


# Debt Sustainability in Low-Income Countries

## The Grants versus Loans Debate in a World without Crystal Balls\*

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### Abstract

When allocating their aid budget, development agencies need to decide whether to give outright grants or use concessional loans that blend a grant and credit element. Theory suggests that the degree of concessionality should be negatively correlated with debt sustainability. Several donors use the World Bank/IMF Debt Sustainability Framework to guide their aid decisions. They give loans to low-risk countries, a blend of loans and grants to medium-risk countries, and only grants to high-risk countries. The paper shows that there are problems with this approach and proposes an alternative allocation mechanism based on GDP-indexed concessional loans.

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## 1 Introduction

When allocating their international aid budget, development agencies need to decide which countries they should target, whether to finance specific projects or provide general budget support, and whether to use their budget to give outright grants or use concessional loans that blend a grant and credit element. This paper focuses on the latter choice.

While grants do not necessarily cost more than loans, grants and loans are not the same. A theoretical analysis of the basic tradeoffs between grants and loans suggests that the degree of concessionality should be positively correlated with initial debt levels and negatively correlated with future growth prospects.

Implementing a strategy based on the theoretical result that countries with an unsustainable debt situation should only receive grant financing requires an operational definition of debt sustainability. The World Bank/IMF Debt Sustainability Framework (DSF) operationalizes the idea of debt sustainability by classifying low-income countries into three groups: low, medium, and high-risk of debt distress. The International Development Association (the concessional arm of the World Bank) and several other donors use the DSF to allocate their aid budget. They provide concessional loans to low-risk countries, a blend of loans and grants to medium-risk countries, and only grants to high-risk countries.

While the DSF is a useful exercise with many objectives and potential users, the Framework is not necessary for deciding on grants versus loans. The decision does not need to be made when the funds are disbursed. It could be postponed to the moment when the borrower should start repaying. With a system of GDP-indexed concessional loans, grants would be decided *ex-post* (instead of *ex-ante*) and the modalities (rather than delivery) of debt relief set *ex-ante* instead of *ex-post*. In this sense, this paper builds on work by Patrick Guillaumont and co-authors aimed at incorporating vulnerability indicators in the delivery of aid and development finance (e.g., Guillaumont et al., 2003).

The paper focuses on the grant versus loan debate when loans have an explicit concessional element. Therefore, it abstains from discussing whether international financial institutions should or should not engage in lending operations which only have an implicit subsidy (such as lending by the International Bank of Reconstruction and Development, the non-concessional arm of the World Bank).<sup>1</sup>

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<sup>1</sup> Bulow and Rogoff (1990, 2005) and Meltzer (2000) suggest that multilateral development banks should only provide grants. The paper also abstains from discussing the relative benefits of aid and debt relief. Arnone and Presbitero (2010) provide an authoritative treatment of recent debt relief initiatives. Cordella and Missale (2013) analyze the trade-offs between aid and debt relief, Birdsall and Deese (2002) make the case for debt relief, and Arslanap and Henry (2005) suggest that low-income countries would benefit more from aid than from debt relief. From now on, I will refer to "grants" as outright grants. The fact that the paper focuses on low-income countries does not imply that there are no benefits to providing grants to middle income countries (for a nice discussion see Glennie and Hurley, 2014).

## 2 Tradeoffs

It is sometimes argued that grants are better than concessional loans because, by definition, they do not need to be repaid. For instance, former US Treasury Secretary Paul O. Neill stated that "The World Bank has driven poor countries into a ditch by lending instead of donating funds to fight poverty."<sup>2</sup> An alternative view maintains that grants are more expensive than concessional loans and that a move from loans to grants will bankrupt donor agencies.

Both views are wrong because they dismiss the facts that, for any given aid budget, a higher degree of concessionality implies a smaller transfer to the recipient country. If, for instance, a country has an aid budget of \$1 billion, it can either disburse \$1 billion in grants (100 percent concessionality) or \$2 billion in loans with 50 percent concessionality. The expected cost of the two policies is identical.<sup>3</sup>

However, the two policies do not have identical effects. If a \$1 transfer with a 50 percent concessional element increases the present value of the recipient's GDP by more than \$0.5 (a negative net return of 50 percent), the recipient should prefer the concessional loan. So, the argument that grants are better than loans is only valid if funds transferred to developing countries have very small returns in terms of development. Perhaps, grants and loans should be modulated according to their likely development impact, as suggested by Cordella and Ulku (2007, more on this below).

There is a second, and more sophisticated, argument that favors grants over concessional loans. If private capital flows to a given developing country are fully determined by the country's ability to pay, any mix of grants and loans will lead to the same flow of external resources (Klein and Harford, 2005, provide a simple example). Therefore, the argument goes, it is better to let the private sector, with its superior screening capacity, decide on the allocation of commercial loans and have the official sector focus on pure grants (Meltzer et al., 2000). In theory, this is a valid argument. However, it suffers from the critique that: "In theory, there is no difference between theory and practice. In practice there is."<sup>4</sup> The theory that any mix of grants and loans will lead to the same flow of resources is based on the assumption of perfect capital markets (Cohen et al., 2007). In practice, the sovereign debt market is rife with market failures (Panizza et al., 2008).

