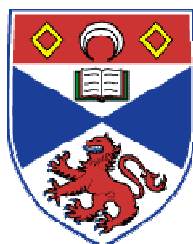


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# The Millennium Development Goals and Sovereign Debt Write-downs\*

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## ABSTRACT

Can sovereign debt write-downs be used to achieve the Millennium Development Goals (MDGs)? This paper shows that transparency of domestic governance determines how a sovereign debt write-down is structured to attain the MDGs. When domestic governance is transparent, an unconditional debt write-down enhances non-elites' welfare. Without such transparency, conditions that directly link the debt write-down to public goods that improve non-elites' welfare are required. In the latter case, in a dynamic setting, the debt write-down also has to be directly linked to the amount of new debt issued. Using our formal analysis, we evaluate the efficacy of the current debt relief initiatives and discuss some policy implications.

**Key words:** Debt Write-down, Representativeness, Transparency, Conditionality, Millennium Development Goals

**JEL Classifications:** C72, C78, D82, F34

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## 1 Introduction

The Millennium Development Goals (MDGs) (to be achieved by 2015) were endorsed by 189 nations during the UN Millennium Summit in September 2000 to serve as an international blueprint for responding to the world's development challenges. MDGs include "poverty alleviation, promoting primary education and gender equality, improving maternal health, combating child mortality, AIDS and other diseases, ensuring environmental sustainability and developing a global partnership for development" (UNDP, 2007).

In related but distinct initiatives, such as the Heavily Indebted Poor Country (hereafter, HIPC) initiative and the Multilateral Debt Relief Initiative (MDRI), multilateral organizations (like the World Bank, and the G8 countries) have reduced indebtedness of low-income countries, especially the HIPCs. However, the operation of such debt relief initiatives is not critically linked to a systematic assessment of each country's needs for debt relief, measured against explicit development objectives like the MDGs (Sachs, 2002).

Can sovereign debt write-downs be used to achieve the MDGs? This paper shows that *transparency* of domestic governance determines the nature of the conditionality requirements attached to sovereign debt write-downs to achieve the MDGs.

We study a model where domestic elites and non-elites have conflicting preferences in allocating the available social surplus over different types of public goods. We begin by showing how the allocation of available social surplus over different types of public goods is determined by the distribution of bargaining power between the two classes. In our setting, achieving the MDGs is synonymous with improving non-elites' utility.

Transparency is the result of democratic and governance reforms that have two properties. First, there is verifiable information about the relative weight attached to non-elites' welfare in the allocation of social surplus over different types of public goods. Second, non-elites are able to hold domestic elites accountable so that the non-elites have some bargaining power in making decisions about the allocation of social surplus

over different public goods.

When domestic governance is transparent, an unconditional debt write-down enhances non-elites' welfare. Without such transparency, conditions that directly link the debt write-down to public expenditure that improves non-elites' welfare are required. In a dynamic setting, without transparency, in addition to linking the debt write-down to public goods that improve non-elites' welfare, the debt write-down also has to be directly linked to the amount of new sovereign debt issued.

Using our formal analysis as a benchmark, we evaluate the efficacy of the current debt relief initiatives, such as the enhanced HIPC initiative and the MDRI, and discuss some policy implications.

The remainder of the paper is structured as follows. In section 2, we study a model of sovereign debt write-down. Section 3 is devoted to evaluate the efficacy of the current mechanisms used to reduce indebtedness of low-income countries, while section 4 concludes.

## 2 Conditionality in sovereign debt write-downs

Consider an economy consisting of two classes: a numerically small but powerful elite (indexed by 1) and a numerically large but weak non-elite (indexed by 2). Assume that there are two types of public goods:  $l_1$  and  $l_2$ , where  $l_1$  denotes the public goods preferred by elites and  $l_2$  denotes the public goods preferred by non-elites. Let  $G_i$  denote the portion of social surplus spent on  $l_i$ , where  $i = 1, 2$ . We assume that  $U(G_1, G_2)$  denotes the utility function for the elites and  $V(G_1, G_2)$  denotes the utility function for the non-elites, where both  $U(G_1, G_2)$  and  $V(G_1, G_2)$  are strictly increasing, twice continuously differentiable, concave functions. Finally, let  $I$  denote the amount of available social surplus interpreted as fiscal resources not committed elsewhere.

