Limits of Conditionality in Poverty Reduction Programs

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When donors and recipients have different preferences over budgetary allocations, conditionality helps the implementation of donor-financed poverty reduction programs. If donors cannot perfectly monitor all recipients' actions, however, conditionality entails an inefficient allocation of resources. Under such conditions, the optimal amount of conditionality varies (often not monotonically) with the recipients' degree of social commitment. Finally, if recipients' preferences are not observable, conditionality can be used to prevent recipients with a weak commitment to poverty reduction from obtaining aid funds. This may, however, lead to further distortions in terms of resource allocation and to phenomena of "aid rationing."

The most indebted countries are among the worst performers in terms of human development indicators.[1] Starting from this stylized fact, the donor community (multilateral agencies, nongovernmental organizations (NGOs), and bilateral donors) seems to agree on two basic principles. First, some debt relief/aid is necessary to reduce the human development divide between "North" and "South."[2] Second, since aid is fungible, and recipient country governments are sovereign,

[1] Berlage, and others (2000) report that 84 percent of the countries with a human development indicator lower than 0.5 belong to the list of highly indebted poor countries (hereinafter referred to as HIPCs).

[2] Of course, there is a large disagreement on how much debt relief is either necessary or desirable. For an estimation of the real amount of debt relief implicit in the HIPC initiative, see Cohen (2000). For a generous plan for completely extinguishing the outstanding debt of 49 poor countries by year 2015, see Berlage, and others (2000).

nothing ensures that the resources generated by an aid program will be devoted to effective poverty reduction policies. If this is the case, a tension might arise between the need to impose conditions limiting the risk of external assistance being mishandled and the efficiency costs that conditionality may create in the recipient economy. In fact, as long as the donors cannot perfectly observe (and monitor) all actions undertaken by recipient country governments, the conditionality they can impose is necessarily incomplete and thus potentially distortionary. Furthermore, in such a situation, a high level of conditionality may absorb an excessive amount of resources, "crowding out" other investments necessary for the success of the reform program. This paper provides a simple one-donor one-recipient framework to study these problems.

In our model, the donor's only concern is the effective implementation of social programs,[3] while the recipient government obtains utility both from the realization of such programs and from other nonsocially oriented expenses.[4] In such a situation, the donor uses the leverage associated with aid (or debt relief) to impose, through conditionality, its own preferences on how resources should be allocated.[5]

In such a framework, we prove three results that shed some light on the important policy issue of how to optimally design conditionality when the objectives of the donor and those of the recipient are not perfectly aligned. First, conditionality entails distortions and is responsible for an inefficient allocation of resources. Second, aid policies should be tailored according to the recipient government's preferences in terms of social spending—its social commitment—and the optimal amount of conditionality varies (generally in a nonmonotonic way) with the latter. Finally, if the characteristics of the recipient government are not observable or, alternatively, if the aid contract cannot depend upon the type of government, conditionality can be used to screen countries (governments). Then, excessive and/or insufficient levels of conditionality, relative to the case where the recipient's type is observable, may arise as equilibrium outcomes. This may also lead to forms of aid rationing.

The intuition for such results is as follows: in our framework, only some of the policy measures that contribute to the success of a social program are verifiable, and thus can be subject to conditionality. Under such circumstances, if the donor forces the recipient government to allocate substantial resources to certain verifiable components of the program, such as investments in infrastructure, the latter will underinvest in other less verifiable components, such as administrative and managerial outlays, costly supportive policies, or other implementation expenses. Furthermore, as the

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[3] As common in the recent theoretical literature on aid (see Svensson (2000b), Azam and Laffont (2001), and Federico (2001)), we assume that the motivations for aid (debt relief) are fully altruistic. Of course, this is not necessarily (and often has not been) the case. Indeed, foreign aid has often been motivated by political and strategic considerations, as Alesina and Dollar (2000) show. We abstract from this important issue, as our interest is that of addressing the normative question of how conditionality should be designed when the donor community's exclusive interest is that of fighting poverty in aid recipient countries.

[4] For example, the recipient government could be subject to the influence of special interest groups opposing socially oriented reforms (see Mayer and Mourmouras (2002)).

[5] Using the taxonomy proposed by Collier (1997), our model is one of *paternalistic conditionality*. However, the success of the poverty reduction program depends upon monitorable and nonmonitorable inputs, so that conditionality is necessarily imperfect.

reaction of the recipient government to the imposition of conditionality depends upon its social commitment, the donor needs to design conditionality according to the recipient's type. From this, it follows that when conditionality is used as a screening device, the donor may have (and generally has) to impose levels of conditionality that would be suboptimal if the recipient's type were observable.

The idea that properly designed conditionality may enhance the effectiveness of "socially friendly" aid programs is gaining increasing support. For instance, whereas in the past NGOs often voiced a strong disagreement with the very principle of conditionality in structural adjustment programs, they now recognize that some form of conditionality is needed for any debt relief project to be conducive to poverty reduction. According to CISDE-Caritas International (1999): "Because not all governments can be counted on to use resources freed through debt relief to invest in the poor and marginalized sectors of society, there is a case for making a strong link between investment in human development and debt cancellation." Oxfam International also points out possible incentive compatibility problems in the debt relief and poverty reduction strategy, and stresses that the "the focus should be on the development of incentives for converting debt relief into poverty reduction investments."[6] In contrast, a large literature emphasizes the limits and the potential costs of conditionality,[7] and nowadays there is substantial evidence that "conditional" aid alone cannot buy a successful social program. Burnside and Dollar (2000) show, indeed, that only in the presence of sound policies does aid foster growth. Instead, in countries with a poor policy environment, large amounts of aid can not only be ineffective but, by allowing governments to delay reforms, they may even be detrimental to growth (World Bank, 1998).

