

Aid and Sanctions

Kenneth Kletzer

Department of Economics
University of California
Santa Cruz, CA 95064

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Abstract

Foreign aid donors and recipient governments often have conflicting objectives. Foreign donors may attempt to influence the policies of recipient governments by offering aid or threatening to suspend aid to sovereign states. This paper considers the credibility of such inducements and the conditioning of aid flows on policy behavior by national governments in the presence of opposing objectives. Aid can be conditioned on past policy actions of the recipient and used to influence the distribution of government resources in a simple repeated agency model. In equilibrium, aid flows are backloaded and reward recipient governments for donor-preferred policy actions. The model is extended to a stochastic setting to allow for asymmetric information between donors and recipients regarding government resources and accumulation of private of foreign assets. This allows for unobserved capital flight implicitly financed by foreign aid inflows by constituents favored by the government. Conditional aid is still feasible and can be enforced by aid suspensions in the presence of potential capital flight.

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1. Introduction

Foreign aid donors and recipient governments frequently have conflicting objectives. Often, multilateral and bilateral donors provide aid for funding poverty alleviation programs and projects, while recipient governments favor domestic constituents that provide the government political support. In some cases, the struggle for political control is a struggle to advance the interests of one group of residents at the expense of others. Many aid receiving countries allocate a large share of public expenditures to the military which may be used to maintain domestic control or exert influence across borders. Further, the leaders of several countries have used aid flows as well as other public resources to enrich themselves and supporters at the expense of growth-enhancing and poverty-reducing public spending.

Not only do conflicts arise between donors and recipients over the use of aid flows, but official and unofficial donors often seek to force policy change in developing countries. Foreign states can suspend aid, as well as access to foreign markets, to punish countries for actions taken within their borders or across those of their neighbors. Sanctions are an alternative to the direct interference with a nation's sovereignty through acts of war for influencing foreign and domestic policies. The suspension of aid seems to be a likely candidate as a means of punishment because providing aid has a positive pecuniary cost to the donor. It also has an opportunity cost - the donor can usually find other recipients it finds more amiable. The kinds of policies that invoke sanctions include human rights abuses by the government, governmental forbearance of such abuses by private parties, prosecution of civil war and military actions (or threats) against other nations.

Using access to aid or threatening the withdrawal of aid to induce particular behavior by a government presumes the capacity of the government to pursue its own choice of policies. That is, the issue arises because there is no direct means of enforcing a contract between nations. Respect for the sovereignty of potential aid recipients allows national governments to choose how to use resources at their disposal, including aid once received. Official foreign aid can be misused and attached conditions violated. Private aid organizations operate with the tolerance of the government that allows or denies their personnel to enter and remain without harassment. Sovereignty of the state also gives the government monopoly rights on violence within national borders. Legal institutions may inadequately limit the confiscatory and extortionary powers of the

state to satisfy foreign donors.

The credibility of using access to aid as a carrot and the withdrawal of aid as a stick for inducing particular behavior by a sovereign is an open issue. Withdrawal of support because the government spends too little on poverty alleviation measures may eliminate what aid does go to the poor. When donors care about the poor, the government can give little but enough aid to the poor to discourage sanctions. The time inconsistency of aid suspension is stressed by Svensson [2000], but Eaton and Engers [1992, 1999] show that sanctions can be sustainable even if sanctions are costly for the countries that impose them. The credibility of sanctions is revisited in this paper without restrictions on strategies adopted by these authors. A repeated game model of aid flows over time in the presence of conflicting objectives for donors and the recipient government is used to find perfect equilibria with punishments that are not renegotiable in the presence of sovereign immunity.

Aid flows and public spending are represented in an analytical model in which the donor cares about transfers to different constituents than does the government. The donor may be concerned with poverty reduction, social welfare program expenditure, aggregate growth or similar objectives. The recipient government instead seeks to satisfy the objectives of a particular domestic constituency. For example, the government may choose policies that distribute income towards the already affluent or direct government spending towards the military or civil service employment. The goals of the government may be geared towards maintaining its position or achieving gain for its own. The process of deriving policy objectives for the government from competition between constituencies is not a topic of this paper. Instead, the objective of the government is taken to be the welfare of an enfranchised group of residents, while donors value the well-being of disenfranchised residents. The government can redistribute national income towards those it favors away from those it disfavors, but there is a minimum level of income that the disenfranchised ensure themselves. The disenfranchised (poor) can opt out of the market economy, migrate, or otherwise avoid complete appropriation of their income by the government.

Conditional aid is sustainable in this economy, and the efficient perfect equilibrium provides incentives to the government to spend resources at its disposal including aid or forego confiscation of income of disenfranchised residents. The equilibrium aid inflows are backloaded - the government must show good faith by making social welfare expenditures from national resources

plus aid before aid rises. The welfare of those favored by the government rises over time with aid inflows, rewarding the government for expenditures made early in equilibrium. This is due to the inability of the government to commit, although donors cannot commit either.

The model applies to using aid suspensions or reductions as sanctions against recipient governments. Permanent aid embargoes are not credible because the donors forego the gains that started them making grants in the first place. Instead, they revert to a conditional aid relationship that yields all the surplus from aid to the donor. This is the implicit contract that requires the government to make concessions in exchange for rising aid and transfers to its preferred constituents. This equilibrium is renegotiation-proof.

A concern with historical precedence is that aid inflows or domestic public revenues finance the accumulation of foreign assets by corrupt government officials or favored constituents. This can range from the acquisition of Swiss bank accounts and seaside residences by despots to capital flight by relatively affluent residents. Allowing hidden savings by favored residents might eliminate the force of aid reductions to encourage donor-preferred public policies. In the first model presented below, government-favored constituents can consume any aid immediately, but in the second model, they can smooth their consumption over time. Consumption smoothing is motivated by stochastic domestic income. The distribution of income towards government-favored constituents is also hidden from donors.¹ The model is a repeated game with moral hazard. Special to this model is neither the donor nor the government can commit to their future policies.

Aid provides insurance for government-favored constituents beyond that achieved through precautionary saving. In a stationary equilibrium, the consumption of government-favored residents is subsidized by donors when their resources are low. When their income is high, the government transfers both foreign and domestic resources to donor-favored residents. Credible sanctions exist and again consist of reverting to an equilibrium in which the donor backloads benefits to the government in exchange for distribution of national resources towards donor-favored residents.

