

**UNIVERSITA' CATTOLICA DEL SACRO CUORE  
MILANO**

**Scuola di dottorato in Politica economica**

**Ciclo XXI**

**S.S.D.: SECS-P/01; SECS P/02; SECS-P/05; SECS-P/06**

**Volatility, Debt and Growth: the Role of Fiscal Policy in Low  
Income Countries**

*Overview of theory and empirical evidence using case studies*

**Tesi di Dottorato di: Luca Bandiera**

**Matricola: 3480078**

**Anno Accademico 2008/09**



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## Foreword

The author of these research papers is an Economist the World Bank responsible for the Implementation of the HIPC Initiative, and the Task Team Leader for Fiscal Sustainability Analysis. The three research papers presented in this dissertation were drafted during 2005-08 in relation to the author's work with colleagues in the World Bank. The paper titled "Kenya's Quest for Growth Stabilization and Reforms—But Political Stability?" (presented in Chapter 3) was published as World Bank Policy Research Working Paper No. 4685, and represents the background for the 2008 Kenya's Country Economic Memorandum, a World Bank publication . The author's main contribution to this paper focuses on sovereign risk and the government intertemporal budget constraint GIBC (sections 3.4 and 3.5). The paper "How to of Fiscal Sustainability in Oil-Rich Countries: The Case of Azerbaijan" (presented in Chapter 4) was prepared for a conference on "Fiscal Sustainability: Analytical Developments and Emerging Policy Issues", organized by the Bank of Italy, in Perugia, in April 2008. This draft is also part of a broader World Bank project aimed at designing a fiscal sustainability analysis tool to be used by both professional economists and country authorities. The author's main contribution to the paper focuses on the methodology (section 4.2) and the simulations (section 4.3). The paper "Growth Determinants in Fragile States and Heavily Indebted Poor Countries" (presented in Chapter 5) was published in the book "Debt Relief and Beyond". In this paper the author is responsible for the parts defining the object of the analysis (sections 5.1 and 5.2), the interpretation of results, and policy implications (section 5.3).

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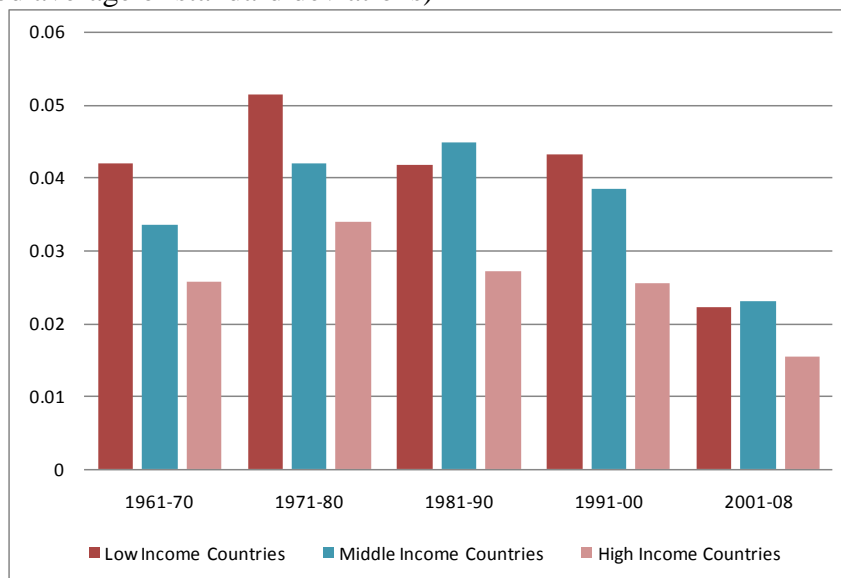
# 1 Introduction

Research on the negative effect of debt on economic growth has mainly focused on middle income countries (MICs) and market access countries (MACs), the latter a group of MICs with unconstrained access to international capital markets (Reinhart, Rogoff and Savastano, 2003). Literature on the effects of macroeconomic volatility on growth focusing on MICs was developed in the 1990's (Fischer, 1993). Few studies have attempted to analyze the nexus between debt and growth in low income countries (LICs). This collection of papers attempts to fill this gap, by examining the applicability of the conceptual framework linking volatility, debt and growth to LICs. Specifically, the papers focus on the role of fiscal policy in LICs, its relevance for achieving and maintaining debt sustainability deterring economic crisis and excessive growth slumps. Results indicate that LICs fiscal policies do not necessarily play a key role in ensuring respect of the government intertemporal budget constraint and debt sustainability. This result is in stark contrast with existing economic research on fiscal sustainability in MICs leading to different implications for policy conducts in LICs.

Growth in developing countries (defined as MICs and LICs) is more volatile than in high income countries (HICs), while in LICs growth is more volatile than in MICs.<sup>1</sup> Volatility in LICs is also associated with lower per capita growth (Figure 1.1 and 2.1)

Figure 1.1. Growth Volatility by Income Groups

(Period average of standard deviations)

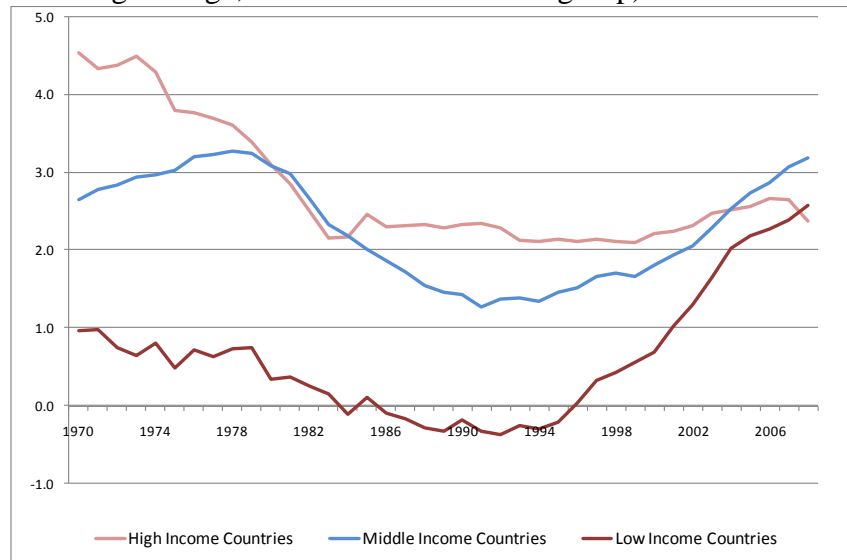


Source: Global Development Finance, The World Bank.

<sup>1</sup> The definition of HICs, MICs and LICs follow the classification of the World Bank Global Development Finance, 2009.

Figure 1.2. Growth of Per-Capita GDP by Income Groups

(10-year rolling average; median of each income group)



Source: Global Development Finance, The World Bank.

Long term sustained growth remains elusive for most developing countries. The growth commission (World Bank, 2008) reports that over the last 50 years only 13 countries have managed to grow no less than 7% per year for an uninterrupted period of 25 years, and double their income every 10 years. None of these countries belongs to the LICs group. Not surprisingly LICs, especially in Sub-Saharan African small states and resource-rich countries, are instead singled out as struggling to achieve durable growth.

Undoubtedly, macroeconomic stability, defined as the absence of external and internal disequilibria, is a necessary condition for achieving sustained growth (Fischer, 1993). Volatility is a tax on private sector investment (Rodrik, 1991), and eventually on growth. Macroeconomic volatility increases uncertainty and reduces the horizon of private sector investments, distorts the allocation of resources in favor of quicker returns providing disincentive for long-term plans (because the long-term expected yields are subject to higher risk). Lowering volatility contributes to private sector development and ultimately to growth (Aizenman and Pinto, 2005).

Literature points to macroeconomic volatility as determinant of debt intolerance, that is the recurrence of debt crisis in MICs at much lower levels of debt compared to developed countries (Reinhart, Rogoff and Savastano, 2003; Catao and Kapur, 2006). MICs tend to experience debt servicing problems at ratios of total external, public and private, debt as low as 25-30 percent of GDP. The threshold is even lower for public external debt. More recent evidence points to the recurrence of domestic debt crisis associated with high level of inflation (Reinhart and Rogoff, 2010). Even though, countries with volatile GDP would prefer a higher optimal level of debt to maximize intertemporal consumption over time (assuming agents adverse to risk), empirical evidence shows that debt intolerance tends to dominate due to incomplete markets and negative effects of debt on growth (Catao and Kapur, 2006).

Therefore, macroeconomic volatility has a long lasting negative effect on growth and it is associated with a higher probability of default episodes, which, in turn, increase volatility and further depress growth. Hence, countries which, according to neoclassical theory, would benefit the most from

borrowing and that borrow externally because their domestic marginal return on capital is higher than their ex-ante cost of borrowing from international capital markets, suffer the most from higher debt and would instead benefit the most from maintaining not only debt levels considered sustainable, but from limiting macroeconomic volatility that increases the probability of future debt default for any given sustainability threshold (Schabert and van Wijnbergen, 2006).

Fiscal sustainability is determined by the government intertemporal budget constraint (GIBC), where fiscal policy and macroeconomic variables (growth, inflation, exchange rate and interest rate) determine the path of public debt. Ruling out Ponzi schemes, fiscal sustainability requires that the present value of primary balances equals current net debt. However a more practical definition would also refer to the current fiscal stance of a government. Fiscal policy is considered sustainable if debt ratios do not increase indefinitely without requiring major policy change in the future. A sufficient condition for solvency requires primary balances to be positively correlated to debt surprises, or deviations from the period average (Bohn, 1989), but empirical research shows that emerging market economies as a group exhibit a lower average primary balance (adjusted for cycle fluctuations) than industrial countries at any level of public debt (IMF, 2003). The response of the primary surplus weakens as the debt-to-GDP ratio rises in emerging market economies, and this response ceases altogether when debt exceeds 50 percent of GDP. This suggests that—on average—the conduct of fiscal policy in emerging market economies is not consistent with ensuring sustainability once public debt exceeds a threshold of 50 percent of (IMF, 2003).

A highly indebted country is more likely to experience a macroeconomic crisis in the face of shocks and severe crisis have the most long lasting effects on growth (Hnatkowska and Loayza, 2004). Therefore maintaining a level of debt which reduces the probability of a crisis would help developing countries to achieve long term growth or return to growth faster after a crisis event. To do so, all the determinants of the GIBC and policies available to the government to influence them should be considered. Literature on the debt crisis, points to the negative effects of high debt on growth and singles out the importance of fiscal policy, which cannot be substituted for by debt management or financial engineering in order to maintain debt sustainability (Gill and Pinto, 2005). But more recent studies also prove that both low growth and high debt could be symptoms of poor quality of past policies and institutions, which have strong explanatory power in explaining default episodes (Kray and Nehru, 2006). This result may further broaden the scope of action and responsibility of the government in maintaining a stable macroeconomic environment.

The literature considered above has been mainly developed in the context of market access countries, countries which face borrowing costs determined in the international capital market, but similar considerations seem also appropriate for LICs, that mainly rely on official creditors (country governments) or international financial institutions (IFIs) such as the IMF, the World Bank and regional development banks to secure the bulk of their external financing requirements. LICs appear to be more vulnerable to exogenous shocks than MICs. They also tend to have less developed domestic debt markets and therefore to rely more on external debt. Their quality of policies and institution is on average poorer than MICs. As a result, high debt and high vulnerability to shocks would compromise macroeconomic stability and hurt growth more, or more often, in LICs than in MICs.

World Bank research (Varangis et al., 2004), has found that LICs, especially the poorest, are disproportionately affected by exogenous shocks, especially fluctuations in commodity prices.<sup>2</sup> The

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<sup>2</sup> Exogenous shocks can be defined as commodity price changes, natural disasters, the sudden withdrawal of aid, the imposition of trade barriers in partner countries, or externalities that result from conflict in a neighboring country.



frequency and severity of shocks are higher in LICs than in countries with higher income, and shocks are closely correlated with growth. The effect of shocks on growth is asymmetric and positive shocks do not offset negative ones partly because negative shocks have irreversible effects. Negative shocks have important effects on private consumption, and very often lead to increases in poverty. LICs are disproportionately affected by shocks, because they lack external cushions (such as large foreign exchange reserves) and internal stabilizers (such as well-developed credit and risk markets) to protect them against shocks. In the absence of a stabilizing mechanism, an input shock, such as a drought for instance, translates very quickly into an output shock and a fall in consumption. However, external shocks are found to explain only a fraction of total output volatility in LICs (Raddatz, 2007). Internal causes, resulting from conflicts, political instability, and economic mismanagement, are the main source of fluctuations. In addition, highly indebted countries and countries with bad institutions tend to be more vulnerable to commodity price shocks and the world business cycles than other LICs.

The possibility to differentiate the risk using financial markets seems constrained. Research shows that consumption does not appear to be less volatile in countries with more developed financial system (Prasad et al., 2003). More so, capital flows are pro cyclical, and dry up in bad years, increasing the negative effects of external financing during crisis years (Kaminsky, Reinhart, and Vegh, 2003). This seemed also relevant during the current financial crisis where evidence (IMF 2010) has pointed to a generalized increase in domestic debt financing in LICs, facing reduction in fiscal revenues, to finance budget deficit. Therefore consistent intertemporal government policies seems not only the first line of defense, but the main one against devastating shock to the economy. Fiscal policy should not only look at the expected evolution of the GIBC but explicitly consider uncertainty in the evolution of key macro variables and set fiscal policy in a way which would avoid crisis outcome.

Empirical research on debt dynamics in MICs shows that most of the episodes of large debt decreases are determined by significant increases in fiscal surpluses (Budina and Fiess, 2004). While macroeconomic shocks to interest rates and exchange rates, together with country specific factors, such as the recognition of contingent liabilities, would determine episode of rapid debt accumulations. . In line with IMF (2003) literature this study shows that debt levels in MICs rise suddenly, and in large amounts following a crisis, while debt reductions are slow.

In the following sections we show that for LICs the role of fiscal policy is more nuanced. Prudent fiscal policy, on average, contributes to the reduction of debt levels in LICs. However, in extreme episodes of debt increases and decreases, the role of fiscal policy in lowering debt is downplayed: movements in exchange rates are the main force explaining both rapid increases and decreases in total public debt in LICs. This result implies different conclusions of economic policy about what would help LICs achieve debt sustainability.

## **1.1 Policy implication for LICs**

The analysis of debt dynamics in episodes of extreme increases and decreases of public debt in LICs presents a striking difference with respect to the similar analysis applied to MICs. If in the latter fiscal policy, together with growth, interest rates and real exchange rate dynamics, has had a key role in reducing the level of public debt over time, in LICs, public debt has increased and decreased in the presence of primary fiscal deficits. Assuming that the government plays a central role in the economies of LICs and MICs alike, its policies in LICs do not have to necessarily focus on posting primary surpluses to ensure the respect of the GIBC and therefore public debt sustainability, a necessary condition for achieving prolonged growth.

