Samaritans, Rotten Kids and Policy Conditionality*

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Abstract

Donors who try to impose policy conditionality on countries receiving their aid commonly face conflicting incentives between using aid to induce income-increasing reforms and using aid to assist low-income countries: this conflict can lead to a time-consistency problem. This paper offers a contractual analysis of conditionality, showing how conditionality contracts are affected by conflicting donor incentives in the presence of limited commitment power. Conditionality is shown to survive in an environment with weak donor commitment power, and it can eliminate the inefficiency associated with the no-conditionality outcome. However, even when conditionality is successfully imposed by donors, there may be an inverse relationship between aid and reform across different aid recipients. Multi-recipient and hidden-information extensions of the baseline model are also considered.

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Aid is thus like champagne: in success you deserve it, in failure you need it.

Bauer (1981), p. 91.

1 Introduction

Policy conditionality is the practice used by donors (i.e. international financial institutions and bilateral aid agencies) to link the provision of financial support to developing countries to the implementation of pre-specified policy reforms.[1] The use of policy conditionality by donors has been increasingly common and extensive throughout the 1980s and 1990s, as donors have attempted to guarantee a satisfactory use of their aid. Conditional aid has become a major factor in the determination of policy-making in many recipient countries, especially in Sub-Saharan Africa, interacting directly with domestic political economy conditions. However, the effectiveness of conditionality has been frequently questioned, with respect not only to its content (i.e. the economic rationale of the reforms supported by donors) but also to its design .

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[1] We employ the terms "policy conditionality" and "donor conditionality" interchangeably in this paper.

In terms of design, which is the focus of this paper, policy conditionality is typically criticised for a lack of credibility. The threat of a cut-off of aid if the policy reforms demanded by donors are not implemented (which underpins conditionality) is often time inconsistent, given that donors face incentives to release funds even if the conditionality contract is not adhered to. This in turn reduces the extent to which conditionality can lead to improved policies and, by implication, it diminishes the positive impact of aid on recipient countries. Recent empirical work on the lack of effectiveness of both aid and conditionality (Burnside and Dollar (2000)) has led to proposals for more donor *selectivity* in the allocation of foreign aid, i.e. a more focused targeting of aid on good performers.

This paper provides an analytical treatment of the practice of donor conditionality, employing a simple dynamic agency model. In particular we focus on the nature and implications of the apparent *incentive incompatibility* of conditional aid for donors. This arises because of the tension between the rationale for conditional aid (*rewarding* the implementation of good policies) and the more traditional role of aid as *insurance* against low-income states.[2] The donor's ex-post incentives to release aid when the recipient's income is low undermines the donor's ability to use aid promises to induce income-increasing reforms ex-ante. This paper's main contribution is to show that conditionality contracts *can* resolve this conflict even in the presence of imperfect (or *weak*) donor commitment,[3] but are affected by it in terms of their effectiveness in stimulating reform efforts.

The baseline model presented in this paper is based on a dynamic two-player game, where the players are an altruistic donor and the policy-makers in a recipient country. The latter consist of a "small"[4] and therefore unrepresentative political élite. The donor cares about its own consumption and the recipient country's consumption, and displays strictly diminishing marginal utility in each. The political élite in the recipient country gains utility from its rents (or share of national income), which are obtained by distorting the economy, thereby failing to maximise national wealth.

This baseline set-up leads to three related results. Firstly, a *Samaritan's Dilemma* situation may arise if the donor is sufficiently altruistic: in such a case the political élite in the recipient country deliberately impoverishes the country in order to qualify for more aid.

Secondly a conditional aid contract, which ex-ante links aid transfers to policy reform, can improve the efficiency of the interaction between donors and recipients. This is because the equilibrium without conditional aid fails to internalise the externality due to the presence of an altruistic donor (i.e. the recipient faces sub-optimal incentives to increase domestic production), and can be Pareto improved by alternative combinations of transfers by the donor and reform effort by the recipient country.

Thirdly, in the presence of imperfect (or weak) commitment the donor suffers from the conflict between aid as "reward" and aid as "insurance" motives, even though a second-best level of conditionality can still be imposed by a donor, inducing an increase in reforms relative to the

[2] This conflict is discussed by Guillamont and Chauvet (1999), and effectively summarised in the quote by Bauer given at the beginning of this paper.

[3] This notion of commitment is formally defined in the next section of the paper, and it broadly corresponds to a situation where a principal cannot commit to punish aid recipients by carrying out "tough" threats, but it can commit to reward them for 'good' behaviour by keeping "nice" promises.

[4] In the sense of Boone (1996) and McGuire and Olson (1996).

corresponding no-aid outcome. This is the main result of the paper, showing how conditionality can survive the donor commitment problem, even if it cannot completely free itself from its consequences.

This second-best conditionality contract can lead to an *inverse* link between aid and reform across countries in equilibrium, corresponding to different degrees of donor altruism between recipients. This effect arises because a more altruistic donor suffers relatively more from the Samaritan's Dilemma and needs to satisfy a more demanding participation constraint for the aid recipient. This makes the "purchase" of reform effort more costly for the donor, inducing it to settle for less intense conditionality. Therefore, even though conditionality contracts "survive" with imperfect donor commitment, aid and reforms may vary across countries in a non-monotonic fashion, giving the impression that conditionality is failing to effectively link aid flows and reform efforts.

Two extensions of the baseline model are also presented in this paper to allow for a richer characterisation of the donor-recipient relationship: a multi-recipient case and a hidden information extension. In a multi-recipient set-up the Samaritan's Dilemma is less likely to set in for a given level of altruism, since donor altruism is "shared-out" between more than one recipient. However, if it does set in, it is more distortionary than in a single-recipient environment, as recipients compete with each other for donor transfers by impoverishing themselves. Conditionality with imperfect commitment is therefore strengthened in a multi-recipient environment given the lower likelihood and lower attractiveness to the recipients of the Samaritan's Dilemma outcome.

In the hidden information extension of the baseline model the donor does not know how much the political élite in the recipient country benefits from distorting the economy, and it therefore faces adverse selection. The donor problem is therefore one of mechanism design, and it is for instance analogous to that of a regulator setting the price of a private monopoly under hidden information and with costly public transfers (Baron and Myerson (1982)). As in the regulation-screening problem we obtain that asymmetric information may force the donor to reduce the intensity of reform relative to the first-best. Contrary to the standard optimal mechanism design result we find that the principal may distort the level of reform for both types, implying a failure of the "no distortions at the top" result. This is due to the direct interaction between aid and reforms in the agent's utility function, which implies that the donor finds it optimal to grant the required information rents for low-cost types by simultaneously increasing aid flows and raising their appropriation rate (which makes aid more effective in providing information rents).

Both the results of the baseline model and of its extensions have implications for the recent proposals to re-design donor conditionality and, in particular, for the calls for greater selectivity in the allocation of aid. The nature of conditionality with weak commitment suggests that the failure of conditionality to induce reforms may be only apparent, therefore undermining some of the justification for a more selective use of aid. The hidden information extension also suggests that excluding "bad" types from conditionality contracts (which is one possible implication of a move towards more selectivity), is sub-optimal, from the donor's perspective, even though it implies more effective conditionality on good types. Finally, the multi-recipient extensions shows that inter-recipient competition for aid can strengthen conditionality, even in the absence of strong donor commitment. If selectivity is interpreted as a mechanism to introduce a yardstick element to conditionality, then it is likely to be an effective reform of this practice.

1.1 Related Literature

This paper is related to work in two areas of the literature. The first, and closest, is the recent work on donor conditionality and aid effectiveness. This work has to a large extent been stimulated by recent empirical findings that foreign aid does not lead to higher growth in developing countries on average, but that it does so in good policy environments (Boone (1996); Burnside and Dollar (2000)). This suggests that conditioning aid on good policies is a practice which can enhance aid effectiveness. However the work of Burnside and Dollar also shows that empirically conditionality has failed, by not rewarding countries with satisfactory policies and by failing to induce policy change. These results have led to the calls for greater selectivity on the part of donors, i.e. focusing aid on good performers, and conditioning aid on policy *levels* rather than on policy *improvements* (e.g. Collier (1997); Dollar and Svensson (2000)).

A number of analytical papers have attempted to clarify the issue of the apparent failure of both aid and conditionality in raising growth in recipient countries, establishing two main results. The first is that conditionality can be seen as an efficient contract, which allows donors to "purchase" reform from policy makers in developing countries and optimally realise "gains from aid" (e.g. Adam and O'Connell (1999); Coate and Morris (1995); and, earlier, Mosley (1987)). The second is that the imperfect donor commitment can drastically limit the effectiveness of conditionality and, by implication, of foreign aid (e.g. Svensson (2000a)). This paper builds upon this analytical work on conditional aid, combining these two results, and showing how they can jointly produce outcomes which are consistent with the evidence on the effectiveness of donor conditionality.

The second strand of the literature which this paper is related to is the work on the effects of altruism in economic interactions. This work originates with Becker (1974) and his Rotten Kid Theorem. This states that the altruism externality between a parent and a selfish kid does not lead to an inefficient outcome as long as certain conditions are met.[5] A particular failure of the Rotten Kid Theorem, the Samaritan's Dilemma, has attracted attention in the literature (Buchanan (1974)). This has been formally analysed by a number of authors (e.g. Lindbeck and Weibull (1988) and Bergstrom (1989)), and it refers to the fact that a selfish recipient may act strategically (and in an inefficient fashion) in a dynamic environment, in order to maximise his benefit from another agent's altruism. This paper illustrates how the Samaritan's Dilemma can apply to donor-recipient relationships in the context of foreign aid, and how contracts (i.e. policy conditionality) can be designed to remove the inefficiency associated with the Samaritan's Dilemma outcome.

1.2 Structure and Approach of the Paper

The next section of the paper presents our baseline model of donor-recipient interaction, which is a dynamic (i.e. two-period), principal-agent model with no information asymmetries. This

[5] The Rotten Kid Theorem holds if the kid's only source of utility is money income, if the kid's consumption is a normal good from the parent's perspective, and if optimal monetary transfers from the parent to the kid are not at a corner solution.

stylised model allows us to isolate the respective roles of the recipient country's inherent Stackelberg advantage and of the donor's access to commitment technology in determining the intensity of policy conditionality.

Section 3 develops two extensions of the core model: a multi-recipient and a hidden information one. Both of these allow us to enrich the model of Section 2, and to illustrate how considerations which are of empirical relevance to the donor-recipient relationship can affect the nature of policy conditionality.[6]

Section 4 discusses some of the policy implications of our results, with particular reference to the recent debate on how to reform policy conditionality. In this section we provide a critical assessment of the calls for greater donor *selectivity* in allocating aid to recipient countries, on the basis of the modelling results obtained in the paper. We also discuss the possible interaction between the effectiveness of aid and that of conditionality, illustrating the presence of a causal link between the two which can improve the donors' hand vis-à-vis aid recipients.

Section 5 summarises the main results and concludes.

2 The Baseline Model

2.1 Set-up

Consider an altruistic[7] donor and a selfish recipient who interact over two periods, a production period and a consumption period. The population of both countries consists of a political élite, which sets public policies, and of politically powerless masses. The size and preferences of the élite are assumed to be fixed and exogenous.

2.1.1 Production

Production in both donor and recipient countries is a function of a uni-dimensional "political" variable α which measures the share of the country's resources which the political élite appropriates for illegitimate private consumption. α is therefore restricted to range between 0 and 1. Elites can raise α via the impositions of market *distortions*, such as export or income taxes and foreign exchange or credit rationing, which enable the ruling élite to accumulate rents (as in e.g. Krueger (1974); Bhagwati (1982); and McGuire and Olson (1996)). These distortions also have the effect of lowering income (or growth) in the country, by preventing the achievement of efficiency in exchange and production (see e.g. Barro (1990) and Easterly (1992)). The variable α is therefore an inverse indicator of market *reforms*, which stimulate overall income but hurt the ruling élite if this is insufficiently representative of the collective interest.

[6] Both of these elements of the aid game are present in Svensson's (2000a) model, which is the closest in spirit to the one developed in this paper. Our work differs from Svensson in the characterisation of the issue of donor commitment, and in the fact that we analyse the various elements present in Svensson's model in turn, isolating their impact on policy conditionality. We also abstract from the issue of hidden action, and consider the case of hidden information instead.

[7] Donor "altruism" in this context is consistent with a number of factors which may lead a country to benefit from the consumption of another country, e.g. outstanding loans in the recipient country; "strategic interest" (e.g. as defined by Alesina and Dollar (2000)); poverty concerns.

The production function of country i is given by the following expression:

$$y_i = \omega_i(1 - \alpha_i^\gamma) \tag{1}$$

where y_i indicates income, ω_i represents the country's full economic potential, achieved if no distortions are imposed (i.e. $\alpha_i = 0$), and $\gamma \geq 1$, implying that there are weakly increasing costs of distortions in terms of foregone income. We assume that the process generating income is deterministic.

2.1.2 Consumption

Aggregate consumption in each country is a function of domestic production and of the level of foreign aid transfers t from the donor to the recipient. Therefore:

$$c_d = y_d - t \tag{2}$$
$$c_r = y_r + t \tag{3}$$

where c stands for consumption, d and r refer to the donor and recipient country respectively, and $t \geq 0$. The functions given above assume that aid effectiveness in the recipient country (i.e. the impact of aid on income) is fixed, and independent of the level of distortions α. In section 4, when discussing our main results and their relationship with the recent debate on aid effectiveness, we relax this assumption, and allow for the possibility of a "Burnside-Dollar" interaction between reform and aid effectiveness.

2.1.3 Utility

The utility of the political élites is a function of their share α_i of national consumption c_i, and of their type (as defined below). Elites in the donor country are altruistic towards the recipient country and care about aggregate consumption in the recipient country c_r.[8] Utility functions are strictly concave and assumed to be logarithmic for simplicity. Therefore:

$$U_d(\alpha_d, \alpha_r, t; \beta, \theta_d) = \ln \alpha_d^{\theta_d} c_d + \beta \ln c_r \tag{4}$$
$$U_r(\alpha_r, t; \theta_r) = \ln \alpha_r^{\theta_r} c_r \tag{5}$$

where U_i denotes the utility of the political élite in country i, β measures donor altruism ($\beta \in [0,1]$), and θ_i is a parameter which captures the effectiveness of resource appropriation on the part of the ruling élite and which therefore defines the *type* of the élite, relative to how costly it finds it to introduce market-friendly reforms (i.e. lowering α_i). θ_i is restricted to range between 0 and 1, with high values implying a high cost of introducing reforms.[9]

[8] This implies that the donor cares about both élite and non-élite consumption. A donor mainly driven by poverty concerns would care only about non-élite consumption (i.e. $\beta \ln(1-\alpha_r)c_r$ would enter its utility function). Allowing for this would not alter the qualitative results on conditionality presented in what follows.

[9] It is possible to think of θ_i as an inverse index for the *size* of the élite, where higher values are associated with smaller and less representative élites, which find reforms less costly than larger élites (as in Boone (1996) and in McGuire and Olson (1996)).

The most natural value for θ_i to take is unity, as this implies that élites consume their share of national income.

The functional form for the utility of the ruling élites implies that aid is fully *fungible* in the recipient country, and that the élite can decide how to use aid in the same way as it can decide how much to appropriate of national production.[10]

2.1.4 Timing

The timing of the game between the donor and the recipient country is as follows. In period 1 (the *production period*) the political élites set the level of their appropriation rate α_i. At the beginning of period 2 (the *consumption period*) transfers take place between the donor and the recipient and then consumption occurs (as specified by equations (2) and (3)).

2.1.5 Parameter and Informational Assumptions

The following parameter assumptions are made in the rest of the paper for analytical simplicity:

- $\gamma = 1$, which implies that the production function in both recipient and donor countries is linear in the level of market distortions;
- $\omega_d = \omega_r = 1$, implying that the full economic potential of the donor and the recipient country is the same, and that any differences in income are due to political economy factors;[11] and
- $\theta_d = 0$, which implies that the political élite in the donor country is representative of the whole population and gains nothing from distorting the economy. This implies that the élite in the donor country always sets $\alpha_d = 0$ and obtains $y_d = \omega_d = 1$. Given this assumption the variables α and θ hereafter refer to the appropriation rate and the type of the political élite in the recipient country respectively (allowing us to omit the subscripts on these variables).

We also assume that the level of distortions in the recipient country α is perfectly observable by the donor country.[12] This implies that we do not allow for hidden action (i.e. moral hazard) considerations in our modelling of conditionality contracts, which might weaken the intensity of the contracts. In the baseline model we also assume that θ is common knowledge. The donor therefore does not face a hidden information (i.e. adverse selection) problem in designing its conditionality contract. We relax this assumption in Section 3.2 of the paper, and show how conditionality needs to be modified in presence of incomplete information about the recipient's type.

[10] This is consistent with recent empirical work on aid fungibility, e.g. Feyzioglu *et al.* (1998).

[11] This is clearly a strong assumption, which we make to focus our results on the impact of political economy considerations on the incentive effects of foreign aid and to guarantee the existence of interior solutions in the presence of a linear production function ($\gamma = 1$).

[12] Given the absence of stochastic shocks to income, this is equivalent to assuming that y_r is observable, which implies that α can be deduced from its level.