The theoretical literature on the effectiveness of aid in the presence of strategic interaction between donors and recipient governments is limited.[8] Notable exceptions are Svensson (2000a and b), Azam and Laffont (2001), and Federico (2001). The first paper by Svensson develops a game theoretic rent-seeking model to assess the effect of aid windfalls on the provision of public goods when social groups compete over common-pool resources. Closely related to our paper is Svensson (2000b), which studies the strategic interaction between a donor and two recipients in a model in which the donor cares uniquely about the welfare of the poor while the recipients also pursue other goals. Since, as in our model, the effectiveness of poverty alleviation programs depends on a nonverifiable implementation effort on the recipient's part, the first-best aid contract is unenforceable. While our setup shares some of the key features of Svensson (2000b), the focus of our analysis is different. In fact, while our interest is in designing an ex ante full commitment optimal aid contract that depends on the characteristics of recipient governments, in Svensson recipients are ex ante identical and the main problem the donor faces is one of commitment. There, it is the very anticipation that aid flows will (ex post) be disbursed according to the need of the poor that negatively affects the recipient government's incentives to carry out effective social

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[6]See UNICEF/Oxfam International (1999).

[7]See, for example, Sachs (1989), Berg (1997), Collier, and others (1997), and Killick (1997).

[8]See Drazen (2000).

programs. Along similar lines, Federico (2001) studies the optimal level of conditionality in a model in which donor's commitment is limited. The focus on ex ante full-commitment contracts links our paper to Azam and Laffont (2001). They also study the characteristics of incentive-compatible aid contracts when the preference of the donor and those of the recipient are not aligned. The main difference between our model and theirs is that we do not assume complete contracts (perfect monitoring) and thus we allow conditionality to be distortionary. This has important implications on the way in which conditionality should be used as a screening device. Marchesi and Thomas (1999) also explore the idea of screening by (costly) conditionality in the context of IMF programs aimed at maximizing the expected repayment of the debt. In this paper, we borrow that idea and apply it to the case where the principal's objective is the maximization of the social impact of aid rather than the repayment of the debt.

THE MODEL

In our model, the international community is represented by a single donor who is willing to grant an aid/debt relief program that provides fresh resources that a developing country government (the recipient, from now on) might devote to poverty reduction programs. Formally, we denote by G the recipient tax revenue (net of the debt service), and by A, the amount of aid/debt relief, which we assume to be fixed.[9]

The recipient (denoted by subscript R) devotes its budgetary resources to developmental and nondevelopmental consumption. In particular, we assume that it maximizes the following CES objective function:

$$U_R = \left(\alpha s^\rho + (1-\alpha)m^\rho\right)^{\frac{1}{\rho}}, \tag{1}$$

where s denotes the consumption of a social good (e.g., social programs, such as poverty alleviation, primary education, access to safe water, etc.); m denotes nondevelopmental consumption (e.g., military expenses); $\alpha \in (0, 1)$ defines the recipient's "social preferences;"[10] and ρ belongs to the interval $(0, 1)$. We further assume that the social good is produced out of two inputs (k, e) one of which is observable and verifiable by the donor (k), and the other is not (e). We can think of the first as capital (e.g., material needed to build a school or a hospital) and of the second as nonmonitorable effort (administrative and managerial outlays, or other costly supportive policies needed for a school or hospital to work). Alternatively, we could have assumed that some of the activities needed for the

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[9]In addition to greatly simplifying the analysis, this assumption is quite realistic for the debt relief program under the HIPC initiative. In such a case, the amount of debt relief is a function of the existing stock of external debt, and thus, at least in principle, not the outcome of negotiations between donors and recipient governments.

[10]The assumption that there is substantial heterogeneity in how HIPCs allocate public resources between military and social expenditures is a very reasonable one. According to World Bank data for 1997, the ratio of health to military expenditure varied from the 0.13 of Vietnam to the 4.3 of Guyana (data are available for 29 HIPCs).

success of a poverty reduction program were inherently multitasking, so that the donor could only exercise control over a part of the recipient's budget. What is indeed critical for our analysis is that both the monitorable and nonmonitorable input are essential for the production of the social good or, less loosely, that the technology for the production of the social good is convex.

Then, for the sake of simplicity, and without great loss of generality, we assume that the social good is produced according to the following technology $s = ke$, which is symmetric in the two inputs. We further assume that the recipient government has no access to the international capital market,[11] and thus that it has to run a balanced budget, both in the case in which aid/debt relief is granted and in the case in which it is not, that is,

$$m + k + e \leq G + \delta A, \text{ with} \tag{2}$$

$$\delta = \begin{cases} 1, & \text{if aid is granted;} \\ 0, & \text{otherwise.} \end{cases}$$

As we already mentioned, in our setup the donor is fully altruistic, and only cares about the success of social programs. If this is the case, its objective function may be written as:

$$W = f(ke), \tag{3}$$

with $f'(.) > 0$. In Section II, we briefly consider the case of aid programs that are costly for the donor country.

No Conditionality Benchmark

In what follows, we first characterize the effect of aid in the absence of any form of conditionality. Then, we briefly discuss the characteristics of the aid contract in the case where all components of the social programs are observable and contractible upon, to then analyze the more interesting (and realistic case) in which the donor is unable to contract upon some of the actions of the recipient. Finally, we discuss situations in which the donor cannot either observe the recipient's social commitment or write aid contracts that are contingent on α.

As a useful benchmark, we first consider the case in which the donor imposes no restrictions on the recipient's budget allocation. In the absence of conditionality, the government will allocate resources to maximize its objective function (1) subject to the budget constraint (2). After substituting (2) into (1), the problem of the recipient can be written as:

$$\max_{k,e} U = \max_{k,e} \left(\alpha(ke)^\rho + (1-\alpha)(G + \delta A - k - e)^\rho \right)^{\frac{1}{\rho}}. \tag{4}$$

Since the technology for the production of the social good is convex and symmetric in the two inputs, in equilibrium the recipient government allocates an

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[11]For many aid recipients (such as the HIPCs) such an assumption is hardly a controversial one.

equal amount of resources to the capital and managerial components of social expenditure. The solution of problem (4) is thus given by $k^* = e^* = x^*$; where x^* belongs to the interval $[0, \frac{G+\delta A}{2})$. In order for the expenditure in the social good to be strictly positive, we need α and/or $G + \delta A$ to be sufficiently large (when associated with a high substitutability between social and military expenditure).[12] This in turn implies that poor human development indicators are the result of either a lack of resources, or a lack of social commitment on the part of the recipient government, or, and perhaps more realistically, of both. The upper bound $\frac{G+\delta A}{2}$ follows from the fact that the most socially committed recipients ($\alpha \approx 1$) will devote their whole budget to the production of the social good, and thus about half of their resources, $x^* \approx \frac{G+\delta A}{2}$, to each of the two inputs.