It has also been argued that grants and loans have different incentive effects and that grants are more likely to be wasted and result in excessive government consumption and lower tax effort (the

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<sup>2</sup><http://www.nytimes.com/2002/02/21/world/treasury-chief-accuses-world-bank-of-harming-poor-countries.html>

<sup>3</sup> I am oversimplifying because calculating the grant element requires several assumptions (see Cohen et al., 2006, and Roodman, 2014). However, the tradeoff is real. In a study of 22 donor countries over the period 1970-99, Odedokun (2004) finds that there is a strong negative correlation between the share of grants and total disbursements. So, it is indeed the case that more grants today lead to less resource flows today. However, Odedokun (2004) finds that debt repayments are not correlated with grants or loans, contradicting the view that more grants today will lead to smaller resource flows in the future. Along similar lines, Nunnenkamp et al. (2005) argue that since a large share of IDA loans is not repaid (it is either forgiven or recycled through defensive lending) the fear of resource depletion is not a compelling argument against grants.

<sup>4</sup> The quote has been attributed to the Baseball player Yogi Berra and to the Scientist Jan van de Snepscheut .

general argument dates back to Schmidt, 1964). Djankov et al. (2004) find that grants increase government consumption, but Morrissey et al. (2007) find that the choice between loans and grant has no effect on tax revenues.<sup>5</sup>

Therefore, grants and concessional loans are not equivalent and there are trade-offs involved in the choice between grants and concessional loans. With grants, the recipient country does not have an obligation to repay but it receives a smaller flow of foreign resources. With concessional loans, the recipient country receives a larger foreign transfer but it also accumulates external debt obligations.<sup>6</sup>

Cordella and Ulku (2007) develop a simple model that provides several insights on the basic tradeoffs between grants and concessional loans. Even if grants are never more expensive than loans, in their model grants and loans are not equivalent. The optimal degree of concessionality is positively correlated with the recipient country's initial debt ratios and negatively correlated with the recipient country's initial level of income and institutional quality, because institutional quality is assumed to be positively correlated with the ability to productively absorb external financing flows. Their results imply that grants should be directed to countries that cannot absorb large aid flows (as proxied by low institutional quality), have low growth prospect, and are likely to face debt sustainability problems. Countries with more favorable growth prospects and larger absorptive capacities can instead benefit from the larger flows of external resources associated with concessional loans.

Implementing the idea that grants should go to countries with unsustainable debt and concessional loans to countries with sustainable debt requires predicting debt sustainability in the distant future.

### **3 The Debt Sustainability Framework as a Crystal Ball**

This section provides a brief description of how the International Development Association (IDA, the concessional arm of the World Bank) decides between grants and loans. IDA's allocation mechanism is important because IDA is the world's largest provider of concessional finance for low-income countries and its aid allocation strategy is mimicked by a number of national and international aid agencies.<sup>7</sup>

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<sup>5</sup> Another often used argument is that, in any given country, grants should be used to finance activities that do not generate an immediate increase in revenues (such as social expenditure) and loans should be used to finance projects that generate revenues stream (such as power generation or toll highways). Money is fungible and I do not find this line of reasoning very compelling.

<sup>6</sup> There are also differences for the donor agency. If there is a positive probability that a concessional loan will not be repaid, the loan has a higher expected cost (unless the default risk is factored in the computation of the degree of concessionality, see Roodman, 2014).

<sup>7</sup> The main regional development banks (the African Development Bank, the Asian Development Bank, the Inter-American Development Bank) and the International Fund for Agricultural Development use similar systems for deciding between concessional loans and grants. Several OECD bilateral donors use the DSF to guide their export credit decisions and Paris Club debt restructuring are also based on an approach similar to the DSF.

**Table 1: IDA Commitments (billions USD)**

	IDA 12 (1999-02)	2003	2004	2005	2006	2007
<b>Total<sup>a</sup></b>	19	7.3	9	8.7	11.3	11.8
<b>Share of Grants</b>	1%	16%	19%	23%	16%	19%
	2008	2009	2010	2011	2012	2013
<b>Total<sup>a</sup></b>	11.2	13.6	14.6	16.27	14.3	16.3
<b>Share of Grants</b>	30%	19%	19%	17%	15%	15%

<sup>a</sup> Totals for the period 2003-13 do not include guarantees.

Sources: own elaborations based on data from the World Bank Annual Reports (various years). IDA commitments and share of loans and grants are usually reported under either "The Role of IDA" or "IDA Commitments." Data for IDA 12 are from World Bank (2003) and Table 4 of World Bank (2013).