Some recent literature on aid finds that aid flows appear to be inefficient from the donors' perspectives. Pallage and Robe [2001] find that aid is not countercyclical and exacerbates the cycle in recipient countries. In Pallage and Robe [2003], they argue that substantial gains may be internalized by reforming international aid flows so that these smooth national income

for recipient countries. In yet another paper, they consider project assistance aid in an agency model.² The solution to the agency problem is co-financing, leading to the financial accelerator that exacerbates the cycle. The second model below offers a different asymmetric information explanation for aid procyclicality. It comes about because the implicit aid contract replaces savings, but procyclicality is distinguished from the conditional correlation between aid inflows and current income. Aid responds to a wealth variable and is procyclical with consumption.

Burnside and Dollar [2000] and Collier and Dollar [2002] find that the impact of aid on growth and on poverty reduction depends on domestic policies and macroeconomic stability but that the distribution of aid does not. They argue that aid should be conditional on domestic policies. This type of aid conditionality fits the generalized models below. The arguments developed here provide a basis for the credibility of conditional aid based on any variety of classes of policies taken by the government.³

2. Foreign Aid with Conflicting Objectives

The analytical model considers aid flows from a donor that cares about the welfare of part or all of the residents of the recipient country. The recipient government acts as an intermediary between foreign aid donors and the domestic economy. The government chooses how to expend aid inflows aware of the objectives of a foreign donor and how the donor may react in the future to the government's choices. The government acts as a sovereign. Foreign donors cannot directly undertake projects in the country without the government's explicit or implicit consent. Aid flows, therefore, may be made conditional on the past use of aid or policies enacted by the government. Reductions or suspensions of aid in response to government actions constitute sanctions in the model economy. Sanctions are the withdrawal of benefits which are represented here as financial aid inflows to the recipient government. This follows the literature on sanctions more generally in which sanctions can be the suspension of access to international commodity markets, preferential trading arrangements or access to international capital markets in addition to foreign aid. Foreign donors will not be concerned solely with the application of aid funds by the government. They suspend aid flows in response to public policies that harm a minority or majority of residents, including policies that exacerbate poverty, the lack of observance of human rights or military actions against other countries.

Conditional aid and sanctions are modeled in an infinite-horizon economy to allow the consideration of credible sanctions in a repeated game. The objective for the government is given by the utility of a representative enfranchised individual for simplicity. The objective function is given by

$$V_t = \sum_{s=t}^{\infty} \beta^{s-t} (v(c_s^e) - v(w_s)),$$

where c_t^e is the consumption in period t by the enfranchised and w_t represents the resources that the government can ensure the enfranchised through domestic policies alone. Consumption can represent private consumption or public consumption that benefits the enfranchised. For example, the enfranchised may be the military and c_t^e military expenditure in period t . The resources, w_t , include the outcome of any redistributive policies available to the government. It represents the most extreme allocation away from the disenfranchised towards the enfranchised that is feasible for the government given political and legal institutions and opportunities for resistance by disenfranchised residents. The government's capacity to extract resources from the disenfranchised or reduce public expenditures that benefit this group is limited by the institutional environment. This includes the ability of minority groups to assure themselves access to public services, demand public goods and reduce inequities in taxation through the exercise of their legal and political rights or through non-compliance and non-cooperation. Total resources before aid inflows are divided between the groups of residents by the government constrained by the greatest share that the disenfranchised can ensure themselves, y_t . The consumption, w_t , is the autarchic consumption of those favored by the government. Savings by the government is not allowed at this point but will be introduced later.

The objective of the donor is given by the utility of the representative disenfranchised resident less the opportunity cost of aid. This objective is chosen for contrast to clarify the role of divergent interests of donors and recipient governments and maintain simplicity. The interests of the donor and the government do not need to be in strict opposition but simply need to be different to provide the underlying conflict of interest here. The objective function for the donor is given by

$$U_t = \sum_{s=t}^{\infty} \beta^{s-t} (u(c_s^d) - u(y_s) - \tau_s),$$

where c_t^d is consumption of the disenfranchised and τ_t is the aid provided in period t .

The domestic resource constraint is

$$c_t^d + c_t^e \leq y_t + w_t + \tau_t.$$

Two additional constraints are imposed in each period. These are self-enforcement constraints representing the capacity of the government and the donor, respectively, to stop interacting. The government, as sovereign, can simply stop acting as the donor wishes and realize utility given by

$$\underline{V}_t(\tau_t) = v(w_t + \tau_t) - v(w_t),$$

where its future consumption equals w_s for all $s > t$ and all current aid goes to the enfranchised. The self-enforcement constraint for the government is

$$V_t \geq \underline{V}_t(\tau_t) \quad \text{for all } t \geq 0.$$

This constraint expresses the assumption that the government receives aid and allocates it along with the share of the national endowment, w_t , between the two uses, c_t^e and c_t^d . The donor can choose to stop providing aid at any time, so that the constraint

$$U_t \geq 0,$$

holds for all t .

Perfect equilibrium with trigger strategies

Equilibrium aid flows in this economy will be determined in perfect equilibrium for the induced repeated game. The action each period for the donor consists of a choice of τ_t , which is followed by the choice of c_t^e and c_t^d by the government. The single-period payoffs are given by $(u(c_t^d) - u(y_t) - \tau_t)$ and $v(c_t^e) - v(w_t)$, respectively. To begin, the efficient perfect equilibrium paths for payments by the donor and the distribution of total resources by the government can be characterized by adopting trigger strategy punishments. In these punishments, whenever the government deviates from the equilibrium division of national resources, the donor stops providing aid forever. Similarly, if the donor fails to provide the equilibrium aid inflow, then the government provides the minimum level of consumption for the disenfranchised, so that $c_t^d = y_t$. Since these may not be credible punishment threats, refinements are considered below.