2.2 The Unconditional Aid Equilibrium

In this sub-section we solve for the unconditional aid equilibrium of the game between the donor and the recipient.[13] Aid transfers t are unconditional if they are not determined according to an explicit contract between players which specifies t as a function the recipient's appropriation rate α, before α is chosen.

The set-up introduced above generates a dynamic game of complete and perfect information between the players, where in the first period the recipient picks a level of resource appropriation α, and in the second period the donor decides how much to transfer to the developing country. The solution to this game needs to be a *Subgame Perfect Equilibrium*, which is found by backwards induction, first solving for the donor's optimal transfer function and then examining the recipient's preferred choice of α, as a function of future donor transfers. This corresponds to a Stackelberg equilibrium, where the recipient country is the Stackelberg leader.

The optimal unconditional aid function for the donor as a function of the recipient's income level is given by:

$$\begin{aligned} t^*(\alpha;\beta) &= \arg\max_t(\ln c_d + \beta \ln c_r) \\ s.t. &: \; t \geq 0 \end{aligned}$$

Substituting for $c_d = 1 - t$ and $c_r = y_r + t$ and differentiating with respect to t, yields:

$$t^*(\alpha;\beta) = \max\left(0, \frac{\beta - y_r}{1+\beta}\right) \tag{6}$$

The $t^*(\alpha;\beta)$ function implies that aid equalises the donor's marginal utilities from own and recipient consumption when the non-negativity constraint on t is not binding. The optimal transfer policy given by equation (6) defines a no-aid space ($t = 0$), where $y_r \geq \beta$, and a positive transfer area, where the converse is true. For $y_r < \beta$ the recipient's consumption frontier expands outwards, as aid flows are forthcoming in that region, augmenting domestic production (which is given by the production function described by equation (1)). This is shown in Figure 1.

In the production period the ruling élite in the developing country maximises its utility with respect to its share of resource appropriation α given the consumption possibility frontier implied by the donor's optimal aid function and by domestic production possibilities. The optimal choice of α in the no-conditionality equilibrium (denoted with the superscript NC) is described by the following Proposition.

Proposition 1 *The appropriation rate α in the subgame perfect (or Stackelberg) equilibrium of the donor-recipient game with no conditionality can take one of two values, depending on the level of donor altruism. If this is sufficiently high a Samaritan's Dilemma equilibrium (denoted by SD, and characterised by positive aid flows) sets in and production in the recipient country falls relative to the no-aid equilibrium (denoted by NA, and where $t = 0$).*

The equilibrium value of α is given by the following step function $\alpha^{NC}(\beta,\theta)$:

$$\alpha^{NC}(\beta,\theta) = \begin{cases} \alpha^{NA}(\theta) \equiv \frac{\theta}{1+\theta} & \text{for } \beta \leq \beta^T(\theta) \\ \alpha^{SD}(\theta) \equiv 2\left(\frac{\theta}{1+\theta}\right) & \text{for } \beta > \beta^T(\theta) \end{cases}$$

[13] Given that the game we consider is played by the élites in the two countries, for simplicity in what follows we will tend to refer to each élite as the donor (or principal) and the recipient (or agent) respectively.

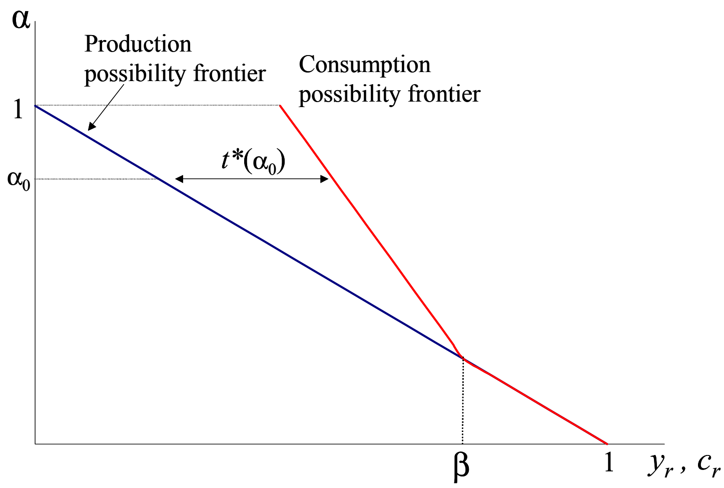


Figure 1: Production and consumption possibility frontiers for the recipient country.

where $\beta^T(\theta) \equiv (2^{\theta+1} - 1)^{-1}$, *which is strictly decreasing in* θ.

Proof. $\alpha^{NC}(\beta, \theta)$ is obtained by maximising the objective function of the élite in the recipient country subject to two budget constraints: one with no aid (defined by the production function described in (1)) and one with positive aid flows (as determined by the donor's optimal transfer function (6)). These two optimisations deliver two locally optimal levels of the appropriation rate for the political élite. The global optimum, defined by $\alpha^{NC}(\beta, \theta)$, is obtained by comparing the utilities associated with each local optimum and establishing the threshold value of the altruism parameter β (i.e. $\beta^T(\theta)$) for which one is preferred to the other. Straightforward differentiation of $\beta^T(\theta)$ w.r.t. θ shows that it is decreasing in θ. ■

Proposition 1 shows that the presence of a sufficiently altruistic donor ($\beta > \beta^T(\theta)$) induces the political élite in the recipient country to impoverish the country more than in a situation with no aid, by increasing the level of distortions α in order to attract higher aid transfers. This corresponds to a Samaritan's Dilemma situation, where the presence of a sufficiently altruistic donor leads to more ex-ante poverty and inefficient behaviour than otherwise (as in Lindbeck and Weibull (1988)). In this model *any equilibrium with positive unconditional aid transfers is characterised by the Samaritan's Dilemma.*

The solution for $\alpha^{NC}(\theta, \beta)$ also shows that the more beneficial does the ruling élite find introducing distortions (i.e. the higher θ), the higher the level of distortions in both the Samaritan's Dilemma and the no-aid equilibrium and the more likely is the Samaritan's Dilemma equilibrium to set in (i.e. $\beta^T(\theta)$ is lower).

The no-conditionality equilibrium described in Proposition 1 is always Pareto inefficient (i.e. the Rotten Kid Theorem fails), in the sense that there are alternative equilibria in which both parties in the recipient-donor game are (weakly) better off. This is so because the externality due to donor altruism is not considered by the recipient when making its choice of α, thus leading to a sub-optimal outcome.[14] This inefficiency is shown explicitly in the next section, where conditionality contracts are considered and shown to be efficient and, for one type of conditionality, Pareto superior to the no-conditionality equilibrium.[15] Conditionality can therefore be thought of as a contract introduced by donors precisely to remove the inefficiency associated with the equilibrium without conditionality.

Figure 2 summarises the Cournot-Stackelberg nature of the no-conditionality equilibrium (for the case $\theta = 1$ and $\beta > \beta^T(\theta)$). The figure plots both the donor and the recipient's reaction functions,[16] showing that the no-conditionality point (labelled SD) is at the tangency of the recipient's iso-utility schedule and the donor's optimal aid function $t^*(\alpha; \beta)$. The figure also shows the position of two efficient conditionality contracts which we derive and illustrate in the next sub-section.

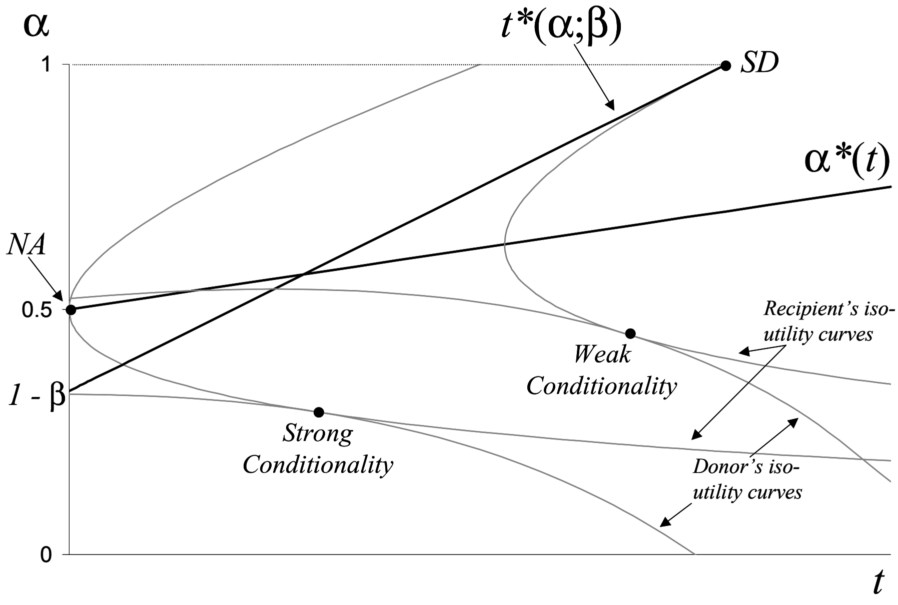


Figure 2: Illustration of the no-conditionality equilibrium as a Cournot-Stackelberg game (for $\theta = 1$ and $\beta > \beta^T$).

[14]Following the approach introduced by Bergstrom (1989), the Rotten Kid Theorem fails in our set-up given that the selfish "kid" (i.e the recipient country's policy-makers) effectively derive utility from two goods (appropriation of local production and appropriation of aid), implying that they have incentives to distort the former to increase the latter. If the agent only derived utility from aid, it would face optimal incentives to engage in efficient activities, from the donor's point of view, in order to maximise the availability of aid.

[15]As we show below, under conditionality, resource appropriation by the élite in the recipient country falls, implying that also the masses in the developing country benefit from the contract.

[16]The recipient's reaction curve is given by $\alpha^*(t) = \frac{\theta}{1+\theta}(1 + t)$.

2.3 The Conditional Aid Equilibria

2.3.1 Donor Commitment and Conditionality

We now introduce the possibility of *conditionality* in the donor-recipient relationship. That is, we allow the donor to offer a contract at the start of the production period which links the level of aid transfers t to the implementation of a set of policy reforms (i.e. a reduction in α) by the recipient. The contract therefore specifies a conditional reform-aid pair, $\{\alpha^c, t^c\}$, where superscript c denotes conditionality.

We identify two cases for donor conditionality, corresponding to two different degrees of donor commitment power: *strong* and *weak* commitment.

Definition 1 *The donor has **strong** commitment power if it can commit to a conditionality contract $\{\alpha^c, t^c\}$ which is such that:*

$$t = \begin{cases} t^c & \text{if } \alpha = \alpha^c \\ 0 & \text{if } \alpha \neq \alpha^c \end{cases}$$

*The donor has **weak** commitment power if it can only commit to a conditionality contract $\{\alpha^c, t^c\}$ which is such that:*

$$t = \begin{cases} t^c & \text{if } \alpha = \alpha^c \\ t^*(\alpha; \beta) & \text{if } \alpha \neq \alpha^c \end{cases}$$

where $t^*(\alpha; \beta)$ is the donor's ex-post optimal aid function (as given by equation (6)).

*The donor has **no** commitment power if it cannot commit to any ex-ante contract, so that $t = t^*(\alpha; \beta)$ for $\forall\alpha$.*

A donor with *strong* commitment power can ex-ante commit to fully depart from its ex-post optimal aid function. This implies that it can commit to keep promises to reward "good" behaviour by the agent (i.e. transfer t^c to the recipient if he chooses α^c), and also to carry out threats to punish the agent (i.e. by giving no aid if the level of reforms α^c is not implemented). The corresponding conditionality contract (which we define as *strong conditionality*) can therefore effectively disregard the potential for a Samaritan's Dilemma (or Stackelberg) equilibrium in the no-conditionality game, and leaves the recipient only as well off as in the no-aid equilibrium.[17] The optimal strong conditionality contract is as shown in Figure 2 (and derived formally below), and it lies at the tangency between the recipient's iso-utility contour at the no-aid equilibrium, and the donor's iso-utility function.

Conversely, a donor with *weak* commitment cannot credibly promise to be 'tough' if α^c is not chosen by the recipient: if $\alpha \neq \alpha^c$ is set by the recipient, the donor will transfer the ex-post optimal aid level $t^*(\alpha; \beta)$. A donor with weak commitment can however commit not to ex-post renege on a promise of t^c, if the recipient implements a level of reforms α^c. That is, the donor is able to commit to depart from its ex-post optimal aid schedule for just one point.

[17] A donor with strong commitment can therefore appropriate the first-mover advantage enjoyed by the recipient in the no-conditionality game by offering a "tough" contract before the game starts. Pedersen (1996) emphasises the potential nature of policy conditionality as Stackelberg leadership.

The corresponding optimal conditionality contract (which we define as *weak conditionality*) therefore leaves the recipient as well off as in the no-conditionality equilibrium and it lies at the tangency between the recipient's iso-utility curve at the Samaritan's Dilemma equilibrium (assuming $\beta > \beta^T$) and the donor's iso-utility curve, as is illustrated in Figure 2.

If the donor has no commitment power, than no conditionality can be imposed, and the equilibrium of the recipient-donor game is the one described by Proposition 1.

In what follows we derive and compare the conditionality contracts corresponding to strong and weak donor conditionality respectively. Existing models of donor conditionality characterise the case of strong commitment power (e.g. Coate and Morris (1995); Adam and O'Connell (1999); Azam and Laffont (2000); Svensson (2000a)). This has been qualitatively criticised as unrealistic by many authors (e.g. Gordon (1993); Collier (1997)) given the pressures faced by donors to release aid when recipients fail to fully implement policy conditionality. Svensson (2000a) formally shows how lack of donor commitment leads to a collapse of conditionality.

The notion of weak donor commitment introduced here is intermediate between the cases of full and no commitment, and can restore a form donor conditionality which is capable of avoiding the inefficiencies associated with the no-conditionality equilibrium. Given the requirements on donor behaviour which underlie the notion of weak commitment (i.e. the ability to keep "nice" promises and not abuse the trust of recipients by cutting aid ex-post if a previously negotiated level of reforms is implemented), and the institutional set-up of donor institutions, this form of commitment and its corresponding conditionality contract appear more plausible than both the strong and no commitment cases.[18] The assumption that no conditionality can be imposed by donors if they do not have strong commitment power in particular seems an unduly restrictive one.

The propositions on conditionality presented in this section (Propositions 2 and 3) are for the case $\theta = 1$, which enables us to obtain closed form solutions for the conditionality contracts. Lemma 1 extends the results obtained for $\theta = 1$ to the more general case $\theta \leq 1$, characterising the impact of the type of the ruling élite in the recipient country on the intensity of the conditionality contracts.

2.3.2 Strong Conditionality

Access to strong commitment technology enables the donor to obtain optimal "purchase" of reforms from the ruling élite in the developing country. To do so the donor offers to the ruling élite at the beginning of the production period a conditional aid contract specifying the level of aid to be given at the beginning of the consumption period as a function of the level of distortions chosen during the production period. The strong conditional aid contract therefore consists of an aid-distortions pair $\{\alpha^c, t^c\}$, such that $t = t^c$ if $\alpha = \alpha^c$ and $t = 0$ otherwise.

[18] Donors' reputational concerns (e.g. arising from multi-period or multi-recipient interaction) may allow them to sustain weak conditionality contracts as an equilibrium outcome even in the absence of any donor commitment power (see e.g. Kreps (1990) and Baker *et al.* (1994)). Reputational effects can sustain weak but *not* strong conditionality if one restricts donors to "punish" recipients who reject the contract by (perfect) Nash-reversion (rather than allowing for harsher punishment profiles). This would imply that donors can only reach payoff points North-East of the payoff associated with the stage game's sub-game perfect equilibrium (i.e. the no-conditionality equilibrium) in a repeated interaction. See Appendix A.2 for a more detailed treatment of this issue.

To establish the optimal levels of α^c and t^c the donor maximises its utility relative to both the level of transfer t and the levels of distortions α subject to the ruling élite's participation constraint, which specifies that it is at least as well off in the conditional aid equilibrium as in the no-aid equilibrium.

The components of the optimal strong conditionality contract α_1^c and t_1^c (where subscript 1 denotes strong conditionality) are therefore given by the following donor program:

$$\begin{aligned} \max_{\alpha,t} U_d &= \max_{\alpha,t} \ln(1-t) + \beta \ln(1-\alpha+t) \\ s.t. &: U_r(\alpha,t;\theta) \geq U_r\left(\alpha^{NA}(\theta),0;\theta\right) \text{ (IR)} \end{aligned} \tag{7}$$

The strong conditionality contract is characterised as follows for the case of $\theta = 1$.