Until 2002, nearly 100 percent of IDA's commitments consisted of concessional loans (Table 1). However, in June 2002 G7 finance ministers agreed on "... an increase in the use of grants, in the range of 18 per cent to 21 per cent of the IDA13 program."<sup>8</sup> Starting from its 14th replenishment (which took place in 2005), IDA adopted the World Bank/IMF Debt Sustainability Framework (DSF) for low-income countries to determine the share of grants in its assistance to this group of countries.<sup>9</sup> The share of grants in total IDA commitments jumped from 1 percent to 16 percent in 2003 and remained close to the 18-21 percent range over 2004-2010 (the only exception was in 2008, when grants represented 30 percent of total commitments). The share of grants decreased over 2011-13, and it is now hovering at around 15 percent of IDA commitment. It is not clear whether this decrease in the share of grants reflects a change in policy or is due to cyclical factors. It is surprising that the complex mechanism described below yields a combination of grants and loans which is so close to the preferences of G7 leaders.

IDA's strategy is to give loans to countries with a sustainable debt situation and grants to countries with an unsustainable debt situation. This strategy, which is in line with the theoretical results of Cordella and Ulku (2007), requires an operational definition of debt sustainability and a way to assess sustainability. The DSF provides this operational definition.

The DSF is a standardized framework for assessing debt sustainability in low-income countries. The Framework has multiple potential users and objectives. IMF (2013, p. 17) states that:

A common misperception is that the DSF itself imposes limits on how much a country can borrow. In fact, the DSF is strictly a tool for assessing debt sustainability. The results of a country's DSA inform separate policies at the Fund and the Bank that establish limits on debt accumulation.

<sup>8</sup> Statement of G7 Finance Minister, Halifax, June 15, 2002., <http://www.g8.utoronto.ca/finance/fm061502.htm>

<sup>9</sup> The Executive Boards of the World Bank and IMF approved the DSF in April 2005. After initial approval, the DSF was reviewed by the Boards of the World Bank and IMF three times. The most recent review took place in February 2012 (IMF, 2013).

This is correct. World Bank and IMF staff use the DSF for their analysis and policy advice, the DSF is also used as an input for the World Bank non-concessional borrowing policy and the IMF debt limits policy (Berg et al., 2014). Low-income countries use the DSF for their borrowing decisions. Donor agencies use the DSF to guide their financing decisions.

This paper is not a generalized criticism of the DSF as it focuses on how the DSF is used to guide IDA's financing decisions. Berg et al. (2014) provide a more general critical evaluation of the DSF.

### **3.1 The Crystal Ball**

The Debt Sustainability Framework, which has the objective of "... assessing whether a country's current borrowing strategy may lead to future debt-servicing difficulties." (World Bank, 2006, p.28), is IDA's crystal ball for evaluating debt sustainability and deciding between grants and loans.

The DSF recognizes that evaluating debt sustainability is a difficult exercise. It requires defining thresholds above which debt is deemed to be unsustainable and then assessing whether these thresholds are likely to be breached.<sup>10</sup> In practice, the DSF consists of two main elements: (i) a methodology for projecting the evolution of the net present value of five debt ratios under different scenarios and (ii) a set of debt sustainability thresholds that depend on the quality of policies and institutions as measured by the CPIA (Country Policy and Institutional Assessment) index built by World Bank staff.

In the Framework, countries with stronger policies and institutions are deemed to be able to sustain higher debt ratios, as originally shown by Kraay and Nehru (2006) and corroborated by a number of World Bank and IMF follow up studies (for a review, see IMF, 2012). For instance, a country with weak policies and institutions will breach a threshold when the present value of outstanding debt surpasses 100 percent of export or 30 percent of GDP. A country with strong policies and institutions, instead, will breach the threshold when the present value of debt surpasses 200 percent of exports or 50 percent of GDP.

In the DSF, the evolution of debt ratios is based on a standard debt dynamics equation in which the change in debt depends on the future behavior of GDP growth, inflation, exchange rate, foreign direct investments, and current account deficit (see, for instance, the debt dynamic equations in World Bank, 2006, p. 21).

As IDA loans tend to have long maturities (ranging between 30 and 40 years) and long grace periods, the DSF requires long term projections.<sup>11</sup> DSF documentation specifies a 20-year

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<sup>10</sup> It also requires defining sustainability. The DSF defines sustainability using the IMF definition that a given debt level is sustainable if it can be serviced without inflation financing or a drastic change in fiscal policies. Berlage et al. (2003) provide an alternative definition of sustainability based on the net feasible revenues to be devoted to debt service.

<sup>11</sup> One example of IDA loan is the ID 40. This loan has a 40-year maturity, a 0.75 percent interest rate, a 10-year grace period, and a 63 percent grant element (evaluated with a 5 percent discount rate). After the grace period, the loan has a back-loaded repayment profile. The borrower repays 20 percent of the principal during years 11-20 (2 percent per year) and the remaining 80 percent during years 21-40 (4 percent per year).

requirement in terms of macroeconomic projections (World Bank, 2006a, p 16) and 50-year requirement in terms of debt service projections (p. 17).

DSF projections consist of a baseline, two alternative scenarios, and six bound tests.<sup>12</sup> The most important alternative scenario is the historical scenario in which real GDP growth, GDP deflator, non-interest current account, and net FDI flows are set to be equal to their historical averages. The second alternative scenario uses the macroeconomic variables of the baseline but assumes that the interest rate on new borrowing increases by two percentage points. The six bound tests evaluate how debt ratios would change in the presence of temporary negative shocks (quantified as one standard deviation below their historical average) to the main macroeconomic variables or a 30 percent depreciation of the domestic currency.