If $\delta = 0$, the solution of equation (4) gives the values k^{NA} and e^{NA} that the recipient country government would choose in absence of aid, the superscript NA standing for no aid. This also identifies the recipient's reservation utility that can be written as:

$$U^{NA}(\alpha) = \left(\alpha\left(k^{NA}e^{NA}\right)^{\rho} + (1-\alpha)\left(G - k^{NA} - e^{NA}\right)^{\rho}\right)^{\frac{1}{\rho}}. \tag{5}$$

Instead, when $\delta = 1$, the solution of problem (4) yields the budget allocation chosen by the recipient when aid is granted but no conditionality is imposed, which we denote k^{NC} and e^{NC} (the superscript NC standing for no conditionality).

Finally, as long as under unconditional aid the social good is produced in positive amounts, its production level increases monotonically with the amount of aid granted by the donor (as well as with the level of social commitment of the recipient). Aid is thus likely to increase the amount of resources that the recipient is willing to devote to social spending. For any $\alpha < 1$, however, the objectives of the recipient and those of the donor are not perfectly aligned, and the latter should be able to obtain a larger production of the social good by imposing conditionality when granting aid.

Optimal Conditionality When "Types" are Observable

Should the donor have full control over all the components of social spending in the recipient country or, alternatively, should it be able to contract on both capital and managerial expenditures, then the first best would be implementable. The optimal contract would be one that maximizes the donor's utility (3) subject to the individual rationality (IR) constraint of the recipient, defined below. In other words, the equilibrium level of k and e would yield the highest level of production of the social good for which the recipient is at least as well off as in absence of aid.

In what follows, we consider the more reasonable and interesting case in which the donor can only observe and make aid conditional upon the capital component of social programs, k, and thus the recipient is free to choose any nonnegative

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[12]More precisely, $\rho < \frac{1}{2} \Rightarrow x^* > 0$. If $\rho = \frac{1}{2}, G + \delta A > \left(\frac{1-\alpha}{\alpha}\right)^2 \Leftrightarrow x^* > 0$. Finally, when $\rho > \frac{1}{2}$ a sufficient condition (albeit quite strong) for $x^* > 0$ is that $G + \delta A > 4\left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{\rho}}$.

amount for the other component, e. This captures the idea that the relation between the donor community and a recipient government is a complex one in which both actors act strategically. Recipients react to conditionality by reallocating the budget expenditure in order to maximize their objective function. This in turn implies that the donor will have to take into account the response of the recipient when setting conditionality on k. Formally, for any fixed level of $k > k^{NC}$ imposed by the donor, the recipient will maximize (4) with respect to e. The first order necessary and sufficient condition for a maximum can be written as:

$$\alpha k^{\rho} e^{\rho-1} - (1-\alpha)(G+A-k-e)^{\rho-1} = 0, \tag{6}$$

from which it follows that the optimal unobserved component of social spending, $\hat{e}(k)$, is given by:

$$\hat{e}(k) = \frac{(1-\alpha)^{\frac{1}{\rho-1}}(G+A-k)}{(1-\alpha)^{\frac{1}{\rho-1}} + k(\alpha k)^{\frac{1}{\rho-1}}}. \tag{7}$$

We can now write the problem of the donor as:

$$\underset{k}{\text{Max}}\, W = \underset{k}{\text{Max}}\, f\big(k\hat{e}(k)\big), \tag{8}$$

such that:

$$\Big(\alpha\big(k\hat{e}(k)\big)^{\rho} + (1-\alpha)(G+A-k-\hat{e}(k))^{\rho}\Big)^{\frac{1}{\rho}} \geq U^{NA}(\alpha), \tag{9}$$

where the last expression is the IR constraint of the recipient. We denote by k^{IR} the value of k for which the IR is exactly binding, that is,

$$k^{IR} \equiv \left\{ k: \Big(\alpha\big(k\hat{e}(k)\big)^{\rho} + (1-\alpha)(G+A-k-\hat{e}(k))^{\rho}\Big)^{\frac{1}{\rho}} = U^{NA}(\alpha) \right\}. \tag{10}$$

To characterize the solution of problem (8), we first prove the following proposition that sheds some light on the costs and the advantages associated with the imposition of conditionality in aid programs.

Proposition 1

I. *Any binding level of conditionality ($k > k^{NC}$) induces a distortion in the production of the social good ($\hat{e}(k) < k$).*
II. *By imposing conditionality, however, the donor can always improve on the production of the social good ($\exists \tilde{k} \in (k^{NC}, k^{IR})$ such that $\tilde{k}\hat{e}(\tilde{k}) > k^{NC} e^{NC}$).* Proof: see Appendix I.

Proposition 1 shows that even if some components of the budget cannot be contracted upon, the donor can strictly improve the effectiveness of aid by imposing conditionality on the contractible component of social spending. Since

for any $k > k^{NC}$, $\hat{e}(k) < k$, however, the recipient reacts to conditionality on the monitorable input by reducing expenditures (with respect to the efficient level) on the other input. This is clearly inefficient, as both the donor and the recipient would be better off if it were possible to reallocate some of the resources from the capital to the managerial component of social spending. The fact that this is not possible is one main feature of our model, and depends upon the characterization of the donor/recipient interaction as a noncooperative game. In such a game, the recipient exploits the donor's inability to observe some of the inputs necessary for the production of the social good to reallocate resources according to its own preferences. In our setup, the donor (acting as a Stackelberg leader) anticipates the reaction of the recipient when choosing the "right" amount of conditionality to attach to an aid program. Notwithstanding the fact that in our model conditionality is costly, the second part of Proposition 1 provides a strong justification for the use of conditionality in poverty reduction programs financed by the donor community. In fact, for any level of social commitment of the recipient, we prove the existence of a level of conditionality that is acceptable for the recipient (i.e., compatible with its *IR* constraint), and at the same time, that it increases the level of production of the social good.