Clearly, a sovereign debt write-down corresponds to the case when there is an increase in the available fiscal resources and is denoted by  $\Delta I$ . However, before studying how  $\Delta I$  affects non-elites' welfare, we begin by characterizing how  $I$  is being allocated over  $l_1$  and  $l_2$ .<sup>1</sup>

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<sup>1</sup>As matters stand, we do not allow for the possibility that some of the social surplus may be directly consumed by either class in the form of transfers. Extending

We make the following simplifying, assumptions on  $U(G_1, G_2)$  and  $V(G_1, G_2)$ :

**Assumption 1:**  $U(G_1, G_2) = V(G_2, G_1)$ ;

**Assumption 2:**  $U_1(G, I - G) = V_2(I - G, G) > U_2(G, I - G) = V_1(I - G, G)$ ,  $0 < G < I$  and  $\lim_{G \rightarrow I} U_1(G, I - G) > U_2(G, I - G)$ .<sup>2</sup>

Assumption 1 implies that the utility of the two classes is symmetric over  $G_1, G_2$ . Assumption 2 implies that starting from any allocation with some expenditure on both public goods, the marginal utility to class  $i$  from increasing expenditure on  $l_i$  is higher than the marginal utility from an increase in expenditure on  $l_j$ ,  $i \neq j$ ,  $i, j = 1, 2$ . Taken together, these two assumptions capture the conflicting preferences of the two classes in the allocation of social surplus over the two public goods.

### The social allocation problem

How is  $I$  being allocated over the two types of public goods? In general, the relative weights attached elites' and non-elites' payoffs in the social welfare function (used to allocate  $I$  over  $l_1$  and  $l_2$ ) will emerge out of a domestic political process of bargaining and conflict.

Assume, for simplicity, that the per unit cost of supplying either type of public good is the same. Let  $G_1 = G$  and  $G_2 = I - G$ . Let  $\alpha$  be the weight attached to the non-elites' welfare. Then, the social allocation problem solves the maximization problem:

$$\max_{0 \leq G \leq I} F(\alpha, G) = \alpha U(G, I - G) + (1 - \alpha) V(G, I - G), \quad (1)$$

where  $F(\alpha, G)$  denotes the social welfare function. It is clear that the solution to the allocation problem will depend critically on  $\alpha$ . Therefore, in what follows, the key issue is to understand how the domestic political process determines  $\alpha$ .

### Democracy, renegotiation and bargaining

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the model to allow for this possibility would not change the qualitative features of our analysis while complicating the formal analysis reported here.

<sup>2</sup>We adopt the notation that for  $i, j = 1, 2$ ,  $U_i$  (respectively,  $V_i$ ) denotes the partial derivative of  $U$  (respectively,  $V$ ) with respect to  $l_i$  and  $U_{ij}$  (respectively,  $V_{ij}$ ) the associated cross-partial derivatives.

Let there be  $n_1$  elites and  $n_2$  non-elites with  $n_2 > n_1$ .

To begin with, assume that  $\alpha$  is determined by voting. With majority voting, as the median voter is a member of the non-elites, in this case,  $\alpha = 0$ . With proportional representation, the weight attached to the preferences of each class will be equal to the fraction of population belonging to that class and therefore,  $\alpha = \frac{n_1}{n_1+n_2} < \frac{1}{2}$ .

In most democracies, the actual policy choices made rarely mirror, in a simple way, voting outcomes. Rather, policy choices are constrained by the possibility of renegotiation (a coup, for example, or less overt forms of manipulation such as lobbying or corruption) where the determining factor is the bargaining power of different classes. In what follows, we assume that the weights attached to elites' and non-elites' payoffs in the social welfare function do not reflect the (relative) numbers of individuals in the group but their relative bargaining power.

A simple way of capturing such a process of renegotiation is via Nash bargaining. We model the raw force of class  $i$  by its disagreement point  $d_i$  which measures the fraction of available surplus class  $i$  is able to appropriate in the event of a civil war against class  $j$ . Moreover, we assume that the two disagreement points are linked by a continuous decreasing function  $c : [0, 1] \rightarrow [0, 1]$  with  $d_2 = c(d_1)$  such that whenever  $0 < d_1 < 1$ ,  $d_1 + d_2 = d_1 + c(d_1) < 1$  but  $\lim_{d_1 \rightarrow 1} d_2 = c(d_1) = 0$  so that there is always some surplus destruction in civil war but the surplus destruction is minimal when the elites completely overwhelm the non-elites. We assume that elites are more powerful than non-elites and therefore,  $d_1 \geq d_2 = c(d_1)$ . As  $n_1 < n_2$ , the bargaining power of elites exceeds their relative numerical strength.