Proposition 2 *Strong conditionality in the $\theta = 1$ case is given by the contract $\{\alpha_1^c(\beta,1)$, $t_1^c(\beta,1)\}$ which has the following properties:*

(i) the appropriation rate α_1^c falls with the value of the altruism parameter. α_1^c is given by the following expression:

$$\alpha_1^c(\beta,1) = \frac{(1+3\beta^2)^{\frac{1}{2}} - 2\beta}{2(1-\beta)} \tag{8}$$

which is strictly decreasing in β, and is such that $\lim_{\beta\to 0}\alpha_1^c(\beta,1) = \alpha^{NA}(1) = \frac{1}{2}$ and $\lim_{\beta\to 1}\alpha_1^c(\beta,1) = \frac{1}{4}$;

(ii) the level of aid t_1^c increases with the value of the altruism parameter. t_1^c is given by the following expression:

$$t_1^c(\beta,1) = \frac{1+\beta+2\beta^2-(1+\beta)(1+3\beta^2)^{\frac{1}{2}}}{(1-\beta)\left[(1+3\beta^2)^{\frac{1}{2}}-2\beta\right]} \tag{9}$$

which is strictly increasing in β, and is such that $\lim_{\beta\to 0} t_1^c(\beta,1) = 0$ and $\lim_{\beta\to 1} t_1^c(\beta,1) = \frac{1}{4}$;

(iii) the strong conditionality contract is efficient, and Pareto superior to the no-aid outcome described in Proposition 1.

Proof. See Appendix A.1.1.

Proposition 2 shows that an altruistic donor with access to strong commitment technology "purchases" reform in the recipient country by means of aid flows. Distortions in the recipient country are always lower than with no conditionality and conditionality is an *enabling condition* for aid in the case of $\beta \leq \beta^T(\theta)$ (given that this case corresponds to the no-aid equilibrium in the absence of conditionality). Under strong conditionality aid has a multiplier effect, raising income in the developing country by more than the aid flows,[19] and is positively correlated with reform effort (as the value of the altruism parameter changes).

[19] This replicates the results obtained by both Coate and Morris (1995) and Adam and O'Connell (1999).

2.3.3 Weak Conditionality

In the absence of strong commitment technology the donor cannot impose strong conditionality. This is because if the donor is sufficiently altruistic (i.e. for $\beta > \beta^T(\theta)$), the ruling élite in the recipient country is better off by disregarding the strong conditionality contract and opting for the Samaritan's Dilemma equilibrium, which yields more utility than the no-aid equilibrium (by Proposition 1). Given that a donor without strong commitment powers cannot commit to implement strong conditionality (under which $t = 0$ for $\alpha \neq \alpha_1^c$), the recipient knows that once presented with the fait accompli of $\alpha = \alpha^{SD} > \alpha_1^c$ the donor will transfer funds according to its optimal aid function, $t^*(\alpha; \beta)$. The recipient would therefore choose $\alpha = \alpha^{SD}$ if offered a strong conditionality contract when $\beta > \beta^T(\theta)$.

A donor with weak commitment power can however achieve *weak* conditionality, which differs from strong conditionality in the definition of the participation constraint of the élite of the recipient country, given that it has to take into account the potential for the Samaritan's Dilemma. That is, under weak conditionality the donor needs to guarantee to the recipient that its utility will be as high as in the no-conditionality equilibrium described in Proposition 1.

Weak conditionality is therefore defined by the following donor program:

$$\max_{\alpha,t} U_d = \max_{\alpha,t} \ln(1-t) + \beta \ln(1-\alpha+t) \tag{10}$$

$$s.t. \quad : \quad \begin{cases} U_r(\alpha, t; \theta) \geq U_r(\alpha^{SD}(\theta), t^*\left(\alpha^{SD}(\theta); \beta\right); \theta) & \text{for } \beta > \beta^T(\theta) \\ U_r(\alpha, t; \theta) \geq U_r(\alpha^{NA}(\theta), 0; \theta) & \text{for } \beta \leq \beta^T(\theta) \end{cases} \quad \text{(IR)}$$

The weak conditionality contract is characterised as follows, for $\theta = 1$.

Proposition 3 *The weak conditionality contract $\{\alpha_2^c(\beta, 1), t_2^c(\beta, 1)\}$ has the following properties:*

(i) the appropriation rate α_2^c increases with β if the corresponding no-conditionality equilibrium is characterised by the Samaritan's Dilemma. α_2^c is given by the following expression:

$$\alpha_2^c(\beta, 1) = \begin{cases} \frac{\sqrt{\beta}-\beta}{1-\beta} & \text{for } \beta > \beta^T(1) \\ \alpha_1^c(\beta, 1) & \text{for } \beta \leq \beta^T(1) \end{cases} \tag{11}$$

which is strictly increasing in β for $\beta > \beta^T(1)$ and is such that $\lim_{\beta \to 1} \alpha_2^c(\beta, 1) = \frac{1}{2}$;

(ii) the level of aid t_2^c is increasing with β and is given by the following expression:

$$t_2^c(\beta, 1) = \begin{cases} \frac{\beta\left(3+\beta^2\right)-\sqrt{\beta}(1+\beta)^2}{\left(\sqrt{\beta}-\beta\right)\left(1-\beta^2\right)} & \text{for } \beta > \beta^T(1) \\ t_1^c(\beta, 1) & \text{for } \beta \leq \beta^T(1) \end{cases} \tag{12}$$

where $\lim_{\beta \to 1} t_2^c(\beta, 1) = \frac{1}{2}$;

(iii) aid under weak conditionality is strictly higher than under strong conditionality if altruism is sufficiently high, i.e. $t_2^c(\beta, 1) > t_1^c(\beta, 1)$ for $\beta > \beta^T(1)$.

(iv) the weak conditionality contract is efficient, and Pareto superior to the no-conditionality equilibrium described in Proposition 1.

Proof. See Appendix A.1.2.

Proposition 3 (in conjunction with Proposition 2) shows that also under weak conditionality there is purchase of reforms by the donor relative to the no-aid outcome (i.e. $\alpha_2^c(\beta, 1) \leq \frac{1}{2}$). However the degree of reforms imposed under weak conditionality *falls with the value of the altruism parameter* β for values of β higher than the threshold value $\beta^T(1)$ and is therefore always lower than the level of reforms attained under strong conditionality. This is because under weak conditionality reforms are more expensive for the donor as the ruling élite in the recipient country has a higher reservation utility. Moreover the recipient's reservation utility increases with donor altruism, making the purchase of reforms via conditionality increasingly costly for the donor and inducing it to settle for lower levels of reform effort (see Figure 3, which plots the solutions for α given in Proposition 2 and Proposition 3).

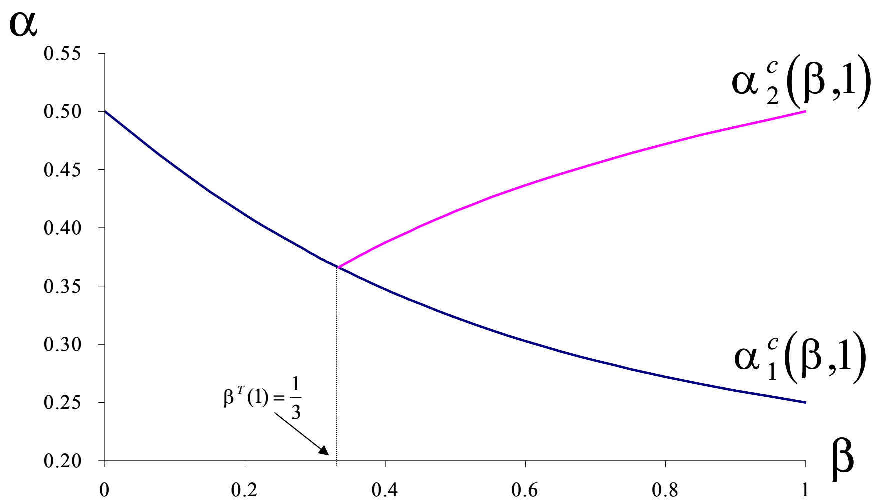


Figure 3: The appropriation rate under strong and weak conditionality (for $\theta = 1$).

Conversely, aid is higher under weak conditionality if the donor is sufficiently altruistic ($\beta > \beta^T(1)$), since the donor needs to make higher transfers to induce the recipient to reform when the recipient's reservation utility is higher. Aid flows increase with donor altruism, and do so faster than under strong conditionality (see Figure 4).[20] A perfectly altruistic donor ($\beta = 1$) transfers half of its wealth to the recipient, with no impact on reform effort relative to the no-aid benchmark (i.e. $\alpha = \frac{1}{2}$).

Proposition 3 implies that in equilibrium there can be an inverse relationship between aid and reforms across different recipients, driven by different degrees of donor altruism.[21] This is

[20] It is straightforward to show that in the determination of non-élite consumption this "aid effect" of higher altruism outweighs the corresponding "élite appropriation effect", ensuring the presence of an increasing (and concave) relationship between donor altruism and non-élite consumption (i.e. $\frac{\partial\left[(1-\alpha_2^c)c_r\right]}{\partial\beta} \geq 0$).

[21] This relationship abstracts from issues of inter-recipient competition for aid, which we analyse in the next section.

Donor altruism may vary across recipient countries as a function of a number of factors (e.g. their strategic position, history, poverty incidence, political regime).

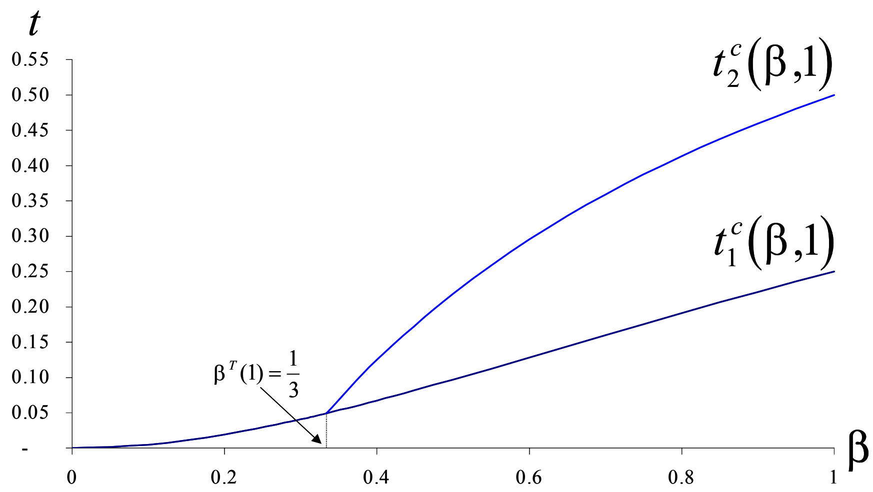


Figure 4: Aid flows under strong and weak conditionality (for $\theta = 1$).

because recipients with a more altruistic donor reform less and receive more aid than recipients with a less altruistic donor (for a given type of the ruling élite in the recipient country). As the altruism parameter varies between 0 and 1 we obtain an inverse U-shaped relationship between aid and reform (defined as $1 - \alpha$), which is plotted in Figure 5.[22] Under strong conditionality on the other hand the relationship between aid and reforms is monotonic.

This baseline model of conditionality with imperfect (i.e. weak) donor commitment can accommodate some of the recent stylised evidence on aid and conditionality. The relationship between aid and reform implied by Proposition 3 suggests this may not be monotonic across countries, if donor altruism varies across them. This can help account for the findings of Burnside and Dollar (1997)[23] that aid has had no impact on policies in recipient countries. Moreover the existence of a negatively sloped aid-reform schedule supports the empirical findings of Collier and Dollar (1999), who find that aid tapers off in good policy environments.

The main policy implication arising from the baseline model is that policy conditionality can be imposed by donors who do not have access to strong commitment technology, and that this is more efficient than the no-conditionality outcome. Donors may however be tempted to give up on traditional policy conditionality given its apparent failure (which manifests itself as a negative relationship between aid and reform), and experiment with novel forms of conditionality, such as “selectivity”. As we have shown so far this failure of traditional conditionality maybe only apparent (i.e. conditionality does not collapse in the absence of strong commitment). Moreover the ‘unpleasant’ properties associated with weak conditionality from the donor’s perspective (i.e. the fact that more altruism weakens conditionality) are due to structural Samaritan’s Dilemma

[22] The plot is obtained by tracing out the values of t and $1 - \alpha$ under strong and weak conditionality which correspond to values of the altruism parameter β between 0 and 1.

[23] This is the working paper version of Burnside and Dollar (2000), which contains the estimation of a policy equation.

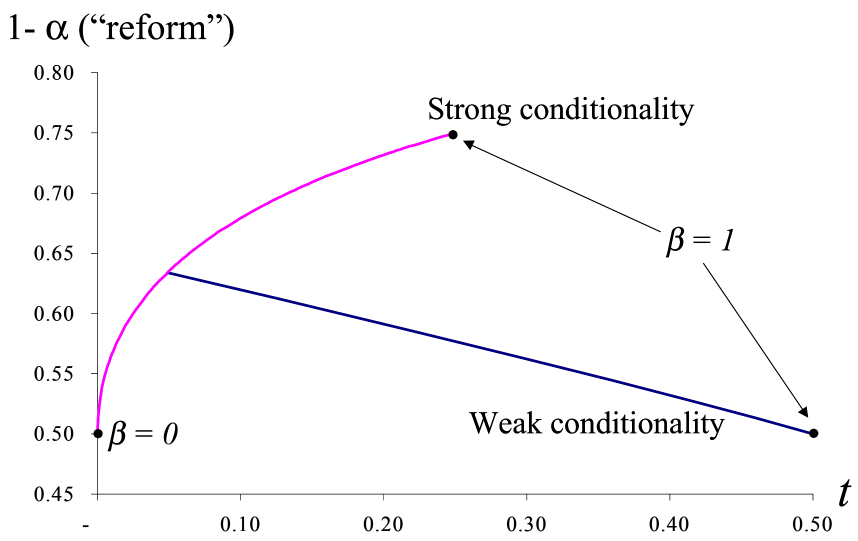


Figure 5: The relationship between aid and reform under strong and weak conditionality, for different values of $\beta \in [0, 1]$.

dynamics which cannot be easily overcome by changing the rules of the conditionality contract. We expand on both of these points in Section 4.1, where we discuss the issue of how to reform traditional policy conditionality and of how to introduce greater selectivity in the allocation of aid.

2.4 Conditionality in the General $\theta \leq 1$ Case

The following Lemma generalises the results obtained in Propositions 2 and 3 on conditional reform effort to the $\theta \leq 1$ case. This result is used in Section 3.2 of the paper, in the context of the hidden information extension of the baseline model.

Lemma 1

(i) The appropriation rate under the strong conditionality contract $\alpha_1^c(\beta, \theta)$ falls with the cost of reform for the élites in the recipient country; i.e. $\frac{\partial \alpha_1^c(\beta,\theta)}{\partial \theta} > 0$;

(ii) The same property applies to the weak conditionality contract; i.e. $\frac{\partial \alpha_2^c(\beta,\theta)}{\partial \theta} > 0$.

Proof. See Appendix A.1.3.

To sum up, this section of the paper has analysed a stylised principal-agent model of donor-recipient interaction obtaining the following results: in the absence of conditionality the donor and the recipient interact inefficiently, and the recipient enjoys a Stackelberg advantage which can lead to a Samaritan's Dilemma equilibrium if donor altruism is sufficiently high (Proposition 1); a conditionality contract can remove the inefficiency associated with the no-conditionality outcome, and its intensity is a function of the strength of donor commitment; *strong* conditionality implies an optimal purchase of reforms on the part of donors and a positive link between aid and reform as altruism varies (Proposition 2); *weak* conditionality needs to leave the recipient as well off as in the no-conditionality outcome, implying that reforms are lower and aid higher than under strong conditionality, and that reforms and aid can be inversely related across countries if donor altruism varies (Proposition 3); and, finally, the intensity of both strong and weak conditionality is negatively related to the cost of introducing income-increasing reforms for the political élite of the recipient country (Lemma 1).

3 Extensions of the Baseline Model

Two extensions of the baseline model of aid and conditionality are analysed in this section of the paper. Both of these are relevant to the contemporary debate on how to reform donor conditionality, and whether to introduce more selectivity in the allocation of aid, which we discuss in Section 4.

The first extension examines the impact of the presence of multiple aid recipients on the no-conditionality benchmark and on the conditionality contracts. This extension shows that the presence of more than one recipient leads to two separate effects: a "dilution" of donor altruism, which is now shared-out between recipients; and strategic interaction between recipients, who compete with each other for aid. These two effects can play into the hands of a donor in a set-up with weak donor commitment, by reducing the attractiveness of the Samaritan's Dilemma equilibrium for aid recipients, i.e. making their outside option when faced with a conditionality contract less appealing. Conditionality with multiple recipients therefore resembles yardstick competition (e.g. as in Holmstrom (1982)), in that the intensity of the agent's contract increases relative to a single recipient environment. This effect is however not due to the insurance properties obtained by using comparative performance information, but it is the result of strategic interaction between the recipients and its implications for the Samaritan's Dilemma.[24]

The second extension considered in this section models the impact of asymmetric information on conditionality contracts. This section draws closely on the literature on mechanism design and its applications (e.g. the regulation of privatised monopolies). Some non-standard results are however present in the case of conditionality contracts under adverse selection given the characteristics of our set-up - in particular the direct interaction between transfers and adjustment effort in the recipient's utility (i.e. the fact that aid is appropriated in inverse proportion to adjustment effort) and the presence of type-specific reservation utilities.

3.1 Multiple Recipients

In this sub-section we introduce the possibility of a donor facing more than one aid recipient. We consider here a symmetric case, where two recipients, indexed i and j, have the same cost of reform ($\theta_i = \theta_j$) and where donor altruism towards them is the same ($\beta_i = \beta_j$).

