \prec x - \varepsilon \prec x \prec a \prec 1)$.

¹⁶We assume hereafter that $(0 \prec \bar{e} \prec \theta r^k)$ in order to have $\beta_2^k \in]0, 1[$. Notice also that $\beta_2^h \leq \beta_2^l$ since $r^h \succ r^l$

¹⁷This statement is ensured by the assumption $(0 \prec e \prec \theta r^k)$. Under this assumption both $\pi_2^k(e)$ and $\pi_2^k(0)$ are positive over $[0, 1]$. The latter crosses the former from above at $(\tilde{\beta}^k)$.

3.2. Behaviors in period 1

3.2.1. If $\beta_1 \in]0, \tilde{\beta}^h[$

Upon acceptance of the contract, and in the event of a non-successful reform (occurrence of a shock and/or low effort exerted), no pure strategy by the soft donor is able to induce effort from recipient 2 (both types)¹⁸. The reason is that the updated beliefs of recipient 2 are forced to be such that if the donor disburses aid in period 1, then $(\beta_2^k = 0)$. If rather, the donor plays suspend in period 1, then $\beta_2^k = \beta_1$. In both cases we have that $\beta_2^k \prec \tilde{\beta}^h \prec \tilde{\beta}^l$. Hence, recipient 2 (both types) does not exert effort during the reform.

Assume now that the soft donor randomizes in period 1 by suspending aid with probability z . This strategy is able to induce effort from recipient 2. Indeed, randomization by donor 1 forces recipient 2 beliefs to be such that (Bayes rule):

$$\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)} \quad (5)$$

In this context, had recipient 2 adopted a pure strategy, she would have chosen not to exert effort (see Proof 1 in the appendice). However, this will not be compatible with the soft donor randomizing in period 1 (following proof 2 in the appendice). We then conclude that shirking by recipient 2 is not compatible with the donor randomizing in period 1. Otherwise, we would have had the soft donor indifferent between disbursing and suspending aid in period 1. We conclude that when the soft donor randomizes in period 1, she forces recipient 2 beliefs to be as in equation (5), and therefore, recipient 2 needs to randomize as well (not exerting effort with probability p).

This also implies that the updated beliefs of recipient 2 must be such that: $\beta_2^k = \frac{e}{\theta r^k} = \tilde{\beta}^k$, from equation (4). Therefore, equations (4) and (5) give:

$$z = \frac{\beta_1}{1 - \beta_1} \left(\frac{\theta r^k - e}{e} \right) \quad (6)$$

It remains to determine formally the behavior of the recipient in period 1. Upon acceptance of the contract, the benefit of exerting effort for recipient 1 of type k is:

$$\begin{aligned} \pi_1^k(e) = & \beta_1 [\theta r^k + (1 - \theta)(-e)] + \\ & (1 - \beta_1) [\theta r^k + (1 - \theta)[z(-e) + (1 - z)r^k]] \end{aligned} \quad (7)$$

¹⁸We will focus hereafter on the behavior of the soft donor in both periods, since the strong donor will disburse aid in the event of a successful reform and will suspend funds if she sees a failure.

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = (1 - \beta_1) [\theta (1 - z) r^k + (1 - \theta) (1 - z) r^k] \quad (8)$$

We find that recipient 1 accepts the contract. Moreover, comparing the payoffs, we have that the recipient of type k has the following behavior in period 1 (see proof 3 in the appendice):

$$\begin{cases} \text{if } \beta_1 \succ \left(\frac{e}{\theta r^k}\right)^2 = (\tilde{\beta}^k)^2 & , \text{ recipient 1 exerts effort when reforming;} \\ \text{if } \beta_1 \prec \left(\frac{e}{\theta r^k}\right)^2 = (\tilde{\beta}^k)^2 & , \text{ no effort exerted when reforming; and} \\ \text{if } \beta_1 = \left(\frac{e}{\theta r^k}\right)^2 = (\tilde{\beta}^k)^2 & , \text{ randomization (no effort with probability } q). \end{cases} \quad (9)$$

Proposition 1.: If $\beta_1 \in]0, \tilde{\beta}^h[$, the contract is accepted in both periods and agents strategies are the following (see proof 4 in the appendice):

Both donor types disburse aid in period 1 following a successful reform. If the reform was a failure, the strong donor suspends aid while the soft donor randomizes suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e}\right)$. In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). As for the recipient, both types randomize¹⁹, exerting effort with probability $1 - p$. Turning to recipient 1, we distinguish the following situations²⁰:

- when $\beta_1 \in]0, (\tilde{\beta}^h)^2[$; both types of recipient 1 do not exert effort to carry out the reform (according to equation (9)). In addition, the probability with which recipient 2 randomizes between his actions in period 2²¹ is $p_1^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$.

- when $\beta_1 \in](\tilde{\beta}^h)^2, (\tilde{\beta}^l)^2[$; only the high type recipient 1 exerts effort when reforming (according to equation (9)). In addition, the probability with which recipient 2 randomizes between his actions is $p_2^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)+\alpha_1\varepsilon}{(x-\varepsilon)-[\theta+x(1-\theta)]}$

- when $\beta_1 \in](\tilde{\beta}^l)^2, \tilde{\beta}^h[$; both types of recipient 1 exert effort when reforming (according to equation (9)). In addition, the probability with which recipient 2 randomizes between his actions in period 2 is $p_3^* = \frac{x+(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$

¹⁹We assume that when agents of different types randomize between their strategies, they do with the same probability for the same strategy in period 2

²⁰We can prove that $(\tilde{\beta}^l)^2 \prec \tilde{\beta}^h$. We will than have: $0 \prec (\tilde{\beta}^h)^2 \prec (\tilde{\beta}^l)^2 \prec \tilde{\beta}^h \prec \tilde{\beta}^l \prec 1$.

²¹This probability makes the soft donor indifferent between suspending aid and disbursing it.

- when $\beta_1 = \left(\tilde{\beta}^h\right)^2$; the high type recipient randomizes in period 1, exerting effort with probability q . While the low type recipient 1 does not exert effort when reforming (according to equation (9)). In addition, the probability with which recipient 2 randomizes between his actions in period 2 is $p_4^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)-\alpha_1\varepsilon(1-q)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$.

- when $\beta_1 = \left(\tilde{\beta}^l\right)^2$; the high type recipient exerts effort when carrying out the reform in period 1 and the low type randomizes, exerting effort with probability q (according to equation (9)). In addition, the probability with which recipient 2 randomizes between his actions after observing aid suspension in period 1 is $p_5^* = \frac{(2x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)-\alpha_1\varepsilon(1-q)-q\varepsilon}{(x-\varepsilon)-[\theta+x(1-\theta)]}$.

3.2.2. If $\beta_1 \in \left] \tilde{\beta}^h, \tilde{\beta}^l \right[$

Upon a failed reform (occurrence of shock and/or low effort exerted), the soft donor will prefer to suspend aid, if $\alpha_2 \succ \tilde{\alpha} = \frac{x-(a-b)}{\theta(1-x)+\varepsilon}$ (see proof 5 in the appendice). The value $\tilde{\alpha}$ is a threshold value for α_2 above which the donor prefers to suspend aid²². Notice that this threshold value depends on the probability of occurrence of a shock (θ). We then have three sub-cases:

1) **a shock to the economy is very likely to occur:** $\theta \succ \tilde{\theta}_1$ This corresponds to a situation where $\tilde{\alpha} \prec 1$. Hence, we distinguish the following situations:

a) *the donor belief about recipient 2 being a high type is low enough:* $\alpha_2 \prec \tilde{\alpha}$

In this context we have that, in period 1, the benefit to the type k recipient from exerting effort is: $\pi_1^k(e) = \beta_1 [\theta r^k + (1-\theta)(-e)] + (1-\beta_1) [\theta r^k + (1-\theta)r^k]$

When recipient 1 does not exert effort, she gets: $\pi_1^k(0) = (1-\beta_1) [\theta r^k + (1-\theta)r^k]$

We have that the contract is always accepted in both periods (see graph. 2). In addition, comparing the payoffs, we find that only the high type recipient prefers to exert effort in period 1. Indeed, effort is preferred by recipient 1 if and only if: $\beta_1 \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$, which is the case only for the high type, since $\beta_1 \in \left] \tilde{\beta}^h, \tilde{\beta}^l \right[$.