Policies that improve the business environment, political stability, and macroeconomic stability could be more relevant in LICs for ensuring debt sustainability. Empirical research (see Kraay and Nehru, 2006) illustrates that contemporaneous improvements in the quality of policies and institutions reduces the risk of debt distress in LICs and make other possible determinants of the risk of debt distress present in the literature for Market access countries (MACs) less relevant for LICs, because of their different debt structure and their greater vulnerability to shocks.

The four chapters following below present the results of empirical research applied to LICs at different levels of development and with different characteristics of their economy. Chapter 2 defines the roles of fiscal policy in LICs during episodes of large increases and decreases of public debt. The following three chapters use different methodologies to present results that may help prioritize macro policies in LICs. These papers emphasize the role of perceived political risk, macroeconomic volatility and quality of institutions on the effectiveness of fiscal policy to achieve and maintain fiscal sustainability with positive implications for growth.

- Chapter 3 analyses the growth performance and the reduction in public debt achieved in Kenya since 1995, through microeconomic and macroeconomic links. The chapter argues that key to achieve faster growth and lower debt was not the posting of continued fiscal surpluses, rather the perceived decrease in political risk, before the 2007 elections, coupled with reforms in the composition of fiscal revenues. The paper presents evidence from Investment Climate Assessments and discusses policy changes related to the composition of revenues and expenditures to show how Kenya achieved a dramatic reduction in public borrowing costs, compared to peers, increased growth and reduced public debt, but at the same time increased its primary deficit.
- Chapter 4 considers the case of Azerbaijan, an oil- and gas-rich LIC, where natural resources will be depleted in the medium term. As for many other resource-endowed LICs, the conduct of fiscal policy is heavily dependent on fiscal revenues deriving from the extraction of natural resources and, consequently, by the volatility of the price of those resources determined on international markets. The chapter argues that in resource-rich countries, fiscal policy should minimize the negative effects of price volatility on government revenues, expenditures, public debt and ultimately the economy. A number of fiscal rules, including a permanent income rule, are discussed in a stochastic model to address the problem of uncertainty of fiscal policy related to the fluctuation of revenues from natural resources. The use of fiscal rules is important in resource rich LICs to support economic diversification, and to determine the provision of public goods, including physical infrastructure with unclear financial rate of return.
- Finally, Chapter 5 focuses on growth determinants on those LICs where leaving conditions could be considered at the bottom of any ranking of human development (Collier, 2007). The chapter applies Bayesian Moving Average (BMA) technique to allow for model and parameter uncertainty in the determination of growth covariates. The analysis considers two groups of partly overlapping countries, which are seldom studied for lack of readily available data: Heavily Indebted Poor Countries (HIPCs, see for example World Bank, 2009) and Fragile States (World Bank, 2007). BMA regressions find that those countries that (i) graduated under the HIPC Initiative and obtained debt relief and (ii) improved the quality of their policies and institutions also benefited from a growth dividend resulting from further debt reduction. Based on a limited sample, the analysis identifies threshold effects related to the level of debt and the quality of policies for fiscal policy to become effective in fragile heavily indebted LICs.

## 2 Determinants of Public Debt Dynamics in LICs

This section examines the determinants of public debt dynamics LICs over the period 1990-2003. Debt dynamics in LICs is influenced not only by macroeconomic variables but also by the composition of debt and the provision of debt relief over time. The determinants of debt dynamics in LICs are described through a modified version of the textbook debt decomposition formula<sup>3</sup> to take into account the average level of concessionality of the external debt portfolio in LICs and the terms of new borrowing<sup>4</sup>. The paper also examines in detail the major shocks that led to debt crisis in the LICs under consideration.

The study considers a sample of 17 LICs in Africa (13), Asia (3) and Latin America (1), for which data on public external as well as domestic debt were available for the period 1990-2002<sup>5</sup>. Determinants of extreme episodes of debt accumulation and decreases are analyzed on the basis of 7 country case studies (Ethiopia, Ghana, Nigeria, Bolivia, Vietnam, Laos and Uganda)<sup>6</sup>.

The average public debt-to-GDP ratio in these LICs amounted to 131 percent in 1990 and declined to 115 percent in 2002 (Figure 2.1). In present value (PV) terms, the ratio of public debt to GDP declined from 83 to 75 percent. Debt dynamics can be described by two successive waves of increase and decrease in terms of GDP. The PV of public debt in percent of GDP increased to 86 percent in 1992 and declined steadily to 66 percent in 1996, before increasing again to 78 percent in 1998 and declining to 60 percent in 2001. In 2002, debt ratios in the 17 countries included in the analysis has increased by 6 percentage points of GDP to 66 percent. For the 7 countries for which detailed studies were done, debt data to end-2003 were available and signaled a continued increase the debt ratios, compared to 2002.

The average trend hides ample differences among countries in the sample. Countries are presented according to decreasing ratios of PV of debt to GDP in 2002, in Figure 2.2. In 9 countries out of 17, the PV of external debt to GDP ratio declined over the period 1990-2002, but in 14 out of 17 countries domestic debt increased from an average of 7.6 percent of GDP in 1990 to an average of 14.0 percent in 2002, tilting the PV of total public debt upwards in 9 countries out of 17.

Different debt dynamics characterize HIPC and non-HIPC countries included in the analysis. For the 11 countries that obtained relief under the HIPC Initiative by 2002, the PV of public external debt remained virtually unchanged from 1990 to 2002 at about 67 percent of GDP, but the domestic debt increased markedly from 9 to 16 percent of GDP. However, in 6 HIPCs the PV of public debt decreased in 1990-2002. In the 5 non-HIPC LICs, the PV of external debt in 2002 was more than 20 percentage points of GDP lower compared to the level in 1990. However, excluding Vietnam, which has a PV of debt to GDP ratio of 284 percent in 1990, the average ratio for non-HIPCs LICs signals a marked increase in the PV of external debt with respect to GDP, from 46 percent in 1990 to 71 percent in 2002. Domestic debt remained stable between 10-11 percent of GDP and only 1 country, Nigeria, achieved a substantial reduction in the PV of public debt over the period.

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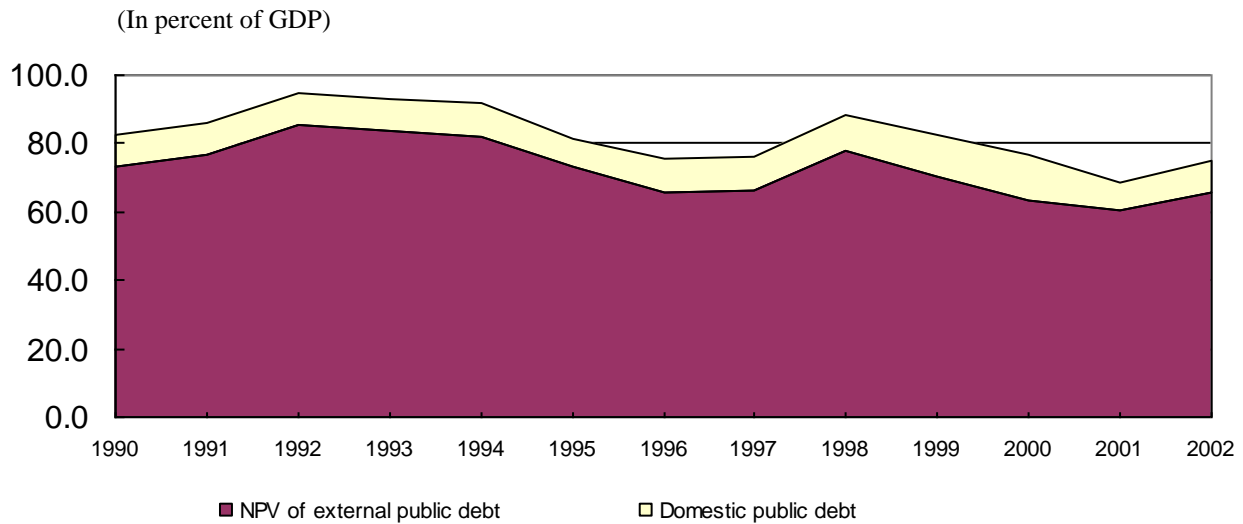
<sup>3</sup> See for example Burnside, 2003.

<sup>4</sup> The Appendix 2 develops the accounting framework used for the decomposition of the changes in the PV of debt-to-GDP ratio.

<sup>5</sup> The 17 Low Income Countries include: Burundi, Ethiopia, The Gambia, Ghana, Lesotho, Madagascar, Malawi, Nigeria, Rwanda, Sierra Leone, Tanzania, Zambia, Bolivia, Vietnam, Laos, Bangladesh and Uganda.

<sup>6</sup> See Bandiera 2006.

Figure 2.1. Average Public Debt Trends for 17 LICs



Sources: see Box 2.1.

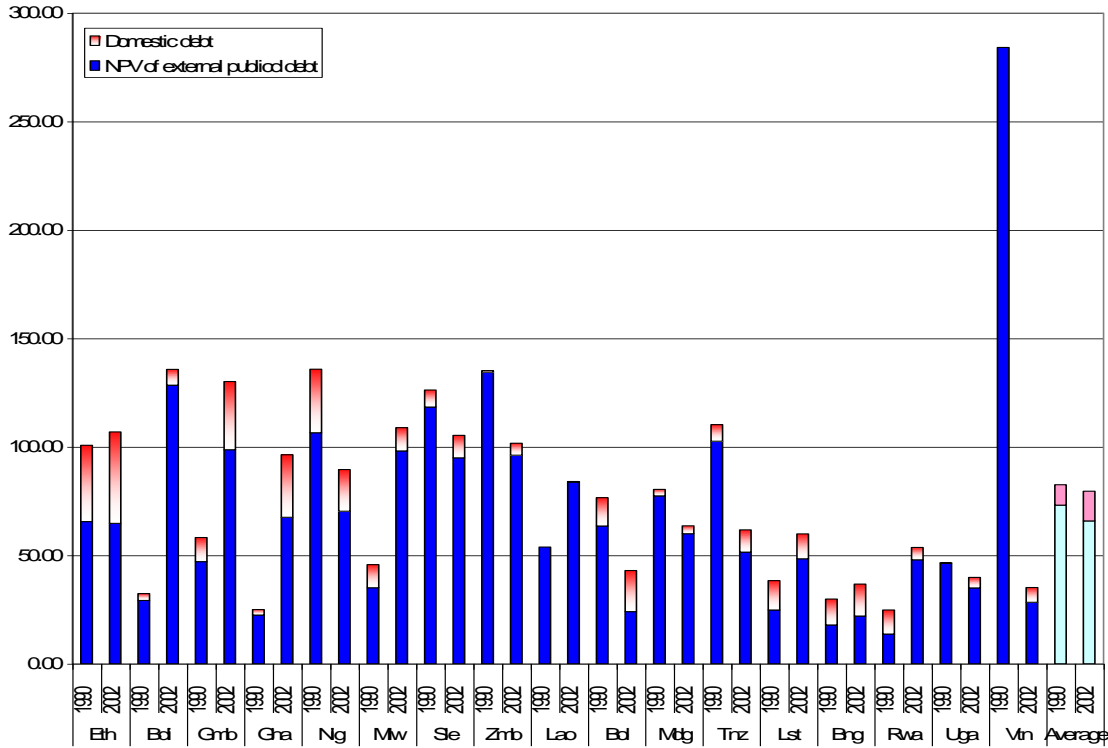
## 2.1 Composition of public debt

The composition of public debt in LICs is analyzed with respect to the creditors, the level of concessionality and the share of domestic and external debt in the period 1990-2002. In the 17 LICs, external public debt is composed mainly by concessional debt, owed to official bilateral and multilateral creditors. Such debt has gradually substituted commercial debt or debt extended by export credit agencies that used to dominate in the 70s. Over the period considered in the analysis, the share of concessional debt has increased from 54 percent of total debt in 1990 to 76 percent in 2003. LICs owed more than 50 percent of their debt to multilateral agencies and 45 percent to official bilateral creditors in 2003. From 1990 to 2003, the share of multilateral creditors in total LICs debt increased from 26 to 51 percent while the share of bilateral official creditors decreased from 55 to 45 percent. Over the period, commercial creditors' share has decreased from 18 percent to less than 5 percent of total debt. Emblematic is the case of Bolivia, where commercial creditors represented 46 percent of total debt outstanding in 1980. Their share has constantly decreased until it dropped below 1 percent in 1996.

Domestic debt has doubled from 1990 to 2002, from 7 to 14 percent of GDP, but, with the notable exception of Ghana and The Gambia, domestic debt has increased by no more than 10 percent of GDP over the period considered. Domestic debt is usually short term, as opposed to the external debt, and carries an *ex-ante* higher real interest rate, compared to external concessional debt. In LICs domestic debt remains a secondary problem with respect to external debt, but the short maturity structure and the high real interest rate represent a risk for the government because of the frequent need to roll over the entire stock of debt.

Figure 2.2. Trends in Public Debt, 1990-2002

(In percent of GDP)



Sources: see Box 2.1.

Note: Countries in this figure are sorted by total debt – to – GDP ratios in 2002.

## 2.2 A Framework for Public Debt Decomposition in LICs

We analyze public debt trends between 1990 and 2002 (2003 in the 7 case studies) by decomposing past changes in the PV of public debt-to-GDP ratios into a number of explanatory factors. Equation (1) is the difference equation for the PV of public debt to GDP ratio, derived in the Appendix 2:

$$\Delta pv_t = pd_t + ndfs_t - \frac{g_t}{(1+g_t)} d_{t-1} + \frac{d_{t-1}}{(1+g_t)} \left[ \frac{\hat{i}_t - \pi_t}{1+\pi_t} - \frac{\alpha_{t-1}(\pi_t^* - \pi_t)}{(1+\pi_t) \cdot (1+\pi_t^*)} \right] - \alpha_{t-1} \frac{RXR_t}{(1+\pi_t)(1+RXR_t)} \frac{d_{t-1}}{(1+g_t)} - dr_t - (1-\phi_t)(d_t^f - d_{t-1}^f) + (\phi_t - \phi_{t-1})d_{t-1}^f + other\_factors \quad (1)$$

where  $pv_t$  is the PV of public debt-to-GDP ratio (defined as the sum of the PV of public and publicly guaranteed external debt and nominal domestic public debt),  $pd_t$  is the primary deficit as a share of GDP,  $g_t$  is the real GDP growth rate,  $\hat{i}_t$  is the weighted average of domestic and foreign interest rates<sup>7</sup>,  $\pi_t$  is domestic inflation rate (proxied by the percentage change in GDP deflator),  $\pi_t^*$  is the US inflation rate (proxied by the percentage change in US GDP deflator),  $\alpha_t$  is the share of foreign currency

<sup>7</sup>  $(1-\alpha_t)\hat{i}_d + \alpha_t\hat{i}_f(1+s_t) = \hat{i}_t$  is average nominal interest on public debt. In practice, it is calculated as an effective interest rate: the ratio of interest payments on debt divided by the previous period stock of debt.

denominated debt in total public debt,  $RXR_t$  is the change in (bilateral, US dollar per local currency unit) real exchange rate<sup>8</sup>,  $dr_t$  is the PV of debt relief,  $\phi_t$  is a function of the interest rate, discount rate, maturity and grace period of debt and  $d_t^f$  is the public and publicly guaranteed (PPG) external debt in terms of GDP.

