

The Debt Sustainability Framework for Low-Income Countries

Bergljot Bjørnson Barkbu, Christian Beddies, and Marie-Hélène Le Manchec



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The following conventions are used in this publication:

- In tables, a blank cell indicates “not applicable,” ellipsis points (. . .) indicate “not available,” and 0 or 0.0 indicates “zero” or “negligible.” Minor discrepancies between sums of constituent figures and totals are due to rounding.
- An en dash (–) between years or months (for example, 2007–08 or January–June) indicates the years or months covered, including the beginning and ending years or months; a slash or virgule (/) between years or months (for example, 2007/08) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2008).
- “Billion” means a thousand million; “trillion” means a thousand billion.
- “Basis points” refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to ¼ of 1 percentage point).

As used in this publication, the term “country” does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

Preface

Low-income countries (LICs) often struggle with debt problems, both domestic and external. And debt problems constrain their economic and social development. Recently, debt burdens have been reduced in many LICs through debt relief under two initiatives: the Heavily Indebted Poor Countries Initiative and the Multilateral Debt Relief Initiative. Looking ahead, LICs will continue to need resources to finance their many development needs in a sustainable manner, without entering new episodes of debt distress. To help the analysis of reasonableness of the debt policies of LICs and to avert undue buildups of debt in the future, the IMF and the World Bank have developed a joint analytical framework called the Debt Sustainability Framework (DSF). This paper explains the analytical underpinnings of the DSF and suggests how it could be used more widely by countries, donors, and creditors.

The paper was prepared by a team comprising staff members from the IMF's Strategy, Policy, and Review Department (SPR). The team included Bergljot Barkbu, Christian Beddies, and Marie-Hélène Le Manchec. Overall supervision was exercised by Martine Guerguil (Division Chief), Hervé Joly (Deputy Division Chief), and Adnan Mazarei (Assistant Director) in SPR. We, the authors, wish to express our gratitude to a large number of IMF and World Bank staff who contributed to the drafting of numerous Board papers on the DSF that eventually led to the production of this paper. Without implicating them in the analysis and views expressed in this paper, we would like to mention Patricia Alonso-Gamo, Birgir Arnason, Gabriel Di Bella, Andrew Berg, Zuzana Brixiova, Christina Daseking, Jan Gottschalk, Mumtaz Hussain, Samir Jahjah, Carlos Leite, Jan Kees Martijn, Mauro Mecagni, Tokhir Mirzoev, Perry Perone, Laure Redifer, Bjoern Rother, Carlo Sdravovich, Gabriel Sterne, Ben Umansky, and Felipe Zanna (IMF) and Luca Bandiera, Dörte Dömeland, Aart Kraay, Vikram Nehru, Gaobo Pang, Frederico Gil Sander, Mark Roland Thomas, and Sona Varma (World Bank). We are also grateful to numerous reviewers who provided valuable input. The authors are also indebted to Julieta del Milagro Caunedo for excellent research assistance, to Lorna Campbell and Shannon Mockler for outstanding administrative and organizational support, and to Esha Ray of the External Relations Department for editorial assistance and overseeing the production of the publication.

The views expressed in this paper are those of the authors, however, and do not necessarily reflect the views of national authorities, the IMF, or IMF Executive Directors.

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Abbreviations

BRH	Central Bank of Haiti
CIRR	Commercial interest reference rate
CPIA	Country Policy and Institutional Assessment
DAC	Development Assistance Committee (OECD)
DSA	Debt sustainability analysis
DSF	Debt Sustainability Framework
ECG	Working Group on Export Credits and Credit Guarantees
FDI	Foreign direct investment
GDP	Gross domestic product
HIPC	Heavily Indebted Poor Country
HOPE Act	Haitian Hemispheric Opportunity Through Partner Encouragement Act
IDA	International Development Association
IMF	International Monetary Fund
LIC	Low-income country
MDG	Millennium Development Goals
MDRI	Multilateral Debt Relief Initiative
MEF	Ministry of Economy and Finances
MIC	Middle-income country
MTDS	Medium-term debt strategy
NPV	Net present value
OECD	Organization for Economic Cooperation and Development
PRGF	Poverty Reduction and Growth Facility
PV	Present value
SPR	Strategy, Policy, and Review Department

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I Overview

Borrowing can help achieve economic and social objectives, and debt is its consequence. Many low-income countries (LICs) require substantial external financing to reach their development objectives, and stepped-up investment in infrastructure is critical to achieve sustained growth and development. External debt financing can help in this regard by channeling resources to projects where the rate of return of the debt-financed investment is at least sufficient to service the debt incurred.

Debt can also expose countries to serious difficulties: If countries borrow too much or suffer shocks to their economies, they may become unable to repay their debts and may have to make disruptive financial and economic policy changes. A large number of LICs accumulated excessive debt starting in the 1970s with a peak in the early 1990s, setting back their efforts to achieve solid growth and alleviate poverty for years.

Debt problems can be particularly difficult for LICs. LICs rely on debt to finance development and are vulnerable to the risks posed by debt. They have macroeconomic and financial features that may undermine their capacity to generate sufficient revenues to repay the debt incurred. These features include narrower production bases and export structures, shallower financial markets, aid volatility, and weaker policy implementation capacity.

In recent years, the debt burden of many LICs has declined, but they are likely to borrow anew to meet their large development needs. The international community has helped lower the debt burden of LICs through debt relief initiatives. The Heavily Indebted Poor Countries (HIPC) Initiative was adopted in the fall of 1996 and enhanced and expanded in 1999. The Multilateral Debt Relief Initiative (MDRI) was adopted in 2005 with a view to ending sizable debt overhangs in the poorest countries and to providing resources to LICs for achieving the Millennium Development Goals (MDGs). Although these initiatives charted a course toward restoring debt sustainability, they did not preclude the rapid buildup of new debt and a new round of debt difficulties.

At the same time, the sources of funds to LICs are expanding, and the increased supply of financing poses risks of future debt difficulties. New or emerging donors, such as Brazil, China, and India, have been increasing their lending activities in LICs. At the same time, global financial markets have sought new opportunities in LICs,

especially in Africa, and have purchased LIC sovereign debt, both external and domestic. In addition, many governments have expanded their domestic borrowing. Also, private equity and sovereign wealth funds may in the future become important players in LIC financing. The combination of low debt and new financing sources will allow LICs to make important strides toward achieving their economic goals, but could also pose risks for new debt distress if not managed carefully.

Against this backdrop, the IMF and the World Bank have been intensifying their efforts to help LICs achieve the MDGs and other development objectives while avoiding a new round of debt distress. An analytical framework, the Debt Sustainability Framework (DSF) for LICs, has been developed to help monitor and analyze the sustainability of public and external debt in LICs. The objective of the framework is to help policymakers and other parties, including those in the financial markets, analyze the consequences of incurring debt and conduct regular updates of the analyses.

The IMF and the World Bank promote a broad use of the DSF by governments, donors, and lenders to help prevent the accumulation of unsustainable debts. For borrowers, debt sustainability analyses (DSAs) should be the cornerstone for developing medium-term debt strategies and public expenditure plans that allow sustainable progress toward the country's development goals. The DSF can also help guide creditors' lending decisions. The International Development Association (IDA) uses the DSF to determine the mix of loans and grants that it provides to LICs. Other key multilateral creditors also incorporate elements of the framework in their lending terms and many OECD Development Assistance Committee (DAC) creditors explicitly use the DSF to guide their lending terms.

This paper describes the concept of debt sustainability and why it is important (Section II). Section III presents the DSF and how it helps determine an adequate borrowing and lending strategy that seeks to contain the risk of debt distress, while maximizing the resource envelope to achieve the MDGs. Last, the paper discusses the use of the DSF by governments, donors, and lenders (Section IV). Section V presents some concluding remarks. Appendix I contains answers to frequently asked questions and Appendix II presents a DSA country case study.

II What Is Debt Sustainability and Why Does It Matter?

The Economics of Public and External Debt

When governments face resource constraints, they often resort to borrowing to finance their expenditure plans. When outlays exceed revenues, a government has two basic options: eliminate the deficit by cutting expenditures or raising more revenues, or finance it through new (net) borrowing, which increases the stock of public debt. Governments may borrow by issuing securities, such as government bonds and bills, or through loans from domestic or foreign institutions (Box 2.1).

Public borrowing can serve a number of purposes. It allows the government to smooth the time profile of expenditures, thus enhancing the efficiency of its spending, and of taxes, thereby reducing tax distortions. Also, borrowing allows the government to implement counter-cyclical policies; such borrowing, however, is expected to be temporary, hence limited to periods of economic slowdown and followed by repayments during periods of economic expansion. Sustained borrowing may be considered to finance public investments viewed as critical to growth and development objectives, under the premise that these investments will generate the capacity to repay the corresponding debt. A drawback of government borrowing, especially from the domestic banking system, is that it may crowd out private borrowing and therefore constrain private activity.

LICs often rely on external debt to finance their investment and development needs. External debt accumulation is not problematic in itself, as long as the foreign savings are channeled (either directly or indirectly) into productive investment that allows the country to grow and generate future export earnings, and thus foreign exchange, with which to repay foreign creditors. Certain categories of government spending classified as consumption, such as education and health, could also be financed through external debt, as long as they are expected to raise a country's growth potential. Given diminishing marginal returns to capital, LICs should be able to generate higher returns on investment than can more advanced economies, attract capital inflows, and catch up.

The link between investment and growth has proven to be hard to pin down in both the theoretical and the empirical literature.¹ Public investment may raise growth through a number of complex channels, including crowding in private investment and the alleviation of structural and macroeconomic absorptive capacity constraints. However, its actual impact on growth is hard to quantify, in part because the impact is contingent upon other elements such as the quality of policies and institutions and the management of exogenous shocks (see Gupta, Powell, and Yang, 2006). There is also uncertainty about whether the impact of higher investment on growth is transitory—raising income levels permanently—or whether investment can increase growth permanently. Doubts regarding these links have also been cast in the literature on the effectiveness of aid.²

At high levels, public debt may undermine growth. Debt financing can have a positive impact on investment and growth if it produces sufficient return to service the debt. However, at high debt levels, the anticipation of higher and progressively more distortionary taxes needed to repay the debt may dampen investors' (after-tax) returns (Krugman, 1989; and Sachs, 1989) and hence reduce investment and growth. The volume of private investment can further be constrained by high interest rates and limited credit as the result of excessive government borrowing (crowding out). At a sufficiently high level of debt (a debt "overhang"), this adverse effect dominates.³ The resulting debt-servicing difficulties in

¹See IMF and IDA (2006b), Appendix III and the references therein.

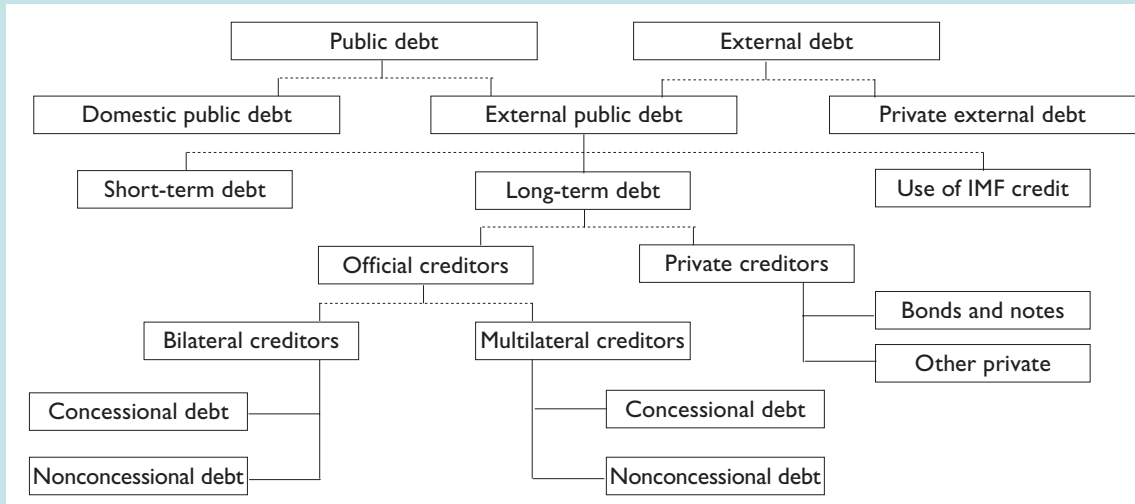
²See, for example, World Bank (1998). Bourguignon and Sundberg (2007) examine the causality chain linking aid flows to development outcomes and conclude that many of the questions policymakers and economists would like data to answer simply cannot be answered because of the complexity and "noise" along links in the chain and the problem of attribution.

³Pattillo, Poirson, and Ricci (2004) conclude that the negative impact of high debt on growth operates both through a strong negative effect on physical capital accumulation and on total factor productivity growth. Using a panel data set for 61 developing countries over a period from 1969 to 1998 they find that on average, for high-debt countries, doubling debt will reduce output growth by about 1 percentage point and reduce both per capita physical capital and total factor productivity growth by somewhat less than that.

Box 2.1. The Composition of Debt

Public debt and external debt are widely used macroeconomic concepts. Public debt is the debt owed by the public sector to residents (domestic public debt) or non-residents (external public debt). External debt refers to the debt owed by the country as a whole—including the government and the private sector—to nonresident creditors, such as private commercial banks and investors, foreign governments, or international financial institutions (see

figure). The structure of a country’s external and public debt tends to vary according to its degree of economic development. Advanced and emerging economies tend to contract a large share of their debt from private creditors, while low-income countries (LICs) borrow more from official creditors, largely on concessional terms. Moreover, the government generally accounts for a larger share of total debt in LICs than in other groups.



turn create expectations that some of the debt will have to be forgiven, thereby discouraging foreign investors from providing new financing, while reducing borrowing governments’ incentives to pursue sound policies that strengthen their capacity to repay. Such a dynamic can ultimately lead to a situation in which the debt burden becomes excessively high and debt can no longer be serviced.

The Analytical Underpinnings of Debt Sustainability Analysis

Debt is sustainable when a borrower is expected to be able to continue servicing its debts without an unrealistically large correction to its income and expenditure. Sustainability is related to solvency as well as to liquidity (Box 2.2). Sustainability also captures the notion that there are social and political limits to adjustments in spending and revenue that determine a country’s willingness (as opposed to its economic ability) to pay, which may be especially important in a sovereign context.

DSAs aim at determining borrowing paths that can be maintained without facing debt-service difficulties

or resorting to exceptional financing (i.e., debt rescheduling or accumulation of arrears). DSAs provide a link between debt dynamics and macroeconomic policies, and are therefore forward-looking and probabilistic. Whether a country, and specifically its government, will be able to service its debt depends on its existing debt burden as well as its prospective policy stance (particularly the fiscal and exchange rate paths) and expected international developments (which may influence the cost of financing as well as the willingness of investors to roll over existing debts).

Debt sustainability can be assessed on the basis of different debt and debt-service indicators relative to measures of repayment capacity. The repayment capacity can be measured in terms of GDP, export proceeds, or fiscal revenue. GDP ratios provide an indication of the size of the economy. Export ratios indicate whether the country can be expected to generate sufficient foreign exchange to meet its debt obligations in the future. Last, revenue ratios measure the government’s ability to mobilize domestic resources to reimburse debt. The most relevant measure of repayment capacity depends on the constraints that are the most binding in an individual country. Ratios of debt stock relative to repay-

Box 2.2. Solvency and Liquidity Conditions

A government is deemed solvent if the present value (PV) of its current and future primary expenditure (net of interest payments) is no greater than the PV of its current and future path of income. Fiscal solvency does not require a stable debt-to-GDP ratio, but that debt grows at a rate that is lower than the nominal interest rate. Similarly, a country is deemed solvent if the PV of its current and future current account balances (net of interest payments) does not exceed the PV of its existing external debt. External solvency is more complex to assess than fiscal solvency because current account positions reflect public and private investment and savings decisions as well as foreign lending decisions.

A government or a country is deemed illiquid, regardless of whether it is solvent, if its liquid assets and available financing are insufficient to roll over its maturing liabilities. Liquidity problems may arise following a sharp drop in

export earnings or an increase in foreign or domestic interest rates. The currency composition of debt, its maturity structure, and the availability of liquid assets are important determinants of the vulnerability of the economy to liquidity crises. As liquidity problems often emerge in circumstances that may give rise to insolvency (e.g., a prolonged increase in interest rates), it may be difficult to distinguish clearly between solvency and liquidity situations at the onset.

Whether solvency or liquidity concerns arise depends on country circumstances, and in particular its sources of finance. For low-income countries that have limited access to capital markets but have a high debt ratio because of borrowing on more concessional terms from official creditors, liquidity is likely to be less of a concern than solvency. For many emerging market countries, although debt ratios may be moderate, the main sustainability risk may arise from liquidity problems.