As for recipient 2, both types will not exert effort to carry out the reform. This is due to the beliefs update, after stating donor behavior in period 1. Since the soft donor disburses aid ($\alpha_2 \prec \tilde{\alpha}$), this will force recipient 2 beliefs to be ($\beta_2^k = 0$). Since we are working under $\beta_1 \in \left] \tilde{\beta}^h, \tilde{\beta}^l \right[$, this implies that $\beta_2^k = 0 \prec \tilde{\beta}^h \prec \tilde{\beta}^l$. Therefore, according to equation (4), recipient 2 (both types) prefers not to exert effort. No reputation can be built. Furthermore, the soft donor will disburse funds in period 1. The reason is that the donor has a low prior about meeting a high

²²We must have $\tilde{\alpha} \prec 1 \Leftrightarrow \frac{(x-\varepsilon)-(a-b)-\varepsilon}{1-x} = \tilde{\theta}_1 \prec \theta$ in order for the condition on α_2 to have a meaning.

type in the next round. As such, imposing a costly punishment (suspending aid in period 1) to a low type (the highly probable type to meet in the following round) will not change the behavior of recipient 2 anyway and will be associated with “no effort” from this recipient.

b) the donor belief about recipient 2 being a high type is high enough: $\alpha_2 \succ \tilde{\alpha}$

The soft donor will suspend aid upon a reform failure. The reason is that the soft donor has a high prior about meeting a high type recipient in period 2. As such imposing a costly punishment could induce the recipient to exert effort in period 2.

As for recipient 1 of type k , her benefit when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta r^k + (1 - \theta)(-e)]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = 0$$

We find that the contract is always accepted. Furthermore, the recipient (regardless of her type) prefers to exert effort in period 1. As for recipient 2, the high type is induced to exert effort. While the low type do not exerts effort when carrying out the reform. This is due to their updated beliefs, after stating donor behavior in period 1. Since the soft donor suspends aid ($\alpha_2 \succ \tilde{\alpha}$), this will not bring any new information to recipient 2 (i.e. $\beta_2^k = \beta_1$) and since we are working under $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, this implies that $\beta_2^h = \beta_1 \succ \tilde{\beta}^h$; hence, the high type recipient exerts effort in period 2. As for the low type, $\beta_2^l = \beta_1 \prec \tilde{\beta}^l$ implying that she does not exert effort when reforming.

c) the donor belief about recipient 2 being a high type is: $\alpha_2 = \tilde{\alpha}$

The soft donor randomizes in period 1 by suspending aid with probability z . She forces recipient 2 beliefs to be as in equation (5): $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)}$.

Now, let's determine the behavior of recipient 2. Had she adopted a pure strategy, she would have chosen not to exert effort (see proof 6 in the appendice). Would this be compatible with the soft donor randomizing in period 1? The answer is no (see proof 7 in the appendice). Therefore, we conclude that when the soft donor randomizes in period 1, she forces recipient 2 beliefs to be as in equation (5), and therefore, recipient 2 needs to randomize as well (not exerting effort with probability p).

As for recipient 1 of type k , her behavior is exactly as defined by equation (9). Therefore, since we are under the case $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, we have that both recipient 1 types are induced to exert effort.

2) a shock to the economy is not very likely to occur: $\theta \prec \tilde{\theta}_1$

This corresponds to a situation where $\tilde{\alpha} \succ 1$, we then has always that $\alpha_2 \prec \tilde{\alpha}$. The results are exactly as those obtained under 1-a). In this context we have that

the soft donor will disburse funds in period 1. Recipient 2, both types will not exerts effort to carry out the reform. No reputation can be built. As for recipient 1, only the high type prefers to exert effort.

3) **a shock to the economy occurs with probability:** $\theta = \tilde{\theta}_1$

This corresponds to a situation where $\tilde{\alpha} = 1$, we then distinguish:

a) *the donor belief about recipient 2 being a high type is low enough:* $\alpha_2 \prec \tilde{\alpha}$

Here again, the results are exactly as those obtained under 1-a). In this context we have that the soft donor will disburse funds in period 1. Recipient 2, both types will not exerts effort to carry out the reform. No reputation can be built. As for recipient 1, only the high type prefers to exert effort.

b) *the donor belief about recipient 2 being a high type is:* $\alpha_2 = \tilde{\alpha}$

The behavior is exactly as described in section 1-c) above. The soft donor randomizes in period 1 by suspending aid with probability z . She forces recipient 2 beliefs to be as in equation (5). Thus, recipient 2 will randomizes between her strategies. As for recipient 1, both types are induced to exert effort.

Proposition 2:. If $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, the contract is accepted and agents strategies in both periods are the following:

Both donor types disburse aid in period 1 following a successful reform. In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). The soft donor strategy in period 1 as well as those of recipient 1 and 2 (both types) depends on the belief about the recipient type as well as about the occurrence of a shock. Therefore we distinguish the following situations:

1) **a shock to the economy is very likely to occur:** $\theta \succ \tilde{\theta}_1$

we then have $\tilde{\alpha} \prec 1$, and we distinguish:

- when $\alpha_2 \prec \tilde{\alpha}$; the soft donor disburses aid in period 1 and only the high type recipient 1 exerts effort. Both types of recipient 2 do not exert effort to carry out the reform (see equation (9));

- when $\alpha_2 \succ \tilde{\alpha}$; the soft donor suspends aid in period 1 and recipient 1 prefers to exert effort. As for recipient 2, only the high type exerts effort when reforming (according to equation (9));

- when $\alpha_2 = \tilde{\alpha}$; the soft donor randomize between her strategies, suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e} \right)$ in period 1. Moreover, recipient 1 exerts effort. As for recipient 2, she randomizes upon observing an aid suspension in period 1, by shirking with probability $p_6^* = \frac{x+(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$ (see proof 8 in appendice). In addition, recipient 2 does not exert effort after an aid disbursement in period 1.

2) a shock to the economy is not very likely to occur: $\theta < \tilde{\theta}_1$

we have always $\tilde{\alpha} > 1$ then $\alpha_2 < \tilde{\alpha}$; and therefore, the soft donor disburses aid in period 1 and only the high type recipient 1 exerts effort. As for recipient 2, both types do not exert effort to carry out the reform (see equation (9));

3) a shock to the economy occurs with probability: $\theta = \tilde{\theta}_1$

we have that $\alpha_2 \leq \tilde{\alpha}$, therefore we distinguish the following:

- when $\alpha_2 < \tilde{\alpha}_1$; the soft donor disburses aid in period 1 and only the high type recipient 1 exerts effort. As for recipient 2, both types do not exert effort to carry out the reform (see equation (9));

- when $\alpha_2 = \tilde{\alpha}$; the soft donor randomize between her strategies, suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e} \right)$ in period 1. Moreover, recipient 1 exerts effort. As for recipient 2, she randomizes, by shirking with probability p_6^* .

3.2.3. If $\beta_1 \in]\tilde{\beta}^l, 1[$

In the event of a non-successful reform (occurrence of shock and/or low effort exerted), the soft donor prefers to suspend aid, if $\theta > \tilde{\theta}_2 = \frac{(x-\varepsilon)-(a-b)}{1-x}$ (see proof 9 in the appendice). Aid suspension is chosen regardless of the recipient behavior or type in period 1 under the later condition. Since players behavior in period 2 will depend on their actions in period 1, and since this behavior depends on the probability of occurrence of a shock (value of θ), we distinguish three sub-cases:

a) a shock to the economy is very likely to occure: $\theta > \tilde{\theta}_2$

The soft donor will suspend aid upon a reform failure and both recipient types will exert effort when carrying out the reform, in period 1. This is because the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1-\theta)(-e)] + (1-\beta_1) [\theta r^k + (1-\theta)(-e)]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = 0$$

We find that the contract is accepted and the recipient (regardless of her type) prefers to exert effort in period 1. As for recipient 2, both types exert effort to carry out the reform. This is due to her updated beliefs, after stating donor behavior in period 1. Since the soft donor suspends aid ($\theta > \tilde{\theta}_2$), this will not bring new information to recipient 2 ($\beta_2^k = \beta_1$) and since we are working under $\beta_1 \in]\tilde{\beta}^l, 1[$, this implies that $\beta_2^k = \beta_1 > \tilde{\beta}^l$. Therefore, recipient 2 (both types) prefers to exert effort.