While the baseline can differ from the historical scenario, it is rarely far from this scenario. The IMF staff guidance note states that: "A situation where debt ratios are significantly lower in the baseline scenario than in the historical scenario may indicate excessive optimism and should be explained." (IMF, 2013, p. 23).

Debt projections and the debt sustainability thresholds are used to classify low-income countries into three groups. IDA uses these three groups to guide their financing decisions (again, IDA financing decisions are not part of the DSF; they are policies based on the results of the DSF).

The first group includes countries for which all debt indicators are below the relevant thresholds and for which the baseline and alternative scenarios and the bound tests suggest that debt ratios are not expected to break the thresholds during the forecast period. These countries are characterized as low-risk (or green light) and receive 100 percent IDA concessional loan financing.

The second group includes countries for which the baseline projections do not indicate a breach of the debt thresholds but that could breach the thresholds under alternative scenarios and bound tests. Countries that belong to this group are classified as having a moderate risk of debt distress (or yellow light) and receive 50 percent IDA loan financing and 50 percent IDA grant financing with a 10 percent reduction in flows with respect to green light countries.

The third group includes countries for which the baseline scenario indicates a breach of the relevant thresholds. Countries in this group are classified as high-risk (or red light) countries and receive pure IDA grant financing with a 20 percent reduction in flows with respect to low-risk countries with similar characteristics.<sup>13</sup> A country is classified as high-risk if one of the five debt indicators breaches the threshold, irrespective of the behavior of the other four indicators. Berg et al. (2014) label this characteristic of the DSF as the worst case aggregator. They show that this aggregation scheme makes the DSF too conservative, even when evaluated with its own loss function.

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<sup>12</sup> The alternative scenarios consist of permanent modifications to the key assumptions of the baseline scenario. The bound tests are based on temporary shocks lasting one or two years.

<sup>13</sup> Total flows are determined by the IDA Resource Allocation Index which also depends on the CPIA <http://www.worldbank.org/ida/IRAI-2012.html>



### 3.2 Problems with the Crystal Ball

The DSF approach is an optimal way to solve the grant versus loans dilemma as long as it provides reliable forecasts of the evolution of the relevant debt ratios and uses appropriate debt thresholds.

There are three problems with the DSF approach: (i) Long term forecasts of macroeconomic variables are unreliable; (ii) The bound tests of the DSF imply an asymmetric loss function; and (iii) Independent researchers cannot assess the robustness of the relationship between debt sustainability and CPIA scores.

#### ***Long term projections are unreliable***

An aid agency interested in evaluating a country's ability to repay a concessional loan with 40-year maturity, a ten-year grace period, and a heavily back-loaded payment schedule (see, for instance, the ID 40 loan discussed in footnote 11) will need long-term forecasts for the borrowing country's main macroeconomic variables. In fact, one scenario uses 10-year historical averages to forecast GDP growth (and several other macroeconomic variables) over the next twenty years.

As the DSF is only as good as the projections on which it is built, I use a simple exercise to evaluate the out-of-sample performance of the historical forecasting procedure suggested in the DSF template (which is unlikely to deviate substantially from the baseline). I start by using average real GDP growth over 1980-90 to estimate GDP growth over 1990-2010 and then compare actual GDP for the year 2010 with forecasts based on the 1980-90 estimates.<sup>14</sup>

The first row of the top panel of Table 2 shows the results for low-income countries. The most precise estimate is for Togo (actual GDP in 2010 was 9 percent of GDP higher than my forecast based on 1980-90 data). Forecast errors range between -77 percent in Mozambique (actual GDP was 77 percent higher than my estimate) and 220 percent in Zimbabwe (actual GDP was 220 percent lower than my forecast). The standard deviation of the forecast error is 62 percent of GDP and the mean and median of the absolute values of the forecast error are 43 and 33 percent of GDP, respectively.

If I repeat the exercise excluding the global financial crisis (i.e., using averages for 1975-1985 to forecast GDP for 2005, second row of the top panel of Table 2), I obtain even larger forecast errors. In this case, the most precise estimate is for Benin (a 5 percent forecast error), with errors ranging between -52 percent and 427 percent, a standard deviation of 120 percent, and average and median forecast errors of 70 and 34 percent, respectively.

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<sup>14</sup> Formally, I use data on real GDP measured in local currency to compute average growth for 1980-90. Then, I apply this growth rate to GDP for the year 1990 to obtain an estimate of GDP for the year 2010 and compute the forecast error as:  $\frac{GDP_{2010}^{estimated} - GDP_{2010}^{actual}}{GDP_{2010}^{actual}} \times 100$ . As GDP cannot take on negative numbers under-predictions are bounded at -100%. Overpredictions are not bounded. I focus on GDP growth, but the same reasoning applies to all other macroeconomic variables included in the DSF.