This extension of the baseline model makes it closer to the Svensson (2000a) model and obtains similar results on the implications of lack of co-ordination between recipients in the no-

[24] Pietrobelli and Scarpa (1992) argue in favour of yardstick competition in aid contracts on the basis of its positive informational role, in the context of a moral hazard model with 'strong' donor commitment.

conditionality benchmark. Our additional contribution relative to Svensson (2000a) is to draw out the implications of inter-recipient competition for aid in a set-up where a conditionality contract can survive, given the presence of weak donor commitment.

This multi-recipient extension is also similar in spirit to Bernheim *et al.* (1985) who, in the context of the family, consider whether a parent can induce an efficient provision of old-age care on the part of her kids by devising an appropriate bequest rule.[25]

3.1.1 The Unconditional Aid Equilibrium with Multiple Recipients

When faced with two potential aid recipients i and j, the donor's utility function is as follows:

$$U_d = \ln(1 - t_i - t_j) + \beta \ln(y_i + t_i) + \beta \ln(y_j + t_j) \tag{13}$$

Maximising U_d with respect to t_i and t_j yields the two unconditional aid functions:

$$\begin{aligned} t_i^* (\alpha_i, \alpha_j; \beta) &= \frac{\beta - y_i + \beta(y_j - y_i)}{1 + 2\beta}; \\ t_j^* (\alpha_j, \alpha_i; \beta) &= \frac{\beta - y_j + \beta(y_i - y_j)}{1 + 2\beta} \end{aligned} \tag{14}$$

which imply that transfers to one recipient increase with the income of the other recipient, as the donor re-distributes funds between them optimally. In the symmetric equilibrium of the game (which is realised with $\theta = \theta_i = \theta_j$, so that $y_i = y_j$), the aid function for recipient i simplifies to:

$$t_i^* (\alpha_i; \beta) = \frac{\beta - y_i}{1 + 2\beta} \tag{15}$$

which shows that transfers, for the same level of β and y_i, are lower than in the single recipient case (see equation (6)) given that altruism is now "diluted". The same aid function applies to recipient j.

The fact that the donor transfer function differs from the single recipient case implies that the no-conditionality equilibrium described in Proposition 1 changes. In particular aid transfers to each recipient country are now a function of the actions of the other recipient (see equation (14)), implying that there is strategic interaction between the two. The non-cooperative no-conditionality equilibrium is characterised as follows.[26]

Proposition 4 *The appropriation rate α in the non-cooperative sub-game perfect equilibrium of the symmetric two-recipient no-conditionality game is described the following step function $\alpha_m^{NC}(\theta, \beta)$:*

$$\alpha_m^{NC}(\theta, \beta) = \begin{cases} \alpha^{NA}(\theta) & \text{for } \beta \leq \beta_m^T(\theta) \\ \alpha_m^{SD}(\theta) \equiv \frac{3\theta}{1+2\theta} & \text{for } \beta > \beta_m^T(\theta) \end{cases} \tag{16}$$

[25] These authors argue that the presence of multiple recipients allows the parent to introduce a bequest rule conditional on the provision of old-age care which induces all kids to provide an efficient amount and restore the Rotten Kid theorem. Bernheim *et al.* however assume that the parent can stand by such a rule, sidestepping commitment problems, which are central to the issue of conditional aid.

[26] Throughout this section we denote equilibrium values in the multi-recipient case with the subscript m.

The Samaritan's Dilemma value of the appropriation rate, $\alpha_m^{SD}(\theta)$, is higher than in the single-recipient case (i.e. $\alpha_m^{SD}(\theta) \geq \alpha^{SD}(\theta)$ for $\theta \in [0,1]$) and is less likely to be chosen by the recipient (i.e. $\beta_m^T(\theta) \equiv \frac{(1+2\theta)^{1+\theta}}{[3(1+\theta)]^{1+\theta} - 2(1+2\theta)^{1+\theta}} > \beta^T(\theta)$).

Proof. The no-aid equilibrium with multiple recipients is equal to the corresponding single recipient case (see Proposition 1), since this is not a function of aid flows from the donor. The Samaritan's Dilemma equilibrium is obtained by maximising recipient utility subject to the revised donor transfer function (14), which yields the following downwards sloping reaction function for recipient i, giving i's optimal distortion level as a function of j's distortions:

$$\alpha_i^*(\alpha_j) = \frac{\theta}{1+\theta}(3 - \alpha_j)$$

and viceversa for recipient j.

The non-cooperative Samaritan's Dilemma equilibrium is given by the intersection of the two reaction functions, obtained by imposing $\alpha_i^*(\alpha_j) = \alpha_j^*(\alpha_i)$. This is higher than the Samaritan's Dilemma equilibrium in the single recipient case for $\theta < 1$, as straightforward comparison of the two values reveals.

As in the single recipient case, the threshold value of the altruism parameter β for which the Samaritan's Dilemma equilibrium sets in is given by equating the utilities of the élites in the recipient country in the no-aid and Samaritan's Dilemma equilibria respectively. This is strictly higher than the corresponding value in the single recipient case (given by Proposition 1), which can be noted by straightforward comparison of the two values. ■

Proposition 4 reveals that a multi-recipient setting modifies the no-conditionality equilibrium in two related ways. Firstly, the Samaritan's Dilemma equilibrium displays a level of distortions which is always greater or equal than the level obtained in the Samaritan's Dilemma equilibrium of the single recipient case. This is because the political élites in each recipient country compete for donor funds with the other country by impoverishing their own country and raising the level of distortions relative to a single-recipient environment. The Nash equilibrium of the period 1 game between recipients is inefficient, as players do not internalise the effects of their strategic interdependence (as in the discretion case in Svensson (2000a)).

Secondly the Samaritan's Dilemma is less likely to set in than in the single recipient case. This is because it is relatively more unattractive to each recipient since aid flows are lower (as donor funds are "shared out" between two recipients) and the level of distortions is higher (due to "competition" with the other recipient to qualify for more aid).[27,28]

To sum up, in the multi-recipient no-conditionality equilibrium the Samaritan's Dilemma is less likely to set in, but if it does set in it is more distortionary than in a single recipient setting.

[27] If recipients were able to co-ordinate their behaviour and maximise their aggregate rents, distortions would be lower than in the single recipient case (namely, $\alpha_{m,coop}^{SD} = \frac{3\theta}{2(1+\theta)}$) and the Samaritan's Dilemma would be less likely than in the single-recipient case but more likely than in the non-cooperative multi-recipient case (i.e. $\beta^T(\theta) < \beta_{m,coop}^T(\theta) < \beta_m^T(\theta)$, where $\beta_{m,coop}^T(\theta) = \frac{2^\theta}{3^{1+\theta} - 2^{1+\theta}}$).

[28] In the case of "perfect competition" (i.e. $n \to \infty$) the Samaritan's Dilemma would never realise ($\beta_m^T \geq 1$).

3.1.2 The Conditionality Equilibria with Multiple Recipients

Conditionality in a multi-recipient setting changes relative to the case modelled in the previous section for two related reasons.[29] Firstly, for a given degree of donor altruism, funds for each recipient country are scarcer so that the incentives on the part of the donor to induce reforms are lower. Secondly, the scarcity of funds is such that the recipient's incentives to behave strategically and benefit from the presence of a Samaritan's Dilemma are lower, as shown above. This in turn implies that lack of strong commitment technology is less of a constraint on the donor, which in turn strengthens the intensity of weak conditionality.

Multi-recipient strong conditionality Conditionality in the multi-recipient commitment case changes relative to the single recipient case only because effective altruism per recipient is lower. The donor does not benefit from the lower likelihood of the Samaritan's Dilemma due to the presence of multiple recipients, given that, thanks to its ability to commit strongly, it does not suffer from the existence of the Samaritan's Dilemma and does not need to account for it in the conditionality contract.

Strong multi-recipient conditionality is therefore given by the following donor program, in the symmetric case:

$$\begin{aligned} \max_{\alpha,t} U_d &= \max_{\alpha,t} \ln(1-2t) + 2\beta \ln(1-\alpha+t) \\ s.t. &: \quad U_r(\alpha,t) \geq U_r\left(\alpha^{NA},0\right) \end{aligned} \tag{17}$$

The following Proposition summarises the features of the strong conditionality contract with two recipients.

Proposition 5 *The multi-recipient strong conditionality contract* $\{\alpha^c_{1,m}(\beta), t^c_{1,m}(\beta)\}$ *has the following properties:*

(i) the strong conditionality appropriation rate $\alpha^c_{1,m}$ *is always higher than under the single-recipient contract and is decreasing with the degree of altruism.* $\alpha^c_{1,m}$ *is given by the following expression:*

$$\alpha^c_{1,m}(\beta) = \frac{\sqrt{1+5\beta^2}-3\beta}{2(1-2\beta)} \geq \alpha^c_1(\beta,1)$$

(ii) the strong conditionality appropriation rate $t^c_{1,m}$ *is always lower than under the single-recipient contract and is increasing with the degree of altruism.* $t^c_{1,m}$ *is given by the following expression:*

$$t^c_{1,m}(\beta) = \frac{\left(1+\beta+3\beta^2\right)-(1+\beta)\sqrt{1+5\beta^2}}{(1-2\beta)\left(\sqrt{1+5\beta^2}-3\beta\right)} \leq t^c_1(\beta,1)$$

Proof. See Appendix A.1.4.

With more than one recipient strong conditionality therefore leads to lower transfers and lower reforms *per recipient* in equilibrium than in the single agent case, due to the relatively smaller amount of donor funds available for each country.

[29] Also in this case, as in the single recipient one, we derive the conditionality contracts only for the case $\theta = 1$, for the sake of simplicity and of tractability. We therefore omit the parameter θ as an argument of the various functions we derive, for notational convenience.

Multi-recipient weak conditionality Weak conditionality with multiple recipients changes relative to the single recipient case not only because the no-conditionality benchmark is different but also because of the presence of strategic interaction between recipients. This implies that the conditionality contract needs to be a Nash equilibrium (NE) of the three-player game.

Whilst it is straightforward to guarantee that conditionality is the unique NE of the three-player game in the case with strong donor commitment,[30] in the weak commitment case the recipients' outside option relative to the conditionality contract needs to be modelled explicitly, and no longer necessarily corresponds to the no-conditionality outcome (as in the single recipient case), since this does not capture the full extent of the strategic interaction between recipients.

In particular the participation constraint included in the donor program for weak conditionality now needs to state that for each player accepting the conditionality contract is optimal *given that the other recipient has accepted it.* This guarantees that weak conditionality is a Nash outcome of the three-player game. It does not however imply that weak conditionality is the *unique* NE of the game, since it may still be optimal for a recipient to reject the contract if the other recipient has also rejected the contract. If this is the case the ("Reject", "Reject") strategy combination is also a NE and is necessarily payoff superior (for the recipients) to the conditionality contract.[31]

The weak conditionality program is therefore as follows (where the participation constraint is only shown for recipient i for simplicity):

$$\begin{aligned} \max_{\alpha_i,t_i,\alpha_j,t_j} U_d &= \max_{\alpha_i,t_i,\alpha_j,t_j} \ln(1-t_i-t_j)+\beta\ln(1-\alpha_i+t_i)+\beta\ln(1-\alpha_j+t_j) \\ s.t. &: U_{r,i}(\alpha_i,t_i) \geq U_{r,i}(\text{reject } \{\alpha_i,t_i\} \mid j \text{ accepts } \{\alpha_j,t_j\}) \text{ (IR)} \end{aligned} \tag{18}$$

The IR constraint given in equation (18) takes the following form, given the donor's optimal aid function (15):

$$\text{IR:} \begin{cases} U_r(\alpha_i,t_i) \geq U_r(\alpha^{NA},0) = \ln\frac{1}{4} & \text{for } \beta \leq \beta^T_{m,c}(t_j) \\ U_r(\alpha_i,t_i) \geq \ln\left[\frac{\beta}{1+\beta}\frac{(2-t_j)^2}{4}\right] & \text{for } \beta > \beta^T_{m,c}(t_j) \end{cases} \tag{19}$$

where $\beta^T_{m,c}(t_j) \equiv \left[(2-t_j)^2-1\right]^{-1}$, which is increasing in t_j (see Figure 6 for a plot of this schedule). As in the single-recipient case there is a threshold level of donor altruism above which the weak conditionality contracts needs grant to recipients a higher payoff than in the no-aid equilibrium. However in the multi-recipient case both the altruism threshold and the recipient's payoff for values of altruism above the threshold are no longer constant, and are a function of the aid transfers t_j offered to the other recipient.[32]

[30] This is achieved simply by meeting the recipient's participation constraint, which is pinned down by the no-aid equilibrium.

[31] This is because for the ("Reject", "Reject") strategy combination to be a NE, rejecting the contract needs to yield a higher payoff to each recipient than accepting the contract, given that the other recipient has rejected it. This implies that the payoff to each aid recipient from the ("Reject", "Reject") outcome is higher than from the ("Accept", "Accept") outcome.

[32] The IR constraint in the single-recipient weak conditionality program corresponds to the multi-recipient IR constraint for $t_j = 0$.

In particular, from the recipient i's perspective, a higher level of t_j increases the likelihood of the no-aid payoff being the relevant outside option for the conditionality contract ($\beta^T_{m,c}(t_j)$ increases with t_j), by lowering the Samaritan's Dilemma payoff which applies for $\beta > \beta^T_{m,c}(t_j)$. This effect is due to the fact that the more aid the donor commits under weak conditionality to one of the recipients, the less it is willing to transfer to the recipient who rejects the contract. A donor with access to weak commitment technology in a multi-recipient setting can therefore use promises of aid both as a bribe to induce reform (as in the single-recipient case), and as a *threat* if the contract is not accepted by only one of the recipients. The second effect has strategic value for the donor in a multi-recipient environment, and it arises from the donor's ability to keep its "nice" promises to recipients (i.e. transfer $t^c_{2,m}$ to one recipient if it sets $\alpha = \alpha^c_{2,m}$).[33]

The IR constraint which applies to the multi-recipient weak conditionality case also implies that aid recipients are worse off in the multi-recipient context relative to the single-recipient environment, given that their reservation utility in the single-recipient Samaritan's Dilemma case (which equals $\ln \frac{\beta}{1+\beta}$, from the IR constraint in the donor's program (10)) is higher than the corresponding level in the multi-recipient case for $t_j > 0$.

Given the presence of strategic interaction between aid recipients, the following condition is also required to guarantee that weak conditionality is the unique NE of the game:

$$\begin{aligned} U_{r,i}\left(\alpha_i, t_i\right) \quad &\geq \quad U_{r,i}\left(\text{reject } \{\alpha_i, t_i\} \mid j \text{ rejects } \{\alpha_j, t_j\}\right) \Rightarrow \\ &\Longrightarrow \quad U_{r,i}\left(\alpha_i, t_i\right) \geq U_{r,i}\left(\alpha^{NC}_m(\beta), t^*_i(\alpha^{NC}_m; \beta)\right) \end{aligned} \tag{20}$$

where $U_{r,i}\left(\alpha^{NC}_m(\beta), t^*_i(\alpha^{NC}_m; \beta)\right) = \max(\ln \frac{1}{4}, \ln \frac{\beta}{1+2\beta})$. This condition simplifies to the following expression in the symmetric $\theta = 1$ case when (19) is binding:

$$t_i \leq t^*(\beta) = 2\left(1 - \sqrt{\frac{1+\beta}{1+2\beta}}\right) \text{ for } \beta > \frac{1}{2} \tag{21}$$

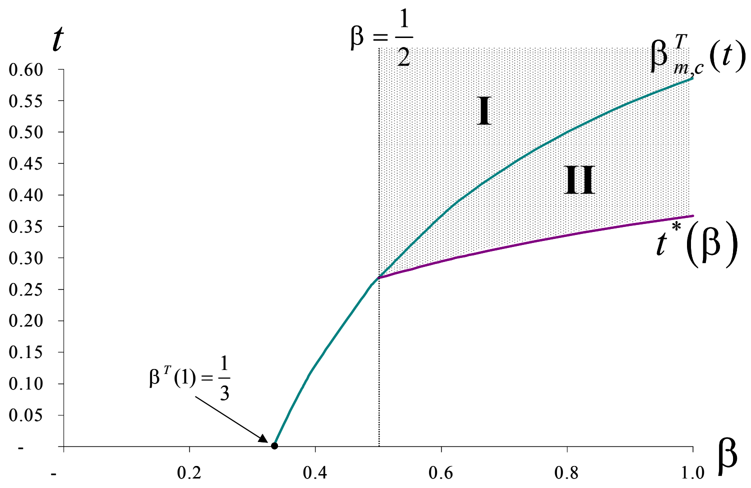
$t^*(\beta)$ is therefore the level of transfers which equalises the recipients' payoffs from the Samaritan's Dilemma no-conditionality equilibrium (i.e. the ("Reject", "Reject") equilibrium which realises for $\beta \geq \beta^T_m(1) = \frac{1}{2}$, as from Proposition 4), and the payoffs from weak conditionality, as given by the IR constraint in equation (19) for $\beta > \beta^T_{m,c}(t_j)$.[34] If the level of aid offered in the weak conditionality contract is above $t^*(\beta)$, then a situation where both recipients reject the contract is a Nash equilibrium, given that the payoff under conditionality is relatively low, due to the properties of the IR constraint (i.e. the negative relationship between the recipient's payoff under weak conditionality and t_j for $\beta > \beta^T_{m,c}(t_j)$).