b) a shock to the economy is not very likely to occure: $\theta < \tilde{\theta}_2$

In this context we know that the strong donor will suspend funds and the soft donor will disburse them in period 1. Moreover, the benefit for the type k recipient 1, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta r^k + (1 - \theta) r^k]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = (1 - \beta_1) [\theta r^k + (1 - \theta) r^k]$$

Comparing the benefits, we find that the contract is accepted and only recipient 1 of high type prefers to exert effort. As for recipient 2, we find that both types prefer to shirk when carrying out the reform. This is due to the beliefs update, after stating donor behavior in period 1. Since the soft donor disburses aid ($\theta < \tilde{\theta}_2$), this will force recipient 2 beliefs to be ($\beta_2^k = 0$). Since we are working under $\beta_1 \in]\tilde{\beta}^l, 1[$, this implies that $\beta_2^k = 0 < \tilde{\beta}^l$. Therefore, according to equation (4), recipient 2 (both types) prefers not to exert effort. No reputation can be built.

c) a shock to the economy occurs with probability: $\theta = \tilde{\theta}_2$

The soft donor randomizes in period 1 by suspending aid with probability z . She forces recipient 2 beliefs to be as in equation (5): $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)}$.

Now, let's determine the behavior of recipient 2. Had she adopted a pure strategy, she would have chosen to exert effort (see proof 10 in the appendice). Would this be compatible with the soft donor randomizing in period 1? The answer is no. Indeed, proof 9 (see appendice) gives the payoffs to suspension and disbursement of aid. Clearly, the comparison gives that disbursing in period 1 is preferred to suspending, in all cases. That means that the donor is not indifferent between her strategies. Hence, exerting effort by recipient 2, does not lead to the donor randomizing between her strategies. The only strategy for recipient 2, that is compatible with donor randomizing in period 1 is to randomize as well. Therefore, we conclude that when the soft donor randomizes in period 1, she forces recipient 2 beliefs to be as in 5, and therefore, recipient 2 needs to randomize as well (not exerting effort with probability p_7^*).

As for recipient 1 of type k , her behavior is exactly as defined in equation (9). Therefore, since we are under the case $\beta_1 \in]\tilde{\beta}^l, 1[$, we have that both recipient 1 types are induced to exert effort.

Proposition 3: If $\beta_1 \in]\tilde{\beta}^l, 1[$, the contract is accepted and agents strategies in both periods are the following:

Both donor types disburse aid in period 1 following a successful reform. If the reform was a failure, the strong donor suspends aid. In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). The soft donor strategy in period 1 as well as those of the recipient depend on the value of θ (the probability of occurrence of a shock in the economy).

- when $\theta > \tilde{\theta}_2$; the soft donor suspends aid in period 1 and recipients in both periods exert effort when carrying out the reform (according to equation (9));

- when $\theta < \tilde{\theta}_2$; the soft donor disburses aid in period 1 and only the high type recipient exerts effort in period 1. Recipient 2 (both types) do not exert effort to carry out the reform (see equation (9));

- when $\theta = \tilde{\theta}_2$; the soft donor randomizes between her strategies, suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e} \right)$ in period 1. Moreover, recipient 1 exerts effort. As for recipient 2, both types randomize not exerting effort with probability $p_7^* = \frac{x+(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$ (see proof 11 in the appendice).

3.2.4. If $\beta_1 = \tilde{\beta}^h$

In the event of a non-successful reform (occurrence of shock and/or low effort exerted), the soft donor prefers to suspend aid after a reform failure, if $\alpha_2 > \tilde{\alpha} = \frac{(x-\varepsilon)-(a-b)}{(1-p)[\varepsilon+(1-x)\theta]}$ (see proof 12 in the appendice)²³. Again, we distinguish three sub-cases:

1) a shock to the economy is very likely to occur: $\theta > \tilde{\theta}_3$

This corresponds to a situation where $\tilde{\alpha} < 1$, we then has to distinguish the following:

a) the donor belief about recipient 2 being a high type is low enough: $\alpha_2 < \tilde{\alpha}$

In this context we know that the strong donor will suspend funds and the soft donor will disburse them in period 1. Both types of recipient 1 prefer not to exert effort when carrying out the reform since the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta \underline{r}^k + (1-\theta)(-e)] + (1-\beta_1) [\theta \underline{r}^k + (1-\theta) \underline{r}^k]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = (1-\beta_1) [\theta r^k + (1-\theta) r^k]$$

Comparing the payoffs, we find that both types of recipient 1 prefer not to exert effort in period 1. Indeed, effort is preferred by recipient 1 if and only if: $\beta_1 > \frac{e}{\theta r^k} = \tilde{\beta}^k$, which is not the case for neither of recipient 1 types, since $\beta_1 = \tilde{\beta}^h$. Furthermore, recipient 2 (both types) does not exert effort to carry out the reform. This is due to the beliefs update, after stating donor behavior in period 1. Since the soft donor disburses aid ($\alpha_2 < \tilde{\alpha}$), this will force recipient 2 beliefs to be ($\beta_2^k = 0$). Since we are working under $\beta_1 = \tilde{\beta}^h$, this implies that $\beta_2^k = 0 < \tilde{\beta}^h$. Therefore, according to equation (4), recipient 2 (both types) prefers not to exert effort. No reputation can be built.

²³In order for the condition on α_2 , to have a sense, we need to have $\tilde{\alpha} < 1$, which can be expressed as a condition on θ : $\theta < \frac{x-(a-b)-(1-p)\alpha_2\varepsilon}{(1-x)(1-p)\alpha_2} = \tilde{\theta}_3$.

b) *the donor belief about recipient 2 being a high type is high enough: $\alpha_2 \succ \tilde{\alpha}$*

The soft donor will suspend aid upon a reform failure and both recipient types will exert effort when carrying out the reform, in period 1. This is because the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta r^k + (1 - \theta)(-e)]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = 0$$

Furthermore, the high type recipient 2 randomizes between her strategies (not exerting effort with probability p). The low type recipient 2 does not exert effort. This is due to their updated beliefs. Indeed, after seeing aid suspension by donor 1, recipient 2 (both types) update her beliefs such that $\beta_2^k = \beta_1$. Since we are under case $\beta_1 = \tilde{\beta}^h$, we will have $(\beta_2^h = \beta_1 = \tilde{\beta}^h)$ and $(\beta_2^l = \beta_1 \prec \tilde{\beta}^l)$. Therefore, the high type recipient 2 randomizes between her strategies (not exerting effort with probability $p_8^* \prec 1 - \frac{x-(a-b)}{\alpha_2[\theta(1-x)+\varepsilon]}$, (see proof 13 in the appendice)). The low type does not exert effort.

c) *the donor belief about recipient 2 being a high type is: $\alpha_2 = \tilde{\alpha}$*

The soft donor randomizes in period 1 by suspending aid with probability (z) . She forces recipient 2 beliefs to be as in equation (5). Therefore, both types of recipient 2 randomize between their strategies (see proof 14 in the appendice) with probability²⁴ $p_9^* = 1 - \frac{x-(a-b)}{\alpha_2[\theta(1-x)+\varepsilon]}$. It remains to determine formally the behavior of the recipient in period 1. Recall the rule of conduct for recipient 1 stated in equation (9), we find that both types of recipient 1 prefer to exert effort (since we are under case $\beta_1 = \tilde{\beta}^h \succ (\tilde{\beta}^h)^2$).

2) a shock to the economy is not very likely to occur: $\theta \prec \tilde{\theta}_3$

This corresponds to a situation where $\tilde{\alpha} \succ 1$, we then have always that $\alpha_2 \prec \tilde{\alpha}$ (the donor belief about recipient 1 being a high type is low enough). In this context, the behavior is exactly as described in 1-a) above. We then have that the soft donor will disburse funds in period 1. Both recipient 1 and recipient 2 (all types) prefer not to exert effort when carrying out the reform.