Table 2.1. Commonly Used Indicators in Debt Sustainability Analyses

Indicators	Use of the Indicator
Solvency	
Nominal stock or present value (PV) of public or external debt to GDP	Compares the debt burden with the resource base. This indicator is commonly used, but may be misleading. For example, a low debt-to-GDP ratio may coexist with a high debt-to-export ratio if exports make up a very small proportion of GDP.
Nominal stock or PV of public or private external debt to exports	Compares the debt burden with the country's capacity to generate foreign exchange receipts. A debt-to-exports ratio that is increasing over time, for a given interest rate, implies that total debt is growing faster than the economy's basic source of external income. This ratio is more precise than the debt-to-GDP ratio but may be volatile (given the price volatility of exports) and incomplete (because countries may have other important sources of external income, such as remittances).
Nominal stock or PV of public domestic and external debt to fiscal revenue	Compares the debt burden with public resources available for repayment. This is a critical ratio for relatively open economies facing a heavy debt-service burden. An increase in this indicator over time suggests that the country may have budgetary problems in servicing the debt.
Foreign currency debt to total debt	Shows the impact of a change in the exchange rate on debt.
Liquidity	
Debt service on public or private external debt to exports	Indicates how much of a country's export revenue is used to service its debt, and how vulnerable the payment of debt service is to an unexpected fall in export proceeds. This ratio tends to highlight vulnerabilities in countries with significant short-term debt: The higher the share of short-term debt to overall debt, the larger and more vulnerable is the annual flow of debt-service payments. The ratio has some limitations: Debt-service payments and the export proceeds may vary from one year to another and debt-service data on private debt are not always available.
Debt service on public domestic and external debt to fiscal revenue	Indicates how much of a country's fiscal revenues are used for debt-service payments, and the associated vulnerability to variations in domestic fiscal revenues.
International reserves to short-term external debt	Indicates reserve adequacy in countries with significant but uncertain access to capital markets; it can be forecasted to assess future vulnerability to liquidity crises.
Short-term debt to total outstanding debt	Indicates relative reliance on short-term financing; together with indicators of maturity structure, it allows monitoring of future repayment risks.
Average maturity of nonconcessional debt	Measures maturity that is not biased by long repayment terms for concessional debt.

ment capacity measures are indicators of the burden represented by the future obligations of a country and thus reflect long-term risks to solvency, while the time path of debt-service ratios provides an indication of the likelihood and possible timing of liquidity problems. For countries with access to concessional finance, the present value (PV) of debt provides a better measure of future debt-service payments than does the nominal debt stock.⁴ A list of frequently used debt indicators is presented in Table 2.1.⁵

⁴Concessionalities are a measure of the difference between the PV of the debt-service payments of a loan (the sum of the discounted future debt-service payments) and the nominal (face) value of the loan. The higher the concessionalities of a loan, the lower the PV compared with the nominal value. See Appendix I for more details.

⁵It is important to note, however, that the debt-stock indicators compare today's debt stock or the discounted value of future debt service with current-year flow variables. As a result, new borrowing will increase the debt-stock ratios regardless of the profitability of the debt-financed investment. Given that the benefits of a debt-

The design of appropriate borrowing strategies also needs to take into account country-specific circumstances. A country's capacity to absorb new financing productively and eventually to repay its debt depends on a variety of elements, many of them of a structural nature. They include the savings propensity of the private sector; the degree of financial development of the economy; the growth rate of productivity; the government's ability to expand the tax base, raise tax rates, and compress public spending; and demographic developments. Thus, it is not possible to identify universally "safe" or "unsafe" levels for debt indicators. A large body of empirical research has attempted to distill country experience into "tolerance levels" that could be assigned to groups of countries sharing common features. But it is generally acknowledged that such levels constitute only indicative benchmarks or ranges.

financed investment materialize only over time, it is important to assess the evolution of debt-stock ratios over time.

III The Low-Income Country Debt Sustainability Framework

The IMF's General Approach to Debt Sustainability

Assessments of external and fiscal sustainability are key elements of the IMF's work. The IMF's advice on macroeconomic policies, in the context of both IMF-supported programs and surveillance, is anchored in an analysis of a country's capacity to finance its policy objectives and service the ensuing debt without unduly large adjustments that may compromise its stability and that of its economic partners.

As part of the IMF's efforts to better detect, prevent, and resolve potential crises, a formal framework for conducting public and external DSAs became operational in 2002. The framework aimed to bring a greater degree of consistency, discipline, and transparency to sustainability analyses, thus allowing for better informed policy advice and program design. The objective of the framework is threefold (see IMF, 2003):

- Assess the current debt situation, its maturity structure, whether it has fixed or floating interest rates, whether it is indexed, and by whom it is held;
- Identify vulnerabilities in the debt structure or the policy framework far enough in advance so that policy corrections can be introduced before payment difficulties arise; and
- In cases where such difficulties have emerged, or are about to emerge, examine the impact of alternative debt-stabilizing policy paths.

The framework consists of two complementary components: the analysis of sustainability of (1) total public debt and (2) total external debt. In both cases, the framework focuses on gross, rather than net, liabilities in part because timely and consistent data on net investment positions are not easily available, but also because gross financing needs provide a better signal of possible liquidity risks.

Each component consists of two main elements: (1) a baseline scenario, based on a set of macroeconomic projections that articulate the government's intended policies, with the main assumptions and parameters clearly laid out and (2) a series of sensitivity tests applied to the baseline scenario, providing a probabilistic upper bound

for the debt dynamics under various assumptions regarding policy variables, macroeconomic developments, and financing costs. The paths of debt indicators under the baseline scenario and the stress tests allow the assessment of the vulnerability of the country to a payments crisis.

DSAs should not be interpreted in a mechanistic or rigid fashion. Their results must be assessed against relevant country-specific circumstances, including the particular features of a given country's debt as well as its policy track record and its policy space. For example, a DSA can be used to calculate the size of a primary surplus required to service a given level of debt, but not to ascertain whether it is feasible, or appropriate, to run a primary surplus of that size. Similarly, DSAs can help identify the sources and potential impact of debt-related exchange rate risks or rollover risks, but the design of appropriate mitigating policies would require a more detailed analysis. In sum, although DSAs provide valuable inputs for the design of macroeconomic policies, they cannot, on their own, help determine an optimal borrowing path, and thus should not be seen as a prescriptive tool.

What Makes Low-Income Countries Different?

LICs are a diverse group, ranging from poor countries with weak policy records and histories of conflict to more diversified economies with access to international capital markets. Although maintaining debt sustainability should be a central objective for all countries, LICs have particular characteristics that require special consideration. Over time and as LICs transition toward more advanced economies, these characteristics are expected to more closely resemble those of middle-income countries (MICs).

LICs' economic performance has often been weaker than that of MICs (Figures 3.1–3.3). This fact largely reflects their higher sensitivity to external and domestic shocks as well as lower-than-expected returns of public investments, themselves often linked to weak institutions. These factors have implications for the assessment of debt sustainability.

- **High vulnerability to exogenous shocks.** With production and export structures that are often concentrated on a few raw commodities (minerals and agricultural products) with volatile prices, LICs tend to suffer from large and more frequent terms of trade shocks (Figure 3.1). They are also more prone to weather-related shocks (such as droughts, hurricanes, and flooding), and their response capacity is weaker because of financial and other domestic constraints. And LICs are also subject to volatile aid flows. These shocks can lead to an unexpected fall in income, thereby reducing the capacity to service debt obligations.

- **Political instability.** Domestic conflicts, frequent government changes, and weak political institutions complicate the implementation of sustainable macroeconomic policies and undermine investor confidence. Limited government accountability increases the chances that scarce public resources are diverted toward unproductive uses, thereby reducing a country’s capacity to honor its debts.

- **Weak policies and institutions.** LICs score significantly lower than MICs in indicators of governance and institutional quality (Figure 3.2). Empirical evidence shows that the effect of debt on growth depends on the quality of policies and institutions (Cordella, Ricci, and Ruiz-Arranz, 2005). Countries with good policies and institutions tend to have a higher debt tolerance threshold, which suggests that they can borrow more before facing a payments problem. Weak public institutions, poor governance, and generally low administrative capacity (including in the debt management area) increase the risk of mismanagement and thus of debt problems.

Specific features of LICs’ debt levels and structures also have implications for debt sustainability assessments.

- **Higher level of external indebtedness.** The external debt relative to GDP is nearly twice as large in LICs as in MICs (Figure 3.3). As mentioned above, the level of indebtedness is a critical determinant affecting the debt-growth relationship.

- **Higher reliance on official external creditors.** Domestic financial markets are less developed in LICs, leading them to rely more on external financing. As their access to international capital markets has remained rather limited, they have relied to a large extent on official (concessional) financing, although this is gradually changing in some LICs.

- **Governments account for the largest share of LICs’ external debt.** As a result, external and public debt sustainability is more closely linked in LICs. The fiscal stance is determined mainly on the basis of expected external financing of the budget.

Figure 3.1. Export Structure, 2005

(In percent of total exports)

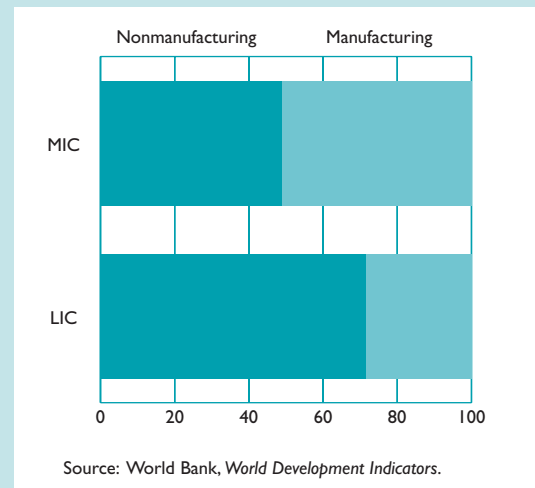
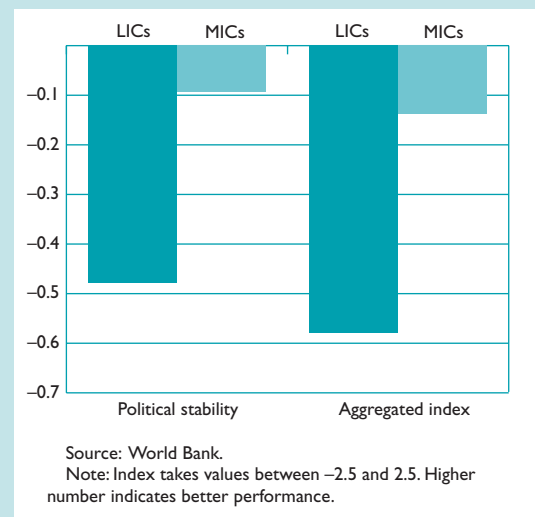


Figure 3.2. Kaufman Index on Governance

(Average 2000–06)

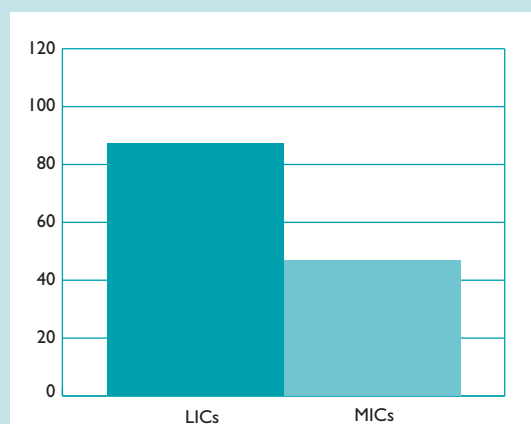


- **Debt is more concessional.** The concessional nature of financing makes it more likely that the returns on new investments exceed their (subsidized) costs (although this in itself does not guarantee sustainable debt dynamics) (Figure 3.4).

- **Moral hazard.** Following successive debt reschedulings and cancellations (Box 3.1), country officials

Figure 3.3. External Debt, 2000–06

(In percent of GDP)



Source: World Bank, *Global Development Finance*.

may be more willing to take on excessive lending with the expectation of new debt relief, should the country again face difficulties in servicing its obligations. The way in which aid is allocated can also create disincentives to implement debt-reducing policies to the extent that aid flows are reduced (or their grant element lowered) in response to improvements in debt indicators (see IMF and IDA, 2003; and Claessens and others, 1997).

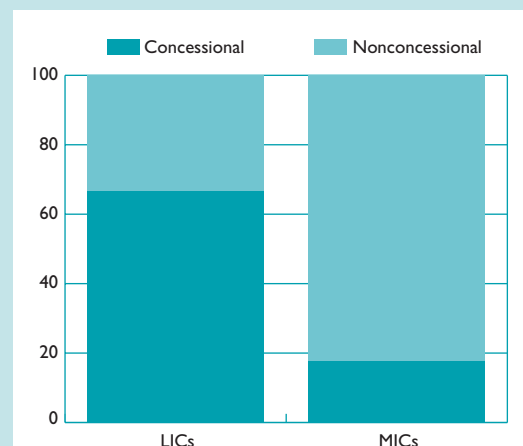
What Is the Low-Income Country Debt Sustainability Framework?

The LIC DSF is built on the original DSA framework for MICs and takes into account the specific characteristics of LICs discussed above. Designed jointly by the IMF and the World Bank, it was introduced in 2005. It has become an important instrument for analyzing debt-related vulnerabilities and guiding the design of policies to help prevent the reemergence of debt distress. The DSF’s design and objectives thus differ from those of the DSAs that are carried out under the HIPC Initiative in several important ways.⁶

⁶DSAs for HIPCs were first requested by the Executive Boards of the World Bank and the IMF in spring 1995, in the context of discussions on means to alleviate high debt burdens. When the HIPC Initiative was adopted in 1996, the HIPC DSA became the key tool for determining a country’s eligibility for, and the amount of, assistance under the Initiative, based on current levels of debt. LIC DSAs under the DSF are forward looking with a view to assessing the risks associated with future debt accumulation.

Figure 3.4. Composition of External Debt, 2000–06

(In percent)



Source: World Bank, *Global Development Finance*.

The main objectives of the DSF are to

- Guide the borrowing decisions of LICs in a way that matches their financing needs with their current and prospective repayment ability, taking into account each country’s circumstances;
- Provide guidance for creditors’ lending and grant-allocation decisions to ensure that resources are provided to LICs on terms that are consistent with both progress toward their development goals and long-term debt sustainability;
- Improve World Bank and IMF assessments and policy advice in these areas; and
- Help detect potential crises early so that preventive action can be taken.

The DSF is built on three pillars: (1) a standardized forward-looking analysis of external and public sector debt and debt-service dynamics under a baseline scenario, alternative scenarios, and standardized stress test scenarios; (2) a debt sustainability assessment based on indicative country-specific debt-burden thresholds for external public debt that depend on the quality of policies and institutions in the country; and (3) recommendations on a borrowing (and lending) strategy to limit the risk of debt distress. The DSF constitutes a standardized analytical framework that allows comparison across countries but is flexible enough to address each country’s specific circumstances. It tries to combine analytical rigor with some degree of flexibility, to avoid a mechanical use of the instrument that would ignore

Box 3.1. Dealing with Debt Crises in Low-Income Countries

In middle-income countries, debt crises have usually been resolved through a mixture of debt relief and domestic adjustment to rebuild confidence. Official creditors can facilitate this process but are not always central to it. In contrast, official creditors have assumed a prominent role in the resolution of debt crises in low-income countries (LICs), reflecting the fact that they hold the largest share and, in many cases, the totality of their debt.

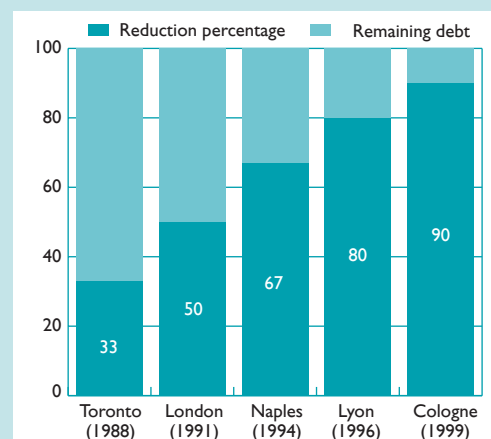
Although they became increasingly concessional over time, the Paris Club's traditional debt-relief mechanisms, aimed at alleviating temporary liquidity problems, were unsuccessful in resolving LICs' payment difficulties in the 1980s and early 1990s (see figure). Moreover, the increasing weight of nonreschedulable multilateral debt reduced the impact of bilateral debt reschedulings. Thus, the perception grew that many LICs were facing a solvency rather than a liquidity problem, and that their ever-growing debt burden acted as a brake on the investment and growth that they needed to restore their long-term payment capacity.

The Heavily Indebted Poor Countries (HIPC) Initiative was launched in 1996 by the IMF and World Bank as a solution to this debt overhang. The Initiative entails coordinated action by the international financial community, including multilateral organizations and bilateral lenders, to reduce the external debt burdens of the most heavily indebted poor countries to sustainable levels. Following a comprehensive review in 1999, a number of modifications were introduced to provide faster, deeper, and broader debt relief and to strengthen the links between debt relief, poverty reduction, and social policies. The HIPC Initiative was followed by the Multilateral Debt Relief Initiative (MDRI), initially proposed by the Group of eight major industrial countries in 2005. The MDRI provides for 100 percent relief on eligible debt from initially three multilateral institutions—the IMF, the International Development Association of the World Bank, and the African Development Fund—to a group of LICs. In 2007, the Inter-American Development Bank also decided to provide MDRI-type debt relief to the five HIPCs in the Western Hemisphere.

The Evian Approach, established in 2003 by the Paris Club for countries that have not benefited from relief

Paris Club Terms in Low-Income Countries¹

(Percentage reduction in the present value of debt)



¹The terms are named after the cities in which Paris Club creditors decided on the new terms.

under the HIPC Initiative, acknowledges that differences between liquidity and solvency problems can be blurred and that flexibility is needed regarding how to address a particular crisis. Under the Evian Approach, non-HIPCs can receive a debt treatment that is tailored to their specific financial circumstances with a view to facilitating an exit treatment.¹ Debt reduction may be considered in exceptional cases, as long as the need is clearly demonstrated (see www.clubdeparis.org/en).

¹An exit treatment is the last rescheduling a country normally gets from the Paris Club. The aim is that the debtor country will not need any further rescheduling and will thus not come back for negotiation to the Paris Club.

relevant specificities and financing circumstances in individual countries.

Although the DSF is built on the same principles as the MIC DSA, there are important differences. Like the framework for MICs, the first pillar of the DSF comprises two main elements: (1) a baseline scenario that articulates the authorities' intended policies, with the main assumptions and parameters clearly laid out, and (2) a series of sensitivity tests applied to the baseline scenario, providing a probabilistic upper bound for the debt dynamics under various assumptions regarding policy variables, macroeconomic developments, and financing costs. But instead

of a five-year projection horizon, the DSF requires a macroeconomic framework that covers 20 years because of the long maturities of LIC debt. Moreover, debt indicators are expressed in PV terms because of the predominance of concessional debt in LICs.