The efficient perfect equilibrium is found by solving a dynamic programming problem. Along

the equilibrium path, the payoff for the government can be written as

$$V_t = v(c_t^e) - v(w_t) + \sum_{s=t+1}^{\infty} \beta^{s-t} (v(c_s^e) - v(w_s)) = v(c_t^e) - v(w_t) + \beta V_{t+1},$$

and the payoff for the donor as

$$U_t = (u(c_t^d) - u(y_t) - \tau_t) + \sum_{s=t+1}^{\infty} \beta^{s-t} (u(c_s^d) - u(y_s) - \tau_s) = (u(c_t^d) - u(y_t) - \tau_t) + \beta U_{t+1}.$$

The problem is to find the maximum of U_t as a function of V_t given the resource and self-enforcement constraints. The problem is

$$U_t(V_t) = \max_{\{c_t^d, c_t^e, \tau_t, V_{t+1}\}} [u(c_t^d) - u(y_t) - \tau_t + \beta U_{t+1}(V_{t+1})]$$

subject to

$$v(c_t^e) - v(y_t) + \beta V_{t+1} \geq v(w_t + \tau_t) - v(w_t), \quad (1)$$

$$v(c_t^e) - v(y_t) + \beta V_{t+1} \geq V_t, \quad (2)$$

$$c_t^d + c_t^e \leq y_t + w_t + \tau_t, \quad (3)$$

$$\tau_t \geq 0 \quad (4)$$

$$V_{t+1} \geq 0 \quad (5)$$

and

$$U_{t+1}(V_{t+1}) \geq 0. \quad (6)$$

The problem is convex and yields a concave solution under the conditions that $u(c)$ and $v(c)$ are strictly concave and increasing. The Inada assumptions on $u(c)$ and $v(c)$ are also made. The proof is not standard because the constraint set is defined in terms of the solution, $U(V)$. The proof simply modifies that given for a different problem in Kletzer and Wright [2000].⁴ In this case, the solution $U(V)$ is not necessarily decreasing and can achieve an interior maximum.

The surplus promised to the government at time t , V_t , is the state variable in this programming problem. The constraint (1) imposes the self-enforcement constraint on the surplus that the government realizes in equilibrium for any choice of aid transfer by the donor. The second constraint (2) is the constraint that the donor cannot provide less surplus to government in period $t + 1$ than promised in period t . The constraints (5) and (6) are the perfection constraints for the trigger strategy case. The constraint (4) articulates the assumption that aid does not flow from the developing country to the donor country.

The necessary conditions for an optimum are found by forming the Lagrangian and

differentiating. The necessary conditions include the first-order conditions,

$$u'(c_t^d) = (\lambda_t + \gamma_t) v'(c_t^e), \quad (7)$$

$$1 + \lambda_t v'(w_t + \tau_t) = u'(c_t^d) + \mu_t \quad (8)$$

and

$$(1 + \varphi_{t+1}) U'_{t+1}(V_{t+1}) + \psi_{t+1} + \lambda_t + \gamma_t = 0. \quad (9)$$

Here λ_t is the multiplier for the current self-enforcement constraint for the government (1), γ_t is the multiplier for constraint (2), $\beta\varphi_{t+1}$ is the multiplier for the self-enforcement constraint of the donor in period $t + 1$, $\beta\psi_{t+1}$ is the multiplier for the self-enforcement constraint of the government in period $t + 1$ and μ_t is the multiplier for constraint (4). The second constraint (2) is not binding as noted above. The envelope condition,

$$U'_t(V_t) = -\gamma_t, \quad (10)$$

completes the necessary conditions for an interior solution.

The first-order conditions can be rearranged so that

$$\lambda_t + \gamma_t = \frac{u'(c_t^d)}{v'(c_t^e)}, \quad (11)$$

$$\lambda_t = \frac{u'(c_t^d) + \mu_t - 1}{v'(w_t + \tau_t)} \quad (12)$$

and

$$\lambda_t + \gamma_t = (1 + \varphi_{t+1}) \gamma_{t+1} - \psi_{t+1}. \quad (13)$$

For simplicity, let the corner constraint on aid transfers not bind, so that $\mu_t = 0$. The multiplier γ_t can be written as

$$\gamma_t = \frac{u'(c_t^d)}{v'(c_t^e)} - \frac{u'(c_t^d) - 1}{v'(w_t + \tau_t)},$$

so that the Euler condition (equation (13)) becomes

$$\frac{u'(c_t^d)}{v'(c_t^e)} = (1 + \varphi_{t+1}) \left[\frac{u'(c_{t+1}^d)}{v'(c_{t+1}^e)} - \frac{u'(c_t^d) - 1}{v'(w_t + \tau_{t+1})} \right] - \psi_{t+1}. \quad (14)$$

The Euler condition implies that if (i) $u'(c_t^d) > 1$ and (ii) neither future perfection constraint binds, then the marginal utility for donor-preferred expenditure must be rising relative to that for government-preferred expenditure. For example, if the preferences of both the enfranchised and disenfranchised residents display a common and constant elasticity of substitution, then the ratio of c_t^d to c_t^e will rise over time.

It is helpful to consider the steady state at this point. The endowments, w and y are given constants. Two types of steady state equilibria appear to be possible for the economy. In one, neither perfection constraint binds ($\bar{\varphi} = \bar{\psi} = 0$) so that $u'(\bar{c}^d) = 1$ (overbars denote steady-state values). In the other, the perfection constraint binds for the donor and $u'(\bar{c}^d) > 1$. Since the perfection constraint does not bind for the recipient government, we confirm the presumption that aid inflows are positive.⁵

In the first potential steady state, the multiplier $\bar{\lambda} = 0$ implying that the self-enforcement constraint for the government need not bind,

$$v(\bar{c}^e) - v(y) + \beta\bar{V} \geq v(w + \bar{\tau}) - v(w).$$

However, the marginal utilities for both types of residents, $u'(\bar{c}^d)$ and $v'(\bar{c}^e)$, must be positive so that $U'(\bar{V})$ is negative, and the aid inflow is positive. The donor can increase its welfare without violating the self-enforcement constraint for the government. A simple way to see this is to observe that the marginal benefit for the donor equals

$$u'(\bar{c}^d) \left(1 - \frac{v'(w + \bar{\tau})}{v'(\bar{c}^e)} \right)$$

and should be less than the marginal cost of aid which is one. Therefore, $u'(\bar{c}^d) > 1$ in steady state.

In the steady state, therefore, the self-enforcement constraint binds for the government,

$$\bar{V} = v(\bar{c}^e) - v(y) + \beta\bar{V} = v(w + \bar{\tau}) - v(w),$$

and $\bar{\tau}$ is positive because the perfection constraint for the government, $\bar{V} \geq 0$, does not bind.⁶

This equation along with the self-enforcement constraint for the donor

$$\bar{U} = u(\bar{c}^d) - u(y) - \bar{\tau} + \beta\bar{U} = 0$$

and the resource constraint

$$\bar{c}^d + \bar{c}^e = y + w + \bar{\tau}$$

determine the steady-state transfer and consumptions.

Next, turn to the dynamics of aid and the surpluses of the donor and government. In the stationary economy, a steady state is reached in which the donor's surplus over autarchy is exhausted. Maximizing the donor's surplus in period zero implies that the initial allocation of welfare is not the same as in the steady state. When the donor's surplus is positive for period

$t + 1$, then the ratio of marginal utilities, $u'(c_t^d) / v'(c_t^e)$, is rising. It must also be the case that the government's surplus, $v(c_t^e) - v(y_t) + \beta V_{t+1}$, equals $v(w_t + \tau_t) - v(w_t)$. The aid flow from the donor can be positive or zero at time t . Over time, the share of aggregate national expenditure shifts in favor of government-preferred spending, and transfers may rise.