3) a shock to the economy occurs with probability: $\theta = \tilde{\theta}_3$

This corresponds to a situation where $\tilde{\alpha} = 1$, and we distinguish the following situations:

a) *the donor belief about recipient 2 being a high type is low enough: $\alpha_2 \prec \tilde{\alpha}$*

Here again, agents behavior is exactly as described in 1-a) above. The strong donor will suspend funds and the soft donor will disburse them in period 1. Both

²⁴This probability is obtained exactly as in proof 13 where the donor is rather indifferent between suspending and disbursing in period 1 (i.e. $\pi_{total}^{soft}(S) = \pi_{total}^{soft}(D)$).

types of recipient 1 prefer not to exert effort when carrying out the reform. Furthermore, recipient 2 (both types) does not exert effort to carry out the reform.

b) *the donor belief about recipient 2 being a high type is: $\alpha_2 = \tilde{\alpha}$*

Agents behavior is exactly as described in 1-c) above. The soft donor randomizes in period 1 by suspending aid with probability (z). As for recipient 2, both types randomize between their strategies (not exerting effort with probability (p_9^*)). As for recipient 1, we have that both types of recipient 1 prefer to exert effort (since we are under case $\beta_1 = \tilde{\beta}^h \succ (\tilde{\beta})^2$, and that effort is preferred to shirking if $\beta_1 \succ (\tilde{\beta}^k)^2$).

Proposition 4.: If $\beta_1 = \tilde{\beta}^h$, the contract is accepted and agents strategies in both periods are the following:

Both donor types disburse aid in period 1 following a successful reform. If the reform was a failure, the strong donor suspends aid. In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). The soft donor strategy in period 1 as well as those of the recipients (both types) depends on the belief about the recipient type as well as on the probability of a shock. Therefore, we distinguish the following situations:

1) a shock to the economy is very likely to occur: $\theta \succ \tilde{\theta}_3$ (i.e. $\tilde{\alpha} \prec 1$)

- when $\alpha_2 \prec \tilde{\alpha}$; the soft donor disburses aid in period 1. Recipient 1 (both types) and recipient 2 (both types) do not exert effort to carry out the reform (see equation (9));

- when $\alpha_2 \succ \tilde{\alpha}$; the soft donor suspends aid in period 1. Both types of recipient 1 exert effort when reforming (according to equation (9)). The low type recipient 2 does not exert effort while the high type recipient 2 randomizes not exerting effort with probability $p_8^* \prec 1 - \frac{x-(a-b)}{\alpha_2[\theta(1-x)+\varepsilon]}$;

- when $\alpha_2 = \tilde{\alpha}$; the soft donor randomizes between her strategies, suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e} \right)$ in period 1. This induces both types of recipient 2 to randomize between their strategies (not exerting effort with probability $p_9^* = 1 - \frac{x-(a-b)}{\alpha_2[\theta(1-x)+\varepsilon]}$). As for recipient 1, both types exert effort when reforming (according to equation (9)).

2) a shock to the economy is not very likely to occur: $\theta \prec \tilde{\theta}_3$ (i.e. $\tilde{\alpha} \succ 1$)

We have always that $\alpha_2 \prec \tilde{\alpha}$. the soft donor disburses aid in period 1. Recipient 1 (both types) and recipient 2 (both) do not exert effort to carry out the reform (see equation (9));

3) a shock to the economy occurs with probability: $\theta = \tilde{\theta}_3$ (i.e. $\tilde{\alpha} = 1$)
We then distinguish the following:

a) *the donor belief about recipient 2 being a high type is low enough:* $\alpha_2 \prec \tilde{\alpha}$

In this context we know that the strong donor will suspend funds and the soft donor disburses them in period 1. Recipient 1 (both types) and recipient 2 (both types) do not exert effort to carry out the reform (see equation (9));

b) *the donor belief about recipient 2 being a high type is:* $\alpha_2 = \tilde{\alpha}$

The soft donor randomizes in period 1 by suspending aid with probability (z). As for recipient 2, both types randomize between their strategies (not exerting effort with probability p_9^*). In addition, we have that both types of recipient 1 prefer to exert effort.

3.2.5. *If $\beta_1 = \tilde{\beta}^l$*

Upon acceptance of the contract, and in the event of a non-successful reform (occurrence of shock and/or low effort exerted), the soft donor prefers to suspend aid, if $\alpha_2 \succ \tilde{\alpha} = \frac{(x-\varepsilon)-(a-b)-\theta(1-p)(1-x)+p\varepsilon}{p[\varepsilon+(1-x)\theta]}$ (see Proof 15 in the appendice). Notice that, in order to have $\tilde{\alpha} \prec 1$, we need to have $\theta \succ \tilde{\theta}_4 = \frac{(x-\varepsilon)-(a-b)}{2p(1-x)}$. Since players behavior in period 2 will depend on their actions in period 1, and since this behavior depends on the probability of occurrence of a shock (value of θ), we distinguish three sub-cases:

1) *a shock to the economy is very likely to occur:* $\theta \succ \tilde{\theta}_4$

This corresponds to a situation where $\tilde{\alpha} \prec 1$, we then has to distinguish the following:

a) *the donor belief about recipient 2 being a high type is low enough:* $\alpha_2 \prec \tilde{\alpha}$

In this context, we know that the strong donor will suspend funds and the soft donor will disburse them in period 1. Moreover, only the high type recipient 1 prefers to exert effort when carrying out the reform since the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta r^k + (1 - \theta) r^k]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = (1 - \beta_1) [\theta r^k + (1 - \theta) r^k]$$

Comparing the payoffs, we find that effort is preferred by recipient 1 if and only if: $\beta_1 \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$, which is the case only for the high type recipient 1, since $\beta_1 = \tilde{\beta}^l$. As for recipient 2, both types do not exert effort to carry out the reform. This is due to the beliefs update, after stating donor behavior in period 1. Since the soft donor disburses aid ($\theta \prec \tilde{\theta}_4$), this will force recipient 2 beliefs to be ($\beta_2^k = 0$). Since we are working under $\beta_1 = \tilde{\beta}^l$, this implies that $\beta_2^k = 0 \prec \tilde{\beta}^l$. Therefore, according to equation (4), recipient 2 (both types) prefers not to exert effort. No reputation can be built.

b) *the donor belief about recipient 2 being a high type is high enough: $\alpha_2 \succ \tilde{\alpha}$*

The soft donor will suspend aid upon a reform failure and both recipient types will exert effort when carrying out the reform, in period 1. This is because the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \beta_1 [\theta r^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta r^k + (1 - \theta)(-e)]$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = 0$$

Furthermore, the high type recipient 2 exerts effort while the low type randomizes between her strategies. This is due to their updated beliefs. Indeed, after seeing aid suspension by donor 1, recipient 2 (both types) update her beliefs such that $\beta_2^k = \beta_1$. Since we are under case $\beta_1 = \tilde{\beta}^l$, we will have $(\beta_2^h = \beta_1 = \tilde{\beta}^l \succ \tilde{\beta}^h)$ and $(\beta_2^l = \beta_1 = \tilde{\beta}^l)$. Therefore, the high type recipient 2 exerts effort. The low type randomizes between her strategies (not exerting effort with probability $p_{10}^* \prec \frac{1}{1-\alpha_2} - \frac{x-(a-b)}{[\theta(1-x)+\varepsilon](1-\alpha_2)}$ (see proof 16 in the appendice).

c) *the donor belief about recipient 2 being a high type is: $\alpha_2 = \tilde{\alpha}$*

The soft donor randomizes in period 1 by suspending aid with probability (z). She forces recipient 2 beliefs to be as in equation (5) inducing recipient 2 (both types) to randomize between their strategies (see proof 17 in the appendice) with probability²⁵ $p_{11}^* = \frac{1}{1-\alpha_2} - \frac{x-(a-b)}{[\theta(1-x)+\varepsilon](1-\alpha_2)}$. It remains to determine formally the behavior of the recipient in period 1. Recall the rule of conduct for recipient 1 stated in equation (9), we find that both types of recipient 1 prefer to exert effort (since we are under case $\beta_1 = \tilde{\beta}^l \succ (\tilde{\beta}^l)^2 \succ (\tilde{\beta}^h)^2$).

2) *a shock to the economy is not very likely to occur: $\theta \prec \tilde{\theta}_4$*

This corresponds to $\tilde{\alpha} \succ 1$ in which case we have always $\alpha_2 \prec \tilde{\alpha}$. In this context, the behavior is exactly as described under 1-a) above. The strong donor will suspend funds and the soft donor will disburse them in period 1. Moreover, only the high type recipient 1 prefers to exert effort when carrying out the reform. Furthermore, recipient 2 (both types) does not exert effort to carry out the reform. No reputation can be built.