The projected debt paths under the baseline scenario and under alternative scenarios and bound tests are used to determine an external public debt distress risk. The choice of the appropriate thresholds under the DSF is a policy decision that balances the risk of debt distress with the costs of applying tighter constraints on new borrowing that could finance investment. A lower

Box 3.2. The Debt Sustainability Framework Thresholds

Building on the experience of emerging economies, Kraay and Nehru (2004 and 2006) examined episodes of debt distress in low-income countries (LICs). One of their key findings is that countries operating in a weaker institutional and policy environment are more likely to experience debt distress at significantly lower debt ratios. More specifically, using the World Bank's Country Policy and Institutional Assessment (CPIA) index (see below) to measure the quality of policies, Kraay and Nehru show that countries operating in a weak policy environment (25th percentile of the CPIA) have the same risk of distress as do countries with strong policies (75th percentile) at debt ratios that are lower by about 30 percent of GDP, 200 percent of exports, and 100 percent of revenues (including grants). These results were corroborated by IMF staff's empirical analysis (IMF and IDA, 2004a and 2004b).

In developing the Debt Sustainability Framework (DSF) and defining the thresholds, special attention was given to (1) consistency with Kraay and Nehru's empirical findings, (2) coherence in the international community's approach to debt sustainability in LICs, and (3) financing implications of the debt thresholds.¹ In particular, the thresholds

¹Details of the approach can be found in Kraay and Nehru (2004 and 2006) and IMF and IDA (2004a, 2004b, and 2005).

- Take into account the central empirical finding that a country's borrowing capacity depends on the quality of its policies and institutions. Although this finding does not imply specific threshold levels (which are a function of the acceptable risk of debt distress), it makes a strong case for thresholds that vary with the quality of policies.
- Reflect the international community's approach that called for aligning the decision about the appropriate tolerance for debt distress with that implicit in the Heavily Indebted Poor Countries (HIPC) Initiative thresholds. Thus, the current thresholds center the debt-burden thresholds on those applied under the HIPC Initiative.
- Consider the financing implications as they call for higher grant resources but limit the burden on LICs in the absence of a firm commitment by donors to increase grants by significant amounts.

The choice made on the thresholds reflects a policy decision that attempts to balance the risk of debt distress with the costs of applying tighter constraints on new borrowing. Although the thresholds are supported by empirical studies, a mechanistic application of them is not recommended. Analytical and research work as well as postmortem studies with the implementation of the DSF continue to test their validity.

tolerance for debt distress, reflected in more conservative thresholds, involves costs to donors in the form of additional grant resources required to replace loans. Should grants, however, fall short of what is needed to sustain nominal aid flows, LICs bear the costs in the way of forgone development opportunities, including lower financing in pursuit of the MDGs. After the trade-offs were weighed, a more conservative approach was taken, limiting the probability of debt distress to about 20 percent (see IMF and IDA, 2005; and Kraay and Nehru, 2004 and 2006).

The external public debt distress risk is assessed against policy-dependent external debt-burden thresholds (Box 3.2), reflecting the finding that the debt levels that LICs can sustain are influenced by the quality of their policies and institutions (see IMF and IDA, 2004a, 2004b, and 2005; and Kraay and Nehru, 2004 and 2006). In other words, LICs with weaker policies and institutions tend to face repayment problems at lower levels of debt. However, the indicative thresholds are not to be seen as rigid ceilings. Rather, they constitute guideposts for informing the assessment of debt sustainability and of the risk of debt distress.

The quality of policies and institutions is measured by the Country Policy and Institutional Assessment (CPIA) index, compiled annually by the World Bank

(Box 3.3).⁷ The DSF divides countries into three performance categories: strong, medium, and poor.⁸ Table 3.1 shows the associated external debt-burden thresholds. To reduce undesirable uncertainty regarding the country's financing terms from IDA (and possibly other donors) from annual fluctuations in the CPIA, the three-year moving average CPIA score is used to determine a country's policy performance under the DSF.

The DSF allows for an explicit assessment of the country's risk of external public debt distress. Depending on how the country's current and projected external public debt indicators compare with the indicative thresholds under the baseline, alternative scenarios, and stress tests (see Box 3.4), a country can be classified as belonging to one of four groups.

- **Low risk.** All debt indicators are well below relevant country-specific debt-burden thresholds. Stress testing and country-specific alternative scenarios do not result in indicators significantly breaching thresholds. In cases where only one indicator is

⁷The CPIA is published annually at www.worldbank.org.

⁸A rating at or above 3.75 corresponds to strong performance; a rating between 3.25 and 3.75 reflects medium performance; and a rating at or below 3.25 corresponds to poor policy performance.

Box 3.3. What Is the Country Policy and Institutional Assessment?

The Country Policy and Institutional Assessment (CPIA) evaluates the quality of a country’s present policy and institutional framework.¹ “Quality” refers to how conducive that framework is to fostering poverty reduction, sustainable growth, and the effective use of development assistance. The CPIA rates countries against a set of 16 criteria grouped in four clusters: (1) macroeconomic management, (2) structural policies, (3) policies for social inclusion and equity, and (4) public sector management and institutions. The CPIA ratings are used in the International Development Association (IDA) allocation process and several other World Bank activities as well as the Debt Sustainability Framework.

The World Bank initiated country assessments in the late 1970s to help guide the allocation of IDA resources. The CPIA consists of a set of criteria representing the different policy and institutional dimensions of an effective poverty reduction and growth strategy. The criteria have evolved over time, reflecting lessons learned and mirroring the evolution of the development paradigm. In 1998, the criteria were substantially revised: Coverage was

expanded to include governance and social policies, the number of criteria was set at 20 (where it remained until 2004), and the ratings scale was changed from a 5- to a 6-point scale.

To strengthen the comparability of country scores across regions, the ratings process was revised to include the benchmarking step. In 2001, following a thorough review of the CPIA by a World Bank working group that benefited from the conclusions of an Operations Evaluation Department report prepared in the context of an evaluation of the implementation of the IDA10–12 replenishment agreements, further changes were introduced. These changes included establishing a written record, providing detailed guidance for criteria with several sub-components, broadening the set of benchmark countries, revising the content of the criteria, and explicitly defining the rating levels 2, 3, 4, and 5 (previously only the 2 and 5 rating levels were fully defined). A new study on the CPIA methodology is under way with the objective to analyze and review the CPIA system and explore the main uses of country ratings in determining performance-based allocation of IDA resources.

CPIAs are calculated annually for all IDA-eligible countries, including blend countries (countries that are currently eligible for funding from IDA and the International Bank for Reconstruction and Development).

¹For details on the 2006 CPIA exercise, see for example <http://siteresources.worldbank.org/IDA/Resources/CPIA2006Questionnaire.pdf>.

above its benchmark, judgment is needed to determine whether there is a debt sustainability problem or some other issue, such as a data problem.

- **Moderate risk.** Although the baseline scenario does not indicate a breach of thresholds, alternative scenarios or stress tests result in a significant rise in debt-service indicators over the projection period (nearing thresholds) or a breach of debt or debt-service thresholds.

- **High risk.** The baseline scenario indicates a protracted breach of debt or debt-service thresholds but the country does not currently face any payment difficulties. This situation is exacerbated by the alternative scenarios or stress tests.
- **In debt distress.** Current debt and debt-service ratios are in significant or sustained breach of thresholds. The existence of arrears would generally suggest that a country is in debt distress, unless

Table 3.1. Debt Burden Thresholds Under the Debt Sustainability Framework

(Applying to external public debt)

	NPV of Debt in Percent of:			Debt Service in Percent of:	
	Exports	GDP	Revenue	Exports	Revenue
Weak policy	100	30	200	15	25
Medium policy	150	40	250	20	30
Strong policy	200	50	300	25	35

Source: IMF and IDA (2008).

Box 3.4. Alternative Scenarios and Bound Tests in the Debt Sustainability Framework

The debt sustainability analysis (DSA) for a country under the Debt Sustainability Framework (DSF) is founded on a baseline scenario representing the projected macroeconomic framework that is deemed most realistic, taking into account the country’s growth potential and economic policies. The realism of the baseline scenario is tested by assessing the impact of changes to key assumptions in alternative scenarios and in bound tests. Additional country-specific scenarios or bound tests are required when a country has special circumstances that impact debt sustainability.

The external DSA has the following alternative scenarios and bound tests:

- **Two alternative scenarios:** A historical scenario with key variables (real GDP and GDP deflator growth, noninterest current account in percentage of GDP, and non-debt-creating flows) at their historical averages and a scenario with less favorable financing terms.

- **Six bound tests:** Historical averages minus one standard deviation of real GDP (1), exports (2), GDP deflator (3), non-debt-creating flows (4), a combination of (1) through (4), and finally a 30 percent devaluation of the national currency.

The public sector DSA uses the following alternative scenarios and bound tests:

- **Three alternative scenarios:** A historical scenario with key variables (real GDP and the primary balance) at their historical averages, a scenario with the primary balance in the projection period equal to the first year of projection, and a scenario with permanently lower real GDP growth.
- **Five bound tests:** Historical averages minus one standard deviation of real GDP (1) and the primary balance (2), a combination of (1) and (2), a 30 percent devaluation of the national currency, and finally a 10 percentage point of GDP increase in debt-creating flows.

there are other reasons than debt-service burden for not servicing its debt.

The assessment of the risk of debt distress needs to strike a balance between a mechanistic use of this classification and a judgmental approach. There may be cases in which a mechanistic approach would imply an unreasonable rating. These could include, for instance, a marginal and temporary breach of thresholds, or an ability to pay that is not captured but evidenced from the level of foreign exchange reserves, or problems in compiling the relevant CPIA scores. In such cases, the DSF calls for judgment.

The DSF was designed as a practical tool to help detect and measure potential debt-related vulnerabilities. Although, as mentioned above, the DSF cannot by itself determine the optimal pace of borrowing, it has a number of features that make it useful to policymakers (see IMF and IDA, 2006b, Appendix II):

- **Self-regulating.** Stress tests are automatically calibrated to historical economic performance, including GDP growth, export growth, foreign direct investment, financing terms, and other factors relevant for debt sustainability.
- **Operational.** The risk rating has consequences for lending decisions by the largest creditors (e.g., IDA, African Development Bank) to address problems as they are detected; an increasing number of creditors base their financing terms on DSA findings (see Section IV).
- **Regular.** The DSA is updated every year, allowing any incipient problems owing to the pace of

new borrowing or updated economic forecasts to be addressed as they arise.

- **Transparent.** DSAs are produced within the same framework consistently over time, allowing for easy comparisons between deviations of past projections and outcomes. The framework thus gives the opportunity to adjust future projections to align them closer to reality. In addition, DSAs display the main macroeconomic and financing assumptions underlying the debt-ratio trajectories, thereby showing transparently how the risk ratings were determined.

Challenges

DSAs raise a number of challenges, beyond the uncertainties always associated with macroeconomic forecasts and the judgment required in determining the debt distress risk. Appendix II provides an application using the 2008 DSA for Haiti.

The Need for a Realistic Baseline Scenario

The usefulness of a DSA depends on the realism of its underlying assumptions. The baseline scenario therefore plays a pivotal role in the design of a DSA. Realism in this context means a scenario that takes due account of a country’s growth potential and reflects the future path of economic policies that is deemed most realistic.⁹ The

⁹This scenario may not necessarily be consistent with a scenario of high long-term growth. A “best policies” approach, which would assume additional policies to enhance output, export, and fiscal revenue growth, can be constructed as an alternative scenario.

realism of the baseline scenario is tested by assessing the impact of changes to key assumptions in alternative scenarios and by stress testing.

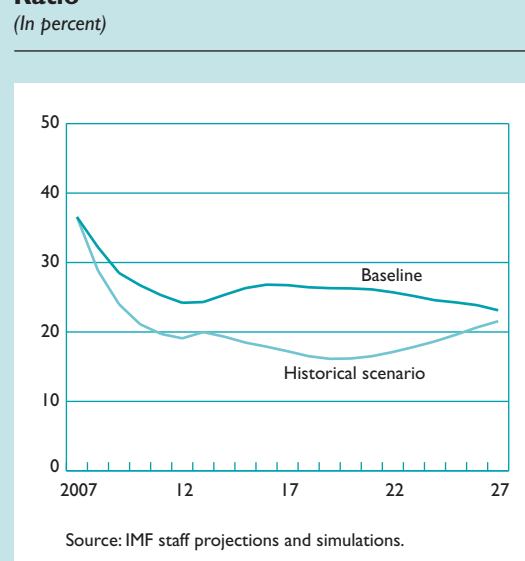
The realism of the assumptions should be tested against historical outcomes. The DSF includes a historical scenario that compares the baseline projections with the debt path that would emerge if key variables remained at their historical averages. In cases where the baseline scenario deviates substantially from the historical scenario, the reasons for such deviations must be substantiated. Plausible reasons include structural breaks, such as the end of civil conflict or a radical change in policy design. For example, as shown in Figure 3.5, historical experience may underestimate future growth prospects under a scaled-up investment program, in the aftermath of the delivery of large debt relief, or with increased access to external finance from a broader range of creditors.

A realistic baseline scenario should not rely on sharp shifts in policies to show an improvement in the debt outlook. An alternative scenario allows the assessment of how much of the improvement in the debt situation depends on policy changes. For instance, a significant improvement in revenue collection, the investment rate, financing mix and terms, or productivity growth would have a positive impact on debt ratios. If the shifts are important, the assessment should take into account how likely these shifts are to be implemented. If a particular country has a history of slow reform implementation, a baseline that relies on significant and timely policy change may not be realistic and would distort the debt sustainability assessment.

A baseline scenario that assumes large up-front borrowing with associated high-growth dividends must be thoroughly substantiated. The main analytical challenge in such “scaling-up scenarios” is to estimate the impact of additional public investment on other macroeconomic variables, such as GDP growth, exports, and public revenues, which are the denominators of the debt indicators. The empirical literature offers some general conclusions, most of which advise against excessive optimism in this regard (Box 3.4 provides an example of a scaling-up scenario) (see for example IMF and IDA, 2006a, 2006b, and 2007; and Berg and others, 2007).

- Prolonged growth accelerations are rare.
- Even if individual projects have high rates of returns, the macroeconomic returns (notably the impact on GDP, government revenues, and exports) tend to be considerably lower than the rates of return of individual projects, because these returns are modulated by factors outside the scope of the project itself.
- The quality of policies and institutions has a large influence on the macroeconomic return of public investment.

Figure 3.5. Present Value of Debt-to-GDP Ratio
(In percent)



- Economic volatility in LICs, including aid volatility and potential shocks, argues for caution in macroeconomic projections over time (over a 20-year period, it would not be prudent to assume that no negative growth shocks would occur).
- Large borrowing—defined as an annual increase in the PV of public external or total public debt of 5 percent of GDP or more—has been found to significantly increase the likelihood of debt distress.

An alternative high-investment, low-growth scenario is therefore useful to assess the implications of a large debt-financed investment program on debt sustainability if only part of the expected growth dividend from the debt-financed investments materializes (see example in Figure 3.6).

Taking into Account Particular Circumstances

The heterogeneity of LICs requires a framework that is flexible enough to incorporate relevant specificities as an input into the debt sustainability analysis. The standardized, rules-based approach at the root of the DSF allows for transparent cross-country comparisons and a more consistent approach to borrowing or lending decisions. However, the DSF balances this discipline with appropriate scope for taking into account important country-specific features in the debt distress risk assessment.

DSAs for LICs receiving significant external private financing should include more extensive vulnerability analyses. Some potential vulnerabilities associated

Figure 3.6. Present Value of Debt-to-Revenue Ratio
(In percent)

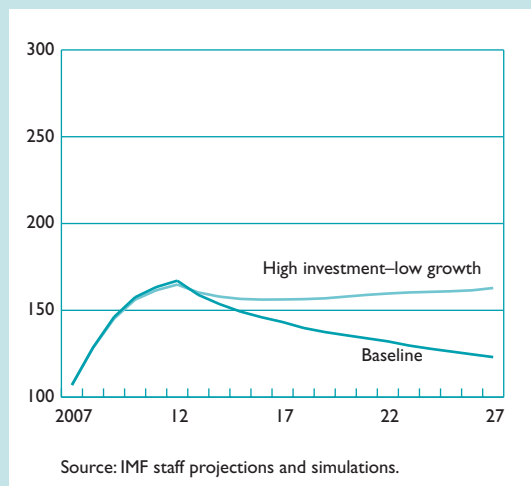
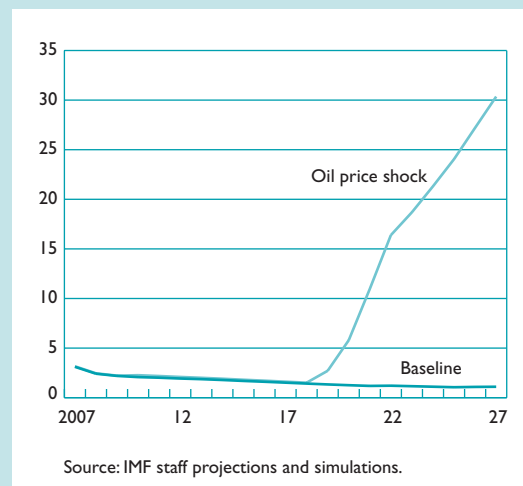


Figure 3.7. Present Value of Debt-to-GDP Ratio
(In percent)



with increasing private capital flows into some LICs may not be captured by the DSF. These vulnerabilities include, for example, abrupt reversals in market sentiment leading to sudden capital outflows; nonstandard financing terms, such as collateralization with future export receipts; weakening medium-term debt sustainability; and secondary balance sheet effects on the domestic financial system as a result of shifts in lending away from lower-yield government securities toward riskier assets, possibly creating contingent public liabilities. Additional indicators not covered by the DSF include the share of index-linked debt, the share of short-term debt, reserve coverage ratios, and financial system soundness indicators, including the capital adequacy ratio, the share of nonperforming loans, and private sector credit growth.

Likewise, the analysis should be adapted for LICs that have accumulated large financial assets. The DSF focuses on a country's (or government's) liabilities, not its assets. These assets, such as large foreign assets accumulated in the wake of a commodity price boom or a windfall in aid, are, however, an important factor in the overall sustainability assessment. In countries where the financial asset position is significant (oil-exporting countries come to mind), the public DSA can be conducted on a net debt rather than a gross debt basis.