With this in mind, we are now able to characterize the optimal amount of conditionality that the donor would impose upon a recipient government of type α in order to maximize the production of the social good. Formally, the optimal amount of conditionality $k^C(\alpha)$ is given by:

$$k^C(\alpha) = \min\{k^{IR}, \hat{k}\}, \text{ with}$$
$$\hat{k} \equiv \arg\max_k f(k\hat{e}(k)),$$

$\hat{k}$ can be interpreted as the level of conditionality that the donor would choose if it were to disregard the recipient's *IR* constraint, and thus it is the optimal amount of conditionality when the *IR* constraint is slack. Of course, when the recipient's *IR* constraint is binding, the maximum amount of conditionality that the donor is able to impose is given by k^{IR}. In order to solve for the optimal level of conditionality, we first need to better characterize the properties of k^{IR} and $\hat{k}$ as functions of the recipient's social commitment. We do this in the following lemma:

Lemma 1

I. k^{IR} *is strictly increasing in* α, $\lim\limits_{\alpha \to 0} k^{IR} = A$, $\lim\limits_{\alpha \to 1} k^{IR} = \frac{G+A+\sqrt{A(2G+A)}}{2}$;

II. $\hat{k}$ *is strictly decreasing in* α, $\lim\limits_{\alpha \to 0} \hat{k} = \frac{G+A}{2-\rho}$, $\lim\limits_{\alpha \to 1} \hat{k} = \frac{G+A}{2}$. Proof: See Appendix I.

According to Lemma 1, on the one hand, more socially committed governments are willing to accept higher levels of conditionality: k^{IR} is increasing in α. On the other hand, because of the convexity in the production of the social good, the donor will want to abstain from imposing excessive conditionality on governments that would, by themselves, choose a high level of social spending. This in

turns implies that $\hat{k}$ is strictly decreasing[13] with the level of social commitment of the recipient. These two features of the solution imply that the optimum amount of conditionality that the donor imposes on the recipient is generally not monotonic in the social commitment of the government. Formally, we can prove the following proposition that fully characterizes the optimal level of conditionality.

Proposition 2

If the amount of aid granted by the donor is not too large relative to the country's own resources $(A < \frac{G}{1-\rho})$, *it exists a* $\alpha^c \in (0,1)$ *such that the optimum level of conditionality increases monotonically with* α *if* $\alpha < \alpha^c$, *and decreases monotonically with* α *otherwise. If, instead,* $A > \frac{G}{1-\rho}$, *the optimal amount of conditionality decreases monotonically with* α. Proof: see Appendix I.

The intuition for this proposition is: when the amount of aid is not large (with respect to the recipient's own resources), it is likely to be the case that for a socially uncommitted government, the *IR* constraint is binding at the "optimum" level of conditionality $(k^{IR} < \hat{k})$. In other words, the amount of conditionality that would maximize the production of the social good (on the recipient's reaction function) is such that the recipients would be better off by not obtaining aid than by accepting it with such a level of conditionality attached. In that case, the best the donor can do is to impose a level of conditionality that keeps the recipient on its *IR* constraint. Consequently, if this is the case, conditionality (on the monitorable component of social program) is increasing in the recipient's social commitment (see the lemma above). For governments with a relatively high interest in social spending, however, the *IR* constraint becomes not binding. This is the case when $\alpha > \alpha^c$, with α^c denoting the level of social commitment for which the *IR* of the recipients is exactly binding at $k = \hat{k}$ (and thus slack for any $\alpha > \alpha^c$). When this is this case, if the donor imposed the maximum level of conditionality acceptable for the recipient, it would force the latter to use an extremely inefficient technique to produce the social good. Such conditionality would just crowd out expenditure on the not monitorable input needed for the production of the social good. Instead, by imposing the "optimum" level of conditionality, the donor makes the recipient strictly better off than under no aid. Furthermore, as α increases, the amount of resources that the government would have devoted to social spending (even in the absence of conditionality) also increases, so that the optimal level of conditionality decreases with the social commitment of the recipient. In the limit, when α tends to 1, conditionality is totally ineffective, and any binding level is detrimental to the poverty reduction program. Finally, when the amount of aid is large enough, the level of conditionality for which the recipient is indifferent between accepting conditional aid or not, k^{IR}, would be so high, that the donor is indeed able to impose the "optimum" level of conditionality, $\hat{k}$, independently of the level of social commitment of the recipient. Of course, in this case conditionality monotonically decreases with the social commitment of the recipient for any values of α.

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[13] Notice, however, that when $\rho \to 0$, and thus when the utility function tends to a Cobb-Douglas, $\frac{d\hat{k}}{d\alpha} \to 0$.

II. CONDITIONALITY WHEN α IS NOT OBSERVABLE

The analysis in the previous section showed that the optimal level of conditionality on social spending depends upon the characteristics of the recipient government. Furthermore, when conditionality can be imposed only on some components of the budget, the relationship between the social commitment of the recipient government, α, and the optimal level of "conditional" social spending is not necessarily monotonic (Proposition 2). In this section, we explore the implications of those results when the "type" of the recipient government is not observable or when the aid contract cannot depend upon the type of the government.

The situation we have in mind is one where, because of political or regime changes (like the end of a war), the recipient government's track record is either not available or cannot be used to infer its preferences with regard to social expenditure. In that context, we show that the donor's inability to impose type-specific conditionality leads to inefficiencies and, under certain conditions, to a form of aid rationing. Alternatively, we can assume that for political constraints (related to certain horizontal equity considerations), the donor community cannot grant aid to a country A and deny it to a country B, if both countries are willing to agree on the same level of conditionality. This may very well be the case for multilateral organizations that are committed (often by statute) to the uniformity of treatment of their members.