3) *a shock to the economy occurs with probability: $\theta = \tilde{\theta}_4$*

a) *the donor belief about recipient 2 being a high type is low enough: $\alpha_2 \prec \tilde{\alpha}$*

Here again, agents behavior is exactly as described in 1-a) above. The strong donor will suspend funds and the soft donor will disburse them in period 1. Moreover, only the high type recipient 1 prefers to exert effort when carrying out the

²⁵The proof is exactly as in proof 16 where the inequality is replaced by an equality.

reform. Furthermore, recipient 2 (both types) does not exert effort to carry out the reform. No reputation can be built.

b) *the donor belief about recipient 2 being a high type is: $\alpha_2 = \tilde{\alpha}$*

Agents behavior is exactly as described in 1-c) above. The soft donor randomizes in period 1 by suspending aid with probability (z). She forces recipient 2 beliefs to be as in equation (5). As such, recipient 2, both types randomize between their strategies (shirking with probability p_{11}^*). As for recipient 1, we have that both types of recipient 1 prefer to exert effort (since we are under case $\beta_1 = \tilde{\beta}^l \succ (\tilde{\beta}^l)^2 \succ (\tilde{\beta}^h)^2$).

Proposition 5:. If $\beta_1 = \tilde{\beta}^l$, the contract is accepted and agents strategies in both periods are the following:

Both donor types disburse aid in period 1 following a successful reform. If the reform was a failure, the strong donor suspends aid. In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). The soft donor strategy in period 1 as well as those of the recipients (both types) depends on the belief about the recipient type as well as it depends on the probability of a shock. Therefore, we distinguish the following situations:

1) a shock to the economy is very likely to occure: $\theta \succ \tilde{\theta}_4$ (i.e. $\tilde{\alpha} \prec 1$)

- when $\alpha_2 \prec \tilde{\alpha}$; the soft donor disburses aid in period 1. Only the high type recipient 1 exerts effort. Recipient 2 (both types) prefers not exert effort to carry out the reform (see equation (9));

- when $\alpha_2 \succ \tilde{\alpha}$; the soft donor suspends aid in period 1. Both types of recipient 1 exert effort when reforming (according to equation (9)). The high type recipient 2 exerts effort while the low type randomizes not exerting effort with probability $p_{10}^* \prec \frac{1}{1-\alpha_2} - \frac{x-(a-b)}{[\theta(1-x)+\varepsilon](1-\alpha_2)}$;

- when $\alpha_2 = \tilde{\alpha}$; the soft donor randomizes between her strategies, suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - \epsilon}{e} \right)$ in period 1. This induces both types of recipient 2 to randomize as well (not exerting effort with probability $p_{11}^* = \frac{1}{1-\alpha_2} - \frac{x-(a-b)}{[\theta(1-x)+\varepsilon](1-\alpha_2)}$). As for recipient 1, both types exert effort when reforming (according to equation (9)).

2) a shock to the economy is not very likely to occure: $\theta \prec \tilde{\theta}_4$ (i.e. $\tilde{\alpha} \succ 1$)

We have always that $\alpha_2 \prec \tilde{\alpha}$. The soft donor disburses aid in period 1. Only the high type recipient 1 exerts effort. Recipient 2 (both types) prefers not exert effort to carry out the reform;

3) **a shock to the economy occurs with probability:** $\theta = \tilde{\theta}_4$ (i.e. $\tilde{\alpha} = 1$)
 We can have $\alpha_2 \prec \tilde{\alpha}$ or $\alpha_2 = \tilde{\alpha}$. We distinguish the following:

a) *the donor belief about recipient 2 being a high type is low enough:* $\alpha_2 \prec \tilde{\alpha}$

In this context we know that the strong donor will suspend funds and the soft donor disburses them in period 1. Only the high type recipient exerts effort. Recipient 2 (both types) prefers not exert effort to carry out the reform;

b) *the donor belief about recipient 2 being a high type is:* $\alpha_2 = \tilde{\alpha}$

The soft donor randomizes in period 1 by suspending aid with probability (z). As for recipient 2, both types randomize between their strategies (shirking with probability p_{11}^*). In addition, we have that both types of recipient 1 prefer to exert effort.

3.2.6. If $\beta_1 = 0$ or $\beta_1 = 1$

If $\beta_1 = 1$, then recipient 1 is sure that the donor is strong and that aid will be suspended upon a reform failure. Furthermore, both recipient types will exert effort when carrying out the reform, in period 1. This is because the benefit for the type k recipient, when she exerts effort is:

$$\pi_1^k(e) = \theta r^k + (1 - \theta)(-e)$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = 0$$

We find that the recipient (regardless of her type) prefers to exert effort in period 1. As for recipient 2, both types exert effort. This is due to their updated beliefs. Indeed, after seeing aid suspension by donor 1, recipient 2 (both types) update her beliefs such that $\beta_2^k = \beta_1$. Since we are under case $\beta_1 = 1$, we will have ($\beta_2^h = \beta_1 = 1 \succ \tilde{\beta}^h$) and ($\beta_2^l = \beta_1 = 1 \succ \tilde{\beta}^l$). Therefore, recipient 2 exerts effort to carry out the reform.

Furthermore, the soft donor disburses aid in period 1. Indeed, the payoff to the donor from disbursing aid in period 1 is:

$$\pi_{total}^{soft}(D) = x + [\theta + (1 - \theta)x]$$

While, when the donor suspends aid in period 1, she gets a total benefit of:

$$\pi_{total}^{soft}(S) = (a - b) + [\theta + (1 - \theta)x]$$

Clearly, the comparison gives that disbursing in period 1 is preferred to suspending.

If $\beta_1 = 0$, the prior of the recipient in period 1 (about the donor being strong) is null. We have that both recipient types will not exert effort when carrying out the reform, in period 1. This is because the benefit for the recipient of type k , when she exerts effort is:

$$\pi_1^k(e) = r^k$$

When recipient 1 does not exert effort, she gets:

$$\pi_1^k(0) = r^k$$

Furthermore, we can easily see that recipient 2 of both types will never exert effort (regardless of the soft donor strategy in period 1). Indeed, assume that the soft donor suspends aid in period 1, the updated beliefs of recipient 2 will be such that $\beta_2^k = \beta_1$. Since we are under case $\beta_1 = 0$, we will have $(\beta_2^h = \beta_1 = 0 \prec \tilde{\beta}^h)$ and $(\beta_2^l = \beta_1 = 0 \prec \tilde{\beta}^l)$. Therefore, both types of recipient 2 do not exert effort to carry out the reform. If rather, the soft donor disburses aid in period 1, then the updated beliefs of recipient 2 (both types) are such that $\beta_2^k = 0$. Since we are under case $\beta_1 = 0$, we will have $(\beta_2^h = 0 \prec \tilde{\beta}^h)$ and $(\beta_2^l = 0 \prec \tilde{\beta}^l)$. Hence, both types of recipient 2 do not exert effort when carrying out the reform. We conclude that regardless of the donor strategy in period 1, recipient 2 does not exert effort, and no reputation can be built.

As for the soft donor, her payoff from disbursing aid in period 1 is:

$$\pi_{total}^{soft}(D) = 2(x - \varepsilon)$$

While, when she suspends aid, she gets a total benefit of:

$$\pi_{total}^{soft}(S) = (a - b) + (x - \varepsilon)$$

Clearly, the comparison gives that disbursing in period 1 is preferred to suspending.

Proposition 6: If $\beta = 0$, the soft donor disburses aid in both periods. Recipient 1 (both types) do not exert effort to carry out the reform, nor does recipient 2. This is due to their updated beliefs. (see equation (9)).

If $\beta_1 = 1$, the strong donor suspends aid upon a reform failure while the soft donor prefers to disburse funds. Furthermore, the recipients will exert effort in both periods when carrying out the reform.

4. Conclusion

The paper adopts the Kreps-Wilson (1982) framework to analyse the conditions under which reputation can serve as a commitment device in order to induce enforcement of a conditional aid contract. The model presented adds a new ingredient to the basic framework by allowing for moral hazard due to the inability of the donor to distinguish whether the failure of conditionality is due to bad luck or misbehavior. The results suggest that investing in reputation is efficient (as a commitment device) only under certain conditions. These have to do with the probability of occurrence of an external shock, combined to the beliefs agents have on their opponents.