Country-specific scenarios or stress tests can also be added to capture idiosyncratic vulnerabilities. A country whose exports are highly concentrated on one commodity may want to explore at which price its debt outlook would worsen significantly. A country dependent on concessional aid may wish to assess the impact

of a lower grant element on its debt sustainability outlook. Such scenarios provide important insights on the actual debt distress risk as well as relevant criteria for borrowing decisions in a given country. The country example shown in Figure 3.7 assumes a significant drop in oil prices over the medium term. Initially the forgone export receipts can be compensated for by drawing down reserves (from a very comfortable position). At some point, however, the level of reserves will become too low and the country will be forced to borrow, which will rapidly increase debt ratios.

The Role of Domestic Debt

Domestic debt is sizable in many LICs and therefore poses risks to fiscal sustainability. Regardless of the size of public domestic debt, all LIC DSAs include an analysis of the sustainability of total public debt (domestic and external). Public domestic debt typically involves higher costs and shorter maturities. Empirical analysis shows that rising domestic debt increases the likelihood of external debt distress.¹⁰ Public sector DSAs therefore play a critical role in helping detect and address any emerging risk (see IMF and IDA, 2006b and 2007).

¹⁰Empirical research presented in IMF and IDA (2006a) suggests that domestic debt (as a percentage of GDP) had an estimated effect on the likelihood of external debt distress similar in magnitude to the effect of external debt relative to GDP. More details on the empirical analysis, the coverage and definition of domestic debt, and the integration of domestic debt in the DSF are presented in IMF and IDA (2006a, Section IIID) and IMF and IDA (2008, Section IIIB).

Box 3.5. Defining Domestic Public Debt in Low-Income Countries

In line with general statistical norms, domestic public debt is defined on the basis of the residency criterion as the sum of public obligations in the hands of domestic residents. Thus, locally issued securities bought by foreign investors are part of external debt, whereas international bonds held by local residents are part of domestic debt, irrespective of the currency in which they are issued. Accurate tracking of domestic and external obligations requires good information on primary- and secondary-market transactions between residents and nonresidents.

Foreign purchase of low-income countries' domestically issued securities was, until recently, a rare event. However, as financial globalization increases, market development progresses, and macroeconomic stability takes hold, investor interest in locally issued debt securities is rising. Oftentimes, because of a lack of information on secondary market transactions, this phenomenon cannot be captured and domestic debt is simply defined as domestically issued debt.

The following considerations guide the coverage and definition of domestic debt in debt sustainability analyses (DSAs):

- As public domestic debt is defined on a residency basis, it may include foreign-currency-denominated obligations.
- Domestic debt data seek to cover the liabilities of the broader public sector, including the central government, local governments, government-owned enterprises, and the central bank. However, in most cases, data limitations restrict the coverage to just the central or general government. The DSA should flag any problems in this area and report on steps taken to improve data coverage.
- To the extent possible, public sector contingent liabilities, including those arising from public-private partnerships and weaknesses in the financial sector, are taken into account.

However, operational as well as analytical limitations do not allow the use of indicative thresholds as guideposts to assess the risk of public debt distress (see IMF and IDA, 2006b). Simply adding domestic to external debt also raises data issues. The coverage of domestic debt differs across countries, making standardized comparisons of debt-to-GDP ratios across countries problematic (Box 3.5). The quality of domestic debt data is generally lower than for external debt and these data are not fully available for all countries. In addition, the inclusion of such debt into the classification system may create adverse incentives for the transparent recording of domestic debt in some cases.¹¹

The public sector DSA assesses public domestic debt risks, the evolution of the primary balance, and overall fiscal sustainability.

- **Domestic debt risks.** Domestic debt may entail significant vulnerabilities when its stock is high (i.e., above 15–20 percent of GDP) and, irrespective of its level, if it is growing rapidly. In both cases, the DSA will analyze the specific circum-

stances behind the high/rising domestic debt stock (e.g., general budget financing or assumption of contingent liabilities), including its creditor base, likely duration, financing burden, and medium-term implications.

- **Primary balance.** The public sector DSA is a key tool to assess whether the fiscal stance is consistent with debt sustainability. It assesses the impact on debt sustainability of the projected path for the primary fiscal balance. It also tests the vulnerability of this projection by analyzing the impact of keeping the primary fiscal balance at current levels, and provides a measure of the primary fiscal balance that would stabilize the debt-to-GDP ratio.
- **Overall fiscal sustainability.** The level and the evolution of domestic public debt and debt service clearly matter for overall fiscal sustainability. Although no indicative threshold has been associated with a level of public debt distress risk, there are cases in which the weight, trend, and composition of public debt entail risks that are sizable, and in addition to those identified in the external DSA. The public sector DSA will discuss how these factors affect the assessment of the overall debt sustainability risks of the public sector, but will not modify on that basis the classification of the risk of external public debt distress, which is guided only by the assessment of external public debt in the external DSA.

¹¹Reinhart and Rogoff (2008) in a paper on “The Forgotten History of Domestic Debt” provide a new data set on domestic public debt for 64 countries over a period of two centuries. They conclude that researchers need to revisit the empirical literature on the sustainability of external public debt and on governments' incentive to engage in high inflation and hyperinflation, taking into account the new data on domestic debt. Their data set, however, covers only a limited number of LICs.

IV The Use of the Debt Sustainability Framework by Borrowers and Lenders

To make it a fully effective tool, borrowers, donors, and lenders must act in broad harmony with the DSF. The DSF helps inform borrowers about the amount and types of financing that are consistent with long-term debt sustainability and progress toward achieving their development objectives. It also provides guidance to donors and lenders on lending and grant-allocation decisions that are consistent with these goals. The DSF can thus help minimize the risk of debt crises and promote the use of scarce concessional resources by the countries that need them most. Its effectiveness in achieving these objectives increases with the number of borrowers, donors, and lenders using it.

The Debt Sustainability Framework and Information Sharing

Information availability is crucial for sound borrowing and lending decisions. In this regard, the introduction of the DSF has improved access, timeliness, comparability, and quality of information on the debt situation of LICs; in turn, improved information availability has increased borrowers', donors', and lenders' capacity to make informed decisions.

The DSF provides up-to-date information on the debt situation in LICs. Regular updates allow stakeholders to base their decisions on the most recent developments and help detect emerging vulnerabilities at an early stage. For IDA-only countries, the IMF and the World Bank complete a joint LIC DSA annually. For countries that are eligible for the Poverty Reduction and Growth Facility (PRGF) but not IDA-only, the IMF generally completes an LIC DSA, unless the country has market access, in which case a DSA for market-access countries (MIC DSA) is carried out.

Country-specific information on debt sustainability is easily accessible. The IMF and the World Bank have established dedicated webpages within their external websites in order to give the general public easy access to information on their work on debt-related issues in LICs.¹²

¹²See www.imf.org/DSA and www.worldbank.org/debt.

The webpages include links to DSA reports by country¹³ and also provide a link to a dedicated mailbox where interested parties can get answers to more specific questions on debt-related issues in LICs.

DSAs provide an indication of the terms and volumes of financing that a country should receive in order for its debt to remain sustainable. The analysis is tailored to the specific circumstances of the country, such as its growth prospects and the authorities' reform strategy and development objectives. It considers the country's financing need and its current and prospective ability to service its debt. Applying the criteria for evaluating the risk of debt distress in an evenhanded manner across countries ensures that DSAs can serve as a basis for the allocation of concessional resources across countries.

Effective information sharing nevertheless hinges on further efforts from borrowers, donors, and lenders. Debtor-reported information, which is the main source of data for DSAs, still suffers from weaknesses (including reliability, comprehensiveness, and timeliness issues) in many LICs. On the side of donors and lenders, challenges relate to the rapidly expanding number of creditors to LICs and the lack of information on associated amounts and terms of financing. Information sharing between lenders and donors has typically taken place in forums such as the Organization for Economic Cooperation and Development (OECD) and the Paris Club, but the increased financing flows to LICs from nontraditional creditors that do not take part in these forums complicate information sharing.

The Debt Sustainability Framework and Its Use by Borrowers

The objective of the DSF is to identify debt-related vulnerabilities so that countries can adequately take these into account when formulating their policies. The framework provides a basis for assessing the risks associated with a country's current debt situation and the

¹³Publication of DSAs on the IMF's website is subject to the country authorities' consent.

sustainability of its policies. It is also a tool to evaluate potential implications for medium- and long-term sustainability of different policy choices, and can help identify policies that are consistent with maintaining or achieving debt sustainability. The DSF can be used actively by governments in their communication with donors, lenders, and other stakeholders.

The DSF can be helpful in analyzing the long-term impact of alternative financing options. It can be used effectively to analyze scenarios of scaled-up aid or other external financing, particularly to provide guidance on appropriate terms for new financing (see Box 4.1). The DSF can also help determine an appropriate pace of debt reaccumulation for countries that have received debt relief and are faced with borrowing space.

The DSF can help LICs in developing their own medium-term debt strategy (MTDS). An MTDS helps to operationalize a country's debt management objectives by outlining cost-risk trade-offs in meeting the government's financing needs and payment obligations. It should seek to address the vulnerabilities uncovered in the DSA and should therefore be closely linked to the DSA. The IMF and the World Bank are involved in capacity building to enhance the ability of governments in LICs to develop and implement effective MTDSs.

The Debt Sustainability Framework and Its Use by Donors and Lenders

Sustainable lending practices are important to safeguard debt sustainability in LICs. Sustainable lending supports a borrowing country's economic and social progress without endangering its financial future and long-term development prospects. In practice, such lending should follow a number of broad principles: It should foster sustainable development, preserve debt sustainability, and support good governance and transparency. Although debt relief has significantly reduced debt ratios in many LICs, many other economic circumstances remain largely unchanged and budgetary, project, and debt management capacities are generally still weak. Most outlays related to achieving development objectives do not, by nature, generate sufficient cash flow to the government in the near term to service nonconcessional debt.

The DSF is a natural starting point for developing sustainable lending practices. The coordination of creditors around the DSF can help ensure that each creditor's financing is provided on terms that are consistent with maintaining debt sustainability. At the same time, coordination gives confidence to each creditor that other creditors will not provide financing on terms that jeopardize debt sustainability and hence undercut their own efforts to prevent payments difficulties. Although the DSF can help promote these good practices, donors

and lenders face operational difficulties in implementing information sharing and coordination in practice, and must also take into consideration other constraints when making financing decisions.

The DSF is used by an increasing number of multilateral creditors. Multilateral creditors represent a large share of external financing to LIC governments. IDA started to use DSAs' risk of debt distress as a criterion for grant eligibility in mid-2005 (see Box 4.2). Regional development banks, such as the Asian Development Bank, the African Development Bank, the Inter-American Development Bank, and the International Fund for Agricultural Development, have adapted similar systems for grant and lending decisions.

Bilateral official creditors also use the DSF as an input for financing decisions, but coordination among these creditors faces challenges. Bilateral official creditors include official development agencies and export credit agencies, and represent a diverse group of creditors with respect to traditions for coordination, policy objectives, and investment strategies. The Paris Club relies on DSAs in the context of the debt restructurings under the Evian Approach for non-HIPCs. Some initiatives for coordination have succeeded. In January 2008, OECD member countries adopted a set of principles and guidelines designed to ensure that loans supported by their export credit agencies are in line with sustainable development objectives (see Box 4.3). Broader coordination and information sharing will require additional outreach efforts from interested parties, including the IMF and the World Bank.

DSAs inform IMF analysis and policy advice. They play a critical role in IMF assessments of macroeconomic stability, long-term sustainability of fiscal policy, and overall debt sustainability, both as part of the IMF's surveillance activities and in the context of IMF-supported programs. DSAs are important for program design, including when assessing the appropriate debt limits and concessionality. Non-concessional borrowing is accommodated in several programs, based on financing need, debt sustainability considerations, and other country-specific circumstances.^{14,15} DSAs are furthermore taken into account to determine access to IMF financing.

¹⁴Some IMF-supported programs also include targets related explicitly to the PV of external debt, as defined in the DSF. Their use is generally limited to countries where debt sustainability is a concern, and is intended to strengthen the control over excessive borrowing. Consequently, the targets have so far been used in countries where external debt was already high at the approval of the program (Central African Republic and The Gambia) or was expected to become high reflecting the authorities' plans for stepping up public investment (Guyana, Rwanda, and Tajikistan).

¹⁵As of mid-2008, about one-third of PRGF arrangements and policy support instruments included a nonzero limit on nonconcessional borrowing.

Box 4.1. The Debt Sustainability Framework and the Scaling-Up of External Financing

The Debt Sustainability Framework can help countries assess the impact of aid scaling-up on debt sustainability. Most low-income countries have substantial external financing needs to meet their development objectives. Concessional resources for scaling-up are scarce and have so far fallen short of donors’ commitments to help countries achieve the Millennium Development Goals. At the same time, new sources of external financing, often

on less concessional terms, are increasingly becoming available. The debt sustainability analysis (DSA) can help assess the impact of different financing terms on the long-term sustainability of the scaling-up strategy.

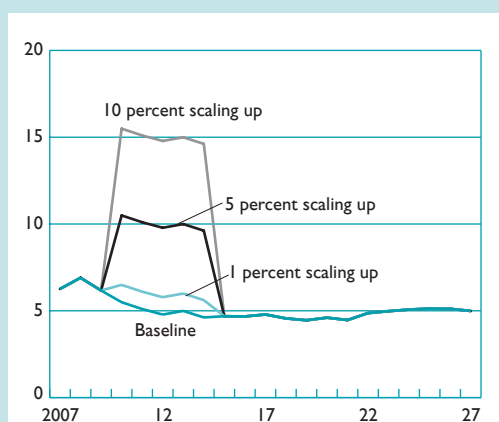
The analysis of a scaling-up scenario needs to build on a full-fledged macroeconomic framework. The design of a macroeconomic framework for analyzing scaled-up aid is not a straightforward exercise and needs to build on hypotheses about absorptive capacity, investment returns, real exchange rate and competitiveness developments, and expected monetary and fiscal policy response (see Berg and others, 2007). A scaling-up model would typically cast a macroeconomic model in a medium- and long-term horizon to analyze the impact on growth and development of scaled-up aid, taking into account these hypotheses. The DSA can complement the scaling-up model by assessing the impact on debt sustainability.

The need for additional external financing, as well as the impact on debt sustainability, depends on country circumstances. Using an illustrative country example, we consider the impact of scaling up aid over a five-year period. We assume that the baseline scenario is based on the current macroeconomic framework of the government, but that it fails to meet the development objectives, triggering the need to consider alternative scenarios. Three different scaling-up scenarios are considered (Figures A and B):

- A small scaling-up with aid inflows increasing by 1 percent of GDP per year over 2010–14, equivalent to a total increase of 5 percent of GDP over the five-year period.
- A moderate scaling-up with aid inflows increasing by 5 percent of GDP per year over 2010–14, bringing the cumulative increase to 25 percent of GDP.

A. Aid Inflows

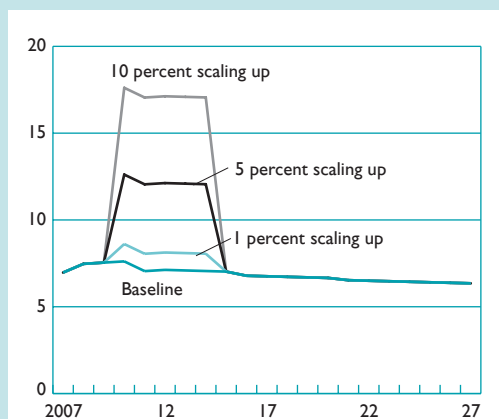
(In percent of GDP)



Source: IMF staff projections and simulations.

B. Public Capital Expenditure

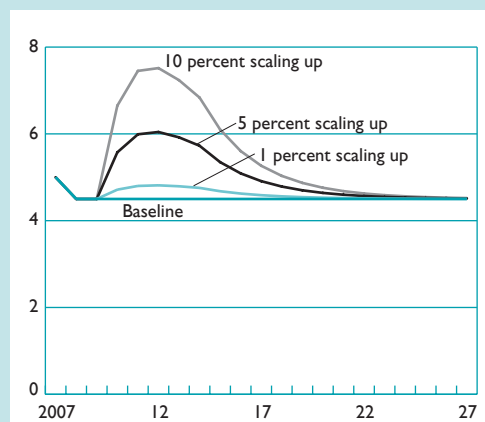
(In percent of GDP)



Source: IMF staff projections and simulations.

C. Real GDP Growth

(In percent)



Source: IMF staff projections and simulations.

- A large scaling-up with aid inflows increasing by 10 percent of GDP per year over 2010–14, totaling 50 percent of GDP over the five-year period.

The additional aid is assumed to be spent mainly on public investment, aimed at improving living conditions and infrastructure in the long term. For the purpose of this illustrative example, the impact of investment on growth is modeled on cross-country empirical evidence, assuming a rate of return on investment starting at 50 percent and taking into account declining marginal returns to investment (Figure C).¹ It is assumed that exports are highly responsive to an improvement in infrastructure, so that the impact of exports is equivalent to the growth impact, implying a constant exports-to-GDP ratio across the scenarios (Figure D).² In general, macroeconomic assumptions in scaling-up scenarios should be consistent with economic theory and empirical evidence, but at the same time adapted to country-specific circumstances.

The impact on debt sustainability depends on the financing terms. Consider the three following alternative financing strategies for each of the scaling-up scenarios for illustrative purposes:

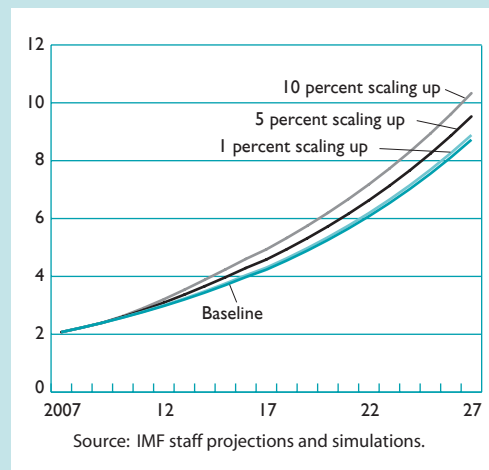
- A scaling-up that is fully financed by grants leaves the debt unchanged but increases the repayment capacity.