[33] The notion of weak commitment technology therefore has stronger implications in a multi-recipient setting relative to a single-recipient one, given the additional strategic value for donors arising from the ability to reward good behaviour.

[34] The $\beta \leq \frac{1}{2}$ case does not need to be checked to establish the uniqueness of the conditionality equilibrium, as in this case the no-conditionality equilibrium corresponds to the no-aid equilibrium, which necessarily grants less utility to the recipients than weak conditionality (from the participation constraint (19)).

The $\frac{1}{2} < \beta \leq \beta^T_{m,c}(t)$ case (Area I in Figure 6) necessarily displays two NE since the no-conditionality equilibrium grants more utility than the no-aid outcome (given $\beta > \frac{1}{2}$) whilst recipient utility under weak conditionality equals the payoff from the no-aid outcome (given $\beta \leq \beta^T_{m,c}(t)$). Meeting the constraint expressed in equation (21) therefore necessarily rules out this range of β (i.e. the $t^*(\beta)$ schedule needs to lie below the inverse of $\beta^T_{m,c}(t)$ for $\beta \geq \frac{1}{2}$ (as it is shown in Figure 6)).

Figure 6 plots the IR constraint and the unique Nash equilibrium condition assuming symmetry in the conditionality contracts (i.e. $t_i = t_j = t$). The shaded area indicates the combinations of the altruism parameter β and aid t for which weak conditionality is not the unique NE of the game.



This figure plots two locuses of points, in terms of altruism β and the level of aid t specified in the weak conditionality contract. The first schedule, $\beta^{T}_{m,c}(t)$, is the maximum level of the altruism parameter for which the recipient's payoff from the weak conditionality contract equals the payoff in the no-aid outcome. If $\beta > \beta^{T}_{m,c}(t)$ the contract needs to offer a higher utility to the recipient, compensating it for a Samaritan's Dilemma counterfactual, which arises if the recipient rejects the contract. This schedule is upwards sloping given that the more aid is offered under the contract, the less attractive is the Samaritan's Dilemma outcome for the recipient who rejects the contract, and therefore the higher the necessary level of altruism to bring the payoffs from conditionality and from the Samaritan's Dilemma counterfactual into balance.

The $t^*(\beta)$ schedule is the locus of points where the payoff from weak conditionality equals the payoff obtained by recipients if they *both* reject the contract. If $t > t^*(\beta)$ recipients are better off if they both reject the contract, given that a higher level of aid in the contract implies a less attractive outside option if the contract is rejected by only one recipient, and therefore a less generous IR constraint. This schedule is upwards sloping for the same reasons which apply to the $\beta^{T}_{m,c}(t)$ function. The $t^*(\beta)$ schedule starts at $\beta = 0.5$, given that for $\beta < 0.5$ the recipients receive no-aid if they both reject conditionality, which cannot give them more utility than under conditionality. The shaded area indicates the combination of parameter values for which the donor-recipient weak conditionality game displays two symmetric Nash equilibria.

Figure 6: The threshold value of β and the unique NE condition for multi-recipient weak conditionality.

The symmetric weak conditionality equilibrium of the multi-recipient game is described by the following Result.

Result 1 *The symmetric weak conditionality contract* $\{\alpha^{c}_{2,m}(\beta), t^{c}_{2,m}(\beta)\}$ *derived from the donor program (18) has the following properties:*

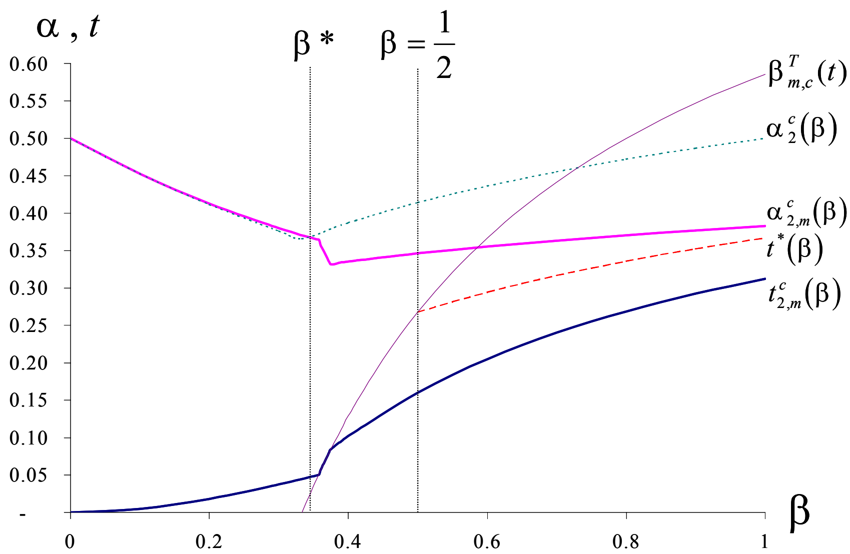
(i) the appropriation rate $\alpha^{c}_{2,m}$ *is lower than in single recipient case for sufficiently high values of the altruism parameter, i.e.* $\alpha^{c}_{2,m}(\beta) < \alpha^{c}_{2}(\beta)$ *for* $\beta > \beta^* \in \left(\beta^T, \frac{1}{2}\right)$*, where* β^* *is given by the intersection of the* $\alpha^{c}_{1,m}(\beta)$ *schedule (given by Proposition 5) and the* $\alpha^{c}_{2}(\beta)$ *schedule (given by Proposition 3), as illustrated by Figure 7; and*

(ii) it is the unique Nash equilibrium of the game

Proof. See Appendix A.1.5.

This Result shows that for sufficiently high values of the altruism parameter ($\beta > \beta^*$) the donor benefits from the presence of multiple recipients in a context with weak commitment power, by being able to purchase more adjustment effort from each recipient than in the single recipient case (as shown in Figure 7). This is because the presence of multiple recipients dilutes donor altruism, making the Samaritan's Dilemma less likely to occur, and less attractive when it occurs (see the IR constraint in equation (19)), which strengthens the donor's position. This effect can dominate the aid-budget effect due to the presence of multiple recipients identified in the case of strong conditionality (i.e. the lower incentives on the part of the donor to purchase adjustment efforts from each recipient), leading to higher reform by each recipient country.

The presence of multiple (and competing) aid recipients can therefore lead to more intense reform effort. As stated at the beginning of this section this link between the number of agents and the intensity of the principal's contract is analogous to the standard effect present in moral hazard models, even though it does not rely on risk-insurance considerations. We analyse some of the policy implications of this extension of the baseline contract in next section, in the more general context of our discussion of the current debate on how to reform donor conditionality.



This figure illustrates the optimal weak conditionality contract in a multi-recipient setting. The weak conditionality aid schedule ($t^{c}_{2,m}(\beta)$) departs from the corresponding strong conditionality one as it crosses the altruism threshold $\beta^{T}_{m,c}(t)$. There is a range of altruism over which the aid schedule and the altruism threshold coincide – the donor finds it optimal to set aid so as to leave the recipient indifferent between a no-aid outcome and accepting the contract. This requires a relatively fast increase of aid with altruism, and it therefore leads to a sharp fall in the corresponding effort level $\alpha^{c}_{2,m}(\beta)$, to keep recipient utility at the no-aid level. As altruism increases the donor finds it optimal to allow the aid schedule to depart from the altruism threshold $\beta^{T}_{m,c}(t)$, and grant to the recipient a higher utility level than under no-aid benchmark, which is increasing in its altruism, given the properties of the Samaritan's Dilemma. This in turn implies that $\alpha^{c}_{2,m}(\beta)$ is increasing in β, as in the single-recipient case. Given the implications of strategic interaction between recipients, the effort level under weak conditionality ($\alpha^{c}_{2,m}(\beta)$) is below the one in the single-recipient case ($\alpha^{c}_{2}(\beta)$), for $\beta > \beta^*$. Note finally the conditional aid level $t^{c}_{2,m}(\beta)$ lies below the $t^*(\beta)$ schedule, implying that the weak conditionality outcome is the unique Nash equilibrium of the game.

Figure 7: Weak conditionality in the multi-recipient case.

3.2 Hidden Information

In this sub-section of the paper we develop an extension of the baseline model which allows for asymmetric information between the donor and the ruling élite in the recipient country.[35] There are several ways in which asymmetric information may affect conditionality contracts. We focus here on one mechanism only, namely *adverse selection* due to hidden information about the recipient's type. We do so to highlight the formal similarity between donor conditionality and more general mechanism design problems, and also to stress the links between the issue of adverse selection among aid recipients and recent proposals for greater selectivity in donor conditionality (which we discuss in the next section of the paper).

Additional mechanisms through which considerations of incomplete information could have an impact on policy conditionality, and which we do not seek to model here, include: standard moral hazard effects (i.e. the presence of an insurance-incentives trade-off), due to the unobservability of the recipient's reform effort (see e.g. Svensson (2000a), and Pietrobelli and Scarpa (1992)); the interaction between the dynamic structure of our set-up and the unobservability of the agent's actions (i.e. as in Bagwell (1995), who shows that a Stackelberg advantage, such as the one enjoyed by the aid-recipient in our set-up, can be eroded if the donor cannot observe the recipient's choice of distortions α); and the impact of hidden information considerations on the relationship between the agent's first-mover advantage and the observability of his action (i.e. as in Maggi (1999), who shows that the Stackelberg advantage may be restored even in the presence of noise in the observation of the first-mover's action if the follower is uncertain about the leader's type, given that if this is the case the leader will have incentives to signal his type with his first move).[36,37]

In the extension we consider in this sub-section the type of the agent is private information. This is captured by the parameter θ, which determines the effective cost of intoducing income-increasing reforms for rulers (see Section 2.1). The issue of uncertainty about the true cost of reform for political leaders of aid-receiving countries has been noted by a number of commentators (e.g. Khaler (1992); Dollar and Svensson (2000)) in the context of conditional aid.[38] These authors stress the difficulties of telling apart genuine reformers (i.e. low-cost of reform types in our set-up) from opportunistic reformers, and the related potential for adverse selection. This affects the incentives of the donor when granting conditional aid and may allow recipient governments to "sell" to donors reforms which they would have implemented anyway (Collier (1997)).

Uncertainty about the type of the agent gives rise to a problem of optimal mechanism design for the donor, in a fashion which is for instance analogous to the regulation of a private monopoly under hidden information with costly public transfers (see Baron and Myerson (1982)

[35] Azam and Laffont (2000) consider a model of conditionality which is similar in spirit to this extension.

[36] The Stackelberg (or "Samaritan's Dilemma") characterisation of our recipient-donor game is therefore appropriate as long as the uncertainty about the recipient's type is large relative to the observation noise.

[37] A related result is illustrated by Lagerlof (1999), who shows that if the agent's type is payoff-relevant to the principal, then the agent has incentives to signal his type by means of his first move, which can weaken the Samaritan's Dilemma and therefore strengthen a donor with weak commitment. In our set-up the type of the recipient country does not affect the donor's utility function, so that this effect is not present.

[38] This is treated in the more general context of international relations and ratification of international agreements by Putnam (1988) and Iida (1993).

and Laffont and Tirole (1986)). In these models a regulator wants to induce a firm to price at marginal cost, to maximise social welfare, but it finds it costly to make the transfers necessary to cover the company's fixed costs (e.g. because they need to be raised via distortionary taxation). Similarly, in the model of conditional aid presented here, the principal wants to induce reforms from an agent but finds the aid transfers necessary do so costly because of imperfect altruism. In both set-ups the presence of hidden information, and the related need to grant information rents to some agents, induces the principal to distort the agents' choice of effort.

To illustrate the nature of optimal mechanism design in the context of conditional aid consider a situation where the parameter θ can take one of two values, $\bar{\theta}$ and $\underline{\theta}$, where $\bar{\theta} = 1$ and $\underline{\theta} < 1$. This implies that the indifference curves of $\bar{\theta}$-types (or high cost of reform types) are flatter than the indifference curves of $\underline{\theta}$-types (or low cost of reform types) when they cross, which satisfies the single-crossing condition necessary for contract implementability (see Figure 8).[39]

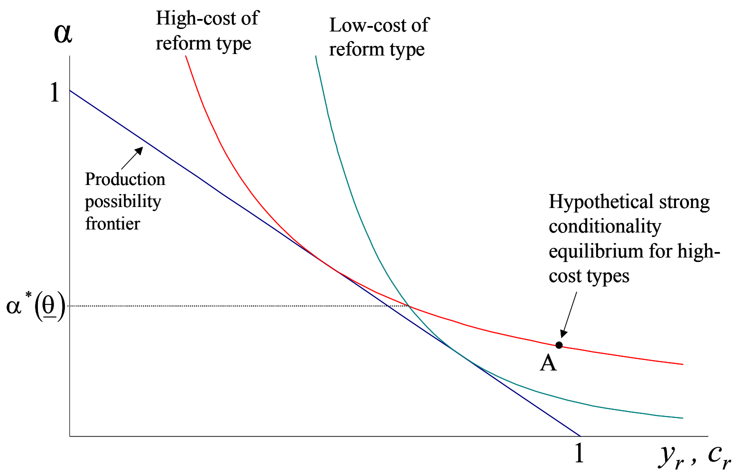


Figure 8: Single crossing condition.

As Figure 8 shows a low-cost type may "envy" the conditionality contract offered to a high-cost type if this lies above its indifference curve at the relevant unconditional aid equilibrium (e.g. point A in Figure 8, which depicts an hypothetical strong conditionality equilibrium for the high-cost type). This occurs if the level of reform effort α specified in the complete information conditionality contract designed for the high-cost type is lower than a threshold value, which is given by the intersection of the indifference curves of the two types at the relevant no-conditionality equilibrium. We denote this threshold level of α as $\alpha^*(\underline{\theta})$ (see Figure 8) and derive it formally in Proposition 6 below. If the complete-information reform effort for high-cost types is lower than $\alpha^*(\underline{\theta})$,[40] then the donor will find it optimal to distort the conditionality contracts identified in the complete-information model in order to make them

[39]The single-crossing condition requires the agent's type to affect the slope of the agent's indifference curve in a systematic manner (i.e. $\frac{\partial}{\partial \theta}\left(\frac{\partial U_r/\partial \alpha}{\partial U_r/\partial t}\right) > 0$), which is satisfied in our set-up. Given the presence of non-quasi linear utilities additional conditions are necessary for contract implementability, which are also satisfied in our set-up (see Guesnerie and Laffont (1984)).

[40]This in turn is the case if the altruism parameter is sufficiently high (see Proposition 6 below).

incentive compatible for both types and induce self-selection (by the Revelation Principle).

The standard solution to this problem is to identify the aid-reforms pair which makes both the incentive-compatibility constraint of the low-cost types (i.e. the types which have incentive to deviate from the full-information first best) and the individual rationality constraint of high-cost types binding. With equal reservation utilities for both types this implies that the participation constraint of low-cost type is automatically met. However in our set-up reservation utility decreases with θ, so that the individual rationality constraint for low-cost types needs to be included in the donor program as well.[41,42]

Strong conditionality under asymmetric information is therefore given by the following donor program:[43]

$$\begin{aligned} \max_{\bar{\alpha},\underline{\alpha},\bar{t},\underline{t}} U_d &= \max_{\bar{\alpha},\underline{\alpha},\bar{t},\underline{t}} (1-v)\left[\ln(1-\underline{t})+\beta\ln(1-\underline{\alpha}+\underline{t})\right]+v\left[\ln(1-\bar{t})+\beta\ln(1-\bar{\alpha}+\bar{t})\right] \\ s.t. &: \; U_r(\underline{\alpha},\underline{t},\underline{\theta}) \geq U_r(\bar{\alpha},\bar{t},\underline{\theta})(\underline{\text{IC}}) \\ &: \; U_r(\bar{\alpha},\bar{t},1) \geq U_r(\alpha^{NA}(1),0,1)\ (\overline{\text{IR}}) \\ &: \; U_r(\underline{\alpha},\underline{t},\underline{\theta}) \geq U_r(\alpha^{NA}(\underline{\theta}),0,\underline{\theta})\ (\underline{\text{IR}}) \end{aligned} \tag{22}$$

where $v \in (0,1)$ is the probability assigned by the donor of the agent being a high-cost type and $\{\bar{\alpha},\bar{t}\}$ and $\{\underline{\alpha},\underline{t}\}$ are the contracts designed for high- and low-cost types respectively. The solution to this program, defined as $\{\hat{\alpha}_1^c(\beta,\theta),\hat{t}_1^c(\beta,\theta)\}$, is characterised by the following Proposition.