Corresponding to a disagreement point is a disagreement utility for each class. Under Assumption 2, class  $i$ , left to itself, will invest any surplus it is able to appropriate in public good  $l_i$  and therefore, we define the disagreement utility of the elite as  $u(d_1 I) = U(d_1 I, 0)$  and the disagreement utility of the non-elite as  $v(d_2 I) = V(0, d_2 I)$ .

The Nash bargaining outcome is the solution to the maximization

problem:

$$\max_{0 \leq g \leq I} (U(g, I - g) - u(d_1 I)) (V(g, I - g) - v(d_2 I)) \quad (2)$$

Let  $g^*$  denote the solution to the Nash bargaining problem. The following result characterizes  $g^*$ :

**Proposition 1** *The solution to the Nash bargaining problem,  $g^*$ , is increasing in  $d_1$  with  $\lim_{d_1 \rightarrow 1} g^* = I$  and whenever  $d_1 \geq c(d_1)$ ,  $g \geq \frac{I}{2}$  with equality when  $d_1 = d_2 = c(d_1)$ .*

**Proof.** At an interior solution, the first-order condition characterizing the solution to the maximization problem (2) is:

$$\frac{U_1(g^*, I - g^*) - U_2(g^*, I - g^*)}{(U(g^*, I - g^*) - u(d_1 I))} = \frac{V_2(g^*, I - g^*) - V_1(g^*, I - g^*)}{(V(g^*, I - g^*) - v(d_2 I))} \quad (3)$$

Note that when  $d_1$  increases,  $d_2 = c(d_1)$  decreases and for a given  $g$ , the LHS of (3) increases and RHS of (3) decreases and therefore, as both  $U(\cdot)$  and  $V(\cdot)$  are concave in  $g$ , by Assumption 2,  $g$  must increase to maintain equality. Therefore,  $g^*$  is increasing in  $d_1$  and as  $d_1 \geq d_2 = c(d_1)$ , by Assumption 2,  $g^* \geq \frac{I}{2}$  and with equality when  $d_1 = d_2$ . Moreover, as  $\lim_{d_1 \rightarrow 1} d_2 = c(d_1) = 0$ , as  $d_1 \rightarrow 1$ ,  $g^* \rightarrow I$ . ■

The above result demonstrates that the amount allocated to the public good favored by the elites is an increasing function of the bargaining power of the elites. Moreover, as long as elites are more powerful than non-elites, more than half of the available surplus is allocated to the public good favored by the elites and in extreme cases, when the elites have all the bargaining power, all the available social surplus is allocated to the public good favored by the elites.

In the analysis that follows, we focus on two cases, one where the bargaining power of the two classes is relatively balanced and the other where the bargaining power of the elites is very high. Formally, the first case corresponds to a scenario where  $d_1 \geq d_2$  but  $d_1 \leq d_2 + \epsilon$ , for a small but positive  $\epsilon$  and in this case,  $g^*$  is close to but no lower than  $\frac{I}{2}$  i.e. the

available surplus is roughly equally allocated between the two types of public goods with a slightly higher share being spent on the public good favored by the elites. The second case corresponds to a scenario where  $d_1 \rightarrow 1$  and  $d_2 \rightarrow 0$  and in this case,  $g^*$  is close to  $I$  i.e. all the available surplus is allocated to the public good favored by the elites.