The donor's inability to impose type-dependent conditionality entails, as expected, an inefficiency that reduces the utility that it can derive from aid relative to the case in which α is contractible upon. In what follows, we focus on two particular aspects of that problem: first, we discuss situations in which excessive or insufficient conditionality arise as equilibrium outcomes; second, we investigate the possibility that informational asymmetries between donors and recipients lead to a particularly bad outcome in which debt relief is denied to countries that would obtain it if they were able to credibly signal their type to the donor.

Conditionality As a Screening Device

Assume that the donor is willing to grant aid only to governments that have a sufficient social commitment. More precisely, assume that there is an $\tilde{\alpha} \in (0, 1)$ such that if the type of the government were observable, all governments with $\alpha \geq \tilde{\alpha}$ would be granted aid and all governments with $\alpha < \tilde{\alpha}$ would be denied it.

In a context where α is not observable, conditionality can be used to screen out recipients with a low degree of social commitment. Indeed, as the individual rationality constraint of the recipient is increasing in α, a sufficiently high level of k will have the effect of screening out government with a weak social commitment. Such screening comes at a cost, however, namely excessive or insufficient conditionality. We can distinguish two cases.

In the first case, see Figure 1a, the cut-off government below which no aid would be granted lies in a region where the *IR* constraint is not binding[14] ($\alpha^C < \tilde{\alpha}$) and where $\frac{dk^C}{d\alpha} < 0$. In such a case, in order to have all and only the governments

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[14]Notice that this is always the case when $A > \frac{G}{1-\rho}$.

with $\alpha \geq \tilde{\alpha}$ accept relief, the donor will have to impose $k = k^{IR}(\tilde{\alpha})$, where $k^{IR}(\tilde{\alpha})$ is the k such that the IR is exactly binding for a government of type $\tilde{\alpha}$. In so doing, however, the donor will impose excessive conditionality on all governments with $\alpha > \tilde{\alpha}$.

In the second case, see Figure 1b, the cut-off government below which no aid would be granted lies in a region where the IR constraint is binding ($\alpha^C > \tilde{\alpha}$), and where $\frac{dk^C}{d\alpha} > 0$. In that case, the donor will impose too little conditionality to at least all recipients in the interval $(\tilde{\alpha}, \alpha^C]$. Also, it is possible that for some $\tilde{\tilde{\alpha}}, k^C(\tilde{\tilde{\alpha}}) = k^{IR}(\tilde{\alpha})$, so that all governments in the region $(\tilde{\tilde{\alpha}}, 1)$ will be imposed too much conditionality. In conclusion, we can make the following remark: *the use of conditionality as screening device may entail distortions as too little or too much conditionality may be imposed on recipient countries.*

This in turn may lead to forms of aid rationing. Indeed, it is possible that countries worth being granted aid when α is contractible upon (meaning with conditionality based upon their true type) are not worth being granted aid if conditionality cannot be tailored to their type. This case is examined next.

Aid Rationing

The discussion in the previous section highlights a simple problem: the donor may have to impose an excessive amount of conditionality in order to screen out socially unfriendly governments (see Figure 1). This directly translates into a loss of donor's utility relative to the case where the type of the government is observable.

Assume now that donors are willing to grant aid only under the expectation that the resulting production of the social good would be above a certain threshold C. This assumption is consistent with the idea that voters in donor countries would consider unsuccessful any aid policy that did not achieve some minimum objective in terms of social good production, irrespective of the initial conditions in the recipient country.

If the recipient's type is observable, this maps directly into a donor's policy granting relief only to some government types, namely the more socially committed ones.[15] Now let $\tilde{\alpha}$ be the degree of social commitment for which the expected level of social good production is just acceptable from the donor's perspective. Then, if α were observable, only governments with $\alpha \geq \tilde{\alpha}$ would obtain aid funds. More formally, we can define $\tilde{\alpha}$, as the lower value of α, for which $\hat{k}(\tilde{\alpha})\hat{e}(\hat{k}(\tilde{\alpha})) = C$.

We now show that, in the presence of asymmetric information, the use of conditionality as a screening device not only yields excessive (or insufficient) conditionality, but it can also lead to aid rationing. With rationing, we define a situation in which governments that would receive aid/debt relief if they could credibly signal their type to the donor are denied it because of asymmetric information problems. Formally, we can state the following proposition.

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[15] Throughout the analysis we will assume that the donor's objective is to grant relief to the largest number of countries that "deserve" it, rather than maximize some aggregate welfare function across countries.

Figure 1. Screening by Conditionality
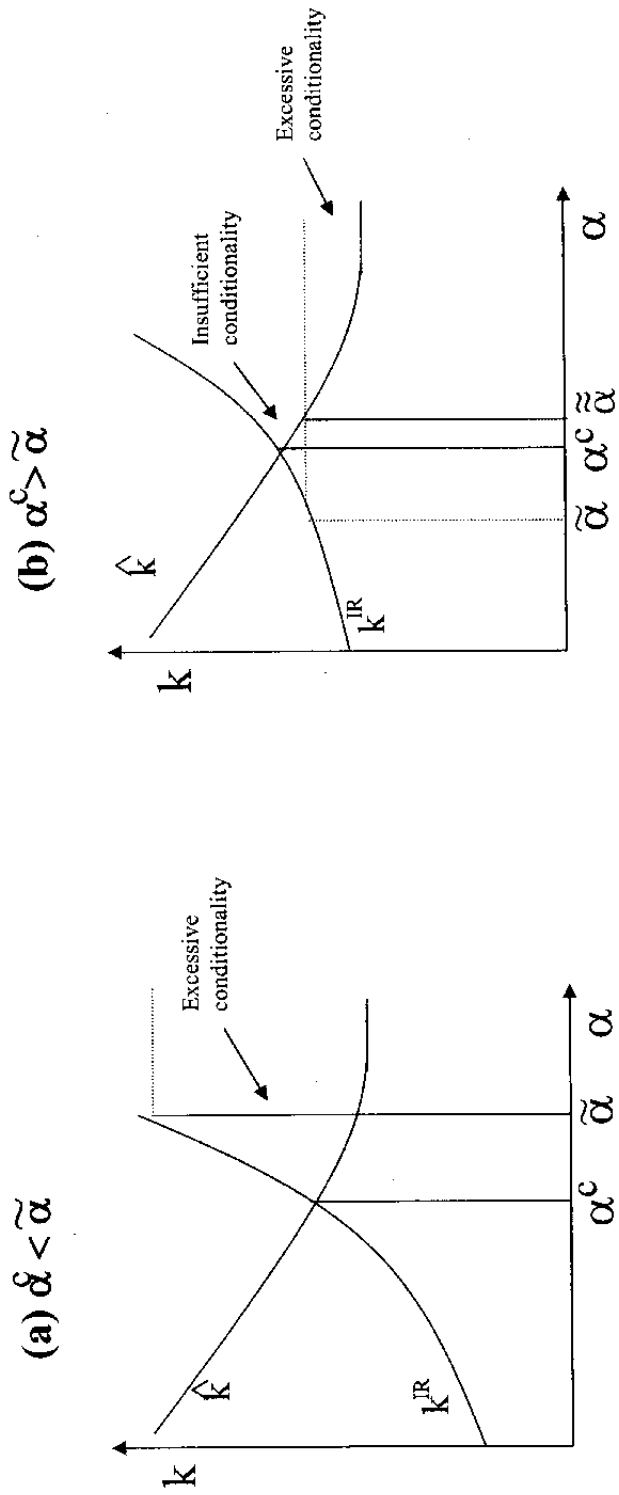
Proposition 3