**Table 2: GDP growth forecast**

Forecast Period	Abs. value of forecast error		Forecast Error			Best forecast
	Mean	Median	St. Dev.	Min	Max	
<b>Low-Income Countries (22 countries)</b>						
<b>1990-2010</b>	43%	33%	62%	-77%	220%	-9%
				Mozambique	Zimbabwe	Togo
<b>1985-2005</b>	70%	34%	120%	-54%	427%	5%
				Sudan	Congo	Benin
<b>OECD Countries (22 countries)</b>						
<b>1990-2010</b>	17%	12%	26%	-28%	103%	0.3%
				Ireland	Japan	Australia
<b>1985-2005</b>	16%	14%	21%	-49%	53%	-1%
				Ireland	Japan	Switzerland

Source: Own calculations based on World Bank's WDI data. Forecasts for 1990-2010 are based on 1980-90 data; forecasts for 1985-2005 are based on data for 1975-85

Next, I repeat the exercise using a sample of high-income OECD countries (bottom Panel of Table 2). When I use data for 1980-90 to forecast GDP over 1990-2010, I find that the smallest forecast error is for Australia (0.3 percent) and that forecasts errors range between -28 percent (Ireland) and 103 percent (Japan). Average and median errors are 17 and 12 percent, respectively. If I exclude the financial crisis, I obtain slightly smaller forecasts errors.

In a discussion of alternative fiscal sustainability measures for OECD countries, Blanchard (1990, p. 7 and p. 14) stated that "Assessing sustainability necessarily involves predicting the future... an index of sustainability cannot avoid taking a stand on where the economy is likely to go in the future." After describing a theoretically ideal index of fiscal sustainability, Blanchard continues by saying that such indicator "...cannot however be constructed ... [because] ...one must make projections of  $g$  [the economy's growth rate] far in the future, far beyond what is known with any accuracy."

While the theoretically ideal sustainability indicator described by Blanchard (1990) is different from the DSF, Blanchard's observation that indicators requiring long-term projections are not useful is relevant for the DSF, which requires long-term projections (up to 20-year) for several macroeconomic variables.

Blanchard (1990) concluded that such forecast errors are too large and that long term projections of macroeconomic variables cannot be used to build ideal indicators of fiscal sustainability for OECD countries. As forecast errors for low-income countries are much larger than forecasts errors for OECD, one is tempted to agree with Wyplosz (2011) that the DSF is mission impossible.<sup>15</sup>

### ***The alternative scenario and bound tests imply an asymmetric loss function***

The designers of the DSF were well aware of the difficulty of obtaining long-term projections for the main macroeconomic variables. The DSF addresses uncertainty by building alternative

<sup>15</sup> This also applies to very short-term forecasts. For instance, Ley and Misch (2014) show that output data revisions in low-income countries are larger and more optimistic than in other countries.

scenarios and bound tests. It also allows for some flexibility in interpreting the various debt thresholds. The most recent IMF-World Bank guidance note suggests that the thresholds should not be interpreted "mechanistically." However, there are few exceptions to the mechanical interpretation of the thresholds (Berg et al., 2014).

There are two problems with the alternative scenarios and bound tests approach. First, if we believe that the baseline is likely to be close to the historical scenario, there is only one true alternative scenario. The only true alternative scenario uses the same macroeconomic projections of the baseline and only allows for higher financing costs (due to changes in the degree of loan concessionality by major donors). Moreover, the bound tests do not tell us much about what it may happen in the long-run because they only focus on shocks during the first two years of the forecast period (they only affect the long-run if temporary shocks have a long-lasting effect).

The second, and more fundamental, problem with the bounds and alternative scenarios strategy is that it implicitly assumes a very asymmetric loss function (for a detailed discussion of the DSF loss function, see Berg et al, 2014).

In the baseline scenario, the DSF uses a loss function that should set equal weights to the cost of failing to predict a debt crisis and the cost of mistakenly predicting a debt crisis. The actual loss function used in the DSF is instead asymmetric and weighs missed crises 11 times more than false alarm. By adding these asymmetric weights to the conservative bias of the worst case aggregator it is possible to show that the DSF implicitly weighs each missed crisis 22 times more than each false alarm (Berg et al., 2014). The alternative scenarios and bound test add a third element to the conservative bias of the DSF.

Countries which do not breach their debt thresholds under the baseline projections but that could breach the thresholds under an alternative scenario are classified as yellow light. There is no symmetric case for countries that breach the threshold under the baseline (and are thus classified as red light) but could have a sustainable level of debt under an alternative scenario. In fact, the DSF does not even contemplate this possibility because the alternative scenarios always involve higher levels of debt.

Summing up, in the baseline scenario the DSF implicitly assumes that errors associated with underestimating a country's ability to service its debt are much costlier than errors associated with being too conservative. The alternative scenarios and bound tests amplify this bias.

Berg et al. (2014) discuss the reasons that may justify this conservative bias. They suggest that the conservative bias of the DSF may balance overly optimistic growth projections. However, as they correctly point out, it is unlikely that two wrongs make a right. If the designers of the DSF thought that there is an optimistic bias in growth projections, it would be better to address this bias rather than including another distortion.