Equation (1) decomposes the change in the PV of public debt to GDP ratio into the components attributable to the 6 factors shown in Table 2.1:

- (i) the primary fiscal balance net of seignorage;
- (ii) real GDP growth;
- (iii) the implicit real interest rate;
- (iv) the real exchange rate;
- (v) debt relief; and
- (vi) the concessionality of new net borrowing and the change in the terms of the outstanding stock of debt.

The last term, “other factors”, is obtained as the actual change in the debt-to-GDP ratio minus the sum of (i) to (vi). It includes:

- the recognition of contingent liabilities net of privatization proceeds,
- the impact of grants, valuation changes of other foreign currencies vis-à-vis the U.S. dollar
- exceptional financing, such as reserve accumulation and measurement errors.

Below, we provide findings from the aggregate debt decomposition based on equation (1) for 17 LICs and from more detailed case studies.

### 2.3 Data

The main challenge for a study on public debt dynamics in LICs is the quality of data.<sup>9</sup> Significant effort was taken to construct a consistent database over time and across countries (See Box 2.1), yet the main concern lies in the coverage and definition of public debt.

A meaningful comparison across countries requires the use of a uniform measure of public debt. Public and external debts include long-term debt of the national government, sub-national governments, and public enterprises. However, there is a great heterogeneity in the coverage of domestic debt across countries. Most of the countries report only central government debt even though sub-national entities can issue debt. Others have data available for the consolidated public sector including the central bank. Only a few countries report comprehensive gross public debt figures, including public guarantees and pension liabilities. A related statistical issue is the matching and comparability of public debt reports with the reporting of government finance statistics.

Further, long series of debt data are not widely available for many LICs. Information on external public debt is generally more readily available than domestic debt. Conflicting debt figures

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<sup>8</sup>  $RXR$  is defined as  $\frac{1}{1 + RXR_t} = \frac{(1 + s_t)(1 + \pi_t^*)}{1 + \pi_t}$  with  $RXR > 0$  denoting a real exchange rate appreciation.

<sup>9</sup> See for example “World Development Report 2009”, of the World Bank, which reports external debt data for 120 of the 122 countries reported in the publication, but domestic public debt data for only 40 countries. All 40 HICs are reported with missing data and most of the remaining 42 countries without available domestic debt data are LICs.

may be found even for identical coverage and definitions.<sup>10</sup>

### *Box 2.1. Data for the Low Income Countries*

This section considers the public debt in 17 LICs. The debt data used the most comprehensive measure of public sector available. The sample includes data from 1990 to 2002. Total nominal stock and PV of public debt is constructed on a gross basis as the sum of : (a) the nominal stock or PV of external public and publicly guaranteed debt and (b) nominal domestic debt. Domestic debt includes only the outstanding, direct, fixed-term contractual obligations of government held by residents. The definition does not include government guaranties (as opposed to the definition of PPG external public debt), contingent liabilities and floating debt resulting from unpaid government obligations, unless converted into a fixed-term contractual obligation. The sources for public debt include IMF World Economic Outlook (WEO), various IMF Country Reports, Global Development Finance (GDF), and the internet sources of the countries' central banks and treasuries.

Data on public sector fiscal balances (primary and overall) and interest payments are taken from IMF WEO and various IMF Country Reports, and World Bank GDF. GDP, GDP deflator, and nominal exchange rates are taken from IMF WEO, IMF IFS, and World Bank GDF. Data on privatization and recognition of contingent or hidden liabilities are compiled from IMF Country Reports.

Debt relief is defined as the PV of the reduction in the stock of external debt as a result of debt cancellation and debt buyback and as the grant element of flow rescheduling of existing debt.

## **2.4 Aggregate public debt decompositions for 17 LICs**

The decomposition of changes in the average PV of debt-to-GDP ratios for the 17 LICs during the period 1991-2002 indicates that (Figure 2.3): (i) primary fiscal surpluses, real GDP growth, real interest rates have contributed to a reduction in the average public debt-to-GDP ratio throughout the whole period; (ii) real exchange rates contributed to the increase in the PV of debt ratios in the period considered; and (iii) the contribution of debt relief to the decline in debt-to-GDP increased markedly in 2000, when most of HIPC countries started receiving debt relief.

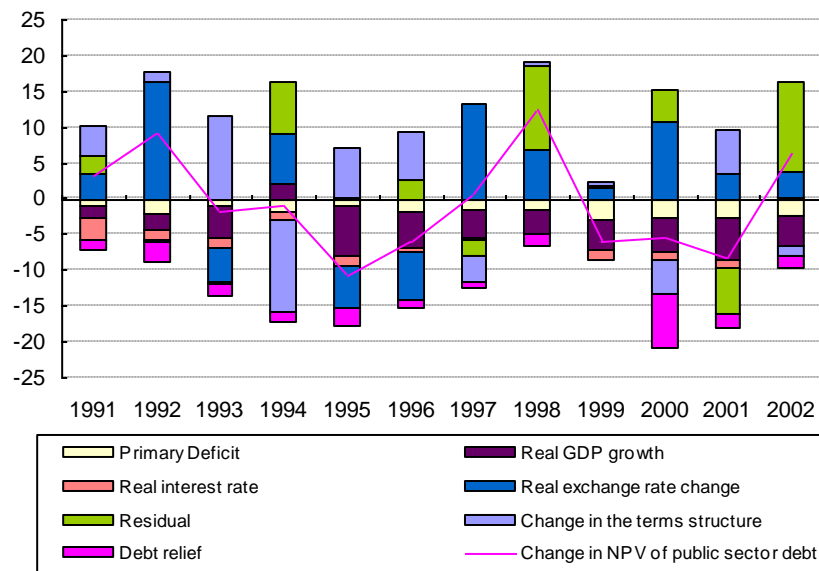
The aggregate cumulative debt decomposition was divided into periods of decreases and increases in the PV of public debt-to-GDP ratio (Table 2.1). The two periods of increase in the PV of public debt-to-GDP ratio lasted only 1 year each and the real exchange rate depreciation was the only identified component contributing to the increase in debt ratios in both periods. The depreciation in the real exchange rate was caused by a large depreciation in the nominal exchange rates in 1992 and in 1997-98. In 1991-92, a worsening of repayment terms, as indicated by a positive value of the contribution in the changes in the terms structure, indicate that the increase in the PV of public debt ratios was partly caused by the accumulation of arrears from 13 percent of total debt in 1991 to 18 percent in 1992.<sup>11</sup> Conversely, the increase in the PV of debt to GDP ratio in 1997-98 was accompanied by a further increase in the level of concessionality of new borrowing, indicating that the second period of debt increase was mainly caused by an increase in the volume of official concessional lending.

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<sup>10</sup> See also IMF (2003), which reports similar problems with debt data.

<sup>11</sup> PV assumes that the present value of an increase in arrears is equal to the arrears nominal increase. A increase in arrears decreases the grant element of foreign debt.

Figure 2.3. Public Debt Dynamics of 17 LICs



Note: The interpretation of this chart is as follows. Each column represents the contribution of each factor in the debt decomposition of the year on year change in the PV of debt/GDP ratio. Items above the zero line contribute to an increase in the PV of debt/GDP ratio, while items below the line contribute to a reduction in the ratio. As an example, a negative sign for *Contribution from real exchange rate change* in a given year indicates that real appreciation during that year contributed to a reduction in the PV of debt/GDP ratio. On the same token, a positive sign for the *Real exchange rate change* indicates that a real depreciation increased the PV of debt ratio during that year.

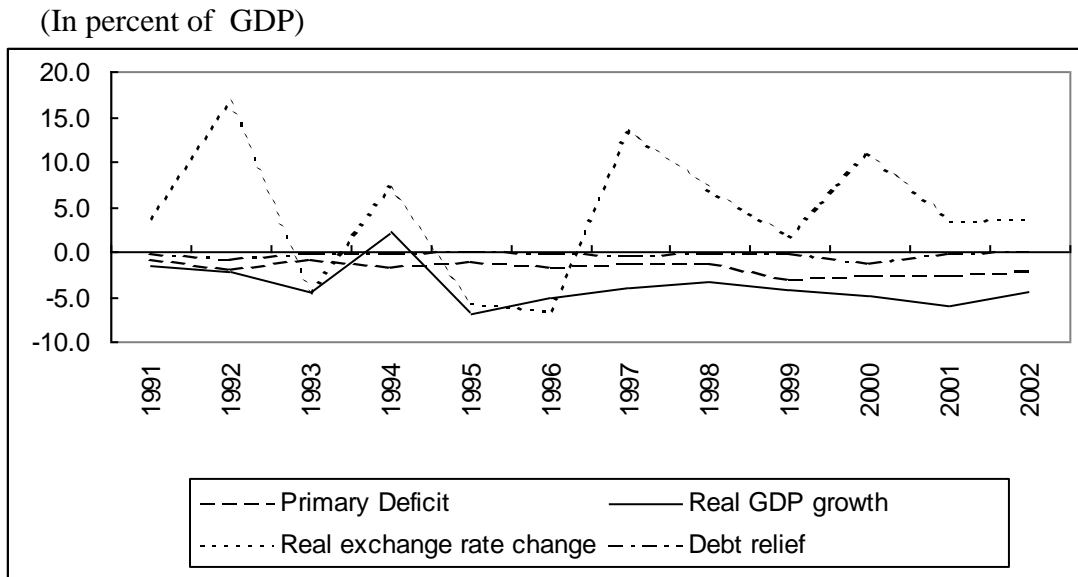
Table 2.1. Cumulative debt decomposition for 17 LICs

Public Debt Decomposition	2.4.1.1.1 Percent of GDP				
	1991-2002	1991-92	1993-96	1997-98	1999-02
Total Change in PV of Public Debt	-7.4	12.3	-19.6	13.2	-13.3
Primary Fiscal Balance	-21.7	-3.0	-5.4	-2.8	-10.5
Real GDP Growth Rate	-45.0	-3.7	-14.4	-7.4	-19.4
Real Interest Rate	-13.1	-4.7	-4.8	-0.6	-3.0
Real Exchange Rate	49.1	19.9	-10.4	20.2	19.4
Debt Relief	-24.2	-4.1	-6.8	-2.5	-10.9
Change in Terms Structure	15.0	5.7	12.1	-3.1	0.3

During 1993-96 and 1999-02, real GDP growth was the main factor contributing to the decrease of the ratio of the PV of public debt to GDP (Figure 2.4). Fiscal surpluses increased significantly with respect to previous periods, to an average of 2.6 percent per year in 1999-02, compared to an average of 1.4 percent before (Figure 2.4). Debt relief contributed to 24.2 percent of decline in the PV of debt to GDP in 1991-2002 with the largest contribution in 2000-02 when most of HICPs started receiving stock of debt relief and the Paris Club agreed to grant debt relief to Nigeria. Real interest rates remained low, given that most of the debt was not contracted at market terms.



Figure 2.4. Contribution to Debt Dynamics



## 2.5 Case Studies: Episodes of Debt Increases and Decreases in LICs

The 7 individual case studies<sup>12</sup> show that most countries experienced episodes of sharp increases and progressive reductions in debt-to-GDP ratios between 1990 and 2003. Based on the case studies, we identified 10 episodes of large debt reductions and 6 episodes of large debt increases. Table 2.2 and Table 2.3 rank the most important factors that contributed to changes in debt ratios during these episodes.

For the episodes of large debt reductions, ranging between 30 and 190 percentage points of GDP, we found that: (i) all episodes involved GDP growth as one of the main contributing factors to the decline, (ii) no episode involved primary surpluses as main factor, while in 8 out of 10 episodes of fiscal deficits weighted against the decrease in public debt, (iii) 60 percent of debt reduction episodes involved real exchange rate appreciations and (iv) 50 percent of episodes involved either debt relief or changes in the terms structure of external debt or both.

For the 6 episodes of large debt accumulations, ranging between 18 and 109 percentage points of GDP, we found that: (i) 5 out of 6 episodes involved primary deficits; (ii) 5 out of 6 debt increases took place in correspondence with sharp real exchange rate depreciations and; (iii) real GDP growth counteracted the increase in the ratio of the PV of public debt to GDP.

Even though, on average, LICs ran fiscal surpluses during 1991-02, fiscal surpluses were not a key factor in reducing the debt burden in LICs in extreme episodes. Real exchange rate appreciation appears to have been a key factor in the periods of decrease or increase of the debt ratios, because of the high proportion of public debt denominated in foreign currency. Real interest rates appear not to represent an important factor in the explanation of debt dynamics, because most of the external debt held by LICs had fixed interest rate. Therefore, the interest rate structure of public debt was not significantly affected by changes in domestic interest rates.

<sup>12</sup> The case studies are Ethiopia, Ghana, Nigeria, Bolivia, Vietnam, Laos and Uganda, see Appendix 1.

*Table 2.2 Public Debt Reduction Episodes in Low Income Countries, 1990 to 2003*

<b>Country, Time Period</b>	<b>Total Change (% of GDP)</b>	<b>Initial level (% of GDP)</b>	<b>Main Contributing Factors (Reducers; % of GDP)</b>	<b>Main Contributing Factors (Increaseers; % of GDP)</b>
Bolivia, 1995-1998	-30.0	78.3	GDP growth (-10.1) Change in terms (-9.1) Debt Relief (-7.6)	Primary deficit (3.0)
Ethiopia, 1994-1996	-36.2	209.3	GDP growth (-34.3) Real Interest rate (-6.9) Other factors (-6.6)	Primary deficit (3.1)
Ethiopia, 1998-2000	-83.8	176.3	Debt Relief (-79.9) Change in terms (-18.1) GDP growth (-17.0)	Primary deficit (17.4) Real exchange rate (11.6)
Ghana, 2000-2003	-78.8	130.1	Real Exchange Rate (-53.7) GDP growth (-20.6) Change in terms (-14.2)	Other factors (12.5)
Lao PDR, 1998-2003	-46.9	109.6	Real Exchange Rate (-69.7) GDP growth (-51.2) Real interest rate (-11.3)	Grant element of debt (88.9) Primary deficit (17.9)
Nigeria, 1994-1996	-71.9	153.7	Oil revenues (-38.9) Real Exchange rate (-36.1) Real Interest Rate (-15.6) GDP growth (-10.2)	Nonoil Primary surplus (17.5)
Nigeria, 2000-2003	-22.3	85.3	Oil revenues (-99.2) GDP growth (-17.4) Real exchange rate (-8.1)	Nonoil Primary surplus (77.9) Other factors (18.0) Real interest rate (8.0)
Uganda, 1992-1997	-42.0	75.3	Real Exchange Rate (-43.3) GDP growth (-25.0) Debt Relief (-4.8)	Grant element of debt (17.9) Other factors (16.2)
Vietnam, 1990-1996	-190.1	284.2	Real exchange rate (-199.5) GDP growth (-98.8) Real interest rate (-24.6)	Grant element of debt (133.1) Primary deficit (12.7)
Vietnam, 1999-2003	-39.6	79.6	Debt Relief (-29.2) GDP growth (-14.2) Change in terms (-12.6)	Off budget factors (15.2) Primary deficit (9.9)

Table 2.3 Public Debt Increase Episodes in Low Income Countries, 1990 to 2003

Country, Time Period	Total Change (% of GDP)	Terminal level (% of GDP)	Main Contributing Factors (Increasers, % of GDP)	Main Contributing Factors (Mitigators, % of GDP)
Ethiopia, 1991-1994	108.5	209.3	Real exchange rate (108.8) Primary deficit (20.8)	Real Interest rate (-22.8) GDP growth (-10.9)
Ghana, 1990-1993	41.6	66.6	Real Interest rate (35.2) Primary deficit (12.9) Other factors (13.2)	GDP growth (-9.8) Grant element (-7.7)
Ghana, 1998-2000	52.9	130.1	Real exchange rate (85.2)	Grant element (-26.3) GDP growth (-9.2)
Lao PDR, 1996-1998	66.4	109.6	Real exchange rate (127.2) Primary deficit (12.4)	Grant element (-57.2) GDP growth (-18.5)
Nigeria, 1992-93	28.3	164.1	Real exchange rate (59.9) Nonoil Primary deficit (37.4)	Oil revenues (-64.5) Real interest rate (-8.7)
Uganda, 1998-2003	13.1	46.5	Real exchange rate (24.7) Primary deficit (17.0)	GDP growth (-23.3) Debt restructuring (-15.6)

## 2.6 Summary of Lessons

Debt dynamics over the 13 years considered shows a high degree of heterogeneity across LICs, which underscores the importance of country-specific factors. These include the fiscal stance, the structure of the economy, the exchange rate system, the composition and structure of the debt and debt management policies. The sections below highlight the main findings of the 7 case studies.