If α is not observable, there will be aid rationing if, and only if, $\tilde{\alpha} > \alpha^C$. Proof: see Appendix I.

The intuition for this result is the following: if the donor screens out socially uncommitted recipients, imposing a level of conditionality that corresponds to the optimal level for recipient $\tilde{\alpha}$ (that is, when $\tilde{\alpha} < \alpha^C$), by definition it will not ration out that marginal government, and hence, given that the *IR* constraint is increasing in α, it will not ration out any government that would have been granted aid under type-contingent conditionality. On the contrary, if to screen out low α recipients, the donor is forced to impose a level of conditionality that is above the optimal level for the recipient at $\tilde{\alpha}$ (as is the case for $\tilde{\alpha} > \alpha^C$), at least that marginal recipient will be rationed out. Indeed, by definition, under type-contingent conditionality, the donor is indifferent between granting and denying aid to a type $\tilde{\alpha}$ recipient. By imposing a level of conditionality that is not optimal for type $\tilde{\alpha}$ recipients, however, the net benefit from granting aid becomes negative. In other words, the donor will be forced to impose an even higher level of conditionality, so that type $\tilde{\alpha}$ recipients will be screened out also, and only recipients for whom the net benefit of granting relief is positive are left in. More precisely, if there exists an $\hat{\alpha} \in (\tilde{\alpha}, 1)$ such that:

$$k^{IR}(\hat{\alpha})\hat{e}\big(k^{IR}(\hat{\alpha}), \hat{\alpha}\big) = C,$$

then all governments with $\alpha > \hat{\alpha}$ will accept the program and obtain aid. However, it could also be that, for all α,

$$k^{IR}(\alpha)\hat{e}\big(k^{IR}(\alpha), \alpha\big) < C,$$

so that there is a total "market failure" and no country receives aid.

Finally, it is worth noting that a donor's ability to use conditionality as a screening device depends crucially on the form of their utility function. The results in this section rely on the implicit assumption that donors rank recipient governments by their type. That assumption is consistent with a situation where the utility donors obtain from aid is increasing in α. However, that is not necessarily the case when the donor's utility function is not linear in the production of the social good. In that case, although the absolute increase in the production of the social good associated with aid is always increasing in the recipient's type, donors may want to focus instead on the relative increase. In other words, donors may want to concentrate on recipients for which aid "makes a difference"; that is, governments that in the absence of aid would allocate very few resources to social spending.

In that context, it can be shown that if the donor's marginal utility decreases "fast enough" with the production of the social good, the "preferred" recipients will not be those with the highest degree of social commitment. Under those circumstances, the effectiveness of conditionality as a screening device is further diminished. Indeed, since the sorting of recipients relies entirely on the *IR* constraint,

one cannot exclude high-type governments without also denying aid to recipients with lower propensities to social spending.

III. CONCLUSION

It is well known that not all aid recipient governments have used, nor can they be counted upon to use, developmental assistance to effectively improve the standards of living of the poorest sectors of their societies. This has led many in the donor community to argue in favor of establishing a direct link between new aid programs (such as debt cancellation) and investment in social programs.[16] In this paper, we have provided a formal analysis of some of the pros and cons of such conditionality.

We have showed that when the social preferences of donor and recipient countries differ, donors may use the leverage associated with aid programs (or debt relief) to influence, through conditionality, the policies of the recipients. To the extent that aid is fungible and not all the relevant actions of the recipient government can be observed and contracted upon, however, conditionality needs to balance the benefits of imposing a certain level of social spending, with the costs arising from a distorted allocation of resources. In addition, consistent with the recent empirical literature, we showed that the effectiveness of conditionality is largely dependent on the recipient's commitment to the social program, so that conditionality should be designed according to the social preferences of the latter. Finally, in the more realistic context where donors cannot observe recipient's preferences or cannot policy-discriminate across recipients, the paper shows that conditionality may be effective in selecting the governments with the strongest social commitment. However, such use of conditionality as screening device entails costs associated with the imposition of suboptimal levels of conditionality on recipient countries. This may lead to forms of aid rationing if governments that would be granted aid if they could credibly signal their social commitment were instead denied aid because of the donor's inability to discriminate between them and less socially committed governments.

From a policy standpoint, by stressing the limits of conditionality, our model suggests that recipient governments need to play a crucial and active role in the successful implementation of a poverty reduction program. In that sense, our results provide some analytical support to the argument that aid (or debt relief) can only be successful in reducing poverty when there is "program ownership" on the part of the recipient country.[17]

Furthermore, our analysis of the asymmetric information case has some implications for the issue of cross-country aid distribution when political and informational constraints prevent donors from tailoring their policy to the structural characteristics of recipient countries. In that context, our model suggests that conditionality can act as an effective, although costly, screening device if donors

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[16]See, for example, CISDE-Caritas (1999).