Appendix A. Proofs

Proof 1:

Equation (3) states that recipient 2 prefers to exert effort if and only if: $\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$. Recall that $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1-\beta_1)}$ (see equation (5)). Hence, the inequality above is equivalent to $\beta_1 \succ \frac{ez}{\theta r^k - (1-z)e}$. As we are under case $\beta_1 \in]0, \tilde{\beta}^k[$, we have that $\beta_1 \prec \frac{e}{\theta r^k}$ which implies that $\beta_1 \prec \frac{ez}{\theta r^k - (1-z)e}$. Hence, $\beta_2^k \prec \tilde{\beta}^k$. Therefore, recipient 2 of both types do not exert effort.

Proof 2:

Whether a pure strategy by recipient 2 (here a shirking) is compatible or not with the soft donor randomizing in period 1, depends on recipient 1 strategy. Notice that the later is determined, in turn, by recipient 1 expectations about the donor strategy in period 1. To solve the problem, we consider all strategies for recipient 1, and we compute, for each of them, the total benefit to the donor from suspending aid in the first period. We compare each of these payoffs to the one obtained from disbursing aid.

After a reform failure, the donor total benefit when she disburses aid in period 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned} \pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\ &= 2(x - \varepsilon) \\ &= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\ &= x - \alpha_1\varepsilon + (x - \varepsilon) \end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of:

$$\pi_{total}^{soft}(S) = (a - b) + (x - \varepsilon)$$

Clearly, the comparison gives that disbursing in period 1 is preferred to suspending, in all cases. That means that the donor is not indifferent between her strategies. Hence, shirking by recipient 2, does not lead to the donor randomizing between her strategies. Therefore the only strategy for recipient 2, that is compatible with donor 1 randomizing is to randomize as well. This leads to recipient 2 having the updated beliefs described in equation (6).

Proof 3:

The benefit of recipient 1 from exerting effort is (see equation (7))

$$\pi_1^k(e) = \beta_1 [\theta \underline{r}^k + (1 - \theta)(-e)] + (1 - \beta_1) [\theta \underline{r}^k + (1 - \theta)[z(-e) + (1 - z)\underline{r}^k]]$$

When recipient 1 does not exert effort, she gets (see equation (8)):

$$\pi_1^k(0) = (1 - \beta_1) [\theta(1 - z)r^k + (1 - \theta)(1 - z)r^k]$$

Comparing both, we find that they are equal if and only if :

$$\theta r^k - e - \theta(1 - \beta_1)(1 - z)r^k = 0$$

Replacing (z) by its expression from equation (6), we obtain that effort is equivalent to non effort, for recipient 1, if and only if: $\beta_1 = \left(\frac{e}{\theta r^k}\right)^2 = (\tilde{\beta}^k)^2$, which leads to the rule of behavior stated in equation (9).

Proof 4:

For all $\beta_1 \in]0, \tilde{\beta}^h[$, the contract is accepted in both periods since the minimum benefit from singing it (when effort is exerted) is higher than the benefit from refusing it. In addition, agents strategies are the following :

Both donor types disburse aid in period 1 following a successful reform. If the reform was a failure, the strong donor suspends aid while the soft donor randomizes suspending aid with probability $z = \frac{\beta_1}{1-\beta_1} \left(\frac{\theta r^k - e}{e}\right)$ (since there are no pure strategy in period 1, that would induce effort from recipient 2). In the second period, the strong donor suspend aid upon a failing reform while the soft donor disburses aid (dominant strategy). As for the recipient in period 2, both types randomize²⁶ exerting effort with probability $1 - p$ (see proof 2 above). As for recipient 1, the rule of behavior stated in equation (9) gives the strategy adopted. It remains to determine the probabilities with which recipient 2 randomizes between her actions, if any: - when $\beta_1 \in]0, (\tilde{\beta}^h)^2[$; we have that this probability is such that the soft donor is indifferent between suspending aid and disbursing it:

$$\begin{aligned}\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ 2(x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]\end{aligned}$$

Solving for p , we find that: $p_1^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$.

It is worthnoting that, in order to have $p_1^* \in]0, 1[$, we must have that: $\theta \succ \frac{(x-2\varepsilon)-(a-b)}{(1-x)}$. This condition would have a sense only if: $2(x - \varepsilon) \prec 1 + (a - b)$.

- when $\beta_1 \in](\tilde{\beta}^h)^2, (\tilde{\beta}^l)^2[$; the probability with which recipient 2 randomizes between his actions is determined by:

$$\begin{aligned}\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ \alpha_1 x + (1 - \alpha_1)(x - \varepsilon) + (x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]\end{aligned}$$

Solving for p , we find that: $p_2^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)+\alpha_1\varepsilon}{(x-\varepsilon)-[\theta+x(1-\theta)]}$

In order to have $p_2^* \in]0, 1[$, we must have that: $\theta \succ \frac{(x-2\varepsilon)-(a-b)-\alpha_1\varepsilon}{(1-x)}$. This condition would have a sense only if: $2(x - \varepsilon) \prec 1 + (a - b) - \alpha_1\varepsilon$.

²⁶We assume that when agents of different types randomize between their strategies, they do with the same probability for the same strategy.

- when $\beta_1 \in]\left(\tilde{\beta}^l\right)^2, \tilde{\beta}^h[$; the probability with which recipient 2 randomizes between his actions in period 2 is such that:

$$\begin{aligned}\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ x + (x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]\end{aligned}$$

Solving for p , we find that: $p_3^* = \frac{x+(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$. We can easily check that $p_3^* \in]0, 1[$.

- when $\beta_1 = \left(\tilde{\beta}^h\right)^2$; the probability with which recipient 2 randomizes between his actions is determined by:

$$\begin{aligned}\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ \alpha_1 q(x - \varepsilon) + \alpha_1(1 - q)x + (1 - \alpha_1)(x - \varepsilon) + (x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]\end{aligned}$$

Solving for p , we find that: $p_4^* = \frac{2(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)+\alpha_1\varepsilon(1-q)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$. In order to have $p_4^* \in]0, 1[$, we must have that: $\theta \succ \frac{(x-2\varepsilon)-(a-b)+\alpha_1\varepsilon(1-q)-\varepsilon}{(1-x)}$. This condition would have a sense only if: $2(x - \varepsilon) \prec 1 + (a - b) - \alpha_1\varepsilon(1 - q)$.

- when $\beta_1 = \left(\tilde{\beta}^l\right)^2$; the probability with which recipient 2 randomizes between his actions is determined by:

$$\begin{aligned}\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ (x - \varepsilon) + (1 - \alpha_1)x + (1 - \alpha_1)q(-\varepsilon) + \alpha_1(x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]\end{aligned}$$

Solving for p , we find that: $p_5^* = \frac{(2x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)-\alpha_1\varepsilon(1-q)-q\varepsilon}{(x-\varepsilon)-[\theta+x(1-\theta)]}$. In order to have $p_5^* \in]0, 1[$, we must have that: $\theta \succ \frac{(x-\varepsilon)-(a-b)-\alpha_1\varepsilon-q(1-\alpha_1)\varepsilon}{(1-x)}$. This condition would have a sense only if: $2(x - \varepsilon) \prec 1 + (a - b) - \varepsilon[1 + q - \alpha_1(1 - q)]$.

Proof 5:

When $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, we have that the strong donor suspends aid in both periods, upon a reform failure. The soft donor disburses aid in period 2. While, in period 1, her strategy depends on the recipient's actions in both periods. Let's then determine the behavior of the soft donor in period 1, under all possible strategies by the recipients. Notice that the behavior of recipient 2 is determined by the rule (equation (4)). With $\beta_2^k = 0$ if donor 1 disburses aid, $\beta_2^k = \beta_1$ if donor 1 suspends it and $\beta_2^k = \frac{\beta_1}{\beta_1+z(1-\beta_1)}$ if donor 1 randomizes between her strategies. The first situation corresponds to recipient 2 of both types not exerting effort, since

$\beta_2^k = 0$ means that $\beta_2^k \prec \tilde{\beta}^k$. The second situation corresponds to the high type recipient 2 exerting effort, the low type does not. Again this is because $\beta_2^k = \beta_1$ and $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$. The third situation corresponds to recipient 2 of both types randomizing (as stated in proof 2).