### a) The Role of Fiscal Policy

Primary fiscal surpluses are not a key factor in the reduction of the ratios of the PV of debt to GDP in the LICs considered in the case studies. No countries managed to run large fiscal surpluses for a prolonged period of time during the period considered.

The main reasons underlying mixed fiscal performance are the high level of planned public expenditure, the realization of contingent liabilities, weak revenue collection capacity and the inability to implement countercyclical policies.

- (1) The public sector in LICs often finances a large share of domestic investments and social expenditures as per the poverty reduction documents. For this reason, the timely delivery of committed foreign financing becomes key to avoiding budget overruns.
- (2) Costs associated with financing of inefficient SOEs or publicly owned commercial banks, as in the case of Bolivia, Ghana, Laos and Vietnam, increase fiscal outlays often not covered by foreign financing.
- (3) Revenue collection is usually weak, as in Laos and Ethiopia in the first half of the 90's and collection relies excessively on export tariffs and non-tax revenues from raw material and SOEs.
- (4) Lastly, LICs are unable to run countercyclical fiscal policies and the level of expenditure is

often rigidly tight to commitments made during good years, as in the case of Bolivia's pension reform and expenditure commitments by regional governments in Nigeria, where fiscal policy is linked to current oil revenues.

Consistent debt reduction in LICs were achieved also in presence of prolonged fiscal deficits, but large deficits financed through debt were likely to significantly increase the debt burden, as in the case of Ghana and Nigeria over a short period of time.

#### **b) The Role of automatic debt dynamics**

LICs public debt is mainly long-term external debt at low fixed interest rates. For this reason, the most relevant automatic debt dynamics depends on the real economic growth rate and the real exchange rate, while the real interest rate, or more precisely, the difference between the real interest rate and the real economic growth rate, has a secondary effect on debt dynamics. Our individual case studies show that during the entire period considered all countries maintained positive real growth and low interest rates even in the midst of exogenous shocks. However, terms of trade shocks or the reduction in demand of exports by key trade partners has triggered a sharp real depreciation that increased the debt burden and offset, often in one-year period, the positive results achieved through sustained growth and macroeconomic stability.

The large negative effects of real exchange rate depreciation on the ratio of the PV of debt to GDP depend upon the excessive reliance of LICs on the exports of a few commodities directed to a few trade partners. Reduction in international market prices or regional crises, as in the case of the Asian crises in 1997 or the Latin American crises in 1999, decreases the LICs access to foreign currencies through exports or FDIs and has a negative impact on GDP growth and on fiscal revenues, increasing the need for additional financing in the form of debt.

As noted above, the role of real interest rate is marginal for the composition and terms structure of LICs public debt. However, Ghana and Nigeria represent notable exceptions. The frequent resort to budget financing through domestic debt increased the overall public debt burden, because domestic debt carries higher real interest rates than foreign concessional debt and most of domestic debt has maturity of less than one year implying a high risk of rollover in the event of an increase of interest rates.

#### **c) The Role of Debt Relief**

Each of the 7 LICs considered in the case studies benefited from debt relief, with Bolivia, Ethiopia, Nigeria and Uganda undergoing a number of cycles of debt relief and restructuring events. Rescheduling of debt service, buyback operations or debt reduction, involving only a part of creditors, failed to achieve a permanent exit of the LICs from additional debt relief. In general, the effect of debt relief appears to have had a smaller effect on debt burden than what brought by continued economic growth. However, the reduction in debt achieved by the 7 LICs as a result of agreements implemented in the second half of the '90s was in many cases the most important factor in determining the decrease in debt burden indicators. In many cases, debt relief masked increasing trends in debt ratios as a result of real exchange rate depreciation or primary deficits. Countries that have had large debt restructuring deals before 2003, including Bolivia, Uganda and Nigeria and Vietnam, experienced upwards trend in external as well as domestic debt ratios afterwards. Countries that received debt relief in 2003 (Ethiopia, Ghana and Laos) experienced an increase in domestic debt. Therefore, debt relief, on the one hand, frees up resources that can be used to finance future development expenditures and reduces the negative effects of debt overhang; on the other hand, debt relief does not prevent the build-up of new debt and the recurrence of episodes of debt distress.

#### **d) The Role of Debt Structures**

In LICs, debt structures have changed over the period 1990-2003. More concessional long-term external debt represented more than 75 percent of total debt in 2003, up from 54 percent in 1990. The level of concessionality of new debt lowered the debt burden, by spreading debt service over a long period of time and maintaining the real interest cost close to 0 or negative. In 5 countries out of 7 an increase in the grant element of external debt decreased the ratio of the PV of debt to GDP after 1995. Exceptions are Uganda, whose level of concessional debt decreased after HIPC relief and Nigeria, for which nominal debt, instead of PV debt was used in the analysis.<sup>13</sup>

LICs debt is mainly denominated in foreign currency which increases the risk of shifting debt burdens upward as a result of external shocks affecting the real exchange rate. A predictable repayment schedule and low interest rate did not prevent debt crisis in Ethiopia, Uganda, Bolivia and Ghana.

Domestic debt played a marginal, albeit increasing, role in the period considered. Countries with high domestic debt, such as Nigeria and Ghana tended to have higher real interest cost than countries that limited the issuance of domestic debt. The interest cost could still rise further in countries where forms of debt indexation are introduced, such as Bolivia.

#### **e) The Role of Contingent/Hidden liabilities**

Past, current, and prospective hidden deficits, due to the realization of contingent liabilities can quickly and dramatically raise public debt.<sup>14</sup> Data on contingent/hidden liabilities are extremely sparse and not documented in formal databases. For that reason, the impact of contingent liabilities on debt dynamics is likely to be underestimated in the analysis, as most countries identify their contingent liabilities only ex-post, e.g., the costs associated with banking failures are acknowledged only in the aftermath of a banking crisis. Although some countries (Vietnam, Bolivia) are tracking contingent liabilities, they do not include provisions for probable losses from contingent liabilities in the fiscal accounts. Most countries also do not account for implicit direct liabilities like pension and social security obligations.

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<sup>13</sup> However, the grant element on Nigeria is close to 0 or slightly negative, implying that PV and nominal value of debt are very similar over the period considered.

<sup>14</sup> Contingent liabilities are financial obligations that only become a direct liability for the government if a certain event occurs. A country's financial system is often considered as its most serious contingent liability, as markets expect government support far beyond legal obligations to ensure financial stability (World Bank, 1998).

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### 3 Kenya's Quest for Growth: Stabilization and Reforms—But Political Stability?<sup>15</sup>

Luca Bandiera, Praveen Kumar and Brian Pinto<sup>16</sup>

#### *Abstract*

Kenya's reputation of being politically risky has been manifested in corruption, uncertainty about economic policies, and the importance of political connections in doing business. Its economic liberalization and reforms began in 1993, forced by a tightening of aid by donors on governance grounds and the need for re-establishing credibility following the Goldenberg scandal uncovered in 1992. But tangible results in the shape of favorable government debt dynamics and a pick up in growth took another decade to materialize. We argue that the peaceful presidential election and transfer of power in December 2002 was central to the economic upswing after 2002. The subsequent decline in political risk was singled out by the private sector as a critical factor. We draw on an analysis of debt dynamics, the evolution of domestic interest rates, and the latest Investment Climate Assessment to present evidence on the criticality of low political risk in facilitating good economic outcomes after 2003. The December 2007 elections have highlighted other aspects of political risk - ethnic and social tensions with roots in inequality. Our findings underline the importance of establishing a foundation for long-term political stability and social cohesion in view of the disruptions following the December 2007 elections. This process is likely to be at least as difficult and lengthy as fundamental economic policy and institutional reform.

“It feels good to make history for Kenya and win the gold.”

-- Samuel Kamau Wanjiru, winner of the 2008 Olympics Marathon, *The Washington Post*, Aug. 24<sup>th</sup>, 2008

“Kenyans are Kenyan only once every four years, during the Olympics. The rest of the time, tribal loyalties rule.”

-- Former government official.

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<sup>15</sup> This title is a take-off on “Mexico: Stabilization, Reform and No Growth” (Dornbusch and Werner 1994). With growth picking up in 2003, Kenya appeared to be one step ahead. But it will need to make a fresh start to overcome the disruption and distrust engendered by the December 2007 Presidential elections.

<sup>16</sup> The authors are all at the World Bank. This paper is based on background analysis for a Country Economic Memorandum being prepared on Kenya. We thank Viktoriya Hnatkovska, Mohan Krishnaswami, Claudio Raddatz and Terry Ryan for helpful discussion and comments. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

## Introduction

For decades, Kenya has suffered from low and volatile economic growth—per capita real GDP growth averaged 1.2 percent over the period 1960-2000, overwhelmed by a standard deviation of 4.8 percent.<sup>17</sup> More recently, notwithstanding deeply-entrenched skepticism, Kenya has done well on growth and macroeconomic stabilization. Over the four years 2003-2007, growth averaged 5.5 percent in contrast to virtual stagnation between 1991 and 2002. Inflation was contained to an average 9 percent, but more convincingly, the ratio of government debt-to-GDP fell by 4.5 percentage points per year over this period as interest rates fell and growth picked up.<sup>18</sup> These impressive developments fueled optimism that Kenya might at last be turning the corner and embarking on a path of sustained growth and poverty reduction. However, the violent and disruptive aftermath of the Presidential elections of December 2007 have tempered such optimism.

### 3.1 Objectives and Background

Kenya's reputation has been overshadowed to such an extent by its image of being corrupt and weakly governed that it might come as a surprise that serious reform began as early as 1993. We highlight the crucial role played by declining political risk after 2002 in at last bringing the reforms implemented by Kenya over the previous decade to fruition. Our analysis was completed before the December 2007 elections. It began in mid-2006, at which point our priors were formed on the basis of available reports. Typical were the following quotes from the May 2006 Economist Intelligence Unit report:<sup>19</sup>

*The president....will struggle to see out the remainder of his term because of the damage to his authority and credibility caused by the "no" vote in the constitutional referendum and corruption scandals that have led to the resignation of three senior ministers.*

*The Government of National Unity continues to confront serious divisions....*

Only a few months later, in October 2006, a substantially better assessment appeared in a Standard & Poor's report:<sup>20</sup>

#### *Major Rating Factors*

##### *Strengths:*

- Macroeconomic and political stability becoming entrenched*
- Improving economic growth prospects*

##### *Weaknesses:*

- Low level of economic development with severely limited infrastructure and vulnerability to exogenous shocks*
- High debt compared with similarly rated peers*
- Governance issues*

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<sup>17</sup> Hnatkovska and Loayza (2005), Appendix A pp. 95-96.

<sup>18</sup> For 8 out of 12 years from 1991 to 2002, per capita income growth was almost zero or negative. Debt-to-GDP ratio is till the end of end-June 2007.

<sup>19</sup> All three quotes from "Kenya at a glance: 2006-07" of *Country Report Kenya* May 2006, EIU.

<sup>20</sup> S&P *Credit Research Report Kenya (Republic of)* Oct. 23, 2006. A later report in February 2007, by JPMorgan titled 'Kenya: A return to Macroeconomic Stability' also notes that 'the turning point for Kenya was the 2002 election of President Mwai Kibaki who was elected on an economic reform and anti-corruption platform.'

The EIU quotes convey the image of corruption and political instability, a combination normally associated with stagnation, bad public finances and a poor investment climate. The S&P quotes contain good news on stability and growth but caution that infrastructure is deficient and governance a weakness. We will not try to explain this disconnection in perceptions separated by only a few months but will instead present evidence on a perceptible change for the better in Kenya's macroeconomic outcomes starting in 2003/04. The first step in this study was to attempt an explanation for the puzzling observation that real interest rates on Kenyan treasury bills were surprisingly low, of the order of 1-3 percent. How could a corrupt and politically unstable country (recall the EIU quotes) have such low interest rates? The possibility of manipulation was rejected because Kenya has a fully convertible currency and an open capital account. If interest rates were being kept artificially low, there would be downward pressure on both the exchange rate and foreign exchange reserves; but the opposite was true. When we asked officials or the private sector why interest rates were so low, the standard reply was "Because government's borrowing requirements have come down."

However, a review of the government's debt dynamics strongly suggests that borrowing requirements came down because interest rates fell substantially, not the other way round. Indeed, with the primary fiscal balance having shrunk and concerns about the composition of public spending, the only factor which could explain the big fall in interest rates was a decline in country or political risk.<sup>21</sup> Informal interviews with businessmen supported this idea. The encouraging refrain was: "We no longer need political connections to do business in Kenya." In addition, it was noted that investments and business would continue regardless of the outcome of the then-upcoming Presidential elections eventually held in December 2007. In order to obtain systematic evidence on perceptions of politics and business, questions were added to the Investment Climate Assessment (ICA) conducted in June 2007. We report these results in section 5.

### **3.2 Main Findings and Organization of the Paper**

Serious data deficiencies—in particular, the availability of a consistent GDP series only after 1995/96—are an impediment to an analysis requiring long time series. Our strategy therefore is to persuade the reader by "connecting the dots" among the extent of past reform; a review of the evolution of government indebtedness (measured by the debt-to-GDP ratio) and its underlying determinants; a decomposition of interest rates to gauge devaluation and default risk; and the survey results from the ICA. We conclude that the positive trends after 2003 were being driven by three factors:

- lagged benefits of price, trade, exchange rate and interest rate liberalization forced by reduced aid after the Goldenberg scandal uncovered in 1992;
- solid foundation for solvency based on significant revenue collection as a payoff to the reform of tax policy and administration which started in the mid-1990s; and critically,
- declining political risk after the successful 2002 elections fueling an improvement in sovereign creditworthiness and the private investment climate.