[17]In a companion paper, Cordella and Dell'Ariccia (2001), we show that, because of the distortions associated with incomplete conditionality, under certain conditions donors may obtain better results by providing assistance in the form of direct project financing.

want to select the most socially committed recipients. However, it also points out that such strategy is not effective if the targets of aid/debt relief programs are countries with governments of an "intermediate" type, where foreign intervention may make "more of a difference."

From a methodological standpoint, we model the incompleteness of aid contracts by assuming that only a subset of the recipient's actions is observable and monitorable by donors. This allows us to analyze a situation where aid is disbursed before the production and consumption of the social good occur. An alternative approach is to assume, as in standard contract problems, that the donor is able to observe the production of the social good, but only with an error.[18] Then, the donor can impose ex post conditionality by linking debt relief to the observed amount of the social good. Note that, in that context, if recipients are risk neutral, the optimal solution involves making the recipients the residual claimants. If recipients are risk averse, however, the optimal solution involves some risk sharing and hence distortions. We chose our ex ante approach because it provided a simple way of representing limits in the scope of conditionality and the associated distortions in terms of mix of reforms often debated in the related policy literature. In addition, the ex ante approach has the attractive feature of being consistent with the notion that ex post punishments of "bad" recipient governments can be severely limited by Samaritan-dilemma considerations (see Federico, 2001).

Finally, it is worth noting that although this paper discusses some of the problems associated with conditionality, it falls far short of addressing them all. In particular, our framework cannot deal effectively with issues related to the debate on the streamlining of conditionality. In our model, for the given information structure, conditionality is always optimal in equilibrium. It follows that there is no room for the notion of "excessive" conditionality defined as a level of conditionality that, if reduced, would increase the production of the social good.

APPENDIX

Proofs

Proof of Proposition 1

I. Since for any $k > k^{NC}$ conditionality is binding,

$$\left.\frac{\partial U}{\partial k}\right|_{k>k^{NC}} = \rho\alpha\hat{e}(k)\big(k\hat{e}(k)\big)^{\rho-1} - \rho(1-\alpha)\big(G+A-k-\hat{e}(k)\big)^{\rho-1} < 0. \tag{12}$$

Suppose $\hat{e}(k) > k^{NC}$. Since $U'(k, 0) > 0$, and $U(.)$ is concave in e, a necessary condition for $\hat{e}(k) > k$ is that:

$$\left.\frac{\partial U}{\partial e}\right|_{\hat{e}(k)=k} = \rho\alpha k\big(k\hat{e}(k)\big)^{\rho-1} - \rho(1-\alpha)\big(G+A-k-\hat{e}(k)\big)^{\rho-1} > 0. \tag{13}$$

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[18] A model of this sort is provided by Azam and Laffont (2001).

Because of the symmetry of the production function, however, at $\hat{e}(k) = k > k^{NC}$, (13) can be written as:

$$\left.\frac{\partial U}{\partial e}\right|_{e(k)=k>k^{NC}} = \rho\alpha\hat{e}(k)\big(k\,\hat{e}(k)\big)^{\rho-1} - \rho(1-\alpha)\big(G + A - k - \hat{e}(k)\big)^{\rho-1} > 0,$$

which contradicts (12).

II. Now, totally differentiating equation (6), we obtain:

$$\frac{d\hat{e}(k)}{dk} = -\frac{\rho\alpha k^{\rho-1}\hat{e}(k)^{\rho-1} + (1-\alpha)(\rho-1)\big(G + A - k - \hat{e}(k)\big)^{\rho-2}}{(\rho-1)\alpha k^{\rho}\hat{e}(k)^{\rho-2} + (1-\alpha)(\rho-1)\big(G + A - k - \hat{e}(k)\big)^{\rho-2}} > -1. \tag{14}$$

In addition, as $\hat{e}(k^{NC}) = k^{NC}$, from (14) it follows that:

$$\left.\frac{d\big(\hat{e}(k)k\big)}{dk}\right|_{k=k^{NC}} = \hat{e}(k) + k\frac{d\hat{e}(k)}{dk} = k\left(1 + \frac{d\hat{e}(k)}{dk}\right) > 0.$$

Hence, a necessary condition for the donor's first order conditions to be verified is that $\hat{k} > k^{NC}$. Finally, as for any $A > 0$, the *IR* constraint cannot be binding at $k = k^{NC}$, the existence of a $\tilde{k} \in (k^{NC}, k^{IR})$ such that $\tilde{k}\hat{e}(\tilde{k}) > k^{NC}\hat{e}(k^{NC})$, follows directly from a continuity argument.

Proof of Lemma 1

I. By totally differentiating the *IR* constraint, we have:

$$\frac{dk^{IR}}{d\alpha} = \frac{\left[\big(G + A - k^{IR} - \hat{e}(k^{IR})\big)^{\rho} - \big(G - k^{NA} - e^{NA}\big)^{\rho}\right] + \left[\big(k^{NA}e^{NA}\big)^{\rho} - \big(k^{IR}\hat{e}(k^{IR})\big)^{\rho}\right]}{\alpha\rho\hat{e}(k^{IR})\big(k^{IR}\hat{e}(k^{IR})\big)^{\rho-1} - (1-\alpha)\rho\big(G + A - k^{IR} - \hat{e}(k^{IR})\big)^{\rho-1}}. \tag{15}$$

(A) First, since by Proposition 1, at equilibrium, $\hat{e}(k) < k$, we know from equation (6) that the denominator of (15) is negative. (B) Second, using the IR constraint we have that:

$$\big(G + A - k^{IR} - \hat{e}(k^{IR})\big)^{\rho} - \big(G - k^{NA} - e^{NA}\big)^{\rho} = \frac{\alpha}{1-\alpha}\left[\big(k^{NA}e^{NA}\big)^{\rho} - \big(k^{IR}\hat{e}(k^{IR})\big)^{\rho}\right],$$

so that the two terms in brackets in the numerator have the same sign. Now, from the first order conditions of the recipient, we can write:

$$\frac{k^{IR}\big(k^{IR}\hat{e}(k^{IR})\big)^{\rho-1}}{\big(G + A - k^{IR} - \hat{e}(k^{IR})\big)^{\rho-1}} = \frac{(1-\alpha)}{\alpha} = \frac{k^{NA}\big(k^{NA}e^{NA}\big)^{\rho-1}}{\big(G - k^{NA} - e^{NA}\big)^{\rho-1}}.$$