Are there values of  $\alpha$  for which the solution of (1) corresponds to these two bargaining scenarios? Let the solution<sup>3</sup> to the social allocation problem be denoted by  $G^*$ . The following proposition shows that this is indeed the case:

**Proposition 2** *As long as  $\alpha \in [\frac{1}{2}, \frac{1}{2} + \varepsilon)$ , for some small but strictly positive  $\varepsilon$ ,  $G^*$  remains close to but no lower than  $\frac{I}{2}$ . Moreover, for some small but strictly positive  $\varepsilon$ , (a) if  $\alpha \in [1 - \varepsilon, 1]$   $G^* = I$  while if  $\alpha < 1 - \varepsilon$ ,  $G^* < I$  and (b) as  $\alpha \rightarrow 1 - \varepsilon$ ,  $G^* \rightarrow I$ .*

**Proof.** Notice that when  $\alpha = \frac{1}{2}$ ,

$$\begin{aligned} \frac{\partial F(\frac{1}{2}, \frac{I}{2})}{\partial G} &= \frac{1}{2} \left( U_1 \left( \frac{I}{2}, \frac{I}{2} \right) - U_2 \left( \frac{I}{2}, \frac{I}{2} \right) \right) \\ &\quad + \frac{1}{2} \left[ V_1 \left( \frac{I}{2}, \frac{I}{2} \right) - V_2 \left( \frac{I}{2}, \frac{I}{2} \right) \right] \\ &= 0 \end{aligned}$$

as by Assumption 2,  $U_1(\frac{I}{2}, \frac{I}{2}) - U_2(\frac{I}{2}, \frac{I}{2}) = V_2(\frac{I}{2}, \frac{I}{2}) - V_1(\frac{I}{2}, \frac{I}{2})$ . Moreover, as  $\frac{\partial F(\alpha, G)}{\partial G}$  is continuous in  $\alpha$ , there exists an  $\varepsilon > 0$  such that as long as  $\alpha \in [\frac{1}{2}, \frac{1}{2} + \varepsilon)$ ,  $G^*$  remains close to but no lower than  $\frac{I}{2}$ . Moreover, by construction,

$$\begin{aligned} \frac{\partial F(\alpha, G)}{\partial G} &= \alpha (U_1(G, I - G) - U_2(G, I - G)) \\ &\quad + (1 - \alpha) [V_1(G, I - G) - V_2(G, I - G)] \end{aligned}$$

is continuous in  $\alpha$  and as

$$U_1(G, I - G) - U_2(G, I - G) = - [V_2(G, I - G) - V_1(G, I - G)]$$

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<sup>3</sup>Since the objective function in the allocation problem (1) is continuous and strictly concave and the constraint set is compact and convex, there is a unique solution to the social allocation problem (1).

as long as  $\alpha > \frac{1}{2}$ ,  $\frac{\partial F(\alpha, G)}{\partial G \partial \alpha} > 0$ . As  $\frac{\partial F(1, G)}{\partial G} > 0$  for all  $G \geq 0$ ,  $G \leq I$ , there exists  $\hat{\alpha} < 1$ , so that when  $\alpha \geq \hat{\alpha}$ ,  $\alpha < 1$ ,  $\frac{\partial F(\alpha, I)}{\partial G} \geq 0$  and  $G^* = I$  and when  $\alpha < \hat{\alpha}$ ,  $\frac{\partial F(\alpha, I)}{\partial G} < 0$  and  $G^* < I$ . ■

The above result demonstrates that values of  $\alpha$  close to but no lower than  $\frac{1}{2}$  correspond to a balanced bargaining scenario where  $G^*$  is close to but no lower than  $\frac{I}{2}$ . In contrast, values of  $\alpha$  close to 1 represent bargaining scenarios where elites have all the bargaining power and  $G^*$  is equal to  $I$ .

Taken together, Proposition 1 and 2 demonstrate how renegotiation and bargaining determine the relative weight attached to elites' and non-elites' preferences in the social welfare function.

### **Transparency and sovereign debt write-downs**

By using the results we obtained above, we are now in a position to study the relationship between domestic governance and the conditionality requirements attached to a sovereign debt write-down. As already pointed out, a sovereign debt write-down corresponds to the case when there is an increase in the available fiscal resources denoted by  $\Delta I$ . We then analyze the impact of a debt write-down by finding how  $G^*$  (thus  $G_2^* = I - G^*$ ),  $U(G^*, I - G^*)$  and  $V(G^*, I - G^*)$  change as  $I$  increases to  $I + \Delta I$ .

In what follows, we show that the precise nature of the conditionality depends on the degree of transparency in governance.

#### *Transparency*

By “transparency” we refer to a situation where structural or governance reforms lower  $\alpha$  verifiably. As mentioned earlier, transparency is the result of democratic and governance reforms that has two properties. First, there is verifiable information about  $\alpha$ . Second, non-elites are able to hold domestic elites accountable so that the non-elites have some bargaining power in the decisions on the allocation of social surplus over different types of public goods i.e.  $\alpha$  increases in value from zero. Therefore, transparency not only requires obtaining verifiable information about  $\alpha$  but also requires an impact on the process by which the value of  $\alpha$  is determined.