Alternatively, it is possible that the cost of missing a crisis is indeed much larger than the cost of a false alarm. If this is the case, it would be good to have an open discussion on the relative costs of the two types of errors and build the DSF on the basis of a loss function that reflect these relative costs.

### ***Independent researchers do not have access to CPIA data***

The rationale for the DSF is Kraay and Nehru's (2006) finding that countries with weaker policies and institutions (as measured the World Bank's CPIA) are more likely to face repayment problems at lower debt ratios. The close link between debt sustainability and the quality of institution and policies has been corroborated by several internal IMF and World Bank assessments (IMF, 2012).

Unfortunately, these studies cannot be replicated by independent researchers because the CPIA data are reserved.<sup>16</sup> Kraay and Nehru (2006) do their best to address this problem by showing that their results are robust to using publicly available measures of institutional quality. It would, however, be better if the research community could have access to historical series for the actual CPIA data that drive the IDA financing policy. At this point, the only critical evaluation of the DSF comes from IMF researchers (Berg et al., 2014) who have access to the CPIA data. Greater data access by the whole research community would enrich the debate.

The World Bank has made enormous progress with its policies aimed at promoting transparency in member countries, and its open data access policy is an important public good. It should now make CPIA data publicly available. Independent researchers should be able to assess the robustness of studies which, ultimately, guide public policy and the allocation of large amounts of public funds (in 2013, IDA commitments surpassed \$16 billion).

## **4 There is an Alternative**

A possible rebuttal to the previous discussion is that there is no alternative (with apologies to Mrs. Thatcher). Decisions on grants versus loans need to be made and an imperfect crystal ball is better than nothing. We can make some changes to the actual implementation of the DSF (and make CPIA data available to the public), the argument goes, but the grant versus loan decision will still need to be guided by an instrument similar to the DSF.

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<sup>16</sup> CPIA scores are now available for LICs and MICs that are IDA eligible starting in 2005. Historical series are not available, and data for most middle income countries (which are used in the econometrics exercises linking debts sustainability with institutional scores) are not even available for the post 2004 period.

However, it is not clear why we need to decide now on a country's ability to service a debt that will not require any payment for the next ten years. Why shouldn't we postpone the decision and make payments contingents on a country's ability to pay. Let me illustrate this idea with a simple example and then consider possible criticisms (including moral hazard).<sup>17</sup>

#### 4.1 From *ex-ante* to *ex-post* grants

Consider a low-income country which is found to be at low risk of debt distress and an, otherwise identical, low-income country which is deemed to be at high risk of debt distress. Let us call these two countries G and R (green and red light, respectively). Further, denote  $\pi_1$  as the probability that the DSF is right (i.e., that when payment starts ten years down the road, the debt of G will turn out to be sustainable and that of R will be unsustainable),  $\pi_2$  as the probability that both countries will have a sustainable debt situation,  $\pi_3$  as the probability that neither country will have a sustainable debt situation, and  $1-\pi_1-\pi_2-\pi_3$  as the probability that the DSF is completely wrong (G will turn out to be unsustainable and R sustainable).

Under the status quo (SQ), IDA will make a concessional loan of, say 100, to G and give a grant of 80 to R. Further assume that the concessional loan is similar to the ID 40 loan described in footnote 11 and has a concessional element of 63%. The expected value of IDA's portfolio will be:  $EV_{SQ} = 37$ . For a total transfer of 180, the cost of this operation will be:  $C_{SQ} = 180 - 37 = 143$

Now consider an alternative in which both countries receive 100 and they only repay if their debt turns out to be sustainable. Let us further assume that, if things go badly, the problem countries will be able to repay a fraction of the amount due. Let  $0 \leq \delta \leq 37$  denote the NPV of the fraction of the debt which is actually repaid by the countries with unsustainable debt. In this case, the expected value of IDA's portfolio will be:

$$EV_{index} = 37(1 + \pi_2 - \pi_3) + \delta(1 + \pi_3 - \pi_2)$$

Given a total transfer of 200, the cost of this operation will be:  $C_{index} = C_{SQ} + 20 + (37 - \delta)(\pi_3 - \pi_2) - \delta$ . The difference in costs ( $C_{index} - C_{SQ} = 20 + (37 - \delta)(\pi_3 - \pi_2) - \delta$ ) could be small, or even negative.

Moreover,  $C_{index} - C_{SQ}$  is an upper bound of the additional cost of the alternative to the status quo. If G's debts turn out to be unsustainable, G is unlikely to repay the full amount due (i.e., it will receive *ex-post* debt relief). Let us denote  $\gamma$  as the NPV of the amount of debt repaid by G if its debts turn out to be unsustainable (with HIPC and MDRI,  $\gamma = 0$ ; I assume  $0 \leq \delta \leq \gamma \leq 37$ ). Then, the expected value of IDA's portfolio becomes:  $EV'_{SQ} = 37 - \pi_3(37 - \gamma)$ . And the difference in costs:

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<sup>17</sup> I first proposed this strategy in Panizza (2010). Tabova (2005) predates my proposal but does not link GDP-indexed lending to the grant versus loan debate. The idea of using GDP indexed loans to address the grant versus loans issue was however hinted by Klein and Harford (2005). Guillaumont et al. (2003) suggest making debt service conditional to commodity price shocks, Hausmann and Rigobon (2003) suggest transforming concessional lending in inflation-indexed domestic currency.

$$C_{index} - C'_{SQ} = 20 - \delta + \pi_3(\gamma - \delta) - \pi_2(37 - \delta) < C_{index} - C_{SQ}$$

Table 3 computes  $C_{index} - C'_{SQ}$  for different values of  $\gamma$ ,  $\pi_2$ , and  $\pi_3$ . The relative cost of indexing decreases quickly with  $\pi_2$  (the probability that both countries will have a sustainable debt situation) and  $\gamma$  (the amount of money which is actually recovered). It becomes negative when  $\pi_2 > 0.5$  or  $\gamma > 20$ .

**Table 3:  $C_{index} - C'_{SQ}$  for different values of  $\gamma$ ,  $\pi_2$ , and  $\pi_3$**

$\gamma$	$\pi_2=0.2$	$\pi_2=0.4$	$\pi_2=0.6$	$\pi_2=0.3$	$\pi_2=0.3$	$\pi_2=0.3$
	$\pi_3=0.3$	$\pi_3=0.3$	$\pi_3=0.3$	$\pi_3=0.2$	$\pi_3=0.4$	$\pi_3=0.6$
0	12.6	5.2	-2.2	8.9	8.9	8.9
5	9.7	3.1	-3.5	6.3	6.5	6.7
10	6.8	1	-4.8	3.7	4.1	4.5
15	3.9	-1.1	-6.1	1.1	1.7	2.3
20	1	-3.2	-7.4	-1.5	-0.7	0.1
25	-1.9	-5.3	-8.7	-4.1	-3.1	-2.1
30	-4.8	-7.4	-10	-6.7	-5.5	-4.3
35	-7.7	-9.5	-11.3	-9.3	-7.9	-6.5

The calculations assume that  $\delta = 0.8\gamma$ .

This simple exercise shows that the cost of the alternative proposal is unlikely to be large (in fact, it could be negative) and could be easily compensated by reducing the minimum degree of concessionality (63 percent in the above example) of the loan program. This approach would be consistent with the risk-sharing nature of international financial institutions, as the additional cost would only be paid by countries that can afford paying it.

Missale and Bachiocchi (2012) go beyond my back-of-the-envelope exercise. They use VAR estimates and a CAPM model to evaluate the feasibility of GDP-indexed loans for concessional lenders and conclude that such loans would have limited risks and yield substantial benefits in terms of reducing the likelihood of debt distress. Along similar lines, Tabova (2005) evaluates GDP indexation for IDA loans to seven African countries and finds that indexation would benefit recipient countries and have small costs for the lender.

One possible objection is that grant-only countries might not be interested in this indexation scheme. A concessional loan of 100 implies a grant of 63, and a grant of 80 implies a grant of 80. In the presence of perfect capital markets, the alternative proposal considered in this paper makes grant-only countries worse-off. However, capital markets are not perfect. When countries go out and borrow the extra 20 (and they always try to do it, sometimes they are not successful) at a commercial rate, they normally pay interest rates which are well above the 5 percent discount rate

used to compute the 63 percent concessionality element. It is possible that a loan of 100 with 63 percent concessionality will be cheaper than a grant of 80 and a commercial loan of 20.<sup>18</sup>

Alternatively, countries with high growth prospects may not be interested. However, countries should not be allowed to choose because their payoffs are asymmetric. A country with strong growth prospects may be tempted to reject GDP indexation knowing that, if things go bad, it will receive debt relief *ex-post*.

## **4.2 Challenges**

There are also problems with the idea of addressing the grant versus loan challenge through GDP-indexed loans. The first possible problem is moral hazard, the second concerns the reliability of GDP statistics, and the third has to do with the fact that new lenders could freeride on a policy that gives automatic debt relief at times of crisis.<sup>19</sup> There is also a class of problems that concern indexed contracts in general (for a discussion see Borensztein and Mauro, 2004). These problems include adverse selection, externalities in contract design, and excessive complexity.

### ***Moral Hazard***

The first objection to the proposal outlined in this paper is moral hazard. If countries know that by growing less they will have to pay less debt they may have less incentive to grow.

This is a red herring. It is easy to write theoretical models in which moral hazard is paramount. However, while moral hazard may play some role at the margin, it is hard to believe that moral hazard (at least moral hazard linked to concessional lending) is the reason why poor countries remain poor. Assume that a policymaker needs to decide whether to transform her country into either South Korea (the only country that went all the way from IDA recipient to high income) or the Democratic Republic of Congo (the country with the lowest GDP per capita in the world) and chooses Congo in order minimize its debt repayments. Probably, this policymaker should not receive development assistance.

The Meltzer Commission affirmed that "Moral hazard cannot be overstated," Paul Krugman replied "Oh yes, it can" (quoted in Williamson, 2000). Froot et al. (1989) show that GDP indexation can be desirable even in the presence of moral hazard and describe the conditions under which GDP indexation is superior to indexing the debt to fully exogenous variables such as commodity prices.