¹The real rate of return is assumed to start at 50 percent when aid is zero and decline as aid increases. See Gupta, Powell, and Yang (2006).

²The illustrative example here is simplistic; a full-fledged scaling-up scenario would be based on a general equilibrium model, with feedback of scaled-up aid and investments on monetary and external sector variables, including inflation, the real exchange rate, and the current account. See Berg and others (2007) for a comprehensive approach to scaling-up scenarios.

D. Exports of Goods and Services

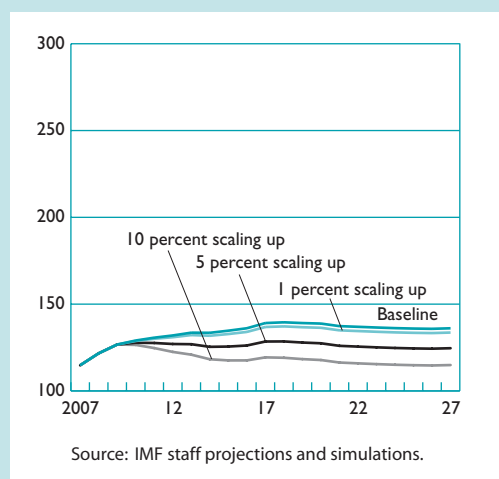
(In billions of U.S. dollars)



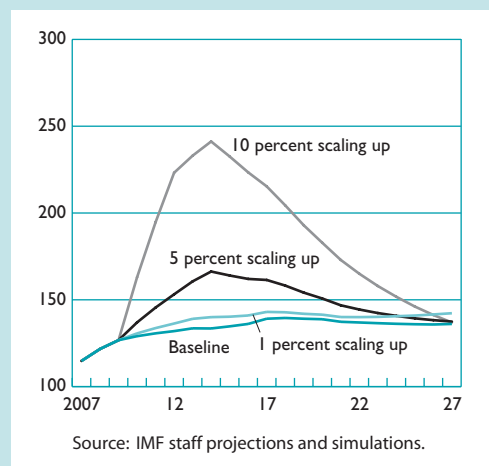
Therefore the present value (PV) of debt to exports is decreasing with the size of the scaling-up (Figure E).

- A scaling-up that is financed by a mix of grants (50 percent) and concessional loans (50 percent) with a grant element of 40 percent leads to an increase in the PV of the debt-to-exports ratio, and can lead to a breach of thresholds depending on the size of the scaling-up and the country circumstances (Figure F).

E. Present Value of External Debt to Exports: 100 Percent Grant Financing

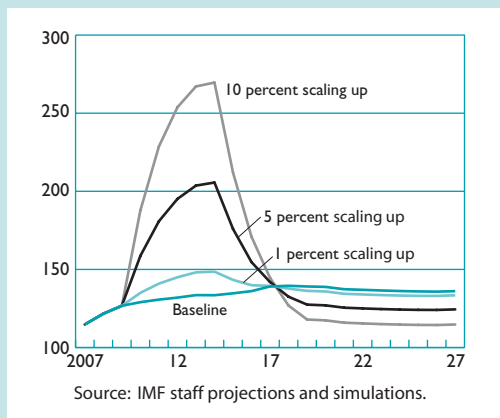


F. Present Value of External Debt to Exports: Mix of Grant and Concessional Financing



Box 4.1 (concluded)

G. Present Value of External Debt to Exports: 100 Percent Commercial Financing



- A scaling-up that is financed uniquely on commercial terms can lead to a large increase in the PV of debt in the short and medium term. A large scaling-up on commercial terms can therefore create debt-servicing problems (Figure G).³

The results indicate that the impact of debt sustainability is highly sensitive to the financing of the scaling-up. For the illustrative example, a small scaling-up based on a mix of grants and concessional financing does not pose considerable threats to debt sustainability, but as the scaling-up gets larger, the risk increases even with concessional financing. Even small scaling-up of expenditure based on commercial borrowing raises issues for debt sustainability.

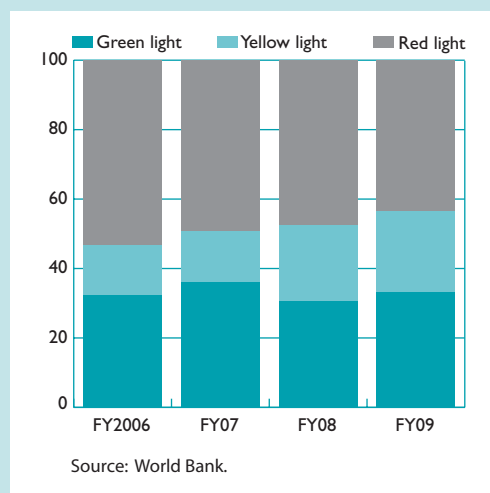
³The result that the debt ratio is lower with commercial borrowing than in the baseline in the long run occurs because increased investment boosts exports in the long term, whereas it is assumed that commercial borrowing has a short maturity and hence is paid back within 10 years. Note that the two scenarios imply different net resource flows.

Box 4.2. The Debt Sustainability Framework and the International Development Association’s “Traffic Light” System

The International Development Association’s (IDA) traffic light system was introduced as part of the new framework for IDA grants under the IDA14 Replenishment agreement in mid-2005. The objective was to ensure that IDA’s terms of financing for IDA-only countries are consistent with each country’s risk of debt distress. Under IDA13, the overall grant percentage was negotiated and then allocated according to multiple criteria for grant eligibility. Under the IDA14 and IDA15 frameworks, the only grant eligibility criterion is a country’s risk of external debt distress, assessed on the basis of the Debt Sustainability Framework (DSF), where available, and historic debt ratios if a DSF risk rating is not available. The development of the DSF and increased availability of the DSF ratings facilitated the evolution of the new grant-eligibility framework that could take into account emerging vulnerabilities based on objective, comparable, and up-to-date DSAs.

Under the IDA14 and IDA15 grant eligibility frameworks, the risk ratings are translated into traffic lights, with a given implication for grant allocation (see figure). The traffic lights are assigned once a year, at the time of the annual IDA allocation process, which determines country allocations and financing terms for the following fiscal year (starting on July 1). Debt sustainability analyses that take place after end-June would be reflected in the IDA traffic light in the following fiscal year. A country that is considered to be “in debt distress” or at a high risk of debt distress according to the DSF is assigned a red traffic light (shown in gray in the figure) and receives 100 percent of its IDA allocation in the form of grants. A moderate risk of debt distress translates into a yellow light (shown in light blue in the figure) and the country receives 50 percent of its IDA allocation in the form of grants and 50 percent in the form of credits. A country with a low risk of debt distress is assigned

Distribution of IDA Traffic Lights
(In percent of total IDA-only countries; FY2006–09)



a green light (shown in turquoise in the figure) and receives only IDA credits (the terms of IDA credits are highly concessional with a grant element of about 60 percent). To address moral hazard concerns, the framework applies the 20 percent discount on grants. As a result, the volume of available financing is reduced by 10 percent for yellow-light countries and by 20 percent for red-light countries.

Box 4.3. Export Credit Agencies and Sustainable Lending Practices

Organization of Economic Cooperation and Development export credit agencies have traditionally coordinated their actions through the Working Group on Export Credits and Credit Guarantees (ECG). Their current exposure to low-income countries (LICs) is small as a share of their total portfolio, particularly in the wake of debt-relief operations in which they have participated. However, like other creditors, they show renewed interest in lending to some LICs. Mindful of the risks of uncoordinated and indiscriminate lending to LICs, ECG members agreed in January 2008 on a set of principles and guidelines for sustainable lending to LICs (see OECD, 2008):

- ECG members will observe any applicable minimum concessionality requirement to the IMF and to the International Development Association (IDA). As a result, export credit agencies will provide support for nonconcessional credits only when doing so continues

to allow LICs to continue to meet the relevant concessionality requirement.

- For those IDA-only countries without concessionality requirements to the IMF and to the IDA, ECG members should take into account the results of the last IMF–World Bank debt sustainability analysis when providing official export credits.
- For larger transactions with a repayment term of two years or greater, ECG members will seek assurances from government authorities in the buyer country that the transaction is in line with the country’s agreed borrowing and development plans.

ECG members also agreed to continue sharing information among themselves and with the IMF and the World Bank on officially supported export credits provided to the countries subject to the principles and guidelines.

V Concluding Remarks

History has shown that debt sustainability matters for sustained development. LICs have struggled with large external debts and destabilizing macro-economic outcomes, and ultimately development has been constrained. Now many LICs' debt burdens have been reduced as a result of debt relief, raising new challenges. As described above, the DSF has been designed to help guide countries and donors in mobilizing resources to finance LICs' development needs while reducing the chances of an excessive buildup of debt.

The financial landscape has and will continue to change. With the menu of financing options expanding and its composition changing, LICs face an array of challenges the DSF can help address. The DSF can help guide the borrowing decisions of LICs in a way that matches their financing needs with their current and prospective repayment ability, provide guidance for creditors' lending and grant-allocation decisions to ensure that resources are provided to LICs on terms that are consistent with both progress toward their development goals and long-term debt sustainability, improve World Bank and IMF assessments and policy advice in these areas, and help detect potential crises early so that preventive action can be taken.

The DSF facilitates information sharing, can serve as a coordinating device, and can help assess alternative borrowing strategies. The introduction of the DSF has improved access to information and emphasis on the debt situation in LICs, hence increasing borrowers', donors', and lenders' capacity to make informed decisions, ultimately reducing the risk of renewed debt problems. For most LICs, concessional flows will remain the most appropriate source of external financing for some time to come. But some LICs will develop faster and become more mature market economies. Nonconcessional financing then will play a more prominent role given the scarcity of concessional resources or a country's desire to tap international capital markets. The DSF is well placed to guide such decisions by showing the impact of such borrowing on overall debt sustainability.

Nonetheless, the DSF does not provide insurance against future debt difficulties. It should not be misconstrued as the silver bullet solution to future debt problems. Despite the framework's detailed analysis and its built-in safeguards, it rests on assumptions and a fair amount of judgment. In a nutshell, the DSF is not the only possible answer to the question of LIC's default risk, but so far LIC DSAs offer the most detailed analysis in the public domain.

Appendix I Glossary of Questions and Answers

What Is the Present Value of Debt?

The present value (*PV*) is the discounted sum of all future principal and interest ($a_t + i_t$) at a given discount rate (β).

$$PV_t = \sum_{t=1}^n (a_t + i_t)(1 + \beta)^{-(t-1)}.$$

If the discount rate and the contractual interest rate of the debt are the same, then the PV is equal to (or is very close to) the nominal value, whereas if the contractual interest rate of the debt is lower than the discount rate, the PV of the debt is lower than the nominal value. The interest rate is not the only means to grant concessionality; other methods include the grace period, the frequency of payments, and the maturity. If debt is concessional, its PV is always lower than its nominal value.

The PV of debt is a more relevant indicator of the debt burden of low-income countries (LICs): PVs take into account the concessionality of debt and allow for a slower pace for the contribution of debt-creating flows to output and export growth.

In the Debt Sustainability Framework (DSF), automatic output tables and graphs display trajectories of debt ratios with PVs and the external debt distress thresholds are based on the PVs of debt. When the DSF was developed, a uniform 5 percent discount rate for the U.S. dollar was applied to avoid frequent changes in the discount rate on the PVs. It will be adjusted whenever it deviates from the U.S. dollar CIRR (commercial interest reference rate; six-month average) by at least 100 basis points for a consecutive period of six months. This method strikes a balance between the desire to insulate PV calculations from temporary noise and the desire to avoid de-linking it entirely from long-term market trends. Any changes to the discount rate will be reflected in the most recent version of the template, which will be posted on the external website of the IMF (www.imf.org/DSA). The use of one discount rate for all external loans implies the need for explicit exchange rate projections to convert the debt service on existing debt into U.S. dollars.

What Is a Grant Element?

The grant element is a measure of the concessionality of a loan, calculated as the difference between the face value of the loan and the sum of discounted future debt-service payments to be made by the borrower, expressed as a percentage of the face value of the loan. Assuming that the loan amount is fully disbursed and that there are no fees other than interest payments, the equation of the grant element (*GE*) is the following:

$$GE = \frac{(\text{face value} - PV)}{\text{face value}}.$$

The implicit assumptions made in the DSF template on the grant element are critical because they affect the PV of external debt and thus the debt sustainability analysis (DSA).

Why Is It Challenging to Maintain Long-Term External Debt Sustainability for a Number of Countries?

To understand the challenges, one has to grasp the linkages between the key determinants of external indebtedness. The sustainability of a country's external debt position depends on three main factors and on their development over time: (1) the existing stock of debt outstanding at a given period, (2) the prospective volume and terms of new external borrowing, and (3) the prospective repayment capacity, which among other things is related to the prospects for GDP and export growth. The interaction of these different factors is called the debt dynamics and is reviewed in more detail below. The DSF template offers the possibility to regularly run DSAs to ensure that the past best estimate of future repayment capacity remains in line with projected debt service due, and to derive the appropriate terms of new lending guided by the growth prospects and the quality of a country's policies and institutions.

What Are the External Debt Dynamics in Low-Income Countries?

Reviewing the details of the basic debt dynamics equation helps one understand better the concept of debt sustainability. The equation is derived from the balance of payments identity with all variables expressed in U.S. dollar terms:

$$D_t = (1 + i_t)D_{t-1} + TD_t - TR_t - FDI_t + \Delta R_t, \quad (1)$$

where D_t = nominal debt stock at the end of the period t ;

i_t = average effective interest rate in period t
(= interest payments in period t divided by the debt stock in the previous period);

TD_t = deficit in the trade and services account;

TR_t = sum of official grants and current transfers;

FDI_t = net non-debt-creating capital inflows; and

ΔR_t = change in official reserves and other foreign assets.

Thus, the gross external debt of a country increases ($D_t - D_{t-1} > 0$) if its current account deficit ($TD_t + i_t D_{t-1} - TR_t > 0$) plus any reserve accumulation ($\Delta R_t > 0$) exceeds the level of net non-debt-creating inflows (FDI_t).

Given the concessionality of loans granted to LICs (see above for details on the concepts of concessionality and grant element), the present value of debt (PV_t) is a more relevant indicator of indebtedness than is the nominal debt stock. Using the concept of the grant element (GE_t), Equation (1) can be rewritten:

$$GE_t = \frac{(D_t - PV_t)}{D_t} \text{ thus } D_t = \frac{PV_t}{(1 - GE_t)}. \quad (2)$$

Substituting for the nominal value of debt, equation (1) yields:

$$\begin{aligned} \frac{PV_t}{(1 - GE_t)} &= (1 + i_t) \frac{PV_{t-1}}{(1 - GE_{t-1})} \\ &+ TD_t - TR_t - FDI_t + \Delta R_t. \end{aligned} \quad (3)$$

Multiplying the above equation by $(1 - GE_t)/X_t$, where X_t denotes the dollar value of exports in period t , and ε_t the growth rate of exports, such as $X_t = (1 + \varepsilon_t)X_{t-1}$, leads to the following equation for the PV of debt-to-export ratio (which is one of the most relevant ratios for LICs) in period t :

$$\begin{aligned} \frac{PV_t}{X_t} - \frac{(1 + i_t)}{(1 + \varepsilon_t)} \frac{PV_{t-1}}{X_{t-1}} &= \frac{(1 - GE_t)}{(1 - GE_{t-1})} \frac{PV_{t-1}}{X_{t-1}} + \frac{(1 - GE_t)}{X_t} * \\ &(TD_t - TR_t - FDI_t + \Delta R_t). \end{aligned} \quad (4)$$

If one assumes, for simplicity, that the grant element remains unchanged between periods $t-1$ and t , and denotes in lowercase letters ratios in percent of GDP (e.g., $x_t = (x_t/GDP_t)$), equation (4) can be transformed into the following expression for the change in the present value of debt-to-export ratio:

$$\begin{aligned} \frac{PV_t}{X_t} - \frac{PV_{t-1}}{X_{t-1}} &= \frac{(i_t - \varepsilon_t)}{(1 + \varepsilon_t)} \frac{PV_{t-1}}{X_{t-1}} \\ &+ \frac{(1 - GE_t)}{X_t} (td_t - tr_t - fdi_t + \Delta r_t). \end{aligned} \quad (5)$$

Equation (5) breaks down changes in the PV of debt-to-exports ratio into three main components:

- The *external financing gap* ($td_t - tr_t - fdi_t + \Delta r_t$) is the factor that captures most directly the tension between debt sustainability and new financing. A positive gap—defined as a deficit in the trade and service account (td_t) that is not financed by grants and other current transfers (tr_t), non-debt-creating inflows (fdi_t), or a reduction in foreign assets, including reserves (Δr_t)—adds to a country’s external debt.
- The multiplier determines the impact of a given financing gap, expressed in percent of GDP, on the PV of debt-to-export ratio. It is derived by dividing the gap by the exports-to-GDP ratio (x_t) and multiplying by $(1 - GE_t)$ —where (GE_t) is the average grant element—to adjust for concessional financing. Both low export ratios and small grant elements magnify the effect of the financing gap on the debt ratio.
- The endogenous debt dynamic describes the changes in the debt ratio that occur independently from new financing. They result from the difference between the (concessional) interest rate (i_t) and the growth rate of exports (ε_t) in the denominator of the debt ratio. The larger the initial debt ratio, the stronger the endogenous effect, which is beneficial in “normal” times, when export growth exceeds the concessional interest rate, but works in the opposite direction—exacerbating an already high debt ratio—when export growth is very low or negative.

In the DSF template, the external debt dynamics are presented in the output tables. To analyze the output tables in the template, the user must understand the different components of the dynamics presented above.

How Do Public Debt Dynamics Work?

To be in a position to fully understand the analytical underpinnings of debt sustainability and analyze the results presented in the DSF template, one must look at how the public debt dynamics are shaped by fiscal policy.