In the initial period, either $U'(V_0) = 0$ or $U'(V_0) < 0$. In the first instance, the equations (10), (11) and (12) together imply that

$$\frac{u'(c_t^d)}{v'(c_t^e)} = \frac{u'(c_t^d) + \mu_t - 1}{v'(w_t + \tau_t)},$$

where μ_t is zero if $\tau_t > 0$. In this case, the self-enforcement constraint for the government is binding in the initial period, but the constraint that $V_0 \geq 0$ is not. Therefore, aid inflows are positive at the outset if $U'(V_0) = 0$. In the second case, V_0 must equal zero implying that aid can be zero. In this case, the government uses domestic resources for donor-preferred spending at the outset (so that $c_t^d > y$). The share of government-preferred spending and aid inflows rise over time. The donor's surplus can be positive even though the government receives no foreign aid and makes donor-preferred expenditures. The incentive for the government to do so are the gains from future aid inflows and rising consumption for the enfranchised in the forward-looking equilibrium.

The reason that an equilibrium other than an immediate and permanent steady state exists for the stationary economy is the presence of binding self-enforcement constraints. The perfect equilibrium is an implicit contract between the donor and the recipient government. The sovereign immunity of the government, expressed in the self-enforcement constraints, leads to a backloaded contract in which the government is rewarded for providing disenfranchised residents with a larger share of national consumption than the government would offer in the absence of the promise of more aid.

Credible punishment threats

The analysis so far relied on permanent autarchy punishments for deviation from the equilibrium plan. These may not be credible in the sense that they are not proof to renegotiation. If the recipient government deviates by spending too little on donor-preferred projects, then the donor foregoes any gains from providing aid that will assist, in part, disenfranchised residents. Under trigger strategies, any deviation is met with a permanent termination of the relationship. However, if the donor gained from entering into the relationship under the initial implicit contract with

the government, then the donor can also gain from renegotiating out of the punishment after the government deviates. This logic implies that trigger strategies may not be credible.

Punishments that are proof to renegotiation can be found for this economy. The choice of punishment of the government will be the restarting of the perfect equilibrium path that maximizes the donor's surplus. This is just the sequence of aid transfers and consumptions for each representative resident that starts in period zero sustaining payoffs to the donor and government equal to $U(V_0)$ and V_0 , respectively. A renegotiation-proof punishment of the donor for failing to provide aid is the immediate move to the steady-state. In the steady state, the donor's surplus is zero, the same as in autarchy.

Imposing the renegotiation-proof punishment of the government changes the perfection constraint (5) to

$$V_{t+1} \geq V_0.$$

This changes the constraint set, reducing admissible equilibria, but it does not eliminate the efficient perfect equilibrium in which the donor's surplus is maximized.

Renegotiation-proof punishment of the recipient government supports conditional aid flows. In the model, deviation by the government means that it has redistributed spending away from the donor-preferred recipients, possibly both aid and domestic resources. Further aid and rising government surplus are conditioned on the government's past behavior. Conditioning is credible in the proposed equilibrium because the donor minimizes the government's surplus along the efficient equilibrium even though punishment results in higher government surplus than does permanent autarchy. Reducing aid flows is a credible threat because the implicit contract backloads the recipient government's payoff. The restriction to credible punishment was made with the inclusion of the self-enforcement constraint in the dynamic program. It is from this restriction that the backloaded contract emerges.

A different issue concerns the access of the government to aid from multiple donors. The punishment might not be credible if another donor has an incentive to provide aid attempting to raise its altruistic utility by increasing c^d . Potential entry by new donors is not a problem because each new donor would maximize identical utility by offering the same implicit contract the old donor offers. With identical donor preferences, competition is not the problem, but free-ridership is a problem. Any potential donor benefits if other donors give aid and it does not. This reinforces

punishment of the government. The coordination problem is the standard one of sharing the cost of public goods expenditures, in this case aid that benefits the objectives of all potential donors. If donors have different objectives, then the government should be able to choose its most desired offer. This should come from the donor whose objectives are closest (in terms of the bilateral equilibrium outcome) to those of the recipient government.

Implications for sanctions

In the renegotiation-proof equilibrium for aid flows with conflicting goals of the donor and the recipient, the government's gains from access to foreign aid rise over time. It is this increase in the surplus, V_t , of the government that gives it the incentive to provide disfavored residents a larger share of the national endowment than it would under aid autarchy. At the outset, the government may not receive any aid but provides consumption c_t^d in excess of the minimum that the disenfranchised can ensure they receive because of the promise of future aid that will partly finance consumption by the enfranchised. In the steady state, the government complies with the implicit distribution of aid and national resources to avoid a credible return to the initial allocation of surplus.

The division of the national endowment between w and y need not reflect the productivity of factors owned by the different residents of the country or their initial ownership shares of national wealth. The share $y/(w + y)$ can be the result of government policies that redistribute wealth from disfavored residents to favored ones or forbearance or encouragement by the government in the face of confiscation of the non-human and human assets of the disfavored by others. This share could reflect the outcome of fiscal policies that harm the poor, military buildups or the denial of human rights. The prospect of aid flows provides the carrot at the beginning which is followed by the stick of returning to the start later to encourage the government to change its policies. The inflow of aid also provides resources to advance the goals of the donor, for example, social welfare expenditures that benefit the poor.

In this economy, deviation by the government is harm to those that are disfavored or an increase in public expenditures that undesirable from the perspective of foreign donor nations and agencies. Such a deviation is met with credible aid sanctions, and the best action for the government under sanctions is to comply with the conditions in exchange for a gradual return of foreign aid.

Governments that do not comply with donor standards initially can be offered conditional future access to aid. This offer is the implicit contract described above.

The strength of sanctions are limited here by the sovereignty of the recipient and its control over what goes on inside its borders. By starting with a perfect equilibrium for a repeated game and allowing renegotiation, sanctions are credible for the donor because they do not reduce the donor's welfare in equilibrium. This is necessary in the subgame perfect equilibrium with self-enforcement constraints. It contrasts with the model of Eaton and Engers [1992] that studies Markov perfect equilibria and does not impose renegotiation-proofness. They also find sustainable punishments.