Proposition 6 *The strong conditionality contract under asymmetric information over the agent's type has the following properties in the two-player case:*

(i) it departs from the complete information contract if donor altruism β is sufficiently high, i.e. $\beta > \hat{\beta}(\underline{\theta})$. $\hat{\beta}(\underline{\theta})$ is a strictly decreasing function of $\underline{\theta}$ ranging between 0 and 1 for $\underline{\theta} \in [0,1]$;

(ii) if $\beta > \hat{\beta}(\underline{\theta})$, then $\hat{\alpha}_1^c(\beta,1) > \alpha_1^c(\beta,1)$, i.e. the contract designed for high-cost types is distorted relative to the complete information benchmark, and it displays lower reform-effort; and

(iii) if $\beta > \hat{\beta}(\underline{\theta})$ and $\underline{IR}$ is slack, then $\hat{\alpha}_1^c(\beta,\underline{\theta}) > \alpha_1^c(\beta,\underline{\theta})$, i.e. the contract for low-cost types is also distorted. $\underline{IR}$ is slack as long as $v > v^* \in (0,1)$.

Proof. Part (i). The incentive compatibility constraint of low-cost types $\underline{IC}$ is slack under the pair of complete information contracts $\{\alpha_1^c(\beta,\theta), t_1^c(\beta,\theta)\}$ with $\theta \in \{\underline{\theta},1\}$, if $\alpha_1^c(\beta,1) > \alpha^*(\underline{\theta})$. $\alpha^*(\underline{\theta})$ is given by the intersection of the two types' indifference curves tangential to the no-aid equilibria (see Figure 8), i.e. $\alpha^*(\underline{\theta}) = \left[\frac{\exp U_r(\alpha^{NA}(\underline{\theta}),0,\underline{\theta})}{\exp U_r(\alpha^{NA}(1),0,1)}\right]^{\frac{1}{1-\underline{\theta}}} = \left[\frac{(1+\underline{\theta})^{1+\underline{\theta}}}{4\underline{\theta}^{\underline{\theta}}}\right]^{\frac{1}{1-\underline{\theta}}}$, which is strictly increasing in $\underline{\theta}$ and lies between $\frac{1}{4}$ and $\frac{1}{2}$ for $\underline{\theta} \in (0,1)$.

$\hat{\beta}(\underline{\theta})$ is therefore given by the inverse of $\alpha_1^c(\beta,1)$ evaluated at $\alpha^*(\underline{\theta})$. Given the properties of $\alpha_1^c(\beta,1)$ (see Proposition 2) and those of $\alpha^*(\underline{\theta})$, $\hat{\beta}(\underline{\theta})$ is decreasing in $\underline{\theta}$, and lies between 0 and 1 for $\underline{\theta} \in [0,1]$.

[41] Under strong conditionality the reservation utility of the agent is equal to $\ln\frac{\theta^\theta}{(1+\theta)^{1+\theta}}$ which is decreasing in θ. The same property applies to weak conditionality.

[42] This is the case also in some extensions of the standard regulation model (e.g. Laffont and Tirole (1990)).

[43] We only consider strong conditionality in what follows for simplicity. Similar results apply would apply to the weak conditionality case.

For $\beta > \hat{\beta}(\underline{\theta})$, $\underline{IC}$ therefore binds (i.e. the low-cost types envy the complete information contract offered to high-cost types, given that $\alpha_1^c(\beta, 1) < \alpha^*(\underline{\theta})$), inducing the donor to distort the complete information contracts.

Part (ii). Using Proposition 1 and combining $\overline{IR}$ and $\underline{IC}$ (which are both binding for $\beta > \hat{\beta}(\underline{\theta})$) gives the following expression for the information rents ($\underline{R}$) of low-cost types:

$$\underline{R} = \ln \frac{1}{4\bar{\alpha}^{1-\underline{\theta}}} - \ln \frac{\underline{\theta}^{\underline{\theta}}}{(1+\underline{\theta})^{1+\underline{\theta}}} \tag{23}$$

which is decreasing in $\bar{\alpha}$. Given that the donor dislikes granting rents to the élites in the recipient country (see the Proof of Proposition 2) this implies that it faces an additional incentive to increase $\bar{\alpha}$, which is not present under strong conditionality with no information asymmetries. Therefore, as long as asymmetric information is a constraint for the donor (i.e. $\beta > \hat{\beta}(\underline{\theta})$), $\bar{\alpha}$ will be increased relative to its strong conditionality level to reduce the information rents granted to low-cost types. Note that it is never optimal for the donor to increase $\hat{\alpha}(\beta, 1)$ beyond $\alpha^*(\underline{\theta})$, given that if $\hat{\alpha}_1^c(\beta, 1) = \alpha^*(\underline{\theta})$, then $\underline{R} = 0$ (see Figure 10).

Part (iii) is obtained by substituting for the binding $\overline{IR}$ and $\underline{IC}$ into the donor's program and differentiating with respect to $\underline{\alpha}$. This gives the following FOC:

$$(1-\beta)\underline{\alpha}^{1+\underline{\theta}} + 2\underline{\theta}\beta\underline{\alpha}^{\underline{\theta}} = \frac{\underline{\theta}(1+\beta)}{4\bar{\alpha}^{1-\underline{\theta}}} \tag{24}$$

If $\underline{\text{IR}}$ is slack and information rents $\underline{R}$ are positive, the r.h.s. of equation (24) is higher than under strong conditionality (see the Proof of Lemma 1 and equation (23) above), which implies a higher value of $\underline{\alpha}$ for the FOC to hold. If $\underline{\text{IR}}$ binds the FOC is equal to the one under strong conditionality, and the contract is therefore not distorted.

The expected cost to the donor of granting information rents to low-cost types goes to 0 as v (i.e. the probability of the recipient being of a high-cost type) goes to 1. Conversely, as v goes to 0, the expected cost of distorting the contract of high-cost types (i.e. raising $\bar{\alpha}$ towards $\alpha^*(\underline{\theta})$), converges to 0. This implies that there is a threshold value of v, $v^* \in (0, 1)$, above which $\underline{\text{IR}}$ is slack and both contracts are distorted (i.e. $\hat{\alpha}_1^c(\beta, \theta) > \alpha_1^c(\beta, \theta)$ for $\theta \in \{\underline{\theta}, 1\}$ and $v > v^*$). ■

Proposition 6 shows that for sufficiently high values of the altruism parameter asymmetric information may force the donor to *distort both conditionality contracts and reduce adjustment efforts* (see Figure 9 for an illustration of this kind of equilibrium). This is the case if information rents for low-cost types are positive. This in turn occurs for a sufficiently high probability of the recipient being of a high-cost type, which makes the donor unwilling to distort its contract to the extent necessary to reduce to zero the information rents of low-cost types (i.e. by imposing $\bar{\alpha} = \alpha^*(\underline{\theta})$).

Figure 10 provides a numerical example of the donor's optimal hidden-information conditionality (assuming $\beta = \underline{\theta} = \frac{1}{2}$). This illustrates the relationship between the information rents of low-cost types $\underline{R}$ (expressed as a percentage of their utility under complete information), the optimal reform effort of high-cost types under the hidden-information contract (i.e. $\hat{\alpha}_1^c(\beta, 1)$), and the frequency of high-cost types v. As v increases, the cost of providing information rents

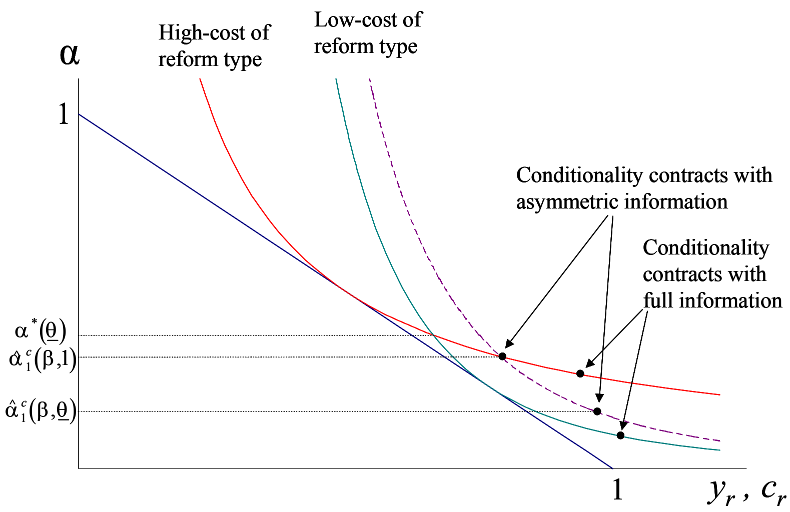


Figure 9: Conditionality contracts with hidden information.

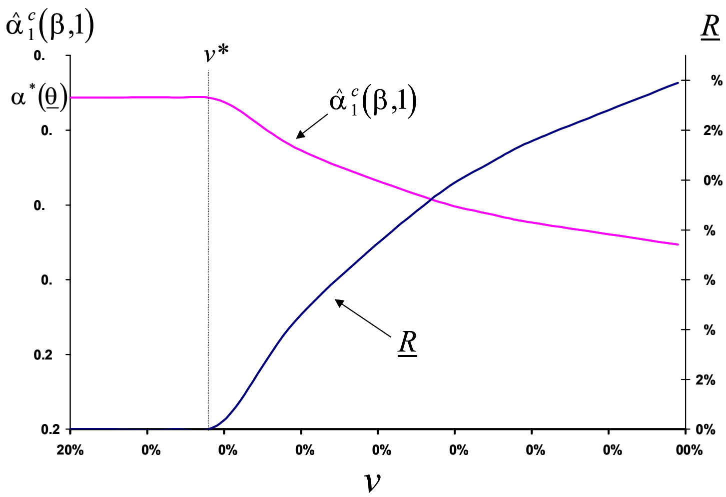


Figure 10: Numerical simulation of an optimal hidden-information full conditionality contract.

to low-cost types falls (so that $\underline{R}$ increases), and the cost of distorting the high-cost contract increases (implying a lower value for $\hat{\alpha}_1^c(\beta, 1)$).

The results given in Proposition 6 violate the standard "no distortions at the top" results from optimal mechanism design, which states that under hidden information contracts are not distorted relative to their full information benchmark for the most efficient types. This non-standard result arises because in our set-up agents appropriate donor transfers in proportion to the level of reform they carry out, which implies that there is a direct interaction between reform effort and transfers.[44] This interaction is such that transfers yield more utility to agents the lower the level of reform (i.e. the higher is α), so that the level of reform effort has a marginal impact on the effectiveness of aid in providing rents to the recipient. This in turn implies that if the donor has to grant information rents to the low-cost agent, it finds it optimal to employ also the reform instrument to do so, rather than simply increasing transfers (as in the standard mechanism design set-up). Note that this relationship between reform and the agent's rents is also apparent from the properties of the full information weak conditionality contract (see Proposition 3), where a more demanding participation constraint (which arises as the value of the altruism parameter increases) induces the donor to lower reform effort relative to strong conditionality.

This extension of the baseline model shows how information deficiencies working against the donor may complement and strengthen commitment problems, leading to a further reduction in the intensity of conditionality. It also shows that the baseline aid model developed in this paper can give rise to issues of optimal mechanism design from the donor's perspective. This interpretation allows for a direct application of existing results in the screening literature to the issue of conditional aid, on a number of dimensions which are of empirical relevance to donor-recipient relationships, such as issues of common agency due to multiple donors, dynamic interaction with ratchet effects and comparative performance evaluation (see e.g. Olsen and Torsvik (1993) and Meyer and Vickers (1997)). We discuss some of the policy implications of the modelling of conditionality with adverse selection presented here in the following section of the paper.

4 Discussion: Conditionality, Selectivity and Aid Effectiveness

In this discussion we touch upon two issues which have dominated recent academic and policy work on how to reform donor conditionality in the context of foreign aid: *selectivity* and *aid effectiveness*. The results we have presented in this paper have implications for both of these issues. In particular, the model of conditionality with weak commitment we have put forward suggests that reforming policy conditionality in favour of greater selectivity is likely to be effective only if this is interpreted as introducing greater competition for donor funds amongst recipients. Secondly, an implication of our modelling of policy conditionality with weak donor commitment is that the presence of positive interaction between aid effectiveness and reform (as suggested by the work of Burnside and Dollar (2000)) can strengthen traditional policy conditionality.

[44] Note that the violation of the standard quasi-linearity assumption for the agent's utility function is not sufficient per se to lead to a violation of the "no distortions at the top" result (see Laffont and Rochet (1998)).

There might therefore be a positive causal link running from the effectiveness of aid to the one of conditionality, which is alternative to the one working in the opposite direction (from conditionality to aid), which is implicit in the Burnside-Dollar results.

4.1 Conditionality and Selectivity

Over the past few years there has been a significant shift in donors' thinking and rhetoric on policy conditionality. This has largely been driven by the perception that traditional conditionality has failed to promote an effective use of foreign aid, and that as a result foreign aid has largely been unsuccessful in stimulating growth in recipient countries (Burnside and Dollar (2000)).

A number of authors have attributed the apparent failure of traditional *policy-change* conditionality (i.e. the promise of aid in exchange for policy changes) to its flawed design. This has been criticised for being time-inconsistent (given the donors' lack of commitment power), excessively "short-leash" (thus undermining the "ownership" of policy reforms) and too undiscriminatory across recipient countries (and therefore not allowing committed reformers to signal their 'type') (see e.g. Collier *et al.* (1997)).

An alternative design for aid contracts which has been recently put forward (see e.g. World Bank (1998); Dollar and Svensson (2000)) hinges around the concept of *selectivity* or *policy-level* conditionality. Under this alternative design donors would lend only to committed reformers, which self-select by adopting good policies before aid is given.[45] Aid would therefore serve as an ex-post reward to countries with good policies rather than as ex-ante bribe to induce unconvinced policy-makers to adopt such policies. This would in turn enhance the effectiveness of aid flows in raising growth in recipient countries.

The concept of selectivity is arguably still rather nebulous, and susceptible to a number of alternative interpretations. In this discussion we identify three possible approaches to donor selectivity, which the formal results of this paper have a bearing upon.

The first approach would be to identify the main difference between traditional conditionality and selectivity as one of *timing*. Whilst the former is *ex-ante* (i.e. the donor moves before the recipient, and offers aid in tranches to induce incremental policy improvements), the latter is *ex-post* (i.e. the donor rewards good policies ex-post, therefore effectively front-loading the conditionality). Our results suggest that simply modifying the timing of the donor-recipient game cannot get around the fundamental time-inconsistency constraint on conditionality contracts. This arises from the fact that the donor's marginal utility from giving aid is higher in bad-policy (and therefore low-income) environments, than in good-policy ones. Therefore ex-post donors have incentives to "reward" bad policies, and would find it just as hard to stick to the tough implicit threats which underlie a selectivity approach, as to comply with the explicit threats contained in a "strong" conditionality contract (as defined in this paper). This suggests that donors with weak commitment power cannot escape the consequence of the Samaritan's

[45] Quoting from Dollar and Svensson (2000, p. 896):

> [...] the role of donors is to identify reformers not create them. Development agencies need to devote resources to understanding the political economy of different countries and to finding promising candidates to support. The key to successful adjustment lending is to find good candidates to support.

Dilemma which underlies the no-conditionality game by simply modifying the timing of the aid game.

Indeed, the form of conditionality modelled in the stylised two-period set-up of this paper is *ex-post*, in the sense that under the conditionality contract donors reward good policy levels after the production period, granting aid in a single tranche. As we have shown, a donor with weak commitment power can only achieve second-best conditionality in this set-up, and cannot escape the consequences of its limited commitment powers. On the other hand, if aid effectiveness and reform interact positively, giving aid once policies have been changed can lead to more effective conditionality, as we discuss in Section 4.2.

A second interpretation of selectivity is based around the concept of *yardstick competition* between recipients. This is discussed by Collier *et al.* (1997) and Svensson (2000b). Under this approach selectivity implies that donors centralise their aid budgets, and give aid on the basis of relative performance. As mentioned above, in a moral-hazard setting with strong donor commitment, this has beneficial incentive properties, by reducing the risk borne by agents. Our results suggest an additional rationale for this form of selectivity, which does not rely on risk-considerations and applies also under conditions of weak donor commitment. By inducing recipient competition for aid, donors can worsen the attractiveness of the Samaritan's Dilemma from the recipients' point of view, and exploit their ability to keep nice promises to their advantage.[46] Introducing selectivity as yardstick competition is therefore a reform which can strengthen donor conditionality.

Thirdly, one might interpret selectivity as a way of distinguishing between good and bad *types* among recipient countries (e.g. as suggested by the quote from Dollar and Svensson (2000) in footnote 45), and giving aid only to good types. This can be seen as a solution to the adverse selection problem due to the presence of hidden information, which would consist of offering a menu of aid contracts which is only attractive to low-cost of reform types and which therefore excludes high-cost types (see Section 3.2).

As our modelling of a situation with hidden information suggests, this is a feasible strategy for the donor: by offering only contracts which require high levels of policy reforms (i.e. low levels of α) in exchange for relatively little aid, the donor can induce good types to self-select, without having to grant them information rents and distort their contract. This would however imply not imposing any conditionality on bad types, and accepting the inefficiency of the no-conditionality outcome for these countries.

As Proposition 6 shows, adopting this selectivity strategy would not be optimal for the donor: its expected utility is higher if it offers a menu of contracts which attracts both bad and good reformers, and induces them to self-select. The gain from inducing bad types to improve policies therefore outweighs the loss from having to distort the contract chosen by the good types. This is especially the case if there are many bad-types amongst aid recipients.