New debt is created when total expenditure (primary and interest) in a single year exceeds tax revenue. The first identity of the one period new public borrowing (B_t) requirement is

$$B_t = PE_t + IP_t - T_t, \quad (6)$$

where PE_t , IP_t , and T_t denote public expenditure, interest payments on public debt, and taxes, respectively. Assuming D_t is the outstanding stock-of-debt and i the nominal interest rate, then the above equation can be rewritten as

$$B_t = PE_t + i_t D_t - T_t. \quad (7)$$

Equation (7) shows that an increase in debt, in one period, has implications for the government's budgetary policy in the following periods. For the debt obligations to be discharged, either spending must be reduced in the future or taxes must increase. But public primary expenditure cannot be reduced to zero and taxes cannot rise forever. Thus, by implication, there is a prudent limit on the level of the debt stock in relation to the productive capacity of the economy.

One of the approaches to fiscal sustainability is to define a sustainable fiscal stance as one that stabilizes the debt-to-GDP ratio. It would mean that the level of the deficit to be financed by issuing new debt in each period should equal the existing stock of public debt multiplied by the rate of growth of nominal GDP (y_t). This derived primary gap may be very different from the actual primary balance of the country. The second identity is

$$B_t = D_t y_t. \quad (8)$$

By combining Equations (7) and (8), we get the long-run budget constraint:

$$D_t y_t = PE_t - T_t + i_t D_t \text{ or } (i_t - y_t) D_t = T_t - PE_t \quad (9)$$

$$(r_t - g_t) D_t = T_t - PE_t, \quad (10)$$

where r_t and g_t represent real interest rate and economic growth rates, respectively. Using the latest equation, one could say that the change in public debt to GDP (d_t) can be represented as follows:

$$\Delta d_t = \frac{\text{primary deficit}_t}{GDP_t} + (r_t - g_t) d_t. \quad (11)$$

The set of equations above is very important because it provides guidance on whether the current levels of taxes and public expenditure in a given country can be sustained in the future with a certain level constraint on the debt-to-GDP ratio. More specifically:

- If the real economic growth rate exceeds the real interest rate, then taxes can be lowered relative to primary expenditure, or existing debt can be refinanced with more debt (without the need for raising taxes) or up to a certain level, and primary deficits can be sustained, all without adversely affecting the debt-to-GDP ratio.
- If, however, the real interest rate is greater than the rate of real GDP growth, then taxes have to rise relative to primary spending. Alternatively, the debt ratio will increase even if the issuance of new debt was required only to service the interest payments on the outstanding stock. Primary surpluses will be required (taxes will have to rise relative to primary spending) to service the debt and stabilize the debt-to-GDP ratio; otherwise, it would eventually become impossible for the government to pay back its debt. It clearly shows that beyond a certain level of debt, fiscal policy no longer seeks to satisfy the government's intertemporal budget constraint.

In the DSF template, the underlying assumptions on the primary deficit, the real interest rate, the real GDP growth rates, and the resulting primary deficit that would stabilize the debt-to-GDP ratio are all presented in the output tables for public debt.

Appendix II How to Conduct a Debt Sustainability Analysis: The Case of Haiti

This appendix complements Section III by providing a hands-on example of implementing the Debt Sustainability Framework (DSF) in a particular country case (Haiti).¹⁶ The joint IMF–World Bank debt sustainability analysis (DSA) presented here assesses the sustainability of Haiti’s external and domestic public debt. On the basis of this DSA, it was concluded that Haiti continues to be at high risk of external debt distress, although Heavily Indebted Poor Countries (HIPC) Initiative- and Multilateral Debt Relief Initiative (MDRI)-type debt relief at the HIPC completion point would reduce the debt and debt-service indicators to below the indicative thresholds.¹⁷ The following sections explore in greater detail the rationale for this conclusion.

Background

The DSA presented in this appendix is based on the DSF and updates the previous low-income country (LIC) DSA, which was undertaken at the HIPC Initiative decision point approval in November 2006 (see IMF and IDA, 2006c).

Haiti’s public debt as of end-September 2007 amounted to 30 percent of GDP. Most of the debt was owed to external creditors (26 percent of GDP), mainly the Inter-American Development Bank (44 percent), the World Bank (34 percent), and bilateral creditors (15 percent). Loans from external creditors had long maturities and were highly concessional. The small stock of domestic debt (4 percent of GDP) was composed of central bank bonds with maturities that did not exceed one year. Apart from the central bank bonds, which were held by the domestic banking system, the Haitian government had no other privately held domestic or foreign debt.

¹⁶The original published version of the 2008 Haiti DSA can be found at www.imf.org/external/pubs/ft/dsa/lic.aspx?cty=HTI&fm=-1&fy=-1&tm=-1&ty=-1. The text has been modified only by adding commentary on specific DSF features, deleting references to the DSF that have been discussed in the main text of this paper.

¹⁷Recall from Section III that a country is considered at high risk of debt distress if the baseline scenario indicates a protracted breach of debt or debt-service thresholds but the country does not currently face any payment difficulties.

Haiti’s debt management capacity remains weak, although steps are being taken to strengthen it. The Central Bank of Haiti (BRH) and the Ministry of Economy and Finances (MEF) are jointly responsible for debt management, but there is no centralized debt database, and information sharing between the BRH and the MEF is inadequate. This situation has resulted in differing accounting methodologies and conflicting data. However, Haiti is currently receiving technical assistance from the United Nations Conference on Trade and Development to put together a single database on public external debt.¹⁸ In addition, in late 2007 the Center for Latin American Monetary Studies provided technical assistance to the MEF to strengthen the institutional aspects of debt management and analysis, particularly DSA.

Assumptions

The essence of the macroeconomic framework remains unchanged from the 2006 LIC DSA exercise, although a number of assumptions have been updated (Table A1 and Box A1):

- Medium-term assumptions (through 2012) reflect actual outcomes in FY2007 and forward-looking expectations under the Poverty Reduction and Growth Facility (PRGF)-supported economic program. Key changes include a significantly more appreciated national currency than was assumed in the 2006 LIC DSA (by about 20 percent), which raises the U.S. dollar value of GDP. Furthermore, projected exports are higher owing to the estimated impact in 2008 and 2009 of the HOPE Act, which went into effect in mid-2007.¹⁹
- Assumptions for 2013–27 are mostly unchanged, absent major developments that would have war-

¹⁸The establishment of such a database is a floating completion point trigger, that is, a precondition to reach the HIPC completion point.

¹⁹The Haitian Hemispheric Opportunity Through Partnership Encouragement (HOPE) Act provides for preferential access of Haitian apparel exports to the U.S. market.

Table A1. Haiti: Long-Term Macroeconomic Assumptions, 2007–27
(Fiscal year ending September 30)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Averages		
																						2008–	2018–	
																							17	27
(Annual percentage change)																								
National income and prices																								
GDP at constant prices	3.2	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.1	4.5
GDP deflator	9.0	9.7	7.5	6.8	5.6	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	5.0
Real GDP per capita (local currency)	1.4	2.0	2.3	2.3	2.3	2.3	2.4	2.4	2.9	3.1	3.1	3.1	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.5	3.3	
Consumer prices (end of period)	7.9	9.0	7.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.7	5.0	
External sector																								
Exports of goods and nonfactor services	5.4	17.0	14.7	8.6	8.6	8.2	8.2	7.7	6.9	6.9	6.9	6.9	7.1	7.1	7.3	7.4	7.5	7.5	7.6	7.6	7.6	7.6	9.4	7.4
Imports of goods and nonfactor services	7.8	16.4	10.4	8.0	8.3	8.0	7.8	6.5	6.9	6.6	6.6	6.7	6.5	6.2	6.0	6.0	6.0	6.0	5.9	5.9	5.9	5.9	8.5	6.1
Central government																								
Total revenue and grants	25.8	26.8	16.3	11.9	11.7	10.8	9.3	9.7	10.2	9.7	10.3	10.3	9.7	10.2	9.8	9.8	10.2	9.8	10.2	10.8	10.8	9.6	12.7	10.0
Central government revenue ¹	15.4	33.4	15.9	13.3	13.4	12.9	12.5	10.6	11.1	10.3	11.1	11.0	10.3	11.0	11.3	11.3	11.0	11.2	10.9	11.5	10.0	14.4	11.0	
Central government expenditure	22.1	30.1	18.1	13.3	12.2	11.5	10.0	9.5	10.4	9.7	10.0	10.2	9.8	10.0	9.8	9.8	10.1	9.8	10.3	10.8	9.9	13.5	10.1	
(In percent of GDP, unless otherwise indicated)																								
National income																								
Consumption	102.3	96.6	93.8	92.8	92.1	91.4	90.2	90.4	90.4	90.3	90.2	90.1	90.0	89.9	89.6	89.3	88.9	88.5	88.2	87.7	87.1	91.8	88.9	
Private	93.4	86.2	82.8	81.4	80.4	79.2	78.0	78.3	78.2	78.1	78.1	78.0	77.9	77.8	77.5	77.2	76.8	76.4	76.0	75.5	74.9	80.1	76.8	
Public	8.8	10.4	11.1	11.4	11.8	12.2	12.1	12.2	12.2	12.2	12.1	12.2	12.1	12.1	12.1	12.1	12.1	12.1	12.2	12.2	12.2	11.8	12.2	
Investment	30.0	31.6	32.7	33.8	35.1	36.3	36.5	36.6	36.6	36.7	36.8	36.8	36.9	36.9	37.0	37.0	37.0	37.1	37.1	37.3	37.3	35.3	37.0	
Private	23.2	24.0	24.8	25.9	27.2	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	27.2	28.4	
Public	6.8	7.6	7.9	7.9	8.0	7.9	8.1	8.2	8.2	8.3	8.4	8.4	8.5	8.5	8.6	8.6	8.6	8.6	8.7	8.7	8.9	8.0	8.6	
GDP per capita (U.S. dollars)	660.3	767.3	801.8	835.8	871.2	908.2	948.6	990.8	1,040.1	1,093.9	1,150.7	1,210.6	1,273.9	1,340.7	1,412.3	1,487.8	1,567.6	1,652.0	1,741.0	1,834.5	1,933.3	940.8	1,545.4	
External sector																								
Noninterest current account deficit	0.4	0.5	-1.0	-0.9	-1.0	-1.2	-1.4	-1.4	-1.6	-1.7	-1.8	-1.8	-1.7	-1.7	-1.6	-1.6	-1.5	-1.4	-1.3	-1.2	-1.1	-1.1	-1.5	
Exports of goods and nonfactor services	12.1	12.0	12.9	13.2	13.6	13.9	14.1	14.4	14.4	14.4	14.5	14.5	14.6	14.7	14.8	14.9	15.0	15.1	15.3	15.4	15.6	13.7	15.0	
Imports of goods and nonfactor services	-37.2	-36.6	-38.1	-38.8	-39.7	-40.4	-41.1	-41.2	-41.4	-41.4	-41.4	-41.4	-41.4	-41.2	-41.0	-40.8	-40.5	-40.3	-40.0	-39.8	-39.5	-40.0	-40.6	
External current account balance ¹	-6.6	-7.5	-7.5	-7.4	-7.6	-7.9	-7.9	-7.9	-8.0	-7.6	-7.5	-7.2	-6.9	-6.7	-6.4	-6.2	-5.9	-5.7	-5.3	-5.2	-4.9	-7.7	-6.0	
External current account balance ²	0.2	-1.3	-1.2	-1.3	-1.5	-1.7	-1.7	-1.9	-2.0	-2.1	-2.1	-2.0	-2.0	-2.0	-1.9	-1.8	-1.7	-1.6	-1.5	-1.4	-1.3	-1.7	-1.7	
Liquid gross reserves (in months of imports of goods and services)	2.5	2.7	2.9	3.0	3.1	3.0	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.1	3.2	
Central government																								
Central government overall balance ²	-0.5	-1.0	-1.4	-1.6	-1.7	-1.9	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-1.8	-2.0	
Total revenue and grants	15.2	16.9	17.6	17.7	18.0	18.3	18.3	18.4	18.4	18.4	18.5	18.6	18.6	18.7	18.7	18.7	18.8	18.8	18.9	19.1	19.1	18.0	18.8	
Central government revenue ¹	10.3	12.1	12.5	12.7	13.2	13.6	14.0	14.2	14.4	14.4	14.6	14.8	14.9	15.0	15.3	15.5	15.7	15.9	16.0	16.3	16.3	13.6	15.6	
Central government expenditure	15.7	17.9	18.9	19.3	19.7	20.1	20.3	20.3	20.4	20.5	20.5	20.6	20.6	20.7	20.7	20.7	20.8	20.8	20.9	21.1	21.1	19.8	20.8	

Sources: Country authorities; and IMF staff estimates and projections.

¹Excluding grants.

²Including grants.

Box A1. Macroeconomic Assumptions for the Low-Income Country Debt Sustainability Analysis

Real GDP is projected to grow by 4.4 percent on average during the projection period (2007–27). Growth would initially rise to about 4 percent, as improvements in security and sustained political and macroeconomic stability provide for an environment that is more conducive to private activity and consumption. In the longer term, growth is projected to rise somewhat faster (4.5 percent), on the assumption that critical infrastructure and human capital bottlenecks that are currently holding the economy back will be gradually overcome.

Private investment is expected to be an important driver of growth, with the level of annual investment increasing by some 5 percentage points of GDP over the projection period. A significant portion of private investment is expected to materialize in the form of foreign direct investment (FDI). Public investment is also projected to rise, by about 2 percentage points of GDP.

Exports are expected to accelerate temporarily in the short term, as a consequence of the Haitian Hemispheric Opportunity through Partnership Encouragement (HOPE) Act, and then rise steadily, supported by FDI. Overall, this would translate into average growth rates of 9 percent (dollar value) in the first half of the period, and about 7 percent in the second half.

Imports are also projected to expand, fueled by inputs for the textile export sector and domestic demand from high investment and remittances-driven consumption. However, the pace of imports will be tempered to some extent by import substitution.

Inflation is expected to decline from 7.9 percent in 2007 to 5 percent in 2011 and beyond. This projection is based on an expectation of continued sound monetary policy and public sector financing, as well as a gradually increasing domestic supply of goods and services.

The fiscal deficit is projected to stabilize at 2 percent of GDP from 2013 onward, reflecting rising budget execution capacity and a relative decline in grant support. Domestic revenues are projected to rise by about 4 to 5 percent of GDP as tax administration and tax policy reforms are implemented. However, these revenue gains are outpaced by rising expenditures necessary to address critical infrastructure needs and restore the supply of essential social services. Budget financing would remain mostly external, because domestic financing is assumed to be introduced only very gradually in the medium term (it would reach about 1 percent of GDP in 2027).

The balance of payments is expected to weaken temporarily, because the projected expansion of investment would widen the current account deficit in the first half of the projection period. However, the solid export performance and expected moderation in import growth will help revert part of this deterioration in the long run. Grants are assumed to decline relative to the economy's size, while private remittances are estimated to grow in line with economic growth in the United States. The current account deficits are expected to be financed largely by FDI and concessional lending.

ranted changes to the long-term perspectives of the economy. Overall, the security situation and institutional environment are expected to stabilize further, while fiscal and monetary policies are projected to remain sound and supportive of foreign and domestic investment. Export activity is assumed to be a key driver of economic growth, with the recovery of domestic demand also playing a significant role. In terms of financing assumptions, international support is projected to persist in the long term, albeit declining as a share of GDP. Reflecting a somewhat more conservative assessment, assumptions regarding access to domestic financing have been lowered. Domestic bond issuances are projected to reach 1 percent of GDP a year by 2027, compared with 1.5 percent of GDP in the 2006 LIC DSA.

(Table A2 and Figure A1).²⁰ In this scenario, external debt indicators remain below the indicative debt-burden thresholds during the entire projection period, with the exception of the present value (PV) of the debt-to-exports ratio, which remains above the indicative threshold of 100 percent until 2020 and falls only slightly below it afterward.²¹ Debt-service payments do not display a smooth pattern throughout the projection period, partly because of PRGF repayments that are due from 2012 to 2015.

Alternative Scenarios and Stress Tests

The alternative scenario based on historical averages of key variables leads to a lower trajectory of debt indicators compared with the baseline scenario (Table A3). However, this outcome does not indicate

External Debt Sustainability

Baseline

The baseline scenario assumes interim HIPC debt relief in 2007 and 2008, but no completion point

²⁰See IMF and IDA (2008).

²¹The World Bank's Country Policy and Institutional Assessment rates Haiti as a poor performer. Under the joint IMF–World Bank DSF, the corresponding indicative debt-burden thresholds are 30 percent for the PV of the debt-to-GDP ratio, 100 percent for the PV of the debt-to-exports ratio, and 15 percent for the debt service-to-exports ratio. See IMF and IDA (2005).