The key parameter in the bargaining process between elites and non-



elites is the relative position of the disagreement points of the elite and non-elite i.e.  $d_1$  and  $d_2 = c(d_1)$ . As Proposition 2 has shown,  $\alpha$  is lowered by increasing  $d_2$  and decreasing  $d_1$ . Therefore, when there is verifiable information about  $d_1$  and  $d_2 = c(d_1)$ , structural and governance reforms can directly target  $d_1$  and  $d_2 = c(d_1)$  and hence,  $\alpha$ .

Elite participation constraints will put a bound to how far  $d_1$  can be pushed relative to  $d_2$  as it is perfectly possible that if structural or governance reforms are too stringent, domestic elites will be able to resort to other creditor countries to search for an alternative source of funds. We assume that the lower bound on elites' bargaining power corresponds to a balanced bargaining scenario where  $d_1 \geq d_2$  but  $d_1 \leq d_2 + \epsilon$ , for a small but positive  $\epsilon$ .

When  $\alpha = \frac{1}{2}$ ,  $G^* + \Delta G^* = \frac{I + \Delta I}{2}$  and as long as  $\alpha \in [\frac{1}{2}, \frac{1}{2} + \epsilon)$  for some small but strictly positive  $\epsilon$ ,  $G^* + \Delta G^*$  remains close to but not lower than  $\frac{I + \Delta I}{2}$ : in this case, the non-elites and the elites benefit equally from a sovereign debt write-down. Evidently, structural and governance reforms that lower  $\alpha$  credibly and verifiably are sufficient to ensure that an unconditional sovereign debt write-down improves non-elites' welfare.

The requirement that structural and governance reforms lower  $\alpha$  verifiably before a sovereign debt write-down occurs ensures that no further conditionality requirements need to be attached to a sovereign debt write-down.

#### *Lack of Transparency*

Lack of transparency refers to a situation where there is little or no verifiable information about the renegotiation and bargaining process between elites and non-elites. In this case, the conditionality requirements attached to a sovereign debt write-down cannot directly target  $\alpha$ . When  $\alpha \in [1 - \epsilon, 1]$   $G^* + \Delta G^* = I + \Delta I$ : in this case, the non-elites do not benefit from a sovereign debt write-down. Clearly, an unconditional debt write-down has no impact on non-elites' welfare when the elites continue to have all the bargaining power.

With a lack of transparency, to ensure that a sovereign debt write-down improves non-elites' utility, specific conditions that directly link the extent of the debt write-down to additional expenditure on  $G_2$  is

required. The general form for such a conditional debt write-down is that  $\Delta G_2 = \beta \Delta I$ , for some  $\frac{1}{2} \leq \beta \leq 1$ : the closer  $\beta$  is to 1, the higher is the proportion of the additional fiscal resources, freed up by the debt write-down, actually spent on  $G_2$ . As already argued, the lower bound on  $\beta$  can reflect some underlying elite participation constraint.

We summarize the above discussion with the following proposition:

**Proposition 3** *With transparency, no further conditionality is required to ensure that a sovereign debt write-down improves non-elites' welfare. Without transparency, conditions that directly link the extent of the debt write-down to additional expenditure on  $G_2$  is required to improve non-elites' welfare.*

In the discussion so far, we have assumed that every extra unit of fiscal resources spent on  $l_2$  increases the amount of  $l_2$  available for consumption by one unit as well. However, typically, the public expenditure that has a higher marginal impact on non-elites' welfare has several components and how an extra unit of fiscal resources is being splitted between different components has a critical impact. For example, increasing spending on secondary education without increasing at the same time spending on infrastructure projects that guarantee availability of regular water supply may mean that the extra places in secondary education are not taken up. In this sense, when there is a lack of transparency, the conditionality requirements attached to sovereign debt-write down should not stop at restricting additional expenditure on the public good favored by the elites but must also specify how the extra fiscal resources are splitted between different components of public expenditure that has a higher marginal impact on non-elites' welfare.