Two messages are embedded in the above: first, the back-to-the-wall effect of a drastic reduction in aid starting in 1992 stimulated substantial reform. Second, it took the successful December 2002 elections and smooth transfer of power from President Arap Moi to President Kibaki

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<sup>21</sup> To paraphrase Sherlock Holmes: When you have eliminated the impossible, whatever remains, however improbable, must be the truth.

for visible results to materialize. This suggests two interacting effects: long lags before payoffs to reform appear; and threshold events (such as a successful election) which trigger these payoffs. Not surprisingly, we concluded (prior to the December 2007 elections) that the maintenance and acceleration of these positive trends depended crucially on continued success in entrenching political stability, improving governance and strengthening fiscal and financial institutions; and relaxing the infrastructure constraint on private investment. The unfortunate December 2007 election fiasco has reinforced the key insight of this paper: that sustained growth and poverty alleviation will eventually depend upon Kenya's ability to engender political stability and social harmony for a prolonged period; experience from countries as disparate as China, India and Vietnam suggests that such stability is needed for a minimum 10-15 years for positive trends to take hold.<sup>22</sup> The reasoning is that irrespective of the political system, good governance and stability in the rules of the game for a long period are needed for having well-managed public finances, investor confidence and hence long-run growth.

Section 2 sketches out an analytical framework which underpins the subsequent presentation of empirical evidence. Section 3 contains a snapshot of Kenya's economic liberalization dating to 1993. Section 4 analyses government debt dynamics, discussing key facets such as revenue mobilization and expenditure composition. While impressive strides have been made towards an efficient revenue system based on broad-based taxes, the composition of expenditure remains a serious constraint on growth. Specifically, spending on infrastructure is inadequate. Section 5 presents evidence on declining country and political risk based on a decomposition of interest rates and perceptions from Investment Climate Assessments. Section 6 discusses challenges—economic and political—looking ahead.

### 3.3 Analytical Framework

A reduction in political risk could have a growth dividend through two channels: at the macro level, a reduction in real interest rates which improves government debt dynamics and contributes to stabilization; and at the micro level, a lengthening of business horizons with its corollaries of lower hurdle rates of return for investment projects and greater private investment. We start with the micro channel using a slight adaptation of the model in Razin and Sadka (2004). The representative competitive firm invests in line with the following Bellman equation:

$$V[(1-\delta)K_0] = \underset{K}{\text{Max}} \left\{ \frac{1-t}{1+r+\theta} F(K) - [K - (1-\delta)K_0] + \frac{(1-\tau)\alpha}{1+r+\theta} V[(1-\delta)K] \right\} ,$$

where  $F(\cdot)$  is the production function,  $V(\cdot)$  a value function,  $(1-\delta)K_0$  the initial net capital stock ( $\delta$  is the rate of depreciation,  $K_0$  the inherited capital stock),  $K$  the chosen capital stock for the current period,  $t$  the current tax rate,  $r$  the world interest rate,  $\theta$  a political (country) risk premium external to the firm and  $\tau$  the future tax rate. The parameter  $\alpha$  captures the investment horizon or equivalently the importance given to the future. We assume  $0 \leq \alpha \leq 1$  with a higher value connoting a longer horizon. The first order condition is:<sup>23</sup>

<sup>22</sup> Rodrik (1999) contains a seminal analysis of the importance of social cohesion in responding efficiently to exogenous shocks and nurturing long-run growth.

<sup>23</sup> For a derivation, see Razin and Sadka (2004)—equation (1) is the same as their equation (2) with  $\theta = \tau = 0$ . But note that the interpretation of  $\alpha$  is different.

$$(1) \quad (1-t)F'(K) = r + \delta + \theta + (1-\delta)(1-\alpha + \alpha\tau).$$

We now mimic a short-horizon situation by setting  $\alpha = 0$ . Equation (1) gets modified as follows:

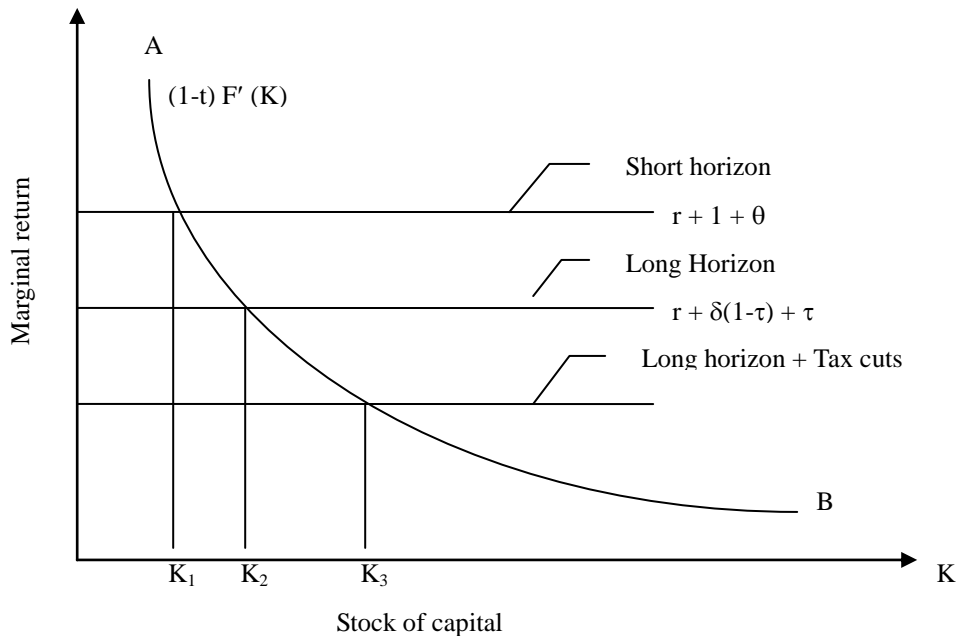
$$(2) \quad (1-t)F'(K) = r + 1 + \theta.$$

Note that the RHS of (2) is the maximum value of the RHS of (1) for a given world interest rate and country risk premium. In other words, when the horizon is short the hurdle rate for private investment is set at its maximum so that the investment can be recouped in short order. This is likely to coincide with a high country risk premium,  $\theta$ . Now consider the polar opposite case of low political risk and a long horizon, which we mimic by setting  $\theta=0$  and  $\alpha = 1$ . Equation (1) becomes:

$$(3) \quad (1-t)F'(K) = r + \delta(1-\tau) + \tau.$$

Comparing the RHS of equation (3) with that of (2), we see a substantial decline in the hurdle rate of return for investment.<sup>24</sup> (**Error! Reference source not found.** summarizes these possibilities).

Figure 3.1. Length of Horizon and Optimal Investment



The figure shows three levels of the optimal capital stock decisions,  $K_1 < K_2 < K_3$ , corresponding to a short horizon (with high political risk), a long horizon (with reduced political risk) and a long horizon reinforced by cuts in the marginal tax rate. In the case of a short horizon and high political risk, there is the danger that  $(1-t)F'[(1-\delta)K_0] \leq r + 1 + \theta$  i.e., that investment does not take place. This would correspond to a situation where  $(1-\delta)K_0 > K_1$  and stagnation would result. On the other

<sup>24</sup> Note that  $\delta(1-\tau) + \tau \ll 1$  for reasonable values of  $\delta$  and  $\tau$ . For example for a 10 percent depreciation rate and a marginal tax rate of 30 percent,  $\delta(1-\tau) + \tau = 0.37 \ll 1$ . In addition, we have the country risk premium on the RHS of (2).

hand, investment would resume if political risk falls and horizons lengthen. Applied to Kenya, this suggests that the initial binding constraint to overcome would be political risk; once this is achieved and the investment climate improves, attention might have to turn to other constraints such as infrastructure.

Turning to the macro, few economists would quarrel with the proposition that macroeconomic stability is necessary for sustained economic growth and a good investment climate. However, the focus has shifted (especially after the most recent emerging market public debt crises which began in 1997-98 and ended with the Argentine default of 2001) from short-run fiscal deficits and inflation to balance in the government's intertemporal budget constraint.<sup>25</sup> Satisfying this constraint rests on the capacity to eventually generate adequate primary fiscal surpluses, which in turn depends upon future growth and tax collection.<sup>26</sup> Two key points emerging from recent empirical work are that balancing the government's intertemporal budget calls for (i) a comprehensive approach to managing the public finances. Paying attention to primary deficits, real interest rates and growth rates is not enough—equally important are bailouts and contingent liabilities, the efficiency and predictability of taxation, expenditure composition and the rate of return on public investments; and (ii) sound macro-micro linkages.<sup>27</sup> We briefly sketch the latter and make the connection with political risk.

Define government net worth as the present value of future primary surpluses (expressed as a ratio of GDP) minus the initial government debt-to-GDP ratio.<sup>28</sup> Since the discount rate is the real interest rate minus the real growth rate (assumed to be positive for convergence), a reduction in interest rates as a result of reduced political risk will unambiguously increase net worth and strengthen government solvency. What about an accompanying reduction in tax rates? This will have two opposing effects: it will tend to lower revenues and hence the present value of primary surpluses; but it will tend to raise private investment and hence growth especially in conjunction with a fall in political risk (increasing the capital stock to  $K_3$  in Figure 1). The combination of rising growth and lower interest rates will in turn exert an upward effect on government net worth which could in principle offset the effect of a fall in revenues. Besides, the fall in revenue could be curtailed by improving tax administration which increases the tax base and thus partially or completely offsets the impact of lower marginal tax rates.<sup>29</sup>

Now consider government capital expenditure. If it is cut, the immediate effect will be to raise primary surpluses and improve debt dynamics; but net worth could decrease as a result of a fall in long-run growth (via complementary reductions in private investment). This in turn could trigger a rise in interest rates if initial indebtedness is high and tax revenues fall with growth. Of course, if capital expenditure is of low quality, a cut would be unambiguously beneficial. In Kenya's case as we shall see, the reduction in interest rates and cut in marginal tax rates have contributed to an accelerated decline in indebtedness (government debt-to-GDP ratio) after 2003; but growth diagnostics indicate that more public spending is needed to alleviate the infrastructure constraint on private investment. The challenge therefore is to choose infrastructure projects with high rates of return which will ensure

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<sup>25</sup> The framework which dominated IFI policy thinking on macroeconomics and growth until 1997 might well have been Fischer (1993).

<sup>26</sup> Solvency requires that the present value of future primary surpluses (discounted at a rate equal to the real interest rate minus the real growth rate) equal or exceed the initial debt-to-GDP ratio.

<sup>27</sup> See IMF (2003), Budina and Fiess (2005), Gill and Pinto (2005).

<sup>28</sup> See Serven (2007).

<sup>29</sup> Many developing countries offer the prospect of raising average effective tax rates (and hence total revenues) *even* when marginal tax rates are cut by enlarging the tax base through better administration.

that the government's net worth is protected.<sup>30</sup> However, in line with the main point of this paper, this is secondary to managing political risk.

### 3.4 Kenya's Economic Liberalization: A Snapshot<sup>31</sup>

The economic liberalization started with Sessional Paper Number 1 of January 1986, when the government decided to shift from dirigisme to freeing up the economy. By the late 1980s, Kenya had adopted a managed float. Then a series of incidents intervened after the Berlin Wall collapsed in November 1989 and Kenya began to lose its geopolitical bargaining power (as it was the most prominent market economy in the region and the US fleet was able to use Mombasa port). Here is a brief timeline:

- Nov 1991: Emphasis in Consultative Group shifts abruptly from economics to governance. Donors freeze aid.
- Jan 1992: IMF refuses to go to its Board with an unfinanced gap. The World Bank pulls back loans in response.
- 1992: Kenya starts building up external debt arrears; foreign exchange becomes the critical constraint.
- End 1994: IMF shadow program enables Paris Club rescheduling.

Prior to the 1994 IMF program, turbulence hits in the shape of the notorious Goldenberg scandal (1991-93), interest rates on treasury bills went to 80 percent and banks allied to Goldenberg's Exchange Bank collapsed. This scandal arose out of a fraudulent effort to exploit schemes set up by the central bank to encourage exports and help alleviate the shortage of foreign exchange that occurred as external debt payments fell due and new loans and aid were cut back.<sup>32</sup> Liberalization continued and by the end of 1994, prices, interest rates and the exchange rate were liberalized. In the meanwhile, aid became small and unpredictable and since 1994/95, net foreign financing to the government of Kenya has been negative except for 2001/02 and 2005/06, when there was a debt rescheduling. As a result, domestic borrowing served not only to finance the deficit but also pay off maturing external debt.

Two points are worth noting. First, the hardening of the donors' stance on governance grounds and the need to re-establish credibility in the wake of Goldenberg were major spurs to reform in Kenya. Second, private sector firms interviewed in mid-2006 invariably pointed to the liberalization which picked up steam in 1993/94 as a positive turning point.

### 3.5 Government Debt Dynamics

A key requirement for macro stabilization noted in section 2 is balance in the government's intertemporal budget constraint, for which a sufficient condition is that public debt be on a sustainable trajectory, i.e., there is no need for a drastic change in fiscal policies to rein in indebtedness. If intertemporal balance is not assured, there will be a tendency for macroeconomic

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<sup>30</sup> A detailed analytical discussion is contained in Serven (2007).

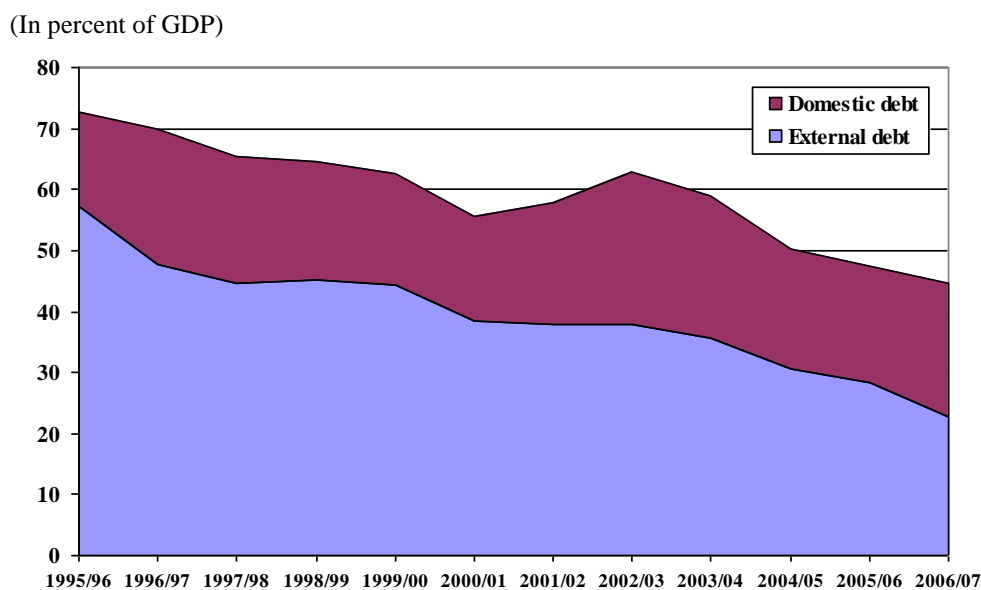
<sup>31</sup> Sources: Meetings with academicians, private sector firms, IMF files.