Table A2. Haiti: External Debt Sustainability Framework, Baseline Scenario, 2007–27¹

(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average ²	Standard Deviation ³	Projections								
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2007–12 Average	2018	2027	2013–27 Average
External debt (nominal)¹	31.0	29.7	25.6			23.0	23.0	23.3	23.6	24.0	24.3	24.8	23.3	
<i>Of which: public and publicly guaranteed (PPG)</i>	31.0	29.7	25.6			23.0	23.0	23.3	23.6	24.0	24.3	24.8	23.3	
Change in external debt	-6.2	-1.3	-4.1			-2.6	0.0	0.3	0.3	0.4	0.3	0.0	-0.2	
Identified net debt-creating flows	-9.9	-6.7	-7.4			-0.5	-0.7	-0.6	-0.4	-0.2	-0.1	0.2	-0.9	
Noninterest current account deficit	-3.4	-0.3	-0.7	0.2	1.5	1.0	0.9	1.0	1.2	1.4	1.4	1.7	1.1	1.5
Deficit in balance of goods and services (G&S)	27.0	28.6	23.2			24.7	25.1	25.6	26.1	26.6	26.9	26.9	24.0	
Exports	13.9	14.4	12.1			12.0	12.9	13.2	13.6	13.9	14.1	14.5	15.6	
Imports	40.8	43.0	35.3			36.6	38.1	38.8	39.7	40.4	41.1	41.4	39.5	
Net current transfers (negative=inflow)	-30.5	-28.6	-23.7	-23.8	5.7	-23.5	-24.0	-24.3	-24.5	-24.7	-24.9	-24.7	-22.5	-23.9
<i>Of which: official</i>	-7.6	-7.9	-5.4			-6.2	-6.4	-6.2	-6.1	-6.2	-6.2	-5.2	-3.6	
Other current account flows (negative=net inflow)	0.1	-0.3	-0.2			-0.1	-0.2	-0.3	-0.4	-0.4	-0.6	-0.5	-0.4	
Net FDI (negative=inflow)	-0.6	-3.3	-1.2	-0.7	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.9	-0.8	-1.2	-1.0
Endogenous debt dynamics³	-5.9	-3.0	-5.5			-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	
Contribution from nominal interest rate	0.8	0.3	0.3			0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	
Contribution from real GDP growth	-0.6	-0.6	-0.7			-0.8	-0.9	-0.9	-0.9	-0.9	-0.9	-1.0	-1.0	
Contribution from price and exchange rate changes	-6.1	-2.7	-5.1			...	...	...	...	...	...	...	...
Residual⁴	3.7	5.4	3.3			-2.0	0.7	0.9	0.7	0.6	0.4	-0.1	0.7	
<i>Of which: exceptional financing</i>	1.0	-0.2	0.7			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Present value (PV) of external debt ⁵	...	...	16.9			15.2	15.1	15.1	15.2	15.3	15.3	15.1	13.9
In percent of exports	...	...	139.1			126.9	116.5	113.9	111.7	110.2	108.4	104.1	89.7
PV of PPG external debt	...	...	16.9			15.2	15.1	15.1	15.2	15.3	15.3	15.1	13.9
In percent of exports	...	...	139.1			126.9	116.5	113.9	111.7	110.2	108.4	104.1	89.7
In percent of government revenues	...	...	159.5			125.9	120.8	119.1	116.2	112.3	109.4	102.2	85.3
Debt service-to-exports ratio (in percent)	17.5	7.5	8.9			6.3	7.2	7.1	6.5	6.6	6.8	6.1	5.5	
PPG debt service-to-exports ratio (in percent)	17.5	7.5	8.9			6.3	7.2	7.1	6.5	6.6	6.8	6.1	5.5	
PPG debt service-to-revenue ratio (in percent)	27.6	10.2	10.2			6.2	7.4	7.4	6.7	6.7	6.8	6.0	5.2	
Total gross financing need (billions of U.S. dollars)	-0.1	-0.1	0.0			0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	
Noninterest current account deficit that stabilizes debt ratio	2.8	1.0	3.5			3.6	0.9	0.7	0.9	1.0	1.1	1.7	1.2	

Table A2 (concluded)

	Actual			Historical Average ²	Standard Deviation ³	Projections									
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2007–12 Average	2018	2027	2013–27 Average
Key macroeconomic assumptions															
Real GDP growth (in percent)	1.8	2.3	3.0	0.8	2.0	3.9	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.2
GDP deflator in U.S. dollar terms (change in percent)	19.7	9.7	20.8	6.0	13.4	14.0	2.2	1.9	1.9	1.9	2.0	4.0	2.0	2.0	1.9
Effective interest rate (percent) ⁶	2.5	1.3	1.4	1.3	0.6	1.3	1.2	1.3	1.2	1.2	1.2	1.3	1.4	1.1	1.2
Growth of exports of G&S (U.S. dollar terms, in percent)	16.9	16.9	4.7	7.3	11.3	16.6	14.7	8.6	8.6	8.2	8.2	10.8	6.9	7.6	6.8
Growth of imports of G&S (U.S. dollar terms, in percent)	13.7	18.2	2.2	9.6	9.3	22.7	10.4	8.0	8.3	8.0	7.8	10.9	6.7	5.9	5.8
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7
Aid flows (in billions of U.S. dollars) ⁷	0.4	0.5	0.5	...	...	0.6	0.6	0.7	0.7	0.8	0.8	...	1.0	1.3	...
Of which: grants	0.1	0.2	0.3	...	...	0.3	0.4	0.4	0.4	0.4	0.4	...	0.5	0.6	...
Of which: concessional loans	0.1	0.1	0.1	...	...	0.1	0.1	0.2	0.2	0.2	0.2	...	0.3	0.4	...
Grant-equivalent financing (in percent of GDP) ⁸	...	...	...	...	...	5.8	6.1	6.0	5.9	5.9	5.5	...	4.9	3.7	4.5
Grant-equivalent financing (in percent of external financing) ⁸	...	...	...	...	...	86.2	86.1	84.7	84.4	83.4	82.3	...	82.4	79.9	81.5
<i>Memorandum items:</i>															
Nominal GDP (billions of U.S. dollars)	4.3	4.8	6.0	...	...	7.1	7.6	8.0	8.5	9.0	9.6	...	13.1	23.2	...
$(PV_t - PV_{t-1})/GDP_{t-1}$ (in percent)	...	...	...	...	...	1.1	0.8	0.9	1.0	1.0	1.0	...	1.0	0.9	0.8

Sources: Country authorities; and IMF staff estimates and projections.

¹Fiscal year ending September 30, includes both public and private sector external debt.

²Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

³Derived as $[r - g - r(1 + g)] / (1 + g + r + gr)$ times previous period debt ratio, r = nominal interest rate, g = real GDP growth rate, and gr = growth rate of GDP deflator in U.S. dollar terms.

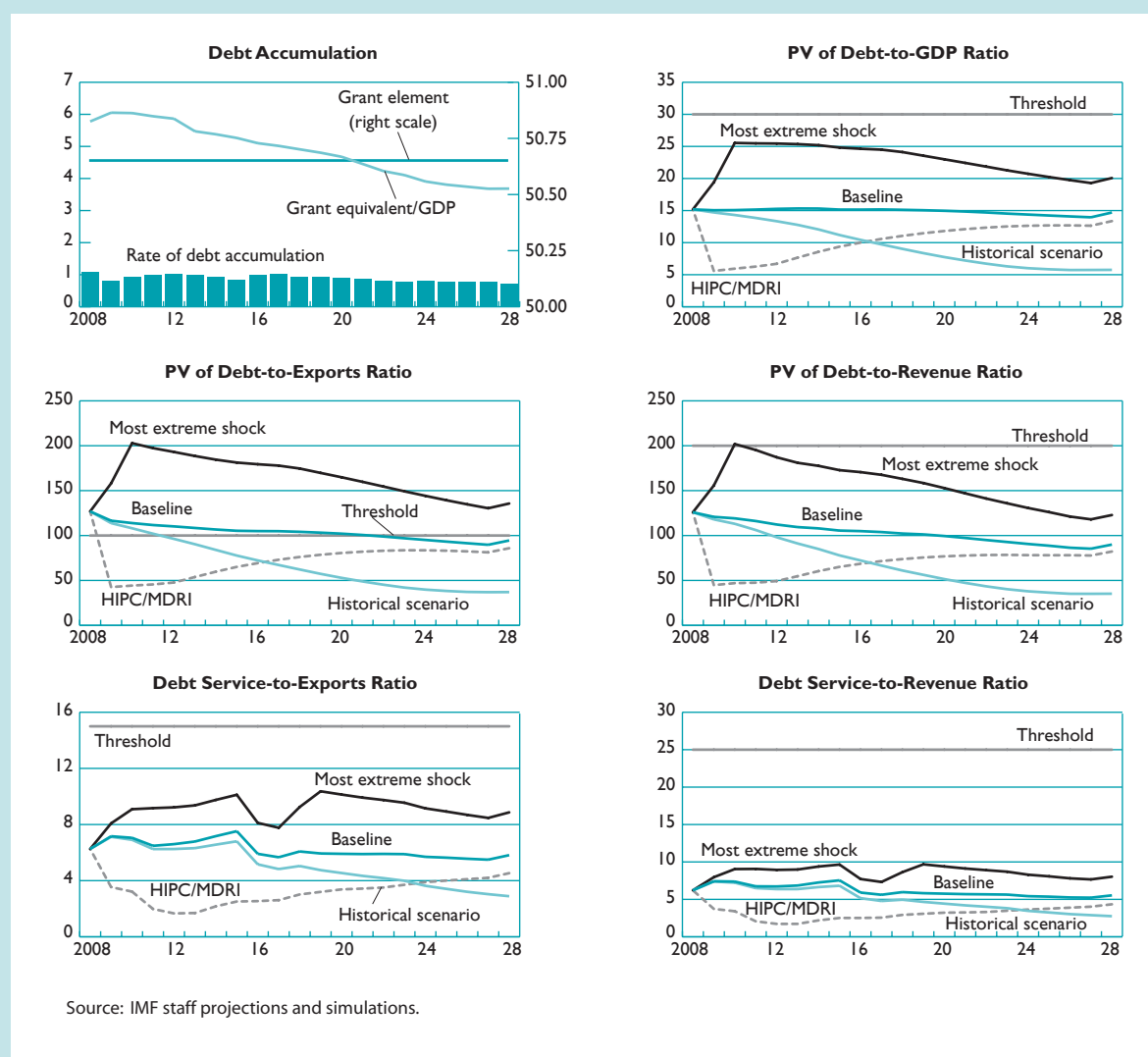
⁴Includes exceptional financing (i.e., changes in arrears and debt relief), changes in gross foreign assets, and valuation adjustments. For projections, also includes contribution from price and exchange rate changes.

⁵Assumes that PV of private sector debt is equivalent to its face value.

⁶Current-year interest payments divided by previous period debt stock.

⁷Defined as grants, concessional loans, and debt relief.

⁸Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

Figure AI. Haiti: Indicators of Public and Publicly Guaranteed External Debt*(In percent)*

that the baseline projection is overly pessimistic. The historical scenario results in lower debt-burden indicators because of exceptionally low levels of external financing in the past 10 years, when donors curbed their assistance in light of high levels of social and political conflict. Over this period, the current account posted an average deficit of only 0.2 percent of GDP, compared with an average deficit of 1.5 percent of GDP assumed in the baseline projection.

Other bound tests confirm that Haiti's debt distress classification is largely a function of its small export sector. Under the most extreme shock—a combined

adverse shock to all key variables: real GDP growth, export growth, U.S. dollar GDP deflator, and non-debt-creating capital inflows—all external debt indicators still remain below the indicative debt-burden thresholds except for the PV of the debt-to-exports ratio, which reaches 203 percent in 2010 before reverting to 130 percent in 2027.

Large amounts of additional concessional external financing would worsen debt indicators. For instance, fully spending and absorbing the financing that could potentially become available under the PetroCaribe agreement would keep the PV of the debt-to-exports

Table A3. Haiti: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008–27*(Fiscal year ending September 30; in percent)*

	Projections							
	2008	2009	2010	2011	2012	2013	2018	2027
PV of debt-to-GDP ratio								
Baseline	15	15	15	15	15	15	15	14
A. Alternative scenarios								
A1. Key variables at their historical averages in 2009–27 ¹	15	15	14	14	13	13	9	6
A2. New public sector loans on less favorable terms in 2009–27 ²	15	16	16	17	18	18	21	22
B. Bound tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	15	16	17	17	17	17	17	15
B2. Export value growth at historical average minus one standard deviation in 2009–10 ³	15	16	18	18	18	18	17	15
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009–10	15	17	18	18	19	19	18	17
B4. Net non-debt-creating flows at historical average minus one standard deviation in 2009–10 ⁴	15	19	22	22	22	22	21	17
B5. Combination of B1–B4 using one-half standard deviation shocks	15	19	26	25	25	25	24	19
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 ⁵	15	21	21	21	22	22	21	20
C. Country-specific alternative scenarios								
C1. PetroCaribe agreement	15	15	16	17	18	19	18	15
C2. HIPC Initiative/MDRI	15	6	6	7	8	9	12	13
PV of debt-to-exports ratio								
Baseline	127	117	114	112	110	108	104	90
A. Alternative scenarios								
A1. Key variables at their historical averages in 2009–27 ¹	127	114	108	102	96	90	62	37
A2. New public sector loans on less favorable terms in 2009–27 ²	127	121	122	124	127	129	141	143
B. Bound tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	127	117	114	112	110	108	104	90
B2. Export value growth at historical average minus one standard deviation in 2009–10 ³	127	149	182	178	175	172	162	131
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009–10	127	117	114	112	110	108	104	90
B4. Net non-debt-creating flows at historical average minus one standard deviation in 2009–10 ⁴	127	145	170	165	162	158	146	109
B5. Combination of B1–B4 using one-half standard deviation shocks	127	158	203	197	193	189	175	130
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 ⁵	127	117	114	112	110	108	104	90
C. Country-specific alternative scenarios								
C1. PetroCaribe agreement	127	117	120	125	129	133	124	96
C2. HIPC Initiative/MDRI	127	44	47	52	57	61	79	85
PV of debt-to-revenue ratio								
Baseline	126	121	119	116	112	109	102	85
A. Alternative scenarios								
A1. Key variables at their historical averages in 2009–27 ¹	126	118	113	106	98	91	61	35
A2. New public sector loans on less favorable terms in 2009–27 ²	126	125	128	129	129	130	139	136
B. Bound tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	126	127	132	129	124	121	113	95
B2. Export value growth at historical average minus one standard deviation in 2009–10 ³	126	129	141	137	132	128	118	92
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009–10	126	133	145	141	136	133	124	104
B4. Net non-debt-creating flows at historical average minus one standard deviation in 2009–10 ⁴	126	150	178	172	165	159	143	103
B5. Combination of B1–B4 using one-half standard deviation shocks	126	156	202	195	187	181	163	118
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 ⁵	126	171	169	164	159	155	145	121

Table A3 (concluded)

	Projections							
	2008	2009	2010	2011	2012	2013	2018	2027
C. Country-specific alternative scenarios								
C1. PetroCaribe agreement	126	121	125	130	132	134	122	92
C2. HIPC Initiative/MDRI	126	45	49	54	58	62	78	121
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) ⁶	49	49	49	49	49	49	49	49
Debt service-to-exports ratio								
Baseline	6	7	7	6	7	7	6	5
A. Alternative scenarios								
A1. Key variables at their historical averages in 2009–27 ¹	6	7	7	6	6	6	5	3
A2. New public sector loans on less favorable terms in 2009–27 ²	6	7	7	7	7	8	8	9
B. Bound tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	6	7	7	6	7	7	6	5
B2. Export value growth at historical average minus one standard deviation in 2009–10 ³	6	9	10	9	9	10	9	8
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009–10	6	7	7	6	7	7	6	5
B4. Net non-debt-creating flows at historical average minus one standard deviation in 2009–10 ⁴	6	7	8	8	8	8	8	7
B5. Combination of B1–B4 using one-half standard deviation shocks	6	8	9	9	9	9	9	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 ⁵	6	7	7	6	7	7	6	5
C. Country-specific alternative scenarios								
C1. PetroCaribe agreement	6	7	7	6	7	7	8	6
C2. HIPC Initiative/MDRI	6	4	3	2	2	2	3	4
Debt service-to-revenue ratio								
Baseline	6	7	7	7	7	7	6	5
A. Alternative scenarios								
A1. Key variables at their historical averages in 2009–27 ¹	6	7	7	7	6	6	5	3
A2. New public sector loans on less favorable terms in 2009–27 ²	6	7	8	7	7	8	8	8
B. Bound tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	6	8	8	7	7	8	7	6
B2. Export value growth at historical average minus one standard deviation in 2009–10 ³	6	7	8	7	7	7	7	6
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009–10	6	8	9	8	8	8	7	6
B4. Net non-debt-creating flows at historical average minus one standard deviation in 2009–10 ⁴	6	7	8	8	8	8	8	7
B5. Combination of B1–B4 using one-half standard deviation shocks	6	8	9	9	9	9	9	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 ⁵	6	11	10	10	10	10	8	7
C. Country-specific alternative scenarios								
C1. PetroCaribe agreement	6	7	7	7	7	7	8	6
C2. HIPC Initiative/MDRI	6	4	3	2	2	2	3	4
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) ⁶	49	49	49	49	49	49	49	49

Sources: Country authorities; and IMF staff estimates and projections.

Note: HIPC Initiative = Heavily Indebted Poor Countries Initiative and MDRI = Multilateral Debt Relief Initiative.

¹Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), noninterest current account in percent of GDP, and non-debt-creating flows.

²Assumes that the interest rate on new borrowing is 2 percentage points higher than in the baseline, while grace and maturity periods are the same as in the baseline.

³Exports are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

⁴Includes official and private transfers and foreign direct investment.

⁵Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

⁶Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

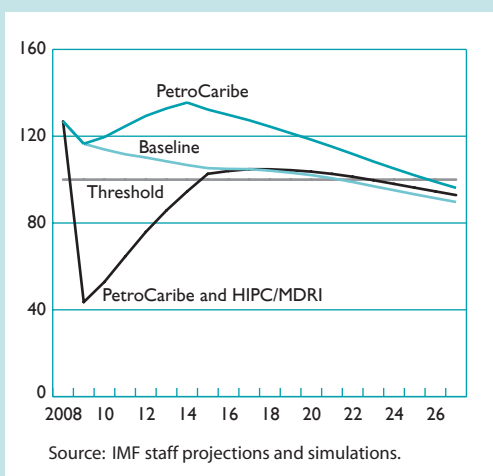
Box A2. The Impact of PetroCaribe on Debt Sustainability

Haiti could obtain substantial concessional external financing from Venezuela for its oil purchases under the PetroCaribe agreement. The agreement was ratified by parliament in March 2007. The authorities are currently working to overcome logistical difficulties that have impeded oil deliveries under PetroCaribe terms so far. At current oil prices, the accord provides for the deferral of 40 percent of oil imports over a period of 25 years (with a two-year grace period), at 1 percent annual interest. The underlying grant element of this facility is estimated at almost 50 percent (using current U.S. dollar discount rates). The agreement specifies that up to a maximum of 14,400 barrels a day could be imported. Haiti's oil needs that could be covered through PetroCaribe deliveries are estimated to be about 10,500 barrels a day in 2008. For the present simulation, it is assumed

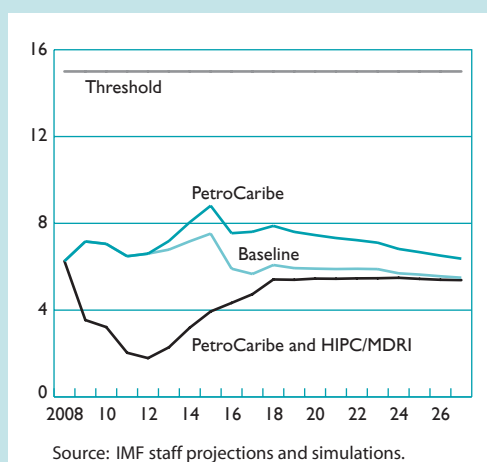
that refined products imported by Haiti under PetroCaribe will grow in line with total oil imports and that deliveries under PetroCaribe terms will take place for a total of five years. This implies additional financing of about 1.6 percent of GDP on average per year.