Foreign aid and volatile domestic income

Domestic income in many poor aid-recipient countries is volatile compared to global income. A natural reason for donors averse to poverty to provide aid is to smooth consumption over stochastic national income. This suggests that aid flows should increase when poverty rises and decline as growth resumes. Aid flows might provide national income or poverty insurance. Pallage and Robe [2001], however, find empirically that aid flows are procyclical rather than countercyclical to developing countries. They suggest that significant welfare gains could result from a system of countercyclical aid inflows to developing countries.⁷

The introduction of stochastic national income to the model of self-enforcing conditional aid allows the consideration of the possibility that aid flows might smooth the consumption of different residents differently. The presence of self-enforcement constraints reduces the amount of insurance that is feasible in a perfect equilibrium compared to unconstrained optimum. With two types of risk-averse recipients and government control of the allocation of the resources, $w_t + \tau_t$, insurance of the disenfranchised poor may be incomplete in equilibrium.

The simple model can be extended readily to the stochastic case by allowing the endowment, w_t , to be a random iid variable with finite support. The support for w_t is given by $0 < w^1 < w^2 < \dots < w^N$. The objective for the government is

$$V_t = v(c_t^e) - v(w_t) + E_t \sum_{s=t+1}^{\infty} \beta^{s-t} (v(c_s^e) - v(w_s)),$$

and the objective for the donor is

$$U_t = u(c_t^d) - u(y_t) - \tau_t + E_t \sum_{s=t+1}^{\infty} \beta^{s-t} (u(c_s^d) - u(y_s) - \tau_s).$$

The constraint set includes self-enforcement constraints for each state of nature in period $t + 1$:

$$V_{t+1}(w_{t+1}) \geq 0 \quad \text{for each } w_{t+1} \in \{w^1, w^2, \dots, w^N\}$$

and

$$U_{t+1}(V_{t+1}(w_{t+1}), w_{t+1}) \geq 0 \quad \text{for each } w_{t+1} \in \{w^1, w^2, \dots, w^N\}.$$

Otherwise, the problem of finding efficient perfect equilibrium is unchanged.

This problem is analyzed by Cordella, Dell'Ariccia and Kletzer [2003] with and without government access to an international capital market. They find that risk sharing between donor-favored residents and government-favored residents is incomplete. The conditional aid relationship gives the government an incentive to provide consumption, c_t^d , above the minimum, y_t , by insuring the consumption of the enfranchised residents. This implies that aid flows are used to increase government-preferred expenditures in low income states. In high income states, the government repays by spending some of the resources it controls, w_t , on donor-preferred consumption, c_t^d . This means that in the stationary state equilibrium, donor-preferred expenditures will exceed the aid inflow, τ_t , in high income states and be less than τ_t in low income states.

Under an equilibrium implicit contract, aid flows will depend upon the history of output realizations. This is expressed in the dynamic program through the time subscripting of the donor and government surpluses. The time dependence is an abuse of notation for simplicity. The surpluses, aid flows and consumptions of the enfranchised and disenfranchised in period t depend on the history of income up to period t , $\{w_0, w_1, \dots, w_t\}$, and the initial surplus for the government, V_0 , which depends on the initial state, w_0 . Therefore, the contract should still be backloaded and renegotiation-proof punishments should still consist of starting over with government surplus equal to $V_0(w_0)$.

3. Conditional Aid Flows with Capital Flight

The distribution of taxes, subsidies and public expenditures influences the pattern of domestic savings. When a government distributes financial aid inflows to favored constituents, the recipients may desire to smooth their consumption forward over time by saving. In some cases, aid inflows and public sector revenues have been used by public officials to accumulate private foreign and domestic financial assets. The opportunity for corrupt officials to take and store

wealth in hidden foreign accounts works against the threat of an aid reduction used to enforce the aid-redistribution contract depicted above.

This section introduces a consumption-smoothing motive for savings by recipients and an asymmetry of information between donors and the recipient government to allow moral hazard in the conditional aid relationship. A very simple way to understand how recipient government moral hazard affects conditional aid is to allow the government's endowment, w_t , to be hidden from donors. The donor cannot observe w_t ever, but does observe the transfer it makes, τ_t , and the government's donor-preferred expenditure, $c_t^d - y_t$. This is a standard principal-agent model in which output, $c_t^d - y_t$, is produced using inputs τ_t and $w_t - c_t^e$ provided by the donor and the government, respectively. The input of the government and its opportunity cost are private information. For example, this fits the interpretation that spending, $c_t^d - y_t$, is social welfare expenditure targeting the poor while transfers to the enfranchised include personal enrichment by corrupt officials and politically powerful constituents. The donor also cannot observe the savings of enfranchised residents, for example the flight of private capital by affluent residents or corrupt officials. These two assumptions allow hidden savings to interfere with enforcement of the conditional aid relationship.

The government's distribution of total resources under its control, $w_t + \tau_t$, need to be incentive compatible in a perfect equilibrium. In an incentive compatible implicit contract, the government's choice of donor-preferred expenditures, $c_t^d - y_t$, will reveal w_t to the donor. Future donor actions will be conditioned on the past sequence of its aid transfers to the government and the government's donor-preferred expenditures. A standard method for finding an incentive compatible equilibrium is to condition the actions of the donor on the government's report of w_t . Therefore, the implicit contract is restricted to be weakly truthfully revealing. The government will be at least as well off reporting w_t correctly as otherwise given the equilibrium strategy of the donor.

The enfranchised have access to anonymous international financial markets where they earn a riskless gross return equal to β^{-1} on their savings ($0 < \beta < 1$). Savings is constrained to be non-negative. The government cannot borrow unobserved, so public sector foreign borrowing is excluded just for simplicity.⁸ In the absence of aid inflows, the government smooths the consumption, c^e , subject to the single-period budget identity

$$s_{t+1} = \beta^{-1}s_t + (w_t - c_t^e),$$

and the constraint

$$s_{t+1} \geq 0,$$

where s_t is accumulated past savings in the beginning of period t . In an equilibrium with positive aid inflows, the government can gain by relaxing the non-negativity constraint on savings. That is, the donor lends to government after a series of low income states that would exhaust savings in the absence of any aid. Repayment by the government can be made as donor-preferred expenditures, $c^d - y$, rather than as conventional foreign loan repayments. Government expenditures will depend on the history of w through period t denoted

$$w^t = (w_0, w_1, \dots, w_t),$$

so that $c_t^e = c_t^e(w^t)$ and $c_t^d = c_t^d(w^t)$. For a given history through period T , the realization w_t in that history for period $t \leq T$ is denoted $w_t(w^T)$. The initial surplus in the aid relationship will be assumed to be maximized by the donor.