<sup>32</sup> Goldenberg International was set up in 1990 to export gold and diamond jewelry from Kenya in return for a 35 percent premium on the exchange rate in contrast to the normal premium of 20 percent for exporters. Little or no gold was actually exported; a scheme was established to round-trip the sale of export dollars to the Central Bank of Kenya (essentially, buy dollars at the official exchange rate, sell them back at a 35 percent premium as "gold exports" and then repeat the process). It was finally uncovered in 1992. Warutere (2005).

uncertainty to increase, engendering expectations of rising inflation and interest rates, which will slow down private investment and growth. Governments borrow when they run fiscal deficits, which can be decomposed into the primary fiscal deficit and interest payments. The path of the debt-to-GDP ratio is then determined by the primary deficit and a term proportional to the difference between the real interest rate and the real growth rate. If the primary deficit is positive and large, and real interest rates exceed growth rates, then the debt-to-GDP ratio will grow until corrective action is taken or a crisis—typically involving a burst of inflation and/or a disruptive debt default—forces such action. Debt can also increase when the government issues recapitalization bonds to bail out banks or takes over the guaranteed loans of loss-making parastatals, while the opposite happens when government assets are privatized.

Figure 3.2 shows the path of Kenya’s debt-to-GDP ratio and its currency composition over the past 11 years. The government debt-to-GDP ratio has fallen by some 28 percentage points over the past 11 years to a level of 45 percent by the end of 2006/07, while the share of foreign-currency denominated debt has gone down from about 80 percent of total debt in 1995/96 to 50 percent at the end of 2006/07. This shift towards domestic debt was occasioned by the need to pay off maturing external debt and compensate for the reduction in external aid after 1993; but at the same time, there has been an impressive reduction in indebtedness as shown in Figure 2.

Figure 3.2. Kenya: Public Debt



Source: Statistical Bulletin of the Ministry of Finance of Kenya and IMF Staff Reports.

### 3.5.1 What Has Lowered the Debt Ratio?

In Table 3.1, the annual average change in indebtedness is algebraically apportioned to the primary fiscal balance (including grants, which averaged approximately 1 percent of GDP per year over both the sub-periods in the table), growth, real interest and exchange rates and other factors like bank bailouts, debt relief, etc. The starting point is the debt-to-GDP ratio at the end of the fiscal year 1995/96. The subsequent 11 years are divided into two sub-periods: 1996/97-2002/03 and 2003/04-2006/07. For each sub-period, the *average annual change* in the debt-to-



GDP ratio is given, as well as the portion attributable to the factors mentioned above.

*Table 3.1. Factors Explaining Falling Indebtedness 1996/97-2006/07*

(% points of GDP, annual average)

	1996/97	2003/04	1996/97
	-2002/3	-2006/07	-2006/07
Change in public sector debt	-1.4	-4.5	-2.5
<i>Contribution from</i>			
1. Primary Deficit (- surplus)	-1.7	0.4	-0.9
2. Real GDP growth	-1.5	-3.3	-2.1
3. Real interest rate	2.2	0.4	1.5
4. Real exchange rate (- appreciation)	0.8	-2.2	-0.3
5. Other Factors	-1.2	0.2	-0.7

Source: Statistical Bulletin of the Ministry of Finance of Kenya, IMF Staff Reports, and authors' estimates.

The first compelling observation is that the rate at which indebtedness has been falling jumped from 1.4 percentage points of GDP per year over the first 7 years to 4.5 percentage points per year over the last four years. The biggest factor explaining this sharp acceleration is the joint effect of the large decline in real interest rates and the real appreciation of the Kenyan shilling after 2003.<sup>33</sup> During the first 7 years, as a result of the combined effect of the real interest rate and real exchange rate (lines 3. and 4. in the table), debt *rose* by 3.0 percentage points of GDP per year, while the combined effect has been to *lower* debt by 1.8 percentage points of GDP per year after 2003, a swing of close to 5 percentage points of GDP. The acceleration in growth rates has also helped significantly in the reduction of debt ratio. Second, the accelerated decline in indebtedness occurred even though the average primary fiscal surplus (including grants) *fell* by 2.0 percentage points of GDP; we will return to this point later when political risk is discussed. Third, big collapses of the real exchange rate (RER) and bank/other bailouts, which were salient features of most of the emerging market debt crises of the past decade, have not been major factors in Kenya.<sup>34</sup>

### 3.5.2 Primary Fiscal Balance and Interest Payments

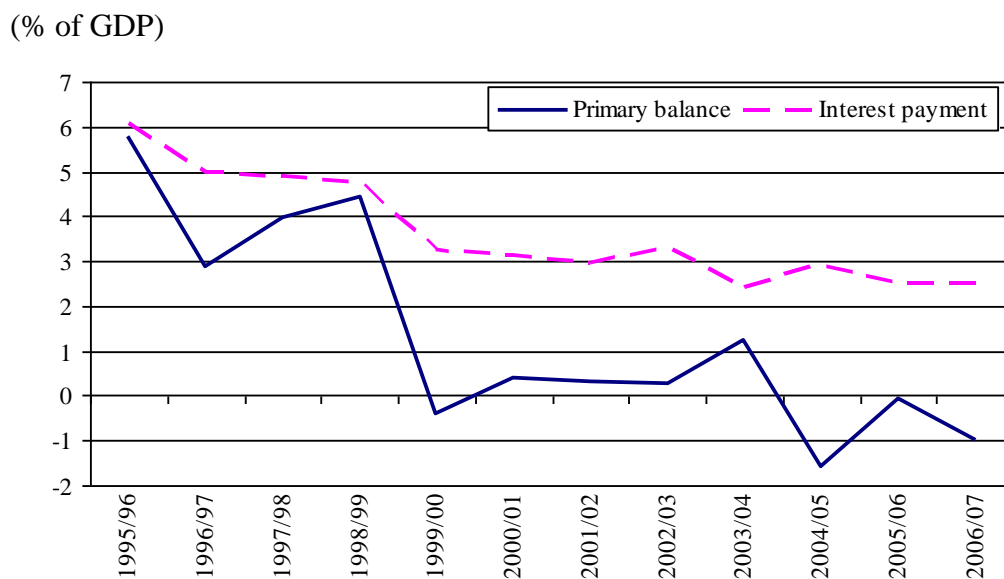
Figure 3.3 plots the primary balance and interest payments over the period 1995/96-2006/07. Two observations stand out: (i) the primary fiscal balance including grants went up in the wake of the Goldenberg scandal and reached close to 6 percent of GDP by the mid-1990s but has been on a declining trend ever since; and (ii) interest payments have fallen from 6 percent of GDP in 1995/96 to 2.5 percent in 2006/07.<sup>35</sup>

<sup>33</sup> Strictly speaking, one has to look at the effective real interest rate, which would capture the effects of both inflation and exchange rates and related capital gains/losses, by summing up rows 3. and 4. in Table 1.

<sup>34</sup> See the country case studies in Budina and Fiess (2005). It also contains a derivation of the flow budget constraint of the government forming the basis for the decomposition shown in Table 1.

<sup>35</sup> Unfortunately, we do not have a consistent GDP series for pre-1995. Earlier numbers showed government interest payments to be as high as 10-12 percent of GDP in the aftermath of Goldenberg.

Figure 3.3. Primary Balance and Interest Payment



Source: IMF Staff Reports.

The fall in interest payments (and interest rates, as we shall see later) even as the primary deficit was rising (primary surplus shrinking) is puzzling. A plausible explanation is that the 1991-93 Goldenberg scandal engendered a great deal of macroeconomic volatility and left little option but to raise the primary surplus sharply; and both the primary surplus and interest payments then gradually returned to ‘normal’ levels. The Goldenberg scandal is estimated to have cost \$600 million to \$1 billion, some 9 to 16 percent of 1994 GDP (Warutere 2005). Efforts to mop-up excessive monetary infusion arising from the scandal pushed interest rates on T-bills to over 80 percent. Kenya was also forced to shift to domestic debt to pay off maturing external debt as a result of the accompanying aid squeeze. A large increase in the primary fiscal surplus was engineered in an attempt to bolster credibility and a significant liberalization was set in train. Import licenses were abolished in May 1993, a unified, market-based exchange rate adopted in November 1993 and exchange controls lifted in May 1994. The era of price controls ended in 1994. As a result of this freeing up, foreign exchange flowed in, helping drive interest rates down.<sup>36</sup> Thus, positive macroeconomic benefits started appearing before 2002 but growth stagnated.

A second possible explanation for falling interest rates in spite of the fall in the primary surplus is that the latter was driven by adjustments in fiscal policy designed to support private investment and long-run growth. This could happen for example if marginal tax rates were cut and/or public spending to alleviate infrastructure bottlenecks were raised. In the short run, this would reduce the primary surplus but with the promise of better prospects for long-run growth and tax collection, as discussed in section 2. Countering this is the argument that markets tend to be myopic and that the quality of Kenya’s past public investments has been low—which would strengthen the argument that interest rates fell because of reduced political risk rather than market perceptions of higher government net worth. Revenue mobilization is now discussed, followed by expenditure composition.

<sup>36</sup> Source: Interview with Kenyan academics.

### 3.5.3 Revenue Mobilization

We shall show that Kenya has managed a successful transition from a high tax rate, low tax base system with considerable reliance on import taxes and seigniorage to a more efficient and equitable revenue system based on broad-based taxes like income tax and VAT. This accomplishment is considered difficult to achieve—countries marked by political instability, social division and weak governance, which is the stereotypical image of Kenya, are more likely to rely on seigniorage and import tariffs, taxes which are relatively easy to collect but highly distortionary, and regressive in the case of seigniorage.<sup>37</sup>

The rise in the primary surplus in the wake of Goldenberg was achieved in part by raising tax rates. This plus high inflation boosted the tax take and pushed the revenue-to-GDP ratio to about 25 percent in the early-to-mid 1990s.<sup>38</sup> It was felt that maintaining such a high rate of revenue mobilization would deter growth, so tax rates were cut and the revenue-to-GDP target lowered to 21-22 percent of GDP. Considerable reform in tax policy and administration has been implemented since the mid-1990s. After 2003, governance improvements have boosted direct tax collections notwithstanding large reductions in the CIT rate and the top PIT rate to 30 percent (from peak levels 45 percent each earlier in the decade). VAT rates and import tariffs have also been cut significantly. A 'large taxpayers office' was set up in 2006 for 800 companies which pay some 70 percent of total direct taxes.

Figure 3.4 plots four important revenue components: import and excise duties, income tax and VAT as a percentage of GDP. Revenues fell as tax rates were cut but then picked up after 2003 as a result of stronger tax administration. The steady decline in import duty collection is by design, given the trade liberalization policy. Income tax displays a u-shaped pattern, falling in the late 1990s, but then, unlike import duty, recovering over the last three years. This is encouraging to the extent that it captures lower tax rates combined with a broadening of the tax base and improving compliance—which is the case in Kenya. VAT was introduced in 1990; the number of rates has been reduced from 15 (with the highest rate once 210 percent) to a unified 16 percent (except for some zero-rated products), with obvious advantages for reducing misclassification and tax evasion and easing administration. Excise duties have been largely replaced by the VAT, but remain on oil imports and other specific products.

Both the level and volatility of the growth rate of reserve (base) money and the change in reserve money divided by GDP (an indicator of seigniorage) have declined sharply after 1999 (Figure A1 in Appendix 4). This is likely to have lowered macroeconomic uncertainty and inflation, reducing interest rates.

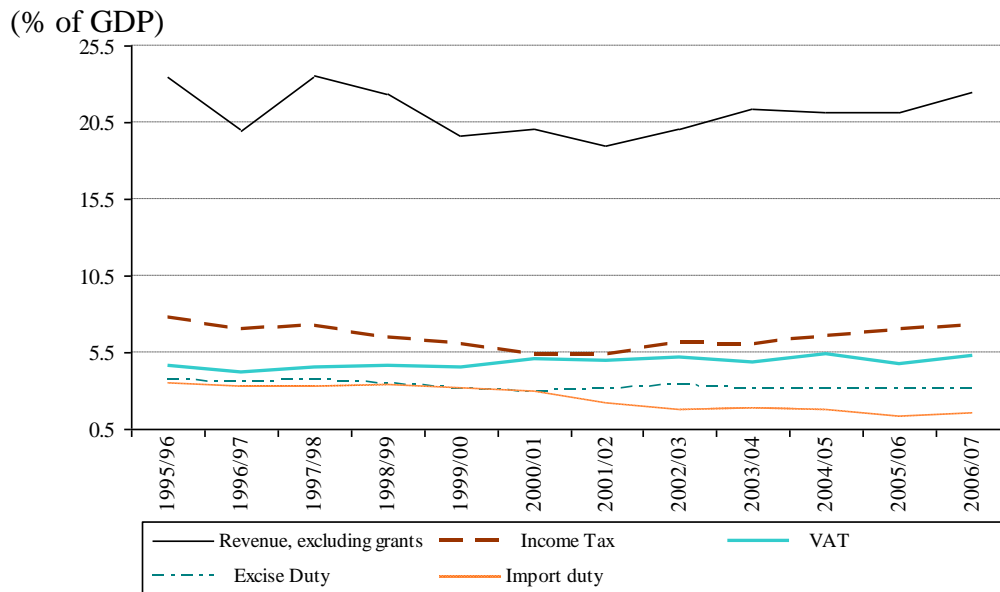
Likewise, the effective import tariff rate and the share of import duties in total revenues, which were at peak levels after Goldenberg, have both come down sharply from above 13.5 percent in 1993-2001 to below 7.5 percent in 2004-2007 (Figure A2 in Appendix 4). The immediate impact of cutting import tariffs would be to increase the primary deficit (as we have seen) and lower the cost of imported machinery and raw materials as well as the tax on exports by Lerner symmetry. In combination with cuts in income tax rates, this would raise the private return to capital. But the cut in import tariffs would also increase import competition, forcing firms to become more efficient. Thus, the package of cuts in income tax rates and import tariffs would stimulate both more investment and higher productivity in firms, improving growth prospects.

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<sup>37</sup> Cukierman, Edwards and Tabellini (1992).

<sup>38</sup> Source: Meeting with Kenya Revenue Authority officials, February 2007.

Figure 3.4. Revenue Mobilization



Source: IMF Staff Reports.