The additional external borrowing through PetroCaribe could significantly increase external debt and debt-service payments in the medium term, notwithstanding its high concessionality. Under a scenario with PetroCaribe financing, the present value (PV) of the debt-to-exports ratio would peak at 135 percent in 2014 before converging back to values below the threshold in 2025. In a scenario with completion point debt-stock reduction and PetroCaribe financing, the PV of the debt-to-exports ratio would increase quickly so that by 2015 its trajectory would be no different from the baseline (see figures).

Present Value of External Debt-to-Exports Ratio



External Debt Service-to-Exports Ratio



ratio permanently above the indicative threshold, with a peak of 135 percent in 2014. However, as in the baseline scenario, the PetroCaribe financing would not lead to breaches of the indicative thresholds for other external debt indicators (Box A2).

Debt relief at the HIPC completion point would substantially improve Haiti's debt situation. Assuming HIPC- and MDRI-type debt relief at the completion point would reduce the PV of the external debt-to-exports ratio well below Haiti's indicative debt-burden threshold of 100 percent.²² However, large-scale borrowing, less conces-

sional financing terms, and large adverse shocks could still raise Haiti's PV of the external debt-to-exports ratio above the indicative threshold in the longer term.

Public Sector Debt Sustainability

Baseline

Under the baseline scenario, Haiti's public debt remains little changed throughout the projection period (Table A4 and Figure A2). The PV of the public debt-to-GDP ratio would remain broadly constant at about 19 percent. Public expenditure is expected to rise significantly through 2012, but stronger

²²For this scenario the completion point is assumed to be reached in 2009.

Table A4. Haiti: Public Sector Debt Sustainability Framework, Baseline Scenario, 2005–27

(In percent of GDP, unless otherwise indicated)

	Actual ¹			Historical Average ²	Standard Deviation ²	Estimate 2008	Projections								
	2005	2006	2007				2009	2010	2011	2012	2013	2008–13 Average	2018	2027	2014–27 Average
Public sector debt³	34.3	33.6	29.6			27.0	27.2	27.5	27.6	27.7	28.5		29.0	28.3	
<i>Of which: foreign-currency-denominated</i>	31.0	29.7	25.6			23.0	23.0	23.3	23.6	24.0	24.3		24.8	23.3	
Change in public sector debt	-5.4	-0.7	-4.0			-2.6	0.2	0.4	0.0	0.2	0.8		-0.1	0.1	
Identified debt-creating flows	-0.5	-7.1	-5.4			-3.0	-0.6	-0.2	0.0	0.4	0.0		0.4	0.0	
Primary deficit	0.0	0.1	-0.5	0.9	1.1	0.2	0.6	0.9	1.1	1.3	1.3	0.9	1.2	1.3	1.3
Revenue and grants	13.1	13.5	15.1			16.9	17.6	17.7	18.0	18.3	18.3		18.6	19.1	
<i>Of which: grants</i>	3.5	3.5	4.8			4.8	5.1	5.0	4.9	4.7	4.3		3.8	2.7	
Primary (noninterest) expenditure	13.1	13.6	14.6			17.1	18.2	18.6	19.1	19.6	19.6		19.9	20.4	
Automatic debt dynamics	-0.5	-7.1	-4.6			-3.0	-1.0	-0.9	-1.0	-0.8	-1.4		-0.9	-1.3	
Contribution from interest rate/growth differential	-1.4	-1.3	-1.0			-1.0	-1.0	-1.0	-1.1	-1.1	-1.0		-1.2	-1.1	
<i>Of which: contribution from average real interest rate</i>	-0.7	-0.5	0.0			0.1	0.1	0.0	0.0	-0.1	0.0		0.1	0.1	
<i>Of which: contribution from real GDP growth</i>	-0.7	-0.8	-1.0			-1.1	-1.0	-1.0	-1.1	-1.1	-1.1		-1.3	-1.2	
Contribution from real exchange rate depreciation	1.0	-5.8	-3.5			-2.0	0.0	0.1	0.0	0.3	-0.3		...	...
Other identified debt-creating flows	0.0	0.0	-0.3			-0.2	-0.3	-0.2	-0.1	-0.1	0.0		0.0	0.0	
Privatization receipts (negative)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC Initiative and other)	0.0	0.0	-0.3			-0.2	-0.3	-0.2	-0.1	-0.1	0.0		0.0	0.0	
Other (specify, e.g., bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	-4.9	6.4	1.4			0.4	0.8	0.5	0.1	-0.3	0.8		-0.5	0.2	
Present value (PV) of public sector debt	...	...	20.9			19.2	19.2	19.4	19.2	19.0	19.6		19.3	19.0
<i>Of which: foreign-currency denominated</i>	...	...	16.9			15.2	15.1	15.1	15.2	15.3	15.3		15.1	13.9
<i>Of which: external</i>	...	...	16.9			15.2	15.1	15.1	15.2	15.3	15.3		15.1	13.9
PV of contingent liabilities (not included in public sector debt)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Gross financing need ⁴	2.2	1.6	1.3			1.7	2.0	2.2	2.3	2.4	2.7		2.6	2.9	
PV of public sector debt-to-revenue ratio (in percent) ⁵	...	...	137.9			113.6	109.5	109.4	106.5	104.2	107.0		103.7	99.6
<i>Of which: external</i>	...	...	111.5			89.9	85.7	85.2	84.2	83.6	83.9		81.2	73.1
Debt service-to-revenue ratio (in percent) ^{5,5}	16.7	11.4	12.0			9.1	7.6	7.5	6.8	6.2	7.3		7.2	8.4	
Primary deficit that stabilizes the debt-to-GDP ratio	5.4	0.8	3.5			2.8	0.4	0.6	1.1	1.2	0.5		1.3	1.2	

Table A4 (concluded)

	Actual ¹			Historical Standard Estimate			Projections								
	2005	2006	2007	Average ²	Deviation ²	Estimate 2008	2009	2010	2011	2012	2013	2008–13 Average	2018	2027	2014–27 Average
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	1.8	2.3	3.2	0.9	2.1	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5
Average nominal interest rate on foreign exchange debt (in percent)	2.5	1.5	1.2	1.1	0.7	1.5	1.4	1.4	1.3	1.3	1.3	1.4	1.5	1.4	1.4
Average real interest rate on domestic currency debt (in percent)	-19.1	-1.4	11.2	3.3	13.4	5.0	4.5	3.8	2.9	2.4	5.6	4.0	4.9	5.4	5.1
Real exchange rate depreciation (in percent, + indicates depreciation)	2.6	-19.6	-12.4	-1.4	23.1	-8.0	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	17.6	16.6	9.0	14.5	6.2	9.7	7.5	6.8	5.6	5.0	5.0	6.6	5.0	5.0	5.0
Growth of real primary spending (deflated by GDP deflator, in percent)	26.5	5.8	10.8	7.7	11.4	21.1	11.0	6.3	6.8	6.6	4.2	9.3	4.8	4.5	4.7
Grant element of new external borrowing (in percent)	60	70	80	70	30	80	80	70	70	70	80	70	80	80	...

Sources: Country authorities; and IMF staff estimates and projections.

¹Fiscal year ending September 30.

²Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

³Includes nonfinancial public sector and central bank.

⁴Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.

⁵Revenues including grants.

⁶Debt service is defined as the sum of interest and amortization of medium- and long-term debt.

revenue efforts and external grants should contain the need for debt-creating financing. In the long term, the country's relatively low initial public debt burden and economic growth would allow primary deficits of 1.3 percent of GDP on average, without threatening sustainability. Because domestic indebtedness is projected to increase only slightly from 4 to 5 percent of GDP during the projection period, the trajectory of total public debt largely follows the dynamics of external debt.

Alternative Scenarios and Stress Tests

The evolution of public debt remains robust under most alternative scenarios and bound tests, although there is some vulnerability to lower-than-projected growth rates (Table A5). Permanently lower real GDP growth would lead to a substantial increase in the PV of the debt-to-GDP ratio between FY2008 and FY2027. Scenarios with macroeconomic assumptions based on historical averages also lead to a gradually rising debt burden because they imply persistence of the relatively poor growth rates recorded in the past.

Main Differences from the 2006 Low-Income Country Debt Sustainability Analysis²³

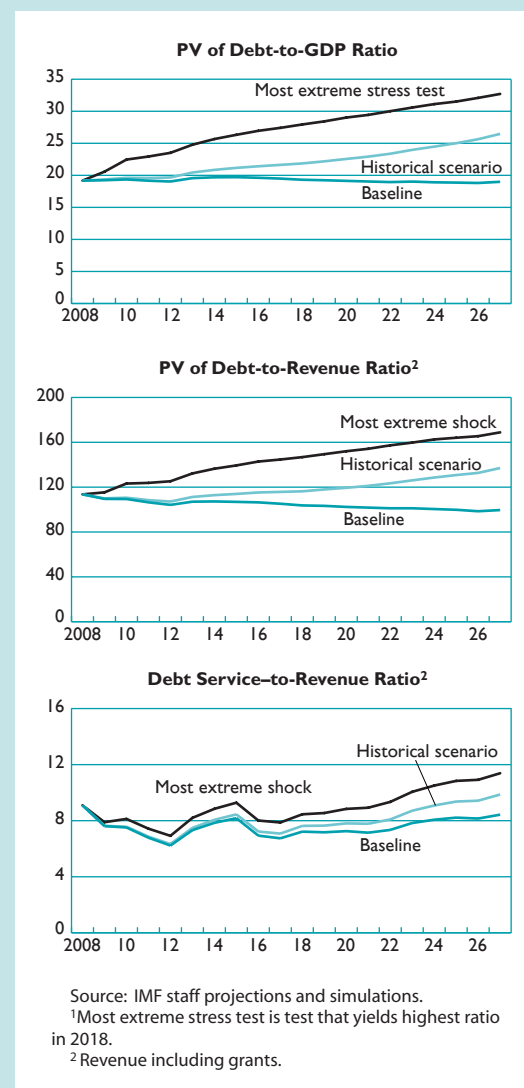
The trajectories of key debt indicators are lower in the current DSA than at the time of the 2006 DSA exercise (Appendix Figure A3).²⁴ The more conservative assumption regarding domestic debt issuances with unchanged financing gaps leads to a faster increase in the PV of external debt. However, the PV of the external debt ratio to both exports and GDP is significantly lower during most of the projection period because of upward revisions in projected exports and U.S. dollar GDP. These improvements are further enhanced in the post-completion-point scenario because of some US\$500 million in HIPC/MDRI-type post-completion-point debt relief from the Inter-American Development Bank, which was committed in 2007 and thus not included in the 2006 LIC DSA.

²³The 2006 DSA for Haiti can be found at www.imf.org/external/pubs/ft/dsa/lic.aspx?cty=HTI&fm=-1&fy=-1&tm=-1&ty=-1.

²⁴The analysis in the 2006 DSA assumed an HIPC stock of debt reduction in the baseline scenario. In line with the most recent guidance on the matter, the baseline in the present DSA includes only interim debt relief. To make both exercises comparable, Figure A2 replicates the 2006 DSA without a stock of debt reduction.

Figure A2. Haiti: Indicators of Public Debt Under Alternative Scenarios

(Fiscal year ending September 30; in percent)



Debt Distress Classification and Conclusion

Haiti's risk of debt distress remains high. Under the baseline scenario—which includes HIPC interim debt relief but no irrevocable debt relief at the floating HIPC completion point or MDRI debt relief—the PV of the debt-to-exports ratio remains above the indicative debt-burden threshold, and sensitivity analysis shows that Haiti's external debt situation is vulnerable to shocks. This result partly reflects Haiti's small export sector,

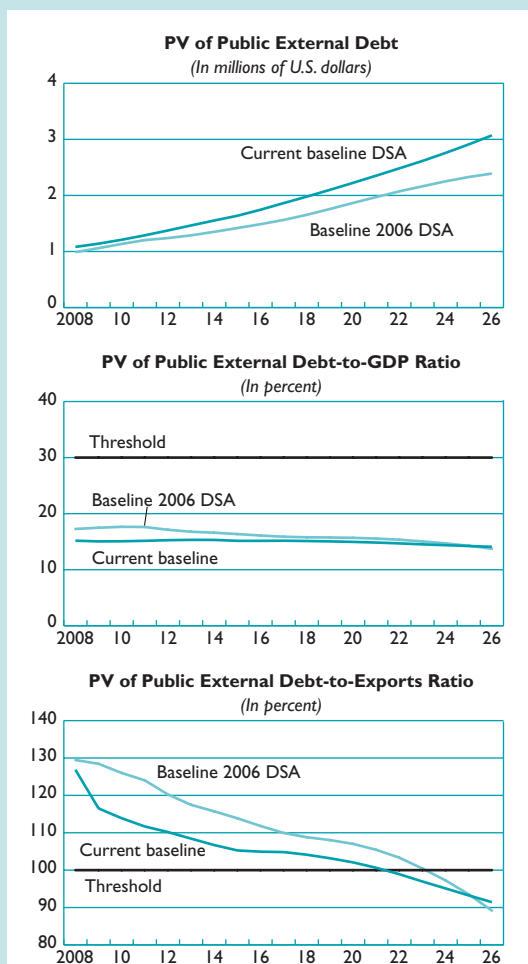
Table A5. Haiti: Sensitivity Analysis for Key Indicators of Public Debt, 2008–27*(Fiscal year ending September 30; in percent)*

	Projections							
	2008	2009	2010	2011	2012	2013	2018	2027
PV of Debt-to-GDP Ratio								
Baseline	19	19	19	19	19	20	19	19
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	19	20	20	20	20	21	22	24
A2. Primary balance is unchanged from 2008	19	19	19	18	17	17	15	11
A3. Permanently lower GDP growth ¹	19	19	20	20	20	20	22	26
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2009–10	19	21	22	23	24	25	28	33
B2. Primary balance is at historical average minus one standard deviation in 2009–10	19	20	20	20	20	20	20	20
B3. Combination of B1–B2 using one-half standard deviation shocks	19	20	21	21	20	21	19	18
B4. One-time 30 percent real depreciation in 2009	19	26	25	25	24	24	22	20
B5. 10 percent of GDP increase in other debt-creating flows in 2009	19	24	24	24	24	24	24	22
PV of Debt-to-Revenue Ratio²								
Baseline	114	110	109	106	104	107	104	100
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	114	112	113	110	108	111	110	111
A2. Primary balance is unchanged from 2008	114	108	106	101	95	95	79	59
A3. Permanently lower GDP growth ¹	114	110	111	108	107	111	116	137
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2009–10	114	115	123	124	125	132	147	169
B2. Primary balance is at historical average minus one standard deviation in 2009–10	114	113	115	112	109	112	108	102
B3. Combination of B1–B2 using one-half standard deviation shocks	114	114	118	113	110	112	103	93
B4. One-time 30 percent real depreciation in 2009	114	147	143	137	132	131	119	107
B5. 10 percent of GDP increase in other debt-creating flows in 2009	114	138	137	133	130	132	126	114
Debt Service-to-Revenue Ratio²								
Baseline	9	8	8	7	6	7	7	8
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	9	8	8	7	7	8	9	12
A2. Primary balance is unchanged from 2008	9	8	7	7	6	7	7	7
A3. Permanently lower GDP growth ¹	9	8	8	7	6	7	8	10
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2009–10	9	8	8	7	7	8	8	11
B2. Primary balance is at historical average minus one standard deviation in 2009–10	9	8	8	7	6	7	7	9
B3. Combination of B1–B2 using one-half standard deviation shocks	9	8	8	7	7	8	8	9
B4. One-time 30 percent real depreciation in 2009	9	8	8	8	7	8	8	9
B5. 10 percent of GDP increase in other debt-creating flows in 2009	9	8	8	7	7	8	8	9

Sources: Country authorities; and IMF staff estimates and projections.

¹Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).²Revenues are defined inclusive of grants.

Figure A3. Haiti: Public External Debt Indicators Compared to 2006 Debt Sustainability Analysis¹



Source: IMF staff projections and simulations.

¹Includes interim HIPC debt relief in 2007 and 2008 but no HIPC completion point.

as other debt indicators are below critical thresholds. Moreover, it is worth noting that Haiti's very high and stable level of private remittances (about 19 percent of GDP in FY2007) provides a reliable inflow of foreign exchange to the country, which reduces its external vulnerability to some extent.

Provision of irrevocable HIPC debt relief and MDRI at the floating completion point would result in a substantial reduction of Haiti's debt burden. This suggests some scope for additional external borrowing in order to maximize the resource envelope available to achieve the Millennium Development Goals while limiting the risk of debt distress. However, a careful approach to scaling up external financing would remain advisable, given that debt indicators deteriorate rapidly in scenarios with large additional concessional borrowing—such as the one that may become available under the PetroCaribe agreement—or less concessional financing terms.

Looking ahead, there is a need to further strengthen debt management. Strengthening debt management capacity will be important, among other things, to prepare for and adequately support the development of an active domestic debt market. Priorities in this area, beyond the establishment of a single debt database, include (1) clarifying by law the debt management responsibility of the BRH and the MEF; (2) improving information sharing, including frequent debt reconciliation exercises, between the BRH and the MEF; (3) shortening the procedures for debt-service payments; (4) improving the tracking of disbursements; and (5) training staff.

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