Now, that we assessed the possibilities for recipient 2, we will determine the benefit for donor 1 for all possible strategies by the recipients in each period. The payoff to donor 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned}\pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\ &= 2(x - \varepsilon) \\ &= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\ &= x - \alpha_1\varepsilon + (x - \varepsilon)\end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + \alpha_2 [\theta + x(1 - \theta)] + (1 - \alpha_2)(x - \varepsilon)$$

We conclude that the donor prefers suspending aid in the first period (for all recipient strategies) if and only if the payoff from suspending is higher than the biggest payoff under aid suspension. This corresponds to: $(a - b) + \alpha_2 [\theta + x(1 - \theta)] + (1 - \alpha_2)(x - \varepsilon) \succ x + (x - \varepsilon)$

Solving for α_2 , we find that aid suspension is preferred to disbursement if: $\alpha_2 \succ \tilde{\alpha} = \frac{x - (a - b)}{\theta(1 - x) + \varepsilon}$.

Proof 6:

Equation (3) states that recipient 2 prefers to exert effort if and only if: $\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$. Recall that $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)}$ (see equation (5)). Hence, the inequality above is equivalent to $\beta_1 \succ \frac{ez}{\theta r^k - (1 - z)e}$. As we are under case $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, this implies that $\beta_1 \prec \frac{ez}{\theta r^l - (1 - z)e}$. Hence, $\beta_2^l \prec \tilde{\beta}^l$ which means that the low type recipient 2 do not exert effort. As for the high type, $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$, this implies that $\beta_1 \succ \frac{ez}{\theta r^h - (1 - z)e}$. Hence, $\beta_2^h \succ \tilde{\beta}^h$ which means that the high type recipient 2 exerts effort.

Proof 7:

The payoff to donor 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and

finally only the low type exerts effort):

$$\begin{aligned}
\pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\
&= 2(x - \varepsilon) \\
&= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\
&= x - \alpha_1\varepsilon + (x - \varepsilon)
\end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + \alpha_2 [\theta + x(1 - \theta)] + (1 - \alpha_2)(x - \varepsilon)$$

Clearly, the comparison gives that disbursing in period 1 is preferred to suspending, in all cases. That means that the donor is not indifferent between her strategies. Hence, shirking by recipient 2, does not lead to the donor randomizing between her strategies. Therefore the only strategy for recipient 2, that is compatible with donor 1 randomizing is to randomize as well. This leads to recipient 2 having the updated beliefs described in equation (6).

Proof 8:

- when $\beta_1 \in]\tilde{\beta}^h, \tilde{\beta}^l[$ with $\theta \succ \tilde{\theta}_1$ and $\alpha_2 = \tilde{\alpha}$, the probability with which recipient 2 randomizes between his actions in period 2 is such that:

$$\begin{aligned}
\pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\
x + (x - \varepsilon) &= (a - b) + p(x - \varepsilon) + (1 - p)[\theta + (1 - \theta)x]
\end{aligned}$$

Solving for p , we find that: $p_6^* = \frac{x + (x - \varepsilon) - [\theta + x(1 - \theta)] - (a - b)}{(x - \varepsilon) - [\theta + x(1 - \theta)]}$. We can easily check that $p_6^* \in]0, 1[$.

Proof 9:

Let's assess the benefit for donor 1 for all possible strategies by the recipients in each period. The payoff to donor 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned}
\pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\
&= 2(x - \varepsilon) \\
&= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\
&= x - \alpha_1\varepsilon + (x - \varepsilon)
\end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + [\theta + x(1 - \theta)]$$

We conclude that the donor prefers suspending aid in the first period (for all recipient strategies) if and only if the payoff from suspending is higher than the

biggest payoff under aid suspension. This corresponds to: $(a-b)+[\theta+x(1-\theta)] \succ x+(x-\varepsilon)$.

Solving for θ , we find that aid suspension is preferred to disbursement if: $\theta \succ \tilde{\theta}_2 = \frac{(x-\varepsilon)-(a-b)}{1-x}$.

Proof 10:

Equation (3) states that recipient 2 prefers to exert effort if and only if: $\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$. Recall that $\beta_2^k = \frac{\beta_1}{\beta_1+z(1-\beta_1)}$ (see equation (5)). Hence, the inequality above is equivalent to $\beta_1 \succ \frac{ez}{\theta r^k - (1-z)e}$. As we are under case $\beta_1 \in]\tilde{\beta}^l, 1[$, this implies that $\beta_1 \succ \frac{ez}{\theta r^l - (1-z)e}$. Hence, $\beta_2^k \succ \tilde{\beta}^k$ which means that recipient 2 of both types exerts effort.

Proof 11:

- when $\beta_1 \in]\tilde{\beta}^l, 1[$ with $\theta = \tilde{\theta}_2$, the probability with which recipient 2 randomizes between his actions in period 2 is such that:

$$\begin{aligned} \pi_{total}^{soft}(D) &= \pi_{total}^{soft}(S) \\ x+(x-\varepsilon) &= (a-b)+p(x-\varepsilon)+(1-p)[\theta+(1-\theta)x] \end{aligned}$$

Solving for p , we find that: $p_7^* = \frac{x+(x-\varepsilon)-[\theta+x(1-\theta)]-(a-b)}{(x-\varepsilon)-[\theta+x(1-\theta)]}$. We can easily check that $p_7^* \in]0, 1[$.

Proof 12:

When $\beta_1 = \tilde{\beta}^h$, we have that the strong donor suspends aid in both periods, upon a reform failure. The soft donor disburses aid in period 2. While, in period 1, her strategy depends on the recipient's actions in both periods. Let's then determine the behavior of the soft donor in period 1, under all possible strategies by the recipients. Notice that the behavior of recipient 2 is determined by the rule (equation (4)). With $\beta_2^k = 0$ if donor 1 disburses aid, $\beta_2^k = \beta_1$ if donor 1 suspends it and $\beta_2^k = \frac{\beta_1}{\beta_1+z(1-\beta_1)}$ if donor 1 randomizes between her strategies. The first situation corresponds to recipient 2 of both types not exerting effort, since $\beta_2^k = 0$ means that $\beta_2^k \prec \tilde{\beta}^h$. The second situation corresponds to the high type recipient 2 randomizing, the low type does not exert effort. Again this is because $\beta_2^k = \beta_1$ and $\beta_1 = \tilde{\beta}^h$. The third situation corresponds to recipient 2 of both types randomizing (as stated in proof 2).

Now, that we assessed the possibilities for recipient 2, we will determine the benefit for donor 1 for all possible strategies by the recipients in each period. The payoff to donor 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the

low type exerts effort):

$$\begin{aligned}
\pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\
&= 2(x - \varepsilon) \\
&= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\
&= x - \alpha_1\varepsilon + (x - \varepsilon)
\end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + \alpha_2(1 - p)[\theta + x(1 - \theta)] + (p\alpha_2)(x - \varepsilon) + (1 - \alpha_2)(x - \varepsilon)$$

We conclude that the donor prefers suspending aid in the first period (for all recipient strategies) if and only if the payoff from suspending is higher than the biggest payoff under aid suspension. This corresponds to:

$$(a - b) + \alpha_2[\theta + x(1 - \theta)] + (1 - \alpha_2)(x - \varepsilon) \succ x + (x - \varepsilon).$$

Solving for α_2 , we find that aid suspension is preferred to disbursement if: $\alpha_2 \succ \tilde{\alpha} = \frac{x - (a - b)}{(1 - p)[\theta(1 - x) + \varepsilon]}$.

Proof 13:

- when $\beta_1 = \tilde{\beta}^h$ with $\theta \succ \tilde{\theta}_3$ and $\alpha_2 \succ \tilde{\alpha}$, the probability with which recipient 2 randomizes between his actions in period 2 must be such that:

$$\begin{aligned}
\pi_{total}^{soft}(D) &\prec \pi_{total}^{soft}(S) \\
x + (x - \varepsilon) &\prec (a - b) + \alpha_2(1 - p)[\theta + x(1 - \theta)] + (p\alpha_2)(x - \varepsilon) + (1 - \alpha_2)(x - \varepsilon)
\end{aligned}$$

Solving for p , we find that: $p_8^* \prec 1 - \frac{x - (a - b)}{\alpha_2[\theta(1 - x) + \varepsilon]}$. Notice that: $p_8^* \in]0, 1[$ since we are working under: $\alpha_2 \succ \tilde{\alpha} = \frac{x - (a - b)}{(1 - p)[\theta(1 - x) + \varepsilon]}$.