A final consideration regarding the current debate on reforming conditional aid practices is partially related to the adverse selection point. The level of conditionality donors can impose

[46]This mechanism is alternative to the one identified by Svensson (2000b) which relies on the presence of a positive interaction between reform and aid effectiveness, and assumes that donors care about the level of poverty reduction rather than about the poverty level itself. Under these conditions the donor's promise to reward good performers is credible, as this enhances aid effectiveness (in terms of poverty reduction), even though it may imply giving little aid to countries with high poverty levels.

even in the absence of strong commitment may appear to imply a failure of conditionality, given that it can give rise to an inverse relationship between aid and reforms. This may tempt donors to stop offering these contracts, and disengage from bad performers. As we have shown in this paper, this failure of conditionality is only apparent, and the weak conditionality contract is efficient and it induces an improvement in policies, even though it suffers from the donor's limited commitment power. From the donor's point of view (and from the perspective of the non-élite population in the developing country), these contracts are still superior to the no-conditionality outcome which would result by moving away from policy conditionality.

4.2 Conditionality and Aid Effectiveness

Some of the recent empirical work on the impact of foreign aid on developing countries suggests that this has on average been ineffective in raising growth levels (Boone (1996); Burnside and Dollar (2000)). The work by Burnside and Dollar (2000) also finds that aid is effective in good policy environments, implying that a key reason behind the failure of foreign aid is the failure of the conditionality which is attached to it. If conditionality were effective in inducing good policies, then aid would be effective too.

Notwithstanding the fact that some of this empirical work is disputed from an econometric point of view (see e.g. Hansen and Tarp (2000)), the analytical set-up presented in this paper suggests that an alternative causal link between aid and conditionality effectiveness may be present, running from the former to the latter. That is, policy conditionality is strengthened if aid effectiveness is positively related to the quality of policies in the recipient country.

This interaction between the effectiveness of aid and that of conditionality is due to two distinct effects present in our model. The first is that, in the presence of a positive Burnside-Dollar (BD) interaction between reform and aid effectiveness, the Samaritan's Dilemma equilibrium is less attractive for the recipient. This is because under this equilibrium policy is bad, implying that aid is relatively ineffective in stimulating domestic income, thereby reducing the donor's incentive to transfer aid and the ruling élite's benefits of receiving aid.

This effect can be introduced formally in the baseline model of this paper by allowing for an aid effectiveness variable $e(\alpha)$ which measures the impact of a given level of aid on the recipient country's income, i.e. $y_r = 1 - \alpha + e(\alpha)\,t$, so that $\frac{\partial y_r}{\partial t} = e(\alpha)$. To capture the BD interaction effect we assume that aid effectiveness is positively correlated with reform ($\frac{\partial e(\alpha)}{\partial \alpha} < 0$), and that it can never be negative ($e(1) > 0$). This is satisfied by a linear aid-effectiveness function of the following form, $e(\alpha) = 1 - \lambda(\alpha - \frac{1}{2})$, where $\lambda \in [0, 2]$ measures the strength of the interaction between policy and aid. This functional form normalises aid-effectiveness to 1 at the no-aid equilibrium ($\alpha = \frac{1}{2}$). The baseline model of conditional aid presented in the main body of the paper therefore corresponds to the case $\lambda = 0$ (which implies constant aid effectiveness, equal to 1).

It is straightforward to show that in the presence of the linear aid effectiveness function given above, the Samaritan's Dilemma is less distortionary, less attractive and thus less likely, than in the baseline $\lambda = 0$ case.[47] This strengthens the intensity of weak conditionality, in a fashion

[47] In particular (for the case $\theta = 1$), we obtain $\alpha^{SD} = \frac{4+\lambda}{4(1+\lambda)}$, $U_r(\alpha^{SD}, t^*(\alpha^{SD})) = \frac{(4+\lambda)^2}{16(1+\lambda)} \frac{\beta}{1+\beta}$, and $\beta^T = \frac{4(1+\lambda)}{12+4\lambda+\lambda^2}$ (see Appendix A.1.6). This generalises the results obtained in Section 2.3 to the $\lambda \in [0, 2]$ case.

similar to the multi-recipient extension modelled in Section 3.1. If the positive interaction between reform and aid effectiveness is very strong (e.g. $\lambda = 2$, using the functional form for $e(\alpha)$ given above), then the Samaritan's Dilemma disappears, and the donor does not suffer from its weak commitment power.

The second effect which arises from the presence of a Burnside-Dollar interaction affects both strong and weak conditionality: if better policies increase aid effectiveness, then an altruistic donor faces greater incentives to purchase reforms via conditionality. This effect can be seen in isolation from the first effect by comparing the strong conditionality reform-effort schedule for $\lambda > 0$ and the corresponding one for $\lambda = 0$ (the baseline case). Figure 11 plots these two schedules, assuming $\lambda = 1$ in the positive-λ case, showing that conditionality is more intense in the presence of a BD interaction term between reform and aid effectiveness.[48] Figure 11 also plots the corresponding weak conditionality profiles for α, illustrating the fact that for $\lambda > 0$ the weak conditionality schedule departs from the strong conditionality one for higher values of altruism than in the baseline case, and always lies below the corresponding $\lambda = 0$ one.

Policy conditionality is therefore more effective in promoting reforms if aid effectiveness is driven by the quality of policies. This does not however imply that aid and reform will necessarily correlate positively across recipient countries, if donors only have access to weak commitment technology.

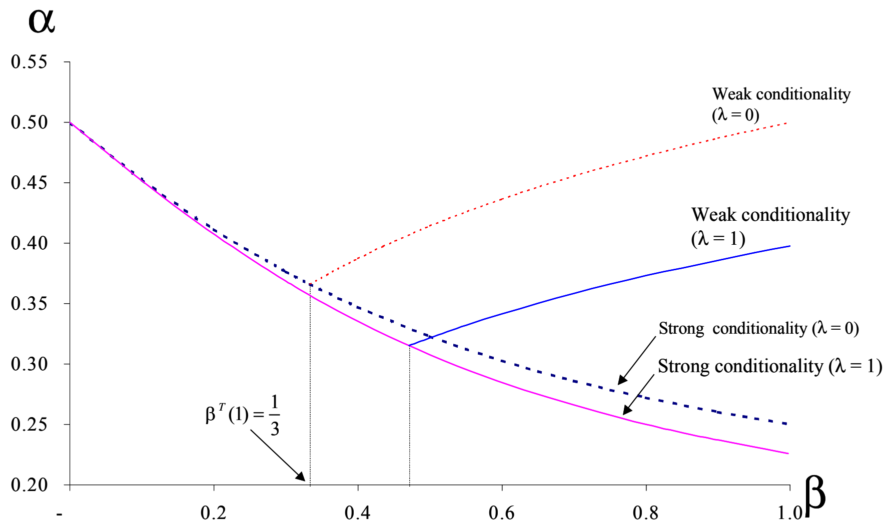


Figure 11: Reforms under strong and weak conditionality in the presence of positive reform-aid effectiveness interaction.

[48] Appendix A.1.6 derives the first order conditions of the donor's program for $\lambda > 0$, for both strong and weak conditionality.

5 Conclusion

Policy conditionality has been the subject of intense discussion from both a policy and an academic perspective since the mid-1980s, when the donor practice of conditioning financial assistance to the implementation of wide-ranging macroeconomic reforms in recipient countries became increasingly common. Following recent influential work carried out at the World Bank (e.g. World Bank (1998)), there has been a renewed interest in both analytical work on conditionality, and empirical evidence on its effectiveness. This has lead to a re-evaluation of traditional forms of policy conditionality, in favour of an alternative approach with promotes donor *selectivity*.

This paper contributes to the current discussion on the nature and prospects for donor conditionality from an analytical standpoint. It clarifies the nature of conditionality contracts and highlights a number of factors which affect the donors' ability to attach conditions to their financial support. This analysis has direct implications on the desirability and potential effectiveness of introducing greater selectivity in the donors' relationship with aid recipients.

The baseline model presented in this paper is a dynamic agency model which recognises that aid-recipients have a structural first-mover advantage in their relationship with donors, which can lead to "Samaritan's Dilemma" outcomes. These are characterised by poor policies in recipient countries and high aid transfers from donors, and are Pareto inefficient.

Conditionality contracts are needed to achieve efficiency in donor-recipient relationships. "Tough" donors (i.e. who have access to *strong* commitment technology, as defined in Section 2.3.1 of the paper) can impose contracts which remove the recipient's Stackelberg-advantage, and lead to an optimal purchase of good policies from the donor's perspective. On the other hand, a donor with weak commitment power will only be able to impose a less high-powered form of conditionality. If this is the case the donor will suffer from its own altruism, given the impact this has on the underlying Samaritan's Dilemma and therefore on the recipient's participation constraint. This in turn can lead to an inverse relationship between aid and reform across different recipients, as donor altruism varies, giving the impression that conditionality is 'failing'.

The extensions considered in this paper show that donors can benefit from the presence of competition for aid transfers among recipients; and that they suffer from the presence of hidden information about the recipient's type, which can lead to less intense (and sub-optimal) conditionality for all types.

These results suggest that reforms of donor conditionality can be effective in strengthening the donor's position and improving policies in recipient countries if they increase the extent to which aid recipients compete with each other. Reforms which focus on changing the timing of aid transfers (i.e. moving from 'ex-ante' to 'ex-post' conditionality) or that aim to exclude bad types from conditionality contracts are likely to be unsuccessful, on the basis of the analysis presented here.

An extension of the framework presented in this paper which would add to its realism and policy relevance would involve endogenising the political economy of the recipient country (e.g. the size of the elite, as measured by θ) on the policies they implement (see e.g. Coate and Morris (1999)). This would give further incentives to a patient donor to impose policy conditionality, in order to induce favourable changes in the political economy of the aid-recipient. This would in turn strengthen one of the policy implications of this paper, namely that donors should not disengage from 'bad types', excluding them from conditionality contracts.

A Appendix

A.1 Omitted Proofs

A.1.1 Proof of Proposition 2

Proof. The strong conditionality values of α and t are given by the donor's constrained optimisation program. Note first that the donor wants to make the recipient élite's participation constraint bind. This is because any aid-reform combination offered by the donor as part of a conditionality contract which leaves positive rents to the recipient relative to the no-aid equilibrium can be improved by the donor by an alternative combination with higher reform effort and lower aid flows which leaves recipient income unaltered and which makes the participation constraint bind. Substituting for $t_1^c(\beta, 1)$ from the participation constraint in the donor's maximand and maximising relative to $\alpha_1^c(\beta, 1)$ yields the following first order condition in α:

$$(1-\beta)\alpha^2 + 2\beta\alpha = \frac{1+\beta}{4} \tag{25}$$

The unique positive root of (25) is the value of α given in part (i) of the Proposition. $t_1^c(\beta, 1)$ is obtained by substituting the equilibrium value of $\alpha_1^c(\beta, 1)$ into the agent's participation constraint.

We can show that $\alpha_1^c(\beta, 1)$ is decreasing in β by differentiation of (8) which yields the following:

$$\frac{\partial \alpha_1^c(\beta, 1)}{\partial \beta} = \frac{1 + 3\beta - 2\sqrt{1+3\beta^2}}{2\left(1-\beta^2\right)\sqrt{1+3\beta^2}}$$

which is less than zero given that $2\sqrt{1+3\beta^2} > 1 + 3\beta$.

The values of $\alpha_1^c(\beta, 1)$ at $\beta = 0$ and $\beta = 1$ follow by imposing $\beta = 0$ and $\beta = 1$ in (25) respectively and solving for α. The corresponding values of $t_1^c(\beta, 1)$ are obtained by substitution from the participation constraint.

The rest of part (ii) of the Proposition follows from the participation constraint, which shows that α and t in the strong conditionality contract need to be inversely related for $\alpha < \arg\max_\alpha \alpha(1-\alpha+t) = \frac{1+t}{2}$, which is necessarily the case under strong conditionality (from part (i) of Proposition 1). Therefore, if $\alpha_1^c(\beta, 1)$ is decreasing in β, $t_1^c(\beta, 1)$ needs to be increasing in β.

Part (iii) follows trivially from the nature of the donor's optimisation, and is clearly illustrated by Figure 2. ■

A.1.2 Proof of Proposition 3

Proof. Parts (i) and (ii) are given by following the same procedure used to prove parts (i) and (ii) of Proposition 2, using the revised participation constraint for $\beta > \beta^T(1)$. This yields the following first order condition in α

$$(1-\beta)\alpha^2 + 2\beta\alpha = \beta \tag{26}$$

whose unique positive root is the solution for $\alpha_2^c(\beta,1)$ in part (i). Using this solution to substitute for α in the recipient's participation constraint yields the solution for $t_2^c(\beta,1)$ in part (ii).

The rest of part (i) is obtained by differentiating $\alpha_2^c(\beta,1)$ with respect to β for $\beta > \beta^T(1)$. This yields the following:

$$\frac{\partial\alpha_2^c(\beta,1)}{\partial\beta} = \frac{\left(1-\sqrt{\beta}\right)^2}{(1-\beta)^2}$$

which is always positive. The limit of $\alpha_2^c(\beta,1)$ as β tends to 1 is obtained by imposing $\beta = 1$ in equation (26) and solving for α. The corresponding value for $t_2^c(\beta,1)$ is obtained by substitution from the participation constraint.

The rest of part (ii) follows from the donor's objective function. This weighs recipient consumption by the altruism parameter. As β increases the donor optimally wishes to raise recipient consumption. Given that α is increasing in β (thereby lowering consumption ceteris paribus), this necessarily implies that t must be increasing in β, to offset the impact of higher values of α. This reasoning also establishes part (iii) given that under weak conditionality the donor has incentives to raise t as β increases both to increase recipient consumption and to meet a more demanding participation constraint. This effect is not present under strong conditionality (given that in this case the IR constraint is not a function of β), and therefore aid flows under weak conditionality are necessarily higher than under strong conditionality.

Part (iv) derives from the fact that under weak conditionality the recipient is as well off as under the no-conditionality equilibrium (from the participation constraint) whilst the donor is strictly better off, having optimised w.r.t. both α and t, as opposed to t only. ■

A.1.3 Proof of Lemma 1

Proof. Part (i). In the general $\theta \leq 1$ case the donor's constrained optimisation program yields the following FOC:

$$(1-\beta)\,\alpha^{1+\theta} + 2\theta\beta\alpha^\theta = \theta(1+\beta)k_1(\theta) \tag{27}$$

where $\ln k_1(\theta) = \ln \frac{\theta^\theta}{(1+\theta)^{1+\theta}}$ is the recipient utility in the no-aid equilibrium (i.e. $U_r(\alpha^{NA}(\theta), 0; \theta)$). The r.h.s. of this FOC is strictly increasing in θ, i.e.

$$\frac{\partial\left[\theta(1+\beta)k_1(\theta)\right]}{\partial\theta} = (1+\beta)k_1(\theta)\left(1+\theta\ln\theta - \theta\ln(1+\theta)\right) > 0$$

The l.h.s. of (27) has the following properties: (i) it lies above the r.h.s. for $\theta = 0$; (ii) it is increasing in α; (iii) its derivative w.r.t. θ is of ambiguous sign ($= \alpha^\theta \ln\alpha\left[\left((1-\beta)\,\alpha + 2\beta\theta\right)\ln\alpha + 2\beta\right]$), and the second derivative is negative if the first derivative is positive. This implies that for (27) to hold when θ increases, we require α to increase too, which proves part (i).

Part (ii). In the weak conditionality $\theta \leq 1$ case the donor's constrained optimisation program yields the following FOC for $\beta > \beta^T(\theta)$:

$$(1-\beta)\,\alpha^{1+\theta} + 2\theta\beta\alpha^{\theta} = \theta\beta k_2(\theta) \tag{28}$$

where $k_2(\theta) = \frac{2(2\theta)^{\theta}}{(1+\theta)^{1+\theta}}$.

The r.h.s. of this FOC is strictly increasing in θ, i.e.

$$\frac{\partial\left[\theta\beta k_2(\theta)\right]}{\partial\theta} = \beta k_2(\theta)\left(1+\theta\ln 2+\theta\ln\theta-\theta\ln(1+\theta)\right) > 0$$

The l.h.s. of (28) is the same as under strong conditionality, which implies that for the FOC to hold α and θ need to be positively correlated. ■

A.1.4 Proof of Proposition 5

Proof. Part (i) follows by substituting for t in the donor's objective function in (17) from the recipient participation's constraint. This yields the following first order condition in α:

$$4\,(2\beta-1)\,\alpha^2 - 12\beta\alpha + 1 + 2\beta = 0$$

which is solved by the value for α given in part (i) of Proposition 5. Differentiating $\alpha_{1,m}$ w.r.t. β yields $\frac{\partial\alpha_{1,m}}{\partial\beta} = \frac{2+5\beta-3\sqrt{1+5\beta^2}}{(1-2\beta)^2\sqrt{1+5\beta^2}}$ which is always negative since $3\sqrt{1+5\beta^2} > 2+5\beta$.

The result that $\alpha_{1,m}(\beta,1) > \alpha_1(\beta,1)$ is given by the following condition:

$$1+2\beta(2\beta^3-3)+13\beta^2(1-\frac{12}{13}\beta) > 0$$

which is satisfied for $\beta \in [0,\frac{1}{2})$ and for $\beta \in (\frac{1}{2},1)$. For $\beta = \frac{1}{2}$ and $\beta = 1$, $\alpha_{1,m}(\beta,1) > \alpha_1(\beta,1)$ can be verified by direct substitution into the relevant first order conditions.