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<sup>18</sup> With a discount rate of 5 percent, the two instruments will be equivalent (assuming the IDA 40 loan discussed above) if the 40-year maturity commercial loan carries a 10 percent interest rate (shorter maturity loans will have a rollover risk). Higher interest rates will make the grant/loan combination more expensive.

<sup>19</sup> Another possible issue is that flows are less predictable from the point of view of the donor country. However, the example of the previous section showed that this should not be a quantitatively important issue. Moreover, donor countries are probably better able to bear risk than recipient countries.

### ***Unreliable GDP statistics***

While it is hard to think of a policymaker that tries to maximize the welfare of his country by minimizing growth, such a policymaker may try to reduce payments by understating actual growth. Measurement is indeed a problem (for instance, holders of inflation-indexed Argentinean bonds are not happy about the government's creative way of measuring inflation).

While it would be difficult for a government to constantly understate GDP growth (after a few years the level of measured GDP would be much smaller than the level of actual GDP), one could think about strategic behaviors in which GDP growth is under-measured during years in which large payments are due. This problem could be addressed by smoothing repayment over long periods (as it already happens with IDA loans) and with independent auditing of GDP statistics.

### ***Freeriding by new lenders***

New lenders may freeride on the automatic debt relief delivered by indexing repayments to GDP growth. They may extend profitable non-concessional loans which benefit from the lower risk of debt distress implied by the indexation of concessional loans. This problem is not likely to be different from potential freeriding based on the current IDA framework.<sup>20</sup> Therefore, the freeriding problem can be addressed with the same debt limit policy used in the current framework (World Bank 2006).

It would be also possible to provide incentives for private sector GDP indexed loans and discourage non-indexed non concessional loans with seniority rules.<sup>21</sup>

### ***Adverse Selection***

If there is asymmetric information and only high risk countries chose indexation, the lender will either have to charge high interest rates or will lose money. This is not a problem if IDA indexes all of its loans to GDP and borrowers cannot opt out. Of course, borrowers may decide not to use IDA loans, but this is unlikely because IDA financing will still be cheaper than commercial, non-concessional loans. While this policy will require coordination among all concessional lenders (see the free rider problems above), coordinating a small number of concessional lenders should be easier than coordinating a large number of commercial lenders.

The use of indexed instruments may also be limited by political economy considerations. Policymakers have limited incentives to buy insurance contracts with costs that must be paid upfront and benefits that may accrue only years later (Borensztein et al, 2006). Again, this will not be a problem if IDA and the other concessional lenders only offer one type of loan.

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<sup>20</sup> An exact evaluation of the difference between the two approaches would require a detailed model which goes beyond the scope of this paper.

<sup>21</sup> Again, it would be necessary to have a well-specified model to examine the optimal design of such a policy and analyze its implications. Implementing such a policy would require an international bankruptcy court for sovereigns (for discussions of the desirability of such an institution see Panizza, 2012 and Buchheit et al., 2013). Also note that Reisen and Ndoye (2008) claim that there is no imprudent lending by new donors.



## **Externalities**

There are externalities in the design of complex indexed instrument. The first issuer absorbs the fixed cost of designing the instrument and the other players can copy the innovator without the need of paying royalties. This is a problem for commercial lenders, but it is not an issue for IDA which is in the business of providing public goods.

## **Complexity**

Low-income countries have limited debt management capacity and their debt managers may not be able to fully appreciate the costs and benefits of complex indexed instruments (Paesani and Piga, 2010). This should not be a problem if concessional lenders just offer one type of indexed instrument with transparent rules.

## **5 Conclusions**

Grants and concessional loans are different and there are tradeoffs involved in the choice between these two instruments of development finance. Ideally, grants should be used for countries with an unsustainable debt situation and loans should go to countries that do not face debt sustainability problems.<sup>22</sup>

Debt sustainability, however, is hard to define and assess. In the current system grants and loans are allocated on the basis of imprecise and conservative measures of debt sustainability. Indexing concessional loans to GDP would allow postponing the grant versus loan decisions to a date in which both lenders and borrowers have more information on capacity to pay.

In a sense, GDP indexation transforms *ex-ante* grants into *ex-post* grants. It would also simplify the debt relief process. It is plausible that some countries that are now deemed to have a sustainable debt situation will end up being in debt distress (because of war, natural disasters or simply because their growth projections were too optimistic). If their debts end up being unsustainable these countries will eventually get debt relief. However, initiatives aimed at responding to unsustainable debt rely upon a patchwork of ad hoc measures. This approach is inefficient and sometimes inequitable. GDP indexation would define the rules for debt relief *ex-ante* and thus increase predictability and efficiency.

GDP indexation may also have other benefits because it may reduce the incentives for irresponsible lending (it could, however, create incentives for irresponsible borrowing) and thus reduce loan pushing and defensive lending.

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<sup>22</sup> In this paper I assumed that the Framework only serves to evaluate debt sustainability. The conclusion could be different if the Framework and IDA lending strategy have the objective of providing incentives for policy reforms.

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