### **Conditionality in a dynamic model**

Next, we extend the static model studied so far to a two-period setting where new sovereign debt can be issued at the initial period. We maintain the assumption that there is a lack of transparency. We assume that elites have all the bargaining power and we ask whether the conditionality requirements attached to an initial sovereign debt write-down need to take into account the amount of new sovereign debt issued

within the same time period.

The available fiscal surplus in each period is denoted by  $I_t$ ,  $t = 1, 2$  and  $G_{1,t}$  and  $G_{2,t}$  denote the amount spent on the two types of public goods in each period. A sovereign debt write-down at  $t = 1$  increases the available fiscal resources by  $\Delta I$  in each period  $t$ . In addition, at  $t = 1$ ,  $D \geq 0$  units of new sovereign debt (measured in units of social surplus) can be issued in the form a one-period bond with interest rate  $r$ . Issuing  $D$  units of new sovereign debt has three effects: (i) it increases the available social surplus at  $t = 1$  by  $D$ , (ii) it increases the available social surplus at  $t = 2$  according to the production function  $I_2 = \tilde{I}_2(D)$ , (with  $\tilde{I}_2(0) = I_1$ ,  $\tilde{I}'_2(D) > 0$ ,  $\tilde{I}''_2(D) < 0$ ,  $\lim_{D \rightarrow 0} \tilde{I}'_2(D) = \infty^4$ ) (iii) it decreases the available social surplus at  $t = 2$  by  $(1+r)D$ , which is the debt repayment that becomes due at  $t = 2$ . Finally, note that productive efficiency requires that the amount of new debt issued at  $t = 1$  satisfies the equation  $\tilde{I}'_2(\hat{D}) = (1+r)$  i.e. the marginal productivity of an additional unit of new debt (measured in units of social surplus) is equal to its marginal cost.

In this setting, we assume that a fraction  $\theta$ ,  $0 < \theta < 1$ , of the fiscal resources controlled by elites (and nothing else, including any planned expenditure on  $G_2$ ) can be protected from the consequences of default. This corresponds to the idea of a capital flight engineered by the elites in the event of default.

Suppose that in each period, the conditionality attached to a debt write-down is  $\Delta G_{2,t} = \beta \Delta I$ ,  $\frac{1}{2} \leq \beta \leq 1$ . For later reference, we refer to such conditionality requirements as static conditionality requirements. Then, at  $t = 1$ ,  $G_{1,1} = I_1 + D + (1 - \beta) \Delta I$  and  $G_{2,1} = \beta \Delta I$ . At  $t = 2$ ,  $G_{1,2} = I_2 - (1+r)D + (1 - \beta) \Delta I$  if there is no default and  $G_{1,2} = \theta (I_2 + (1 - \beta) \Delta I)$  if there is default while  $G_{2,2} = \beta \Delta I$  if there is no default and  $G_{2,2} = 0$  if there is default.

At  $t = 2$ , for a fixed  $D$ , we first determine the default decision.

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<sup>4</sup>In effect, we are assuming that  $\tilde{I}_2(D)$  is an increasing, concave function of  $D$  whose marginal productivity is very high for values of  $D$  close to zero.

Default will be the preferred option for the elites if

$$U(\tilde{I}_2(D) - (1+r)D + (1-\beta)\Delta I, \beta\Delta I) < U\left(\theta\left[\tilde{I}_2(D) + (1-\beta)\Delta I\right], 0\right)$$

Note that  $U(I_1 + (1-\beta)\Delta I, \beta\Delta I) > U(\theta[I_1 + (1-\beta)\Delta I], 0)$ . Therefore, as  $U_1 > 0$  and  $\tilde{I}'_2(D) > 0$ , default occurs with a positive probability if and only if  $D \geq D_{\max} > 0$  where  $D_{\max} > 0$  is the unique solution to the equation

$$U(\tilde{I}_2(D) - (1+r)D + (1-\beta)\Delta I, \beta\Delta I) = U\left(\theta\left[\tilde{I}_2(D) + (1-\beta)\Delta I\right], 0\right)$$

At  $D_{\max}$ , elites are indifferent between defaulting and not defaulting. Moreover,  $D_{\max}$  is an upper bound on the amount of new sovereign debt issued by the elites at  $t = 1$  as, whenever  $D > D_{\max}$ , default occurs with probability one. Note that the LHS of the preceding equation reaches a maximum at  $D = \hat{D}$  while  $U'\left(\theta\left[\tilde{I}_2(\hat{D}) + (1-\beta)\Delta I\right], 0\right)\tilde{I}'_2(\hat{D}) > 0$ . Therefore,  $D_{\max} > \hat{D}$ .