The strategy for the donor is to offer a transfer $\tau_t(\hat{w}^t)$ and require expenditures $c_t^d(\hat{w}^t)$, where \hat{w}^t is government's report of w^t . The maximized surplus of the government is a function of the actual state of nature, reported state and savings for the enfranchised given the strategy of the donor. It is written as

$$V_t(\hat{w}^t, s_t) = v(w_t + \tau_t(\hat{w}^t) - (c_t^d(\hat{w}^t) - y_t)) - v(w_t) + \beta E_t V_{t+1}(\hat{w}^t, s_t).$$

The incentive compatibility constraint is that the utility of the government is maximized by truthful reporting,

$$V_t(w^t, s_t) \geq V_t(\hat{w}^t, s_t) \quad \text{for any feasible history, } \hat{w}^t, \text{ for all } t \geq 0. \quad (15)$$

This model is similar to the Cole and Kocherlakota [2001] model of efficient contracts with hidden income and hidden savings. The important difference is the imposition of self-enforcement constraints. One-sided self-enforcement constraints are considered for a similar hidden income model, but without hidden savings, by Thomas and Worrall [1990], Atkeson and Lucas [1992] and others. Allen [1985] studies an economy similar to the one studied by Cole and Kocherlakota. The addition of self-enforcement constraints is also special to the case of aid, rather than sovereign debt as considered by Kletzer [2004].

The equilibrium dynamic for consumptions, c_t^e and c_t^d , when the self-enforcement constraints do not bind is given by Cole and Kocherlakota. With full commitment, they show that equilibrium

consumption with savings and transfers can be replicated in an equilibrium with zero savings in all states. Access to hidden savings means that the first-order condition for optimal saving by enfranchised residents,

$$v'(c_t^e(w^t)) \geq E_t v'(c_{t+1}^e(w^t, w_{t+1})), \quad (16)$$

with equality if period $t + 1$ accumulated savings, s_{t+1} , is positive, is an incentive compatibility constraint for the donor's problem. Incentive compatibility also requires that the net present value of transfers cannot rise as reported income, w_t , decreases. Otherwise, the government would always report income that maximizes the net present value of net transfers it receives (these are $c_t^e - w_t$). This restricts insurance for the government, since there can be no net wealth transfers to enfranchised residents contingent upon realizations of w_t . The government must borrow against the future consumption of enfranchised residents if it is to increase their consumption in any period.

In the absence of self-enforcement constraints (that is, with two-sided commitment) and allowing transfers from the donor, τ_t , to be either positive or negative, the solution to the donor's problem with hidden enfranchised resident income and savings satisfies the standard consumption Euler condition,

$$v'(c_t^e(w^t)) = E_t v'(c_{t+1}^e(w^t, w_{t+1})), \quad (17)$$

for the government (subject to the caveat that donor's initial surplus is not constrained). This means that the government achieves the same path for consumption for the enfranchised in histories such that savings in the absence of donor transfers is positive. For histories such that $s_t = 0$, the donor smooths the consumption of the enfranchised in expectation, in essence relaxing the non-negativity constraint on savings. In such an economy, transfers to the disenfranchised are efficient ($u'(c_t^d) = 1$), and the donor lends to or borrows from the government at the non-state-contingent (gross) interest rate β^{-1} . Savings by enfranchised residents can be done through the accumulation of conventional bond claims against the donor. If hidden savings are interpreted as investment with a storage technology (yielding gross return β^{-1}), then the donor relaxes the stock-out constraint, $s_t \geq 0$.

With two-sided commitment and donor transfers constrained to be non-negative, storage is essential in the sense that savers will need to accumulate assets other than implicit claims against the donor. Savings by the enfranchised in this case is given by

$$\hat{s}_t = w_t + (y_t + \hat{\tau}_t) - c_t^d - c_t^e,$$

where c_t^d solves $u'(c_t^d) = 1$ and $\hat{\tau}_t \geq 0$ such that $\hat{s}_t \geq 0$. Feasibility is straightforward since $\hat{\tau}_t - \hat{s}_t$ equals net donor transfers, τ_t , when these are unconstrained and $s_t = 0$ for all t .

Adding the self-enforcement constraints for the recipient government and the donor can still allow smoothing of enfranchised residents' consumption by the donor beyond what they can achieve using private storage. However, the presence of the self-enforcement constraints will typically lead to inefficient transfers to the disenfranchised, so that $u'(c_t^d) > 1$ in equilibrium.

First, consider the constrained maximization problem for the donor in the special case such that $u(c_t^d) = c_t^d$. We seek to maximize

$$E_{t-1}(-\tau_t + c_t^d - y_t + \beta U(V_{t+1}))$$

subject to the constraints given by inequalities (16) and (15),

$$\begin{aligned} E_{t-1}(v(c_t^e) - v(c^{aut}(w_t)) + \beta V_{t+1}) &\geq V_t, \\ v(c_t^e) - v(c^{aut}(w_t + \tau_t)) + \beta V_{t+1} &\geq 0 \quad \text{for each history } w^t, \\ V_{t+1} &\geq 0 \quad \text{for each history } w^t \end{aligned} \quad (18)$$

and

$$U(V_{t+1}) \geq 0 \quad \text{for each history } w^t,$$

where the new notation, $c^{aut}(w_t)$, denotes autarchy consumption of the enfranchised residents when the current endowment equals w_t and these residents can accumulate private hidden savings. The constraint set for this problem is large, but some of the constraints are redundant. For the linear donor utility case, constraint (18) will not bind in any history, and the incentive compatibility constraint can be rewritten for zero savings with the inclusion of the first-order inequality for savings by the enfranchised (16). Note that this last assertion is true because savings is indeterminate when it is operative and the self-enforcement constraint for the donor does not bind for the particular case that the gross return to storage equals β^{-1} .

After derivation, the Euler condition for a constrained optimum can be rewritten as

$$v'(c_t^e(w^t)) = (1 + \hat{\psi}_t) E_t v'(c_{t+1}^e(w^t, w_{t+1})), \quad (19)$$

where the multipliers $\hat{\psi}_t$ is derived from the multiplier on the self-enforcement constraints for the government. The self-enforcement constraint for the donor can bind but does not enter this first-order condition for the linear donor utility case in the presence of the private savings opportunity. When $\hat{\psi}_t > 0$, then the government's expected surplus for $t + 1$ equals its expected

autarchy surplus with savings,

$$E_t \left(v \left(c_{t+1}^e \left(w^{t+1} \right) \right) + \beta V_{t+2} \left(w^{t+1} \right) \right) = E_t \left(v \left(c^{aut} \left(w_{t+1} \right) \right) + \beta V_{t+2}^{aut} \left(w_{t+1} \right) \right), \quad (20)$$

where $V_{t+2}^{aut} \left(w_{t+1} \right)$ represents the dependence of future autarchy utility on current financial wealth, $w_{t+1} - c^{aut} \left(w_{t+1} \right)$, for simplicity of notation.