Proof 14:

Equation (3) states that recipient 2 prefers to exert effort if and only if: $\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$. Recall that $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)}$ (see equation (5)). Hence, the inequality above is equivalent to $\beta_1 \succ \frac{e z}{\theta r^k - (1 - z)e}$. As we are under case $\beta_1 = \tilde{\beta}^h$, we have that $\beta_1 = \frac{e}{\theta r^h}$ imply that $\beta_1 = \frac{e z}{\theta r^h - (1 - z)e}$. Hence, $\beta_2^k \prec \tilde{\beta}^k$ which means that recipient 2 of both types do not exert effort. However, this is not compatible with the soft donor randomizing. Indeed, after a reform failure, the donor benefit (in both periods) when she disburses aid in period 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned}
\pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\
&= 2(x - \varepsilon) \\
&= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\
&= x - \alpha_1\varepsilon + (x - \varepsilon)
\end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + \alpha_2(1 - p) [\theta + x(1 - \theta)] + (p\alpha_2)(x - \varepsilon) + (1 - \alpha_2)(x - \varepsilon)$$

Clearly, the comparison gives that disbursing in period 1 is preferred to suspending, in all cases. That means that the donor is not indifferent between her strategies. Hence, shirking by recipient 2, does not lead to the donor randomizing between her strategies. Therefore the only strategy for recipient 2, that is compatible with donor 1 randomizing is to randomize as well. This leads to recipient 2 having the updated beliefs described in equation (6).

Proof 15:

When $\beta_1 = \tilde{\beta}^l$, we have that the strong donor suspends aid in both periods, upon a reform failure. The soft donor disburses aid in period 2. While, in period 1, her strategy depends on the recipient's actions in both periods. Let's then determine the behavior of the soft donor in period 1, under all possible strategies by the recipients. Notice that the behavior of recipient 2 is determined by the rule (equation (4)). With $\beta_2^k = 0$ if donor 1 disburses aid, $\beta_2^k = \beta_1$ if donor 1 suspends it and $\beta_2^k = \frac{\beta_1}{\beta_1 + z(1 - \beta_1)}$ if donor 1 randomizes between her strategies. The first situation corresponds to recipient 2 of both types not exerting effort, since $\beta_2^k = 0$ means that $\beta_2^k \prec \tilde{\beta}^l$. The second situation corresponds to the high type recipient 2 exerting effort, the low type randomizes. Again this is because $\beta_2^k = \beta_1$ and $\beta_1 = \tilde{\beta}^l$. The third situation corresponds to recipient 2 of both types randomizing (as stated in proof 2).

Now, that we assessed the possibilities for recipient 2, we will determine the benefit for donor 1 for all possible strategies by the recipients in each period. The payoff to donor 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned} \pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\ &= 2(x - \varepsilon) \\ &= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\ &= x - \alpha_1\varepsilon + (x - \varepsilon) \end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + [1 - p(1 - \alpha_2)] [\theta + x(1 - \theta)] + p(1 - \alpha_2)(x - \varepsilon)$$

We conclude that the donor prefers suspending aid in the first period (for all recipient strategies) if and only if the payoff from suspending is higher than the biggest payoff under aid suspension. This corresponds to:

$$(a - b) + [1 - p(1 - \alpha_2)] [\theta + x(1 - \theta)] + p(1 - \alpha_2)(x - \varepsilon) \succ x + (x - \varepsilon)$$

Solving for α_2 , we find that aid suspension is preferred to disbursement if: $\alpha_2 \succ \tilde{\tilde{\alpha}} = \frac{(x-\varepsilon)-(a-b)-\theta(1-p)(1-x)+p\varepsilon}{p[\varepsilon+(1-x)\theta]}$.

Proof 16:

- when $\beta_1 = \tilde{\beta}^l$ with $\theta \succ \tilde{\theta}_4$ and $\alpha_2 \succ \tilde{\tilde{\alpha}}$, the probability with which recipient 2 randomizes between her actions in period 2 must be such that:

$$\begin{aligned} \pi_{total}^{soft}(D) &< \pi_{total}^{soft}(S) \\ x + (x - \varepsilon) &< (a - b) + [1 - p(1 - \alpha_2)] [\theta + x(1 - \theta)] + p(1 - \alpha_2)(x - \varepsilon) \end{aligned}$$

Solving for p , we find that: $p_{10}^* < \frac{1}{1-\alpha_2} - \frac{[x-(a-b)]}{[\theta(1-x)+\varepsilon](1-\alpha_2)}$. Notice that: $p_{10}^* \in]0, 1[$ since we are working under: $\theta \succ \tilde{\theta}_4 = \frac{(x-\varepsilon)-(a-b)}{2p(1-x)}$.

Proof 17:

Effort is preferred by recipient 2 if and only if (see equation (3)):

$$\beta_2^k \succ \frac{e}{\theta r^k} = \tilde{\beta}^k$$

Recall that $\beta_2^k = \frac{\beta_1}{\beta_1+z(1-\beta_1)}$ (see equation (5)). Hence, the inequality above is equivalent to $\beta_1 \succ \frac{ez}{\theta r^k - (1-z)e}$. As we are under case $\beta_1 = \tilde{\beta}^l$, we have that $\beta_1 = \frac{e}{\theta r^l}$ imply that $\beta_1 = \frac{ez}{\theta r^l - (1-z)e}$. Hence, $\beta_2^k < \tilde{\beta}^k$ which means that recipient 2 of both types do not exert effort. However, this is not compatible with the soft donor randomizing. Indeed, after a reform failure, the donor benefit (in both periods) when she disburses aid in period 1, assuming respectively that both types of recipient 1 exert effort, they both do not exert effort, only the high type exerts effort, and finally only the low type exerts effort):

$$\begin{aligned} \pi_{total}^{soft}(D) &= x + (x - \varepsilon) \\ &= 2(x - \varepsilon) \\ &= x - (1 - \alpha_1)\varepsilon + (x - \varepsilon) \\ &= x - \alpha_1\varepsilon + (x - \varepsilon) \end{aligned}$$

When the donor suspends aid in period 1, she gets a total benefit of (regardless of recipient 1 strategy):

$$\pi_{total}^{soft}(S) = (a - b) + [1 - p(1 - \alpha_2)] [\theta + x(1 - \theta)] + p(1 - \alpha_2)(x - \varepsilon)$$

Clearly, the comparison gives that disbursing in period 1 gives a different payoff than suspending, in all cases. That means that the donor is not indifferent between her strategies. Hence, shirking by recipient, does not lead to the donor randomizing between her strategies. Therefore the only strategy for recipient 2, that is compatible with donor 1 randomizing is to randomize as well. This leads to recipient 2 having the updated beliefs described in equation (6).

Proof 18:

If $\beta_1 \in]0, \tilde{\beta}^h[$, the benefit of recipient 1 from exerting effort is:

$$\pi_{total}^k(e) = (\theta r^k - e) + (1 - \beta_1)(1 - \theta)(1 - z)r^k + \beta_2^k(\theta r^k - e) + (1 - \beta_2^k)[r^k + (1 - q)(-e)]$$

When recipient 1 does not exert effort, she gets:

$$\pi_{total}^k(0) = (1 - \beta_1)(1 - z)r^k + (1 - \beta_2^k)[qr^k + (1 - q)(r^k - e)], \quad k : \{h, l\}$$

Comparing both, we find that they are equal if and only if :

$$(1 - \beta_2^k)(\theta r^k - e) - \theta(1 - \beta_1)(1 - z)r^k = 0$$

Replacing (z) by its expression from equation (6), we obtain that effort is equivalent to non effort, for recipient 1, if and only if: $\beta_1 = \left(\frac{e}{\theta r^k}\right)^3 = (\tilde{\beta}^k)^3$, which leads to the rule of behavior stated in equation (??).

Acknowledgments : lkjmpi

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