Private sector firms interviewed in mid-2006 unanimously concurred that the economic liberalization starting in 1993 has been a major stimulus to higher efficiency and productivity (Box 3.1). Microeconomic evidence from Investment Climate Assessment 2007 corroborates this anecdotal evidence. It confirms significant growth in total factor productivity during the period 2002-2006 after stagnation during the 1990s.<sup>39</sup>

Box 3.1: Vignettes from Interviews with Private Sector Firms, July 2006

- Firms noted that reductions in import tariffs had spurred exports because it had lowered their costs, exactly as Lerner symmetry would predict. One firm described this as decisive in doubling its capacity in 2003, even more important than the fall in interest rates.
- All firms mentioned pressures to increase efficiency and productivity by reducing waste and technological upgrading because of greater competition and falling profit margins as a consequence of lower import barriers. Many mentioned adopting Gemba Kaizen techniques to reduce waste, get workers more involved in preventive maintenance and doing things better on the shop floor.<sup>a/</sup> One multinational said it had reduced manufacturing unit costs by 30-40 percent in spite of rising labor and energy costs.
- Kenyan labor force was typically described as well-educated and the best in the region.
- While the increased competition has not so far led to bankruptcies, the expectation was voiced that loss-making parastatals will eventually close.

In short: competition and hard budget constraints are forcing firms to become more efficient and innovative, while the increased incentive for exports is spurring capacity expansion.

<sup>a/</sup> Gemba Kaizen in Japanese means change for the better (kaizen) in the workplace (gemba). It was originated by Masaaki Imai, a Japanese management consultant, who established the Kaizen Institute in 1986.

<sup>39</sup> Based on a firm-level production function, Soderbom (2004) reported that average firm TFP increased by 7 percent (but was not statistically significantly different from zero) over the entire 1999-2002 period. Using a similar methodology, ICA (World Bank 2007) provides preliminary evidence that TFP increased in manufacturing firms by a statistically significant 15 percent over 2002-2006.

A point worth making is that in spite of the cut in VAT, income tax and import tariff rates, which contributed to the decline in revenues since the mid-1990s till 2001/02, the revenue-to-GDP ratio at around 21 percent is still high in Kenya compared to other countries of a similar income level. Kenya collects at least 4-7 percentage points of GDP more in revenue than its EAC partners, Tanzania and Uganda, and is a positive outlier among developing countries.

### 3.5.4 Expenditure Composition

The major complaint voiced by the private sector pertains to the quantity and quality of infrastructure. Roads in particular are singled out—the fuel levy has not translated into better roads.<sup>40</sup> This brings us to the Achilles' heel of the Kenyan public finances: expenditure composition. During the fiscal consolidation of the 1990s, development expenditure, much of it on public infrastructure, was cut from a high of 6.4 percent of GDP in 1994/95 to 1.9 percent in 1999/2000 (Figure A3 in Appendix 4). These cuts were accompanied by a deterioration in the quality of the public investment portfolio. Several questionable construction projects were undertaken (Eldoret airport being a prime example) and a large stock of incomplete projects accumulated.<sup>41</sup>

The neglect of infrastructure in the 1990s has resulted in a huge backlog of road maintenance. It is estimated that clearing the maintenance backlog alone would cost KSh 150 billion (about 9 percent of 2006 GDP); periodic and routine maintenance require an additional 15 billion KSh per year. If urgently-needed network expansion and capacity enhancement are included, the annual spending requirement over a 7-year period is estimated at 4 percent of GDP against the 2006/07 allocation of about 2.7 percent of GDP.<sup>42</sup>

The challenge is to increase spending on the maintenance and rehabilitation of infrastructure while ensuring the quality of the investment portfolio. This challenge needs to be seen in conjunction with the competing demand for social spending, which has been increasing at a fast pace following the adoption of free primary education in 2003 and various health goals by the government.

## 3.6 Political Stability and the Country Risk Premium

Interviews with private sector and participants in financial markets show that 2003 was considered a watershed year. The change in political leadership was seen as the culmination of a successful transition to multi-party democracy, a process that began in 1992. It was widely believed that Kenya's political development was irreversible and economic policies unlikely to change dramatically with changes in political leadership.<sup>43</sup> In other words, there was a decline in perceived

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<sup>40</sup> The Road Maintenance Fuel Levy was established in 1993. It consists of an automotive fuel levy and transit toll collections. The objective of the levy was to provide funds for maintenance of roads; its proceeds are also used for rehabilitation and reconstruction. In 2006/07, approximately KSh 18.6 billion (1% of GDP) was collected as fuel levy.

<sup>41</sup> Kenya, Public Expenditure Review 1997. World Bank (1997).

<sup>42</sup> Sessional Paper: The Development and Management of the Roads Sector for Sustainable Economic Growth, Ministry of Roads and Public Works, Nairobi, 2006.

<sup>43</sup> A statement by Titus Naikuni, chief executive of Kenya Airways, reported in Financial Times, June 13, 2007, characterizes the changed political scene and attitude of businesses. He said, "I think we've sort of separated the

political and economic risk by investors.

### 3.6.1 Inferences from Domestic Interest Rates

What can be inferred about country risk from the Kenyan government's domestic borrowing costs? Since Kenya has no exchange controls, the following formal construct can help shed light on risks:

$$i_K = i_{\$} + \hat{x} + DRP + SRP ,$$

where  $i_K$  is the nominal interest rate on Kenyan government T-bills (denominated in Kenyan shillings),  $i_{\$}$  is that on US government T-bills (denominated in USD) and  $\hat{x}$  is the target devaluation rate for the KSh/USD exchange rate. This is standard interest parity. Risk could arise on two counts: suppose the market believes the eventual depreciation rate will turn out higher than that (explicitly or implicitly) targeted by the central bank, CBK. It will then demand a devaluation risk premium,  $DRP$ , to compensate for this. Suppose it also believes, given Kenya's image of political instability and weak governance that the government could default on its debt. It would then demand a sovereign or default risk premium,  $SRP$ , to compensate for this. The  $SRP$  could be regarded as a function of Kenya's credit and inflation history, its political risk and the quality of its fiscal and financial institutions.

Table 3.2 presents data organized around the preceding equation. It shows that the difference between US T-bill and Kenyan T-bill rates has fallen sharply starting in 2003, indicating declining devaluation and default risk; the average difference during 1999-2002 was 7.9 percentage points but went down to 2.8 percentage points during the 2003-2007 period. Unfortunately, there is not a way of disentangling the  $DRP$  and the  $SRP$ . A standard way of doing so is to assign the same  $SRP$  to Kenyan T-bills as that on an instrument of similar maturity issued in the international capital markets (with  $SRP$  given by the spread on such an instrument relative to an identical currency and maturity borrowing by a benchmark country, such as the US) and then obtain the  $DRP$  as a residual; but Kenya's external debt is mainly on concessional terms and it has not had access to the international capital markets. Ex post, the Kenyan shilling has been on an appreciating trend since 2002, as can be seen from the table.

What is exceptional when Kenya's experience is stacked against that of even emerging market countries is its ability to issue nominal (i.e., un-indexed) local currency debt at single-digit interest rates. Notably, countries such as Brazil and Turkey have had great difficulty in doing so in spite of running significant primary surpluses (far greater than Kenya's) for several years in a row (Brazil since 1999). This indicates a high degree of macro policy credibility and the absence of "debt intolerance" (Reinhart, Rogoff and Savastano 2003). Further, Kenya's debt structure is less vulnerable to external shocks as a result of the falling share of external debt over the past decade. Finally, Kenya's debt dynamics are favorable and it has been growing impressively over the past three years in contrast to the debt sustainability problems and slow growth in many of the emerging market countries.

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politicians, who are making noise, from those of us who want to make money. Because the politicians realize that without this money we won't have development." Of the election, he says, "It's time people realized Kenya has become very mature, in the sense that the business community couldn't care less about what happens. I don't put our business plans based on whether we're going to elect Kibaki or someone else."

*Table 3.2. Interest Rate Decomposition*

(In percent)	1999	2000	2001	2002	2003	2004	2005	2006	2007
91-Day Tbill	13.3	12.1	12.7	8.9	3.7	3.0	8.4	6.8	6.8
U.S. Treasury bill	4.7	5.8	3.5	1.6	1.0	1.4	3.2	4.7	4.4
Diference	8.6	6.2	9.3	7.3	2.7	1.6	5.3	2.1	2.4
Actual KSh./US\$ depreciation	17.8	7.0	0.7	-1.9	-1.2	1.6	-6.4	-4.1	-9.7
EMBI Africa (in basis points)	..	..	..	529	232	177	145	74	166
Nigeria	1338	2037	1426	2276	732	667	523	481	..
South Africa	..	..	..	238	141	95	85	85	164
EMBI+ Spread (in basis points)	824	756	731	765	418	356	245	169	239

Source: Central Bank of Kenya; International Financial Statistics; JPMorgan; and Staff estimates.

Kenyan T-bill rates have fallen along with US T-bill rates, suggesting that the favorable global interest rate climate has filtered through to Kenya. In addition, changes in monetary policy may have contributed to the very low interest rates in 2003 and 2004: the cash reserve ratio was lowered from 10 percent to 8 percent and then 6 percent. This coincided with the maturing of a large tranche of repo operations, boosting short-run liquidity and lowering domestic interest rates.<sup>44</sup> Of course, since Kenya has an open capital account, this money could leave and be invested in US or UK T-bills; this would put upward pressure on Kenyan T-bill interest rates. Alternatively, banks and other investors may be hampered from investing overseas because of prudential restrictions; however, there is little evidence that such restrictions are binding.<sup>45</sup> Besides, investors have the option of investing in capital market or real estate if returns on T-bills are considered too low. One additional factor may be contributing to low interest rates: Kenya as a regional safe haven for financial assets.<sup>46</sup> Such investors are not likely to be fussy about the rate of return.

Comparing T-bill yields with neighboring countries in sub-Saharan Africa, Kenya's T-bill rates were on a declining trend before 2003, ever after the spike associated with the Goldenberg scandal (Figure A4 in Appendix 4). However, Kenya is the only country to show a decreasing path of interest rate without a substantial increase in official financing. In the period 2000-2005, Mozambique, Tanzania, Uganda and Zambia have all benefited from debt relief under the HIPC Initiative and have received positive net transfers, which increased over time<sup>47</sup>, while Kenya had consistently negative net transfer over the same period.

### 3.6.2 Sovereign credit ratings

In the absence of current market indicators of sovereign risk, such as changes in sovereign spreads<sup>48</sup>, we rely upon sovereign credit ratings as a measure of risk, as do most investors. In October

<sup>44</sup> Source: Meeting with CBK officials. Interviews with current and former senior officials indicate a deliberate strategy to stimulate the economy after 2003 by lowering interest rates and targeting moderate inflation rather than inflation in the 0-5 percent.

<sup>45</sup> For example, the Retirement Benefits Authority requires pension funds to invest no more than 15 percent of their funds overseas; but the actual volume is 5-10 percent.

<sup>46</sup> For example, for oil money from southern Sudan. Anecdotal evidence suggests that the Kenyan shilling is widely tendered in the region, including in troubled areas like Somalia.

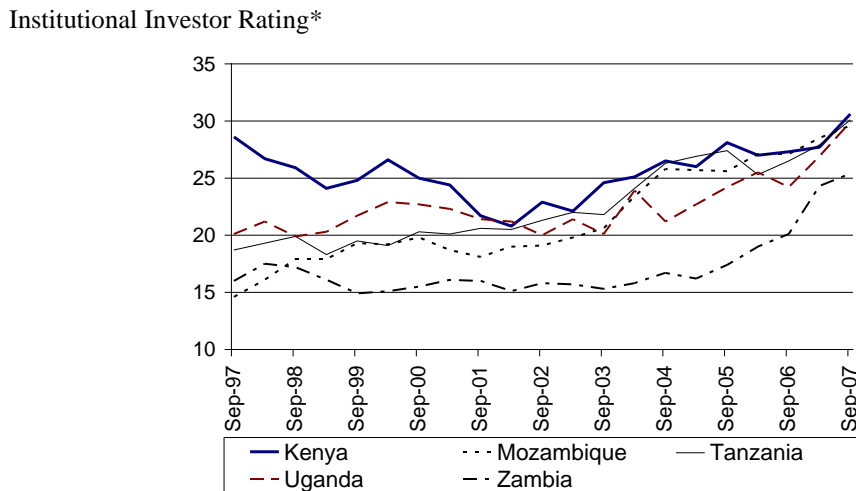
<sup>47</sup> For the four countries, net transfers increased from 1.8 percent of GNP in 2000 to 4.4 percent in 2004, on average.

<sup>48</sup> Authorities plan a initial sovereign bond of \$500 million in 2009 and \$200 million in annual sovereign bond issuance

2006, S&P rated Kenya’s capacity to repay long term sovereign obligations denominated in foreign currency as B+, which indicates that the sovereign has the capacity to meet its financial commitment, but adverse business, financial, or economic conditions could impair its capacity.<sup>49</sup> Countries that received the same S&P rating of B+ in 2006 and are tracked by the EMBI+ index exhibited a spread of over 200 basis points (bps) at end-2006 over the U.S. Treasuries, about 30 bps above the overall EMBI+ spread at end-2006.<sup>50</sup> Table 3.2 also presents the EMBI spread for Africa and the EMBI+ spread, which have been on a declining trend since 2002, attesting to the improved global interest rate climate, from which Kenya has also benefited.

After 2003, Kenya’s credit ratings show a reversal of previous declining trend. Figure 3.5 shows International Country Risk Guide (ICRG) rating of political risk and the semi-annual Institutional Investor (II) rating of credit risk. Both ratings showed a distinct reversal of trend after 2003. The II rating also shows that Kenya’s experience was different compared to neighboring low-income Sub-Saharan African countries, which have had stable macroeconomic environment and good growth performance.

Figure 3.5. Kenya’s Political and Credit Risk Ratings



Source: Institutional Investor Magazine, various editions.

\*Scale of zero to 100, with 100 representing the least chance of default

from 2010 through 2013.

<sup>49</sup> Indeed In January 2008, following post-election violence, S&P downgraded Kenya’s long-term foreign currency rating to B from B+, five levels below investment grade.

<sup>50</sup> The Emerging Markets Bond Index Plus (EMBI+) tracks total returns for traded external debt instruments in the emerging markets. In addition to serving as a benchmark, the EMBI+ provides investors with a definition of the market for emerging markets external-currency debt, a list of the instruments traded, and a compilation of their terms. The EMBI+ tracks instruments mainly from the three major Latin American countries (Argentina, Brazil, and Mexico), reflecting the size and liquidity of these external debt markets. The non-Latin countries are represented in the index by Bulgaria, Morocco, Nigeria, Philippines, Poland, Russia, and South Africa.



### 3.6.3 Survey Evidence from the Investment Climate Assessment

What would be the implications of greater confidence and lower country risk? One would expect to see firms more willing to reinvest profits instead of depositing these in an overseas bank account. One would also expect investment horizons to lengthen, so that the hurdle rate for investments goes down.<sup>51</sup> Indeed, the rising political and macroeconomic stability has led to a significantly reduced perception of risk on these two counts by the surveyed firms. In the Investment Climate Assessment (ICA) conducted by the World Bank in June 2007, the percentage of manufacturing firms which perceived political instability or uncertainty as a “major-to-severe” constraint dropped to 18 percent in June 2007 from 47 percent in 2003. Similarly, the percentage of manufacturing firms that consider macroeconomic stability to be a major constraint dropped to 28 percent in 2007 from 50 percent in 2003. Table 3.3 presents the changes in perceptions of manufacturing firms about the investment climate between 2003 and 2007.<sup>52</sup> ICA 2007 also reported that a larger percentage of surveyed manufacturing firms were preparing multiyear business plans in 2007 (58 percent) than five years before (49 percent).