At  $t = 1$ , the amount of new sovereign debt issued solves:

$$\max_{0 \leq D \leq D_{\max}} \left\{ U(I_1 + D + (1-\beta)\Delta I, \beta\Delta I) + \delta U\left(\tilde{I}_2(D) - (1+r)D + (1-\beta)\Delta I, \beta\Delta I\right) \right\}, \quad (4)$$

where  $\delta$  is the discount factor. Let  $D^*$  denote the solution to (4). The derivative of the objective function in (4) is

$$f(D, \beta) = \left\{ U_1(I_1 + D + (1-\beta)\Delta I, \beta\Delta I) + \delta U_1\left(\tilde{I}_2(D) - (1+r)D + (1-\beta)\Delta I, \beta\Delta I\right)\left[\tilde{I}'_2(D) - (1+r)\right] \right\}.$$

As long as  $f(0, \beta) > 0$ ,  $D^* > 0$ . As  $D_{\max} > \hat{D}$  and  $U_1 > 0$ ,  $f(\hat{D}, \beta) > 0$ ,  $D^* > \hat{D}$ . If  $f(D_{\max}, \beta) > 0$ ,  $D^* = D_{\max}$ . When  $D^* = D_{\max}$ , even an  $\varepsilon$  probability of default, for a small but positive  $\varepsilon$ , will not leave the elites worse-off but will have a discrete impact on the non-elites' welfare. With

default, the non-elites' utility is

$$V^D = \left\{ V(I_1 + D + (1 - \beta) \Delta I, \beta \Delta I) + \delta V \left( \theta \left[ \tilde{I}_2(D) + (1 - \beta) \Delta I \right], 0 \right) \right\},$$

while the non-elites' utility in the scenario without default is

$$V^{ND} = \left\{ V(I_1 + D + (1 - \beta) \Delta I, \beta \Delta I) + \delta V \left( \tilde{I}_2(D) - (1 + r) D + (1 - \beta) \Delta I, \beta \Delta I \right) \right\},$$

and clearly

$$V^D < V^{ND}.$$

In addition, as long as the two public goods are complements in elites' preferences so that  $U_{12} > 0$  and for any constant  $I$ ,  $U_1(I + (1 - \beta) \Delta I, \beta \Delta I)$  is an increasing function of  $\beta$  and therefore,  $f(D, \beta)$  is an increasing function of  $\beta$ . Further, if  $D_\beta^*$  is an interior optimum for some  $\beta$ , then  $0 = f(D_\beta^*, \beta) < f(D_\beta^*, \beta')$  for  $\beta' > \beta$  and as  $f(D, \beta)$  is decreasing in  $D$ ,  $D_{\beta'}^* > D_\beta^*$ .

We summarize the above discussion with the following proposition:

**Proposition 4** *In a dynamic setting without transparency, in addition to the static conditionality requirements, the initial debt write-down has to be directly linked to the amount of new debt issued.*

### 3 Policy Implications

At present, multilateral organizations (like the World Bank and the G8 countries) have used the enhanced HIPC initiative and the MDRI (also known as the Gleneagles Proposal for debt write-down) as the main mechanisms by which indebtedness of the low-income countries, especially the HIPCs, is reduced. However, the progress and outcome of debt relief under these initiatives are still unsatisfactory. Using the formal analysis developed in the preceding section, here we discuss why this is the case. We begin by evaluating the efficacy of the enhanced HIPC initiative, followed by the MDRI.

The enhanced HIPC initiative was agreed by the G7 countries at their July 1999 Summit in Cologne, Germany. This initiative has been notable because of its emphasis on ensuring that the debt stock of HIPCs

is reduced to a sustainable level. However, the concept of sustainability used under this framework is based on the use of arbitrary formulas<sup>5</sup> instead of basing on a systematic assessment of each country's needs for debt relief, measured against explicit development objectives like the MDGs (Sachs<sup>6</sup>, 2002). Moreover, the debt write-down under the enhanced HIPC initiative has been linked to inappropriate conditionality requirements, particularly those related to the IMF program. The main criticism of IMF conditionality that emerges from our model is that it does not address the difficulties faced by HIPCs to focus on their priorities, such as addressing the problems of inadequate investment in education and health, the public goods favored by the poor. The myriad of conditions set forth by the IMF, emphasizing on fiscal discipline and capital account liberalization, could lead us to a situation where “the country is just as impoverished but with more debts and even richer ruling elite,” (Stiglitz, 2003).