Part (ii) follows from part (i) and from the recipient's participation constraint. As in the single recipient case, the value of $t_{1,m}$ is given by imposing $\alpha = \alpha_{1,m}(\beta,1)$ in the IR constraint. The latter implies a negative relationship between α and t for $\alpha < \frac{1+t}{2}$, so that $\frac{\partial t_{1,m}(\beta,1)}{\partial\beta}$ is necessarily positive if $\frac{\partial\alpha_{1,m}}{\partial\beta} < 0$. Lastly it must be the case that $t_{1,m}(\beta,1) < t_1(\beta,1)$ if $\alpha_{1,m}(\beta,1) > \alpha_1(\beta,1)$ given that the donor is facing the same recipient IR constraint in the single and multiple recipient strong conditionality programs, so that if the appropriation rate is increased in a multi-recipient context, aid necessarily falls. ■

A.1.5 Proof of Result 1

Proof. Consider firstly the solution to the donor's program subject to the IR constraint which applies for $\beta > \beta^T_{m,c}(t)$ (i.e. the "Samaritan's Dilemma" participation constraint in (19)) and imposing $t_i = t_j = t$. Substituting for α from this participation constraint yields the following FOC:

$$\beta(2t-1)(3\beta+t+4)+(1+t)^2 = -\Delta(t)(1+\beta)\left[t(1+2\beta)+1-\beta\right]$$

where $\Delta(t) = \sqrt{\frac{3\beta(2t-1)+(1+t)^2}{1+\beta}}$

Figure 12 plots the relevant solution to this FOC for t (defined as $t'_{2,m}(\beta)$ and computed numerically), and the corresponding value of α from the IR-constraint ($\alpha'_{2,m}(\beta)$), for values of β greater than $\beta^T(1)$ (i.e. the minimum value $\beta^T_{m,c}(t)$ can take).

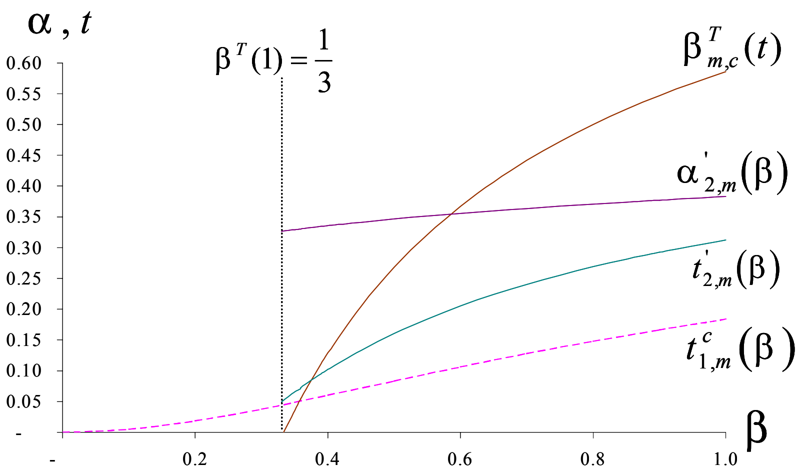


Figure 12: Interim solution to the weak conditionality multi-recipient program.

On the basis of the contract $\{\alpha'_{2,m}(\beta), t'_{2,m}(\beta)\}$ we can identify three cases for weak conditionality aid $t^c_{2,m}(\beta)$ (and correspondingly for $\alpha^c_{2,m}(\beta)$):

(a) if $t'_{2,m}(\beta) < \beta^{T-1}_{m,c}(\beta)$ (i.e. the $t'_{2,m}(\beta)$ schedule lies below the $\beta^T_{m,c}(t)$ line in Figure 12), then $t^c_{2,m}(\beta) = t'_{2,m}(\beta)$, given that the program which yields $t'_{2,m}(\beta)$ is identical to the weak conditionality program;

(b) if $t'_{2,m}(\beta) > \beta^{T-1}_{m,c}(\beta)$ and $t^c_{1,m}(\beta) > \beta^{T-1}_{m,c}(\beta)$ (i.e. both aid schedules lie above $\beta^T_{m,c}(t)$) we have $t^c_{2,m}(\beta) = t^c_{1,m}(\beta)$, given that in this case the donor programs for strong and weak conditionality are the same since the recipients' reservation utility corresponds to the no-aid payoff;

(c) otherwise $t^c_{2,m}(\beta) = \beta^{T-1}_{m,c}(\beta)$, which arises because both $t^c_{1,m}(\beta)$ and $t'_{2,m}(\beta)$ are violating the recipient's IR constraint (the former due to insufficient transfers and the latter to excess transfers), inducing the donor to move along the $\beta^T_{m,c}(t)$ schedule, which satisfies the recipients' IR constraint since the no-aid payoff equals the "Samaritan's Dilemma" payoff along this schedule (see condition (19)).

Figure 7 illustrates the values of $t^c_{2,m}(\beta)$ and $\alpha^c_{2,m}(\beta)$ thus obtained, comparing them to $t^c_2(\beta)$, $\alpha^c_2(\beta)$ and $t^*(\beta)$ and establishing parts (i) and (ii) of the Result. ■

A.1.6 Generalisation of the Conditionality Contracts with Variable Aid Effectiveness

Generalising the results given for the baseline conditionality case, to allow for $e(\alpha) \neq 1$ (as discussed in Section 4.2 in the main text), we obtain the following outcomes. The donor's optimal aid function equals $t^*(\alpha) = \frac{\beta - \frac{y(\alpha)}{e(\alpha)}}{1+\beta}$. This implies that the level of distortions in the Samaritan's Dilemma equilibrium is as follows: $\alpha^{SD} = \frac{1+e(\alpha^{SD})}{2-e'}$. Substituting for the linear aid effectiveness function given in the text $(e(\alpha) = 1 - \lambda(\alpha - \frac{1}{2})$, we obtain $\alpha^{SD} = \frac{4+\lambda}{4(1+\lambda)}$. Computing the corresponding level of recipient utility, we obtain $U_r(\alpha^{SD}, t^*(\alpha^{SD})) = \frac{(4+\lambda)^2}{16(1+\lambda)}\frac{\beta}{1+\beta}$, which implies $\beta^T = \frac{4(1+\lambda)}{12+4\lambda+\lambda^2}$.

Strong conditionality is given by a revised donor program, which allows for the presence of the relationship between reform and aid effectiveness. Substituting from the recipient's IR constraint into the donor's maximand, and differentiating with respect to α, we obtain the following first order condition:

$$(1-2\alpha)\left[(1+2\alpha)e + (1-2(\alpha))e'\alpha\right] = \beta(4\alpha(1+e-\alpha)-1)$$

This function is linear in the altruism parameter β, which is plotted, as a function of α, in Figure 11, for $\lambda = 1$.

The weak conditionality schedule is given following the same procedure and accounting for a revised recipient IR constraint. This yields the following first order condition in α:

$$e(1+\beta)\left[\alpha^2(e'-1) - \beta(\alpha(1+e-\alpha)-\gamma)\right] = e'\alpha\left[\alpha(1+\beta)(1+e-\alpha) - \gamma\beta\right]$$

where $\gamma \equiv \frac{(4+\lambda)^2}{16(1+\lambda)}$. This is solved for numerically for $\lambda = 1$, and the solution is as plotted in Figure 11.

A.2 Conditionality in the Infinitely Repeated Game

This appendix of the paper explores the nature of conditionality in a repeated game setting. We examine the conditions under which a long-lived donor may be able to sustain strong conditionality even when it lacks commitment power and when altruism is relatively high (i.e. $\beta > \beta^T(\theta)$), which implies that the recipient strictly prefers the Samaritan's Dilemma outcome to strong conditionality.

In what follows we assume that there are multiple and short-lived recipients, who interact with the donor only once and one at the time. The donor on the other hand is long-lived, and faces an infinite series of recipients sequentially, interacting with each under conditions of complete information.

A.2.1 Strong Conditionality

Can the long-lived donor sustain strong conditionality in an infinitely repeated game? To answer this question consider the following strategy combination:

- The donor offers a strong conditionality contract $\{\alpha_1^c, t_1^c\}$ to each recipient. If the recipient accepts and chooses $\alpha = \alpha_1^c$, the donor delivers the level of aid t_1^c; if not it "punishes" the recipient, by transferring a level of aid which is contingent on the value of α chosen by the recipient and which leaves the recipient as well off as in the no-aid equilibrium.[49] After punishing a recipient the donor offers the conditionality contract to the next recipient, following the same strategy described above.

- Each recipient accepts the strong conditionality contract, as long as in previous interactions between the donor and other recipients the donor has not deviated from the strategy outlined above, i.e. the donor has not "reneged" on recipients who have accepted the contract (i.e. transferring $t < t_1^c$ when the recipient has chosen $\alpha = \alpha_1^c$) and the donor has punished recipients who have previously rejected the contract. If the donor has ever deviated from this strategy, no recipient ever trusts the donor again, and opts for the Samaritan's Dilemma equilibrium action (i.e. $\alpha = \alpha^{SD}$) always.

This strategy combination is a SPE of the repeated game for high enough donor discount factors.[50] This is because if the donor is patient enough it will value the future gain from strong conditionality more than the short-term gains from not punishing recipients who reject the contract or from reneging on recipients who accept the contract. The donor will therefore stick to the strategy outlined above.

This is of course contingent on the recipient(s) punishing the donor harshly (i.e. for ever) for any deviations from its equilibrium strategy. This is in turn is optimal given that (i) a donor that does not punish a recipient who rejects the contract will not punish the next recipient who also rejects, allowing recipients to obtain the Samaritan's Dilemma outcome which is superior to strong conditionality; and (ii) a donor who has "reneged" once on a recipient will have incentives to cheat on the "next" recipient too, making it optimal for recipients never to trust it again.

Strong conditionality is therefore a SPE of the infinitely repeated game if two conditions on the donor discount factor δ are satisfied: one stopping the donor from reneging on recipients who accept the contract, and one inducing the donor to punish recipients who reject the contract.

The first of these conditions is obtained by comparing the one-off payoff from reneging on a recipient who has accepted the contract (which we denote as $U_d(\text{renege\_strong})$) and the infinite stream of utility from the Samaritan's Dilemma equilibrium which arises as all future recipients "punish" the donor ($U_d(SD)$), with the stream of payoffs from strong conditionality ($U_d(\text{contract\_strong})$). This gives:

$$\delta \geq \delta^1_{strong} \equiv \frac{U_d(renege\_strong) - U_d(contract\_strong)}{U_d(renege\_strong) - U_d(SD)}$$

[49] Any level of aid below this level is sub-optimal for the donor, as it does not incentivise recipients to accept the conditionality contract, and it lowers the donor's utility. The definition of strong conditionality used here is therefore different from the one given in the main text of the paper in terms of the "out-of-equilibrium path" behaviour of the donor (i.e. $t \neq 0$ if $\alpha \neq \alpha_1^c$), and it is a more reasonable one in the context of a repeated game.

Note that this punishment strategy deviates from the Subgame Perfect Equilibrium of the stage game (as described by Proposition 1) . Restricting our attention to punishment strategies which correspond to equilibria of the stage game would rule out strong conditionality as an equilibrium of the repeated game.

[50] This follows Fudenberg and Maskin (1986), who show that any equilibrium within the feasible and individually rational payoff set (i.e. such that all players obtain more than their Minimax value) can be sustained as a perfect equilibrium of an infinitely repeated game for high enough discount factors. The presence of a short-lived player implies that punishment strategies implemented by the recipient need to be a short-run best response, which is satisfied by the strategy described in the text (Fudenberg, Kreps and Maskin (1990)).

The second condition is given by comparing the donor's payoffs from punishing a recipient who rejects the contract once (U_d(punish_strong)) and then reverting back to strong conditionality, with the stream of payoffs from the Samaritan's Dilemma equilibrium. This gives:

$$\delta \geq \delta^2_{strong} \equiv \frac{U_d(SD) - U_d(punish\_strong)}{U_d(contract\_strong) - U_d(punish\_strong)}$$

Therefore strong conditionality is an equilibrium of the infinitely repeated game if:

$$\delta \geq \max(\delta^1_{strong}, \delta^2_{strong}) \tag{29}$$

A.2.2 Weak Conditionality

Weak conditionality is an equilibrium of the repeated game if the donor is patient enough not to want to renege on recipients who accept the contract, assuming that the donor and the recipients follow the same strategies described for strong conditionality (with the exception that the donor is now offering a weak rather than a strong conditionality contract). Note that we do not need to check the second condition that the donor finds it optimal to punish recipients who reject the contract in this case, since under weak conditionality no recipient would want to do so.

The equilibrium condition for weak conditionality is therefore:

$$\delta \geq \delta^1_{weak} \equiv \frac{U_d(renege\_weak) - U_d(contract\_weak)}{U_d(renege\_weak) - U_d(SD)} \tag{30}$$

where the notation is analogous to the one used for strong conditionality.

A.2.3 Comparison

Conditions (29) and (30) imply the following four cases for the equilibria of the infinitely repeated game:

Condition	Strong conditionality is an equilibrium	Weak conditionality is an equilibrium
$\delta \geq \max(\delta^1_{strong}, \delta^2_{strong})$ and $\delta \geq \delta^1_{weak}$	✓	✓
$\delta < \max(\delta^1_{strong}, \delta^2_{strong})$ and $\delta < \delta^1_{weak}$	×	×
$\max(\delta^1_{strong}, \delta^2_{strong}) \leq \delta < \delta^1_{weak}$	✓	×
$\delta^1_{weak} \leq \delta < \max(\delta^1_{strong}, \delta^2_{strong})$	×	✓

Figure 13 plots the values of δ^1_{strong}, δ^2_{strong} and δ^1_{weak} for the case $\theta = 1$, showing where each of these four cases applies.[51] The combination of δ and β which gives rise to the fourth case is highlighted in the shaded area. This shows that there exist parameter combinations for which weak conditionality is an equilibrium outcome and strong conditionality is not, even in a infinitely repeated interaction. However, for most values of the discount factor (i.e. $\delta > 20\%$ approximately), both weak and strong conditionality are an equilibrium of the infinitely repeated game. This multiplicity of equilibria is of course not surprising given the predictions of the Folk Theorem that all points in the set of weak and individually rational payoffs F^* can be sustained

[51] Note that $\delta^2_{full} = 0$ for $\beta = \beta^T(1) = \frac{1}{3}$, given that in this case $U_d(SD) = U_d$(punish_strong). For higher values of β punishing recipients who reject conditionality hurts the donor, which therefore needs to attach enough weight to future payoffs to be willing to do so.

as equilibria for high enough discount rates. Figure 14 plots the payoff space implied by the conditionality game for a given value of β (i.e. $\beta = \frac{3}{4}$), showing the set of feasible and individually rational payoffs F^*.

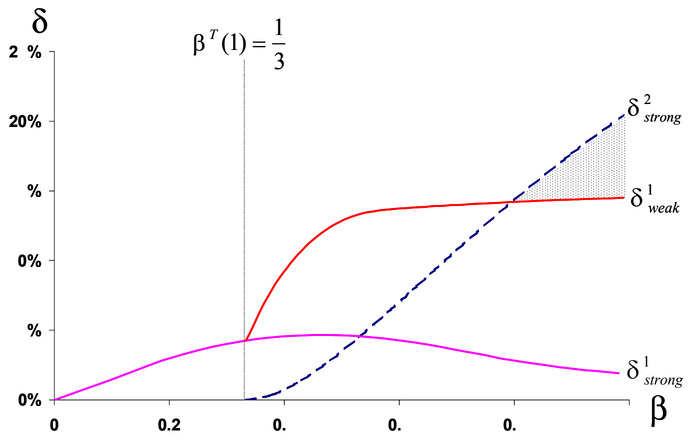


Figure 13: The threshold discount factors for strong and weak conditionality.

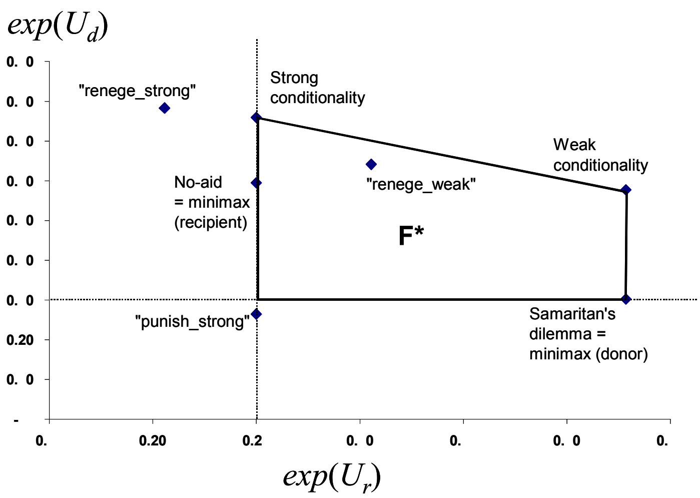


Figure 14: The payoff space F^* in the conditionality game (for $\beta = \frac{3}{4}$).

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