In this case, an equilibrium can be interpreted along the lines of the government borrowing when $\tau_t > 0$ and repaying when $w_t - c_t^e = c_t^d - y > 0$. The aid relationship is equivalent to sovereign borrowing in the presence of hidden income and savings with repayments going to the disenfranchised.⁹ The opportunity to borrow allows the government to follow a path such that the Euler condition (17) holds in period t in history w^t when the self-enforcement constraints for neither the government nor the donor bind in any history, (w^t, w_{t+1}) . If $w_{t+1} = w^1$ (the lowest state), then enfranchised consumption, c_{t+1}^e , is lower than period t consumption and government surplus in period $t + 1$, $v \left(c_{t+1}^e \left(w^{t+1} \right) \right) - v \left(c^{aut} \left(w_{t+1} \right) \right) + \beta V_{t+2}$, is less than government surplus in period t , $v \left(c_t^e \left(w^t \right) \right) - v \left(c^{aut} \left(w_t \right) \right) + \beta V_{t+1}$. The government trades future surplus, V_{t+2} , for larger current transfers, $\tau \left(w^{t+1} \right)$ and consumption, c_{t+1}^e , in low states, and conversely in high states. The presence of the donor avails the government of the opportunity to smooth consumption in expectation in events in which it would not be able to do so under aid autarchy. These are histories of its endowment in which savings goes to zero in the absence of aid. Relaxing this constraint provides the government's gain from a conditional aid relationship that motivates repayment in the form of expenditures benefitting donor-favored residents.

To understand how aid flows provide insurance for the government and benefit the donor-favored residents, begin with the role of the self-enforcement constraint for the donor. In an equilibrium without aid, in a high income state with positive savings the enfranchised will smooth consumption forward by saving a portion of current income as in the permanent income model. The financial assets and consumption of the enfranchised will continue to rise with further realizations of high income, but the addition to accumulated wealth is bounded. For example, for linear quadratic utility it is the difference between actual income and mean income each period. With aid and inactive saving, government savings takes the form of direct expenditures on donor-favored consumption. Replicating the consumption of the enfranchised with ever-growing financial wealth would require ever-growing transfers from the donor to the government to finance consumption of the enfranchised. Eventually, replicating the savings equilibrium would drive the

donor's surplus below zero violating the donor's self-enforcement constraint.

To keep the government from abandoning the aid relationship when the financial wealth of the enfranchised is high, the donor provides insurance against downside risk. This is the risk that private financial wealth hits zero in autarchy with hidden private savings. In accepting an implicit contract, the government can trade off consumption of its favored constituents in high consumption events for additional consumption in low consumption events. Consider the necessary conditions for a constrained optimum, equations (19) and (20). Households can only accumulate non-state-contingent assets under autarchy to achieve the utility on the right-hand side of equation (20). The donor, however, can offer state-contingent transfers that achieve the same level of utility (the left-hand side of (20)) requiring payments by the government to donor-favored constituents in high endowment states for period $t + 1$ and transfers to the government in low endowment states.

When the self-enforcement constraint for the government binds for period $t + 1$ for an income realization w'_t for period t , the first-order condition (19) implies that private savings is zero and marginal utility for period t exceeds expected marginal utility for period $t + 1$,

$$v'(c_t^e(\bar{w}^{t-1}, w'_t)) > E_t v'(c_{t+1}^e(\bar{w}^{t-1}, w'_t, w_{t+1})). \quad (21)$$

The shadow gross interest rate for government borrowing equals $(1 + \hat{\psi}_t) \beta^{-1}$. Government welfare could be increased by raising current consumption, c_t^e , and lowering future surplus, V_{t+1} , but this is not possible within the constraint set. Let this inequality hold for a subset of income states, W . The contract gives the government the surplus $v(c_t^e(w^{t-1}, w'_t)) - v(c^{aut}(w'_t)) + \beta V_{t+1}$ in state w'_t . For every possible report of w_t, \hat{w}_t , the utility for the government equals

$$v(c_t^e(w^{t-1}, \hat{w}_t)) + E_t \sum_{s=t+1}^{\infty} \beta^{s-t} v(c_s^e(\bar{w}^{t-1}, \hat{w}_t, \dots, w_s)),$$

where

$$c_t^e(w^{t-1}, \hat{w}_t) = w'_t + y_t + \tau(\bar{w}^{t-1}, \hat{w}_t) - c_t^d(\bar{w}^{t-1}, \hat{w}_t).$$

Incentive compatibility requires that truth-telling is optimal ($\hat{w}_t = w'_t$). The Euler inequality (21), however, implies that the continuation surplus for the government,

$$V_{t+1} = E_t \left[\sum_{s=t+1}^{\infty} \beta^{s-t} v(c_s^e(\bar{w}^{t-1}, w_t, \dots, w_s)) - V^{aut}(w_{t+1}) \right],$$

must be the same for any w_t in W . Therefore, the equilibrium aid inflow, $\tau(\bar{w}^{t-1}, w_t)$, cannot vary

across w_t in W . To minimize the government's surplus, the contract must repeat itself between periods t and $t + 1$ for income realizations in the set W . To induce government cooperation, the implicit contract must provide insurance for government-favored constituents these events. Therefore, when the government's self-enforcement constraint binds, the inflow of aid must be positive for states w_t in W and at least part of this aid must be consumed by enfranchised residents.

For the risk-averse government and risk-neutral donor, enfranchised consumption will be increasing in income when the Euler condition holds with equality. Therefore, when the expected government surplus, $V_t(w^t)$, is minimized in a perfect equilibrium, the inequality (21) holds for low income states and $W = \{w^1, \dots, w^j\}$ for some $w^j < w^N$. For high income states, $\{w^{j+1}, \dots, w^N\}$, the government makes positive donor-preferred expenditures in exchange for higher continuation surplus, so that $V_{t+1}(w^{t-1}, w_t) > V_{t+1}(w^{t-1}, w'_t)$. The donor offers higher expected government surplus to induce the government to increase donor-preferred spending.