Our analysis suggests that democratic and governance reforms that ensure transparency are key to ensure that non-elites' welfare is improved by a debt write down. Some elements of the HIPC initiative, such as the requirement that the qualifying country needs to establish a track record of sound policies through IMF and World Bank's International Development Association (IDA) supported programs as well as develop a Poverty Reduction Strategy Paper (PRSP) through a broad-based participatory process (IMF, 2007a; World Bank, 2007), are consistent with the analysis reported here.

To help accelerate progress toward the MDGs and respond to the request made by the Commission for Africa<sup>7</sup>, the enhanced HIPC Ini-

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<sup>5</sup>The benchmark for debt sustainability under this enhanced HIPC initiative was set at 150 percent of debt-to-export ratio (on a net present value basis) or 250 percent NPV of debt to tax revenue for countries with open economies (which require a minimum of 30 percent export-to-GNP ratio) and a substantial tax revenue (a minimum of 15 percent of GNP) (Birdsall and Williamson, 2002).

<sup>6</sup>Sachs (2002) proposed that each country should come up with its own specific “business plan” for scaling up health, education and basic infrastructure as a part of an overall strategy for meeting the MDGs. Then, basing on such plan, the external funding agency should consider whether or not the country's debts are sustainable and what are the size of financial gaps that must be bridged by debt write-downs.

<sup>7</sup>After realizing that it is difficult for the MDGs to be achieved if debt obligations

tiative was supplemented by the MDRI, which allows for a complete write-down on eligible debts by the IMF, the IDA and the African Development Fund (AfDF) for countries, which reached the completion point under the HIPC Initiative process (IMF, 2007b). For such initiatives to provide greater relief to poor indebted nations and achieve the MDGs, either domestic and governance reforms that ensure transparency have to be put in place or the debt write-down has to directly target non-elites' welfare.

A mechanism akin to the "Poverty Action Fund" used in Uganda can be a useful starting point. The money that would have been spent on servicing debts can then be directed to the Poverty Action Fund and from there the money will be channelled into the country's health and education systems. This type of mechanism can help minimize the chance that government diverts the public funds to support corruption and transfers them to safe havens overseas<sup>8</sup>.

The kind of conditionality requirements that we advocate here can also be attached to foreign aid<sup>9</sup>. However, debt write-down has several advantages over foreign aid. First, a single debt write-down creates a flow of fiscal revenues over a period of time. Second, a debt write-down tends to be multilateral and not bilateral: therefore, the conditionality requirements tend to be more effective in improving the non-elites' welfare.

## 4 Conclusion

In this paper, we ask if sovereign debt write-downs could be used to achieve the Millennium Development Goals (MDGs). We have shown that transparency is the key feature of domestic governance that deter-

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of many low-income countries are still excessive, the Commission for Africa called for a 100 percent debt write-down and a boost in aid (Commission for Africa, 2005).

<sup>8</sup>By no mean restricted to low-income countries, this model may be applied to study similar problems in Latin America, where the elites divert public funds to safe havens overseas.

<sup>9</sup>We set aside a major limitation of foreign aid in that it is often tied as the donor country mandates that the money from aid be spent in the country providing aid (the donor country) or in a group of selected countries or on goods or services produced in the selected countries. Clearly, a debt write-down will not have this feature.

mines how a sovereign debt write-down is structured to attain the MDGs. When domestic governance is transparent, an unconditional debt write-down can enhance the non-elites' welfare. Without such transparency, conditions that directly link the debt write-down to public goods that improve non-elites' welfare is required. In the latter case, in a dynamic setting, the debt write-down also has to be directly linked to the amount of new sovereign debt issued. Using our formal analysis, we evaluate the efficacy of the current debt relief initiatives and discuss some policy implications.

Extending the model to study the link between sovereign debt write-downs and growth on one hand, and the conditions under which a sovereign debt write-down stimulates the inflow of private capital are important topics for future research.

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