Since $k^{NA} < k^{IR}$, this in turns means that:

$$\frac{\big(k^{IR}\hat{e}(k^{IR})\big)^{\rho-1}}{\big(G + A - k^{IR} - \hat{e}(k^{IR})\big)^{\rho-1}} < \frac{\big(k^{NA}e^{NA}\big)^{\rho-1}}{\big(G - k^{NA} - e^{NA}\big)^{\rho-1}};$$

this jointly with the *IR* constraint implies $k^{IR}\hat{e}(k^{IR}) > k^{NA}e^{NA}$, which means that the numerator of (15) is negative. (A) and (B) in turn imply that $\frac{dk^{IR}}{d\alpha} > 0$.

From (7), we have that $\lim_{\alpha \to 0} \hat{e}(k) = \lim_{\alpha \to 0} e^{NC} = k^{NC} = 0$, so that using (10) $\lim_{\alpha \to 0} k^{IR} = \{k: G + A - k = G\} = A$. Since, $\lim_{\alpha \to 1} \hat{e}(k) = G + A - k$, and $\lim_{\alpha \to 1} e^{NC} = k^{NC} = \frac{G}{2}$,

$$\lim_{\alpha \to 1} k^{IR} = \left\{k: k(G+A-k) = \left(\frac{G}{2}\right)^2\right\} = \frac{G+A+\sqrt{A(2G+A)}}{2}.$$

II. The problem of the donor is that of:

$$\max_k f\big(\hat{e}(k)k\big) = \max_k \frac{(1-\alpha)^{\frac{1}{\rho-1}}(G+A-k)k}{(1-\alpha)^{\frac{1}{\rho-1}} + k(\alpha k)^{\frac{1}{\rho-1}}},$$

and the first order conditions are given by:

$$-\frac{(1-\alpha)^{\frac{1}{\rho-1}}\left(-k(\alpha k)^{\frac{1}{\rho-1}}\big(G+A+k(\rho-2)\big) - (1-\alpha)^{\frac{1}{\rho-1}}(G+A-2k)(1-\rho)\right)}{(1-\rho)\left((1-\alpha)^{\frac{1}{\rho-1}} + k(\alpha k)^{\frac{1}{\rho-1}}\right)^2} = 0. \tag{16}$$

Since neither $k = 0$ nor $k = G$ can be a solution of the problem, and since the maximand is continuous in k, an interior solution $\tilde{k}$ should necessarily exist in which both equation (16) and the second order condition are verified. Implicitly differentiating equation (16), after some manipulation, we have that:

$$\hat{k} > \frac{G+A}{2} \Rightarrow \frac{d\hat{k}}{d\alpha} < 0.$$

Finally, for equation (16) to be verified it is necessary that:

$$-k(\alpha k)^{\frac{1}{\rho-1}}\big(G+A-k(\rho-2)\big)$$

and

$$-(1-\alpha)^{\frac{1}{\rho-1}}(G+A-2k)(1-\rho)$$

have discordant signs, and this is the case only if $k \in \left[\frac{G+A}{2}, \frac{G+A}{2-\rho}\right]$.

When $\alpha \to 1$, the preference of the donor and those of the recipient converge and the optimal (nonbinding level) of conditionality is $\hat{k} = \frac{G+A}{2}$. Taking the limit of equation (16) for $\alpha \to 0$, and solving the equation in k, it is immediate to verify that $\lim_{\alpha \to 0} \hat{k} = \frac{G+A}{2-\rho}$.

Proof of Proposition 2

From Lemma 1, we know that $\frac{dk^{IR}}{d\alpha} < 0$, $\frac{d\hat{k}}{d\alpha} > 0$, and that $\lim_{\alpha \to 1} k^{IR} > \lim_{\alpha \to 1} \hat{k}$. Thus, for the *IR* to be binding for some recipient of type $\alpha \in (0, 1)$, we need that $\lim_{\alpha \to 0} k^{IR} < \lim_{\alpha \to 0} \hat{k} \Leftrightarrow A < \frac{G}{1-\rho}$. The rest of the proof follows directly from Lemma 1.

Proof of Proposition 3

For $\tilde{\alpha} > \alpha^c$, by definition, we have

$$\hat{k}(\tilde{\alpha})\hat{e}\big(\hat{k}(\tilde{\alpha}),\tilde{\alpha}\big) \geq k^{IR}(\tilde{\alpha})\hat{e}\big(k^{IR}(\tilde{\alpha}),\tilde{\alpha}\big), \tag{17}$$

$\tilde{\alpha}$ is the minimum degree of social commitment for which the donor would find it optimal to grant aid when the recipient's type is observable. Hence, if $\tilde{\alpha} > \alpha^c$, using (17), we have:

$$k^{IR}(\tilde{\alpha})\hat{e}(k^{IR}(\tilde{\alpha}),\tilde{\alpha}) < C.$$

This means that at least the marginal government is rationed out under asymmetric information. If instead $\tilde{\alpha} \leq \alpha^c$, we have $k^{IR}(\tilde{\alpha}) = \hat{k}(\tilde{\alpha})$ so that the marginal recipient is not rationed out, as:

$$k^{IR}(\tilde{\alpha})\hat{e}(k^{IR}(\tilde{\alpha}),\tilde{\alpha}) < C.$$

In addition, as $\frac{\partial \hat{e}}{\partial \alpha} > 0$, for any $\alpha > \tilde{\alpha}$, we have:

$$k^{IR}(\tilde{\alpha})\hat{e}(k^{IR}(\tilde{\alpha}),\tilde{\alpha}) < k^{IR}(\tilde{\alpha})\hat{e}(k^{IR}(\tilde{\alpha}),\alpha),$$

so that no recipient that would have been granted relief under α observable is denied it.

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