When the self-enforcement constraints do not bind, government transfers to the enfranchised out of aid inflows replace consumption out of gross foreign asset earnings, and government transfers to donor-favored constituents replace foreign asset accumulation. Because the self-enforcement constraint for the donor must bind when the surplus of the government is high, the donor supports government-preferred consumption only when the government's surplus is low. The incentive for the recipient government to cooperate is provided by the insurance provided to the government by the donor when the wealth of the enfranchised is low. The value of this insurance diminishes as the government's surplus rises, so that transfers replicate the storage equilibrium with savings going to donor-preferred expenditures and donor aid paying for consumption by enfranchised residents.

Some basic properties of the dynamics of aid flows and donor-preferred expenditures can be inferred. The replacement of foreign asset accumulation implies that for a given history, w^{t-1} , donor-preferred expenditures are higher and aid inflows lower for higher current income, w_t . This must be true if either self-enforcement constraint binds or neither does. For the economy in aid autarchy, the state variable is accumulated foreign savings, s_t . In the economy with aid and no equilibrium saving, the state variable is government surplus, V_t . Each of these decreases for low income states until the liquidity or self-enforcement constraint binds, respectively. With aid, as V_t decreases, aid inflows must decrease just as dissaving from accumulated foreign assets would under aid autarchy. As V_t rises for favorable income sequences, aid inflows in low income states

rise, just as dissaving from financial wealth does in the permanent income model. It is this sense that aid inflows can be procyclical: aid rises with good income sequences and falls with poor ones, although the conditional correlation of aid with current income alone is negative.

The last consideration is the enforcement of the conditional aid equilibrium. One punishment threat for deviation from the equilibrium sequence of expenditures favored by the donor conditional on the donor's provision of aid is reversion to aid autarchy. As before, this is not renegotiation proof when there are gains from cooperation. Another punishment threat parallels that used in the previous section. The donor switches to a path that maximizes the donor's surplus in period t in response to a deviation by the government in period $t - 1$. This must be an efficient equilibrium that begins with no aid to the government and offers the reward of future downside insurance. After deviating, the government starts out with no implicit financial wealth (V_t is zero) and saves out of high income realizations to smooth the consumption of the enfranchised forward. This savings takes the form of donor-preferred spending which is rewarded with conditional aid inflows.

The generalization of the problem to strictly concave $u(c^d)$ reintroduces the trade-off between the marginal utility of donor-favored residents and that of government-favored residents and the possibility that the constraint on defections by the government given by (18) binds. The necessary conditions for the general problem include

$$\frac{v'(c_t^e)}{u'(c_t^d)} = \left(1 + \hat{\psi}_{t+1}\right) E_t \left[\frac{u'(c_{t+1}^d)}{v'(c_{t+1}^e)} - \frac{u'(c_{t+1}^d) - 1}{v'(c^{aut}(w_{t+1} + \tau_{t+1}))} \right]^{-1} - \hat{\varphi}_{t+1}$$

and

$$v'(c_t^e) \geq E_t v'(c_{t+1}^e),$$

for $\hat{\varphi}_{t+1} \geq 0$ and $\hat{\psi}_{t+1} \geq 0$, derived from the respective multipliers on the self-enforcement constraints. The risk aversion of the donor matters so that analysis of the dynamics is very difficult. As in the risk-neutral case, the insurance role of foreign aid for government-favored constituents in low wealth states provides the incentive for the government to cooperate in passing a share of aid flows on to donor-favored constituents. The nature of sanctions for deviation by the recipient government does not change. However, the first-order condition for the ratio of marginal utilities shows that backloading also occurs in the stochastic equilibrium.

4. Conclusion

By offering aid, a donor advances its objectives when these do not coincide with the concerns of the recipient government. Aid flows either pass directly through the government or require government acquiescence when sovereignty is respected. Further, the sovereignty of the recipient nation allows the government power to enact policies that are counter to the objectives of donors or fail to conform with foreign standards. Conditioning future aid on the policy actions of the recipient government can provide incentives for the government to undertake donor-favored initiatives. A theoretical concern arises that refusing aid or threatening to withdraw aid are not time-consistent actions for the donor because its funds are necessary for raising the welfare of the domestically disenfranchised population it seeks to help.

In the models presented, perfect equilibrium aid flows and redistributive policies are found that are supported by renegotiation-proof punishments. Donors create incentives for government cooperation by increasing the government's surplus over time. By cooperating in the distributional goals of the donor early on, the government is able to shift future aid towards its favored projects. The donor complies with this implicit contract in later periods because some expenditure continues to flow to its favored uses. The self-enforcement constraints imposed on both sides of the relationship in the repeated game are essential. They articulate the inability of the government to commit its use of aid once received and the point that donors voluntarily provide continuing aid.

The credibility of conditional aid is demonstrated in the presence of conflicting donor and government objectives without commitment by either party. The reduction or withdrawal of aid can be used as a credible sanction in response to policy actions of recipient government. In equilibrium, aid inflows that benefit government-favored projects or constituents follow cooperation by the government rescinding objectional policies or adopting donor-desired policies. The model with asymmetric information and savings shows how moral hazard can lead to procyclical aid flows to developing countries.

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Endnotes

¹These assumptions find empirical support in the fungibility of aid, particularly of military and non-military aid. See Devarajan and Swaroop [1998], Khilji and Zampelli [1994], Lahiri and Raimondes-Moller [2000] and Pack and Pack [1993].

²Pallage, Robe and Bérube [2004].

³Aid conditionality is also considered in several other recent papers, notably Azam and Lafont [2003], Cordella and Dell'Araccia [2003], Cordella, Dell'Araccia and Kletzer [2002], Federico [2001], Killick [1997] and Murshed and Sen [1995].

⁴Different proofs are given by Thomas and Worrall [1988], and Kocherlakota [1996] analyzes a self-enforcing consumption-smoothing relationship between risk-averse agents.

⁵Both constraints cannot bind simultaneously in equilibrium if there are utility gains from aid flows.

⁶Properly, this also uses the assumption that there are gains from aid for the donor in the relationship.

⁷See Pallage, Robe and Bérube [2004].

⁸The interaction between foreign debt and aid is analyzed in Cordella, Dell'Araccia and Kletzer [2002] in a stochastic economy with symmetric information.

⁹The literature on sovereign debt does not offer an analysis of this problem. Atkeson [1991] includes one-sided self-enforcement with hidden action by the debtor, while Thomas and Worrall [1990] study borrowing with commitment and private information on the part of the risk-averse borrower. Kletzer [2004] analyzes renegotiation when a self-enforcement constraint binds with hidden income and a continuum of states.