*Table 3.3. Percent of Manufacturing Firms Perceiving Issue as Being a Major or Severe Constraint to Business*

<b>Issue</b>	<b>2003</b>	<b>2007</b>
Crime, Theft and Disorder	69	59
Tax Rates	69	56
Electricity	47	55
Corruption	73	54
Transportation	36	53
Practices of Competitors in Informal Sector	64	50
Tax Administration	52	50
Customs and Trade Regulations	40	42
Telecommunications	45	28
Business licensing and Permits	13	28
<b>Macroeconomic Instability</b>	<b>50</b>	<b>28</b>
Access to Finance	71	26
<b>Political Instability</b>	<b>47</b>	<b>18</b>
Access to Land	23	16
Labor Regulations	22	16
Inadequately Educated Labor Force	31	11

Source: Kenya ICA, 2003 and 2007.

A last remarkable observation is that a higher percentage of firms considered electricity and transportation to be constraints in 2007 than in 2003. One possibility is that these sectors deteriorated between 2003 and 2007; but that does not appear plausible. The operational performance of Kenya

<sup>51</sup> See section 2.

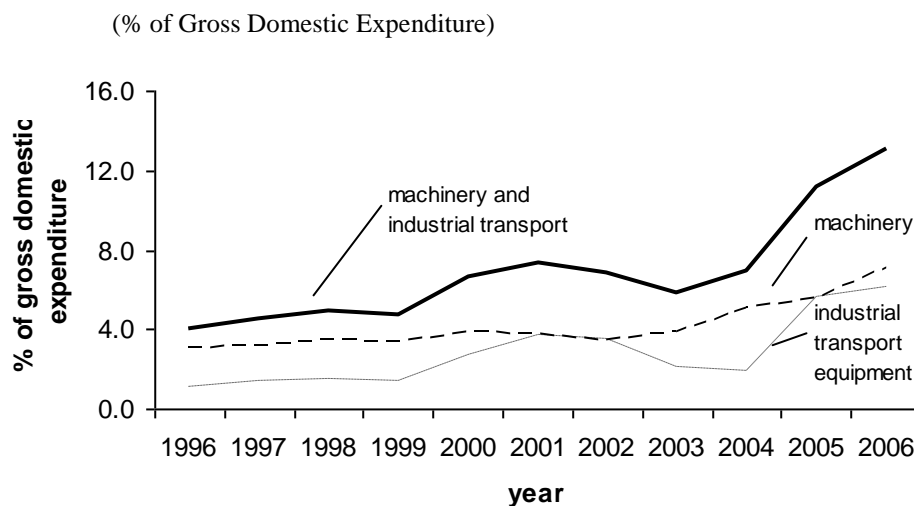
<sup>52</sup> These data are for a panel of 169 manufacturing firms that participated in both surveys.

Power and Lighting Company – the power operator - improved considerably after its management was contracted out to an international company in 2006. The number of power outages went down by about 40 percent between 2004 and June 2007, and new connections have increased by more than 50 percent.

Similar hard perception data for transport are not available but the government has been allocating increasing amounts for road rehabilitation since 2005/06. A more likely possibility is that the increased dissatisfaction with infrastructure reflects a resurgence in investment. Between 2003 and 2006, expenditure on gross fixed capital formation expanded at an average of 16 percent per year (Economic Survey 2007, Kenya National Bureau of Statistics). This evidence is consistent with the idea that after 2003, infrastructure services *replaced* political and macroeconomic risk as the binding constraint to private investment.<sup>53</sup>

A last piece of persuasive evidence supporting a sharp improvement in the investment climate is provided by import trends. Figure 6 shows a marked increase in the imports of machinery and industrial transport equipment after 2003. These imports averaged 5.6 percent of gross domestic expenditure (GDE, equal to consumption plus investment plus government spending) over 1996-2002. This went up to 9.3 percent of GDE over 2003-2006.

Figure 3.6. Imports of Machinery and Transport Equipment



### 3.7 Challenges Looking Ahead: Concluding Remarks

The *economic policy* challenge for Kenya is to consolidate macroeconomic stabilization while continuing to accelerate growth. There are two ways of describing this challenge:

1. Increasing spending on the social sectors and infrastructure without compromising government solvency
2. Raising the rate of return to private capital while lowering the cost of capital.

<sup>53</sup> For the binding constraint approach to growth diagnostics, see Hausmann, Rodrik and Velasco (2005).

The good news in challenge 1 is that Kenya does not appear to have a debt sustainability problem and therefore has more latitude in generating ‘fiscal space’ for infrastructure and social spending, than many MICs with such a problem, which has severely constrained their fiscal space options.<sup>54</sup> Its debt dynamics have been especially favorable for the past 4 years as shown above and real interest rates have been low. With indebtedness on a steady decline over the past 10 years, the key question that policymakers need to ask is whether this trend should be preserved or whether an alternative goal may be socially more desirable, such as either keeping the government debt-to-GDP ratio constant or even letting it rise in the short-run while the infrastructure constraint is alleviated. The key point is to select infrastructure projects with high economic rates of return and ensure that infrastructure services are priced at a cost-recovery level. This together with any acceleration in growth as a result of relaxing the infrastructure constraint on private investment should ensure that over the long-term, the additional public investments pay for themselves. Resources can also be released for higher infrastructure investment through more efficient spending. For example, an ongoing study shows that the quality of roads portfolio can be improved by selecting projects with higher economic returns. There is also scope for curtailing waste through more efficient procurement. Similarly, in the education sector, better allocation of the time of existing teachers will help in financing the ongoing expansion on a fiscally sustainable basis while improving the quality of education outcomes.

Challenge 2 is related to challenge 1 in that relaxing the infrastructure constraint will raise the return to private capital. In addition to macroeconomic stabilization, a crucial factor for keeping interest rates and the cost of capital low is political stability, which will also lengthen private investment horizons and thus the threshold rate of return for investment projects. We conclude by discussing this *political stability* challenge, which has superseded the economic policy challenge.

Notwithstanding significant reform spurred by a reduction in aid by donors on governance grounds and as an attempt to bolster credibility after the costly and disruptive Goldenberg scandal broke in 1992, tangible results took a decade to emerge in the form of sharply improved government debt dynamics, faster growth and lower interest rates. We argue that the peaceful presidential elections and smooth transfer of power in 2003 was a threshold event enabling positive economic outcomes. While the latter coincided with falling global interest rates and a pick-up in growth throughout the developing world, we base our evidence on the vastly improved debt dynamics of the government and surveys of private investors, who pointed to rising political stability as a major factor lengthening their business planning horizons. Besides, interest rates fell in spite of a shrinking primary surplus. Apart from lowered country risk, this has been facilitated by a rise in the revenue-to-GDP ratio after 2003 even though marginal tax rates were cut, attesting to better governance and tax administration.

Against this background, the new round of political instability unleashed by the flawed December 2007 presidential elections presents a formidable challenge. Not only is there need to achieve a speedy resolution, there is a fundamental need to establish political stability for an extended period of time—considerably longer than that achieved over the 5 years 2003-2007. This challenge promises to be at least as difficult as that of policy and institutional reform.

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<sup>54</sup> See for example Gill and Pinto (2005).

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## 4 “How to” of Fiscal Sustainability in Oil-Rich Countries: The Case of Azerbaijan

Nina Budina, Sweder van Wijnbergen, and Luca Bandiera<sup>55</sup>

### *Abstract*

Assessing fiscal sustainability – i.e. considering whether or not a country can maintain its current fiscal policies without running into solvency problems and possible default – requires projections on a government’s future revenue stream, expenditures and contingent liabilities within a macroeconomic framework. Such an exercise is always subject to uncertainty. In commodity-rich countries dependent upon resource revenues, this is intensified by unpredictable and volatile commodity prices. We apply the Framework for Fiscal Sustainability and Managing Uncertainty to Azerbaijan: we explore the link between non-oil primary deficit and Oil Fund allocation rules and assess their impact on fiscal sustainability in Azerbaijan and allow for explicit analysis of the effects of uncertainty through scenario analysis and full stochastic analysis allowing Value-at-Risk assessments.

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## 4.1 Introduction

Traditional fiscal sustainability approaches consider the overall fiscal accounts. However, for oil-rich countries a distinction between the oil and non-oil fiscal position is desirable because oil-related revenues are not like traditional sources of government revenue for the following reasons:<sup>56</sup>

First, oil is an exhaustible asset. In extracting and selling oil, the government can be thought of as converting a physical asset (“below ground”) into an economic or financial asset (“above ground”). Hence, to maintain its level of wealth, the government should invest oil revenues in projects that yield a competitive economic rate of return. Second, oil reserves depletion should explicitly consider the intergenerational equity. It is reasonable that the benefits from taxation should accrue to the generation incurring the taxes. But since oil is an asset which is naturally endowed to a country, its benefits net of extraction costs ought to be shared across generations.

Finally, oil income is highly volatile. In many oil-rich developing countries, oil-related revenues account for the lion’s share of government revenues as shown in Table 4.1; but oil income is highly volatile even when quantities are relatively easy to predict, because oil *price volatility* is high. Experience has shown that high volatility slows down productivity growth by a substantial margin, in particular in countries with a relatively underdeveloped financial sector. Hence many oil-producing countries aim at reducing spending volatility below the levels of oil revenue volatility by diverting a stable flow of resources from oil revenues to the budget, and allocating the remainder to a stabilization fund.

Table 4.1. *Relative Petroleum Dependence for Selected Oil Producing Countries (2005)*

Country	% GDP <sup>1</sup>	% Govt Revenues	% Goods Exports
Nigeria	53.1	84.4	87.6
Azerbaijan	42.2	38.9	90.0
Kazakhstan	30.5 <sup>/2</sup>	36.8	61.5
Norway	23.2	25.8	64.6
Russia	15.3 <sup>/2</sup>	12.7	48.1
Indonesia	10.2	28.0	10.9
Mexico	1.3	37.8	14.9

Source: WDI, WEO, IMF Art.IV and Macro Framework, and country statistics reports.

<sup>1</sup> Mining as % of GDP 2/Oil exports as % of GDP.

<sup>56</sup> The non-oil fiscal position is (total revenues minus oil-related revenues) – (total expenditure minus oil-related expenditure), i.e. the budget surplus if the oil sector did not exist.

Assessing fiscal sustainability – i.e. considering whether or not a country can maintain its current fiscal policies without running into solvency problems and possible default – requires projections on a government’s future revenue stream, expenditures and contingent liabilities within a macroeconomic framework. Such an exercise is always subject to uncertainty. Given the special features of oil-rich countries, managing volatility during oil price booms makes it advisable to divert at least some of the current oil revenues to an Oil Stabilization Fund (OSF), which many countries are doing today. Hence, the analysis needs to incorporate an OSF and an OSF allocation rule. Fiscal policy is captured by restrictions on the size of the non-oil primary deficit (NOPD) of the public sector plus the rule for allocating current oil revenues between the OSF and the budget. Fiscal sustainability analysis would then examine the impact of the non-oil primary fiscal deficit and OSF allocation rules on net debt levels, including monies saved in the OSF under various scenarios for the oil price.

We apply the Fiscal Sustainability Analysis (FSA) tool (Bandiera et al.) to the case of Azerbaijan, which is interesting on its own right but can also offer some lessons to other oil-rich countries. Azerbaijan faces a major challenge of managing its sudden high but temporary oil wealth. Because of the temporary nature of Azerbaijan’s likely oil and gas revenues, intergenerational fairness is a major issue, as are concerns about post oil economic performance. Finally the highly volatile nature of oil revenues add further policy challenges; if it would translate in highly volatile spending levels and associated volatility of the real exchange rate, an effective tax on private investment would result with negative consequences for economic growth.

## **4.2 The Fiscal Sustainability Analysis (FSA) Tool**

Many oil-rich countries (ORCs) have attempted to use oil funds and/or fiscal rules to de-link public expenditure from volatile oil revenue and to accumulate large foreign exchange reserves/oil fund assets to lower vulnerability to financial crises and debt overhang problems. Experience has shown that high current oil income is in no way a guarantee that these countries will not at times have to face crisis circumstances in the future. Thus, managing fiscal risks from oil revenue uncertainty is a key challenge facing policy makers in ORCs. This section extends further the analytical framework for assessing the sustainability of fiscal strategies in ORCs (Budina and van Wijnbergen, 2008).

Any framework needs to go beyond the routine consistency checks that form the bread and butter of fiscal sustainability analysis (FSA).<sup>57</sup> First of all, doing an FSA in the presence of an oil fund rule requires explicit incorporation of non-oil deficit rules to make the oil fund a meaningful exercise.<sup>58</sup> This requires modifying the government budget constraint and the resulting public debt dynamics equation to isolate the impact of oil on public finances and to reflect the special features of oil discussed above.

### **4.2.1 Incorporation of the impact of oil on public finances**

The first step in such an approach is to create a baseline scenario of the likely future time path of the oil producer’s net financial asset position, using the flow budget constraint equation. This baseline uses the flow budget equation to update future net financial assets as a share of GDP, based on macroeconomic projections of key determinants of public debt dynamics, such as growth, inflation, projected primary surpluses, and interest rates, as well as our projections for the oil fiscal revenues, which involve projections or assumptions of remaining oil reserves, the future rate of oil extraction,

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<sup>57</sup> See Burnside (2005) for a good overview of the traditional World Bank approach.

<sup>58</sup> See Davis, Ossowski and Fedelino (2003) for a discussion of fiscal policy formulation in ORCs, and see Baunsgaard (2003) for a discussion of possible fiscal rules for Nigeria.

future oil prices, and taxation regimes. Customizing the forward looking approach to ORCs requires modifying the government budget constraint and the resulting public debt dynamics equation to isolate the impact of oil on public finances and to reflect the special features of oil.

Before going into the details, we should consider one important point. To ensure consistency among debt stocks, deficits, and revenue from seigniorage, it is necessary to consolidate the general government accounts with the central bank's profit and loss account (Anand and van Wijnbergen 1988 and 1989). Otherwise, seigniorage, an important source of revenue in most developing countries will not show up in the budget dynamics, and debt may be mis-measured by failing to take into account assets held by the central bank.<sup>59</sup> This is especially important if the savings from current oil revenues are deposited at the central bank. Public sector foreign debt is then measured net of the (net) foreign asset holdings of the central bank and net of the assets of the oil fund, if those are deposited outside the central bank. Similarly, deficits and the ensuing liabilities for the state may be seriously mis-measured if the quasi-fiscal deficit of the central bank is excluded. Such mis-measurement is a major shortcoming of the recent International Monetary Fund approach to sustainability (IMF 2002 and 2003). Similarly, if the oil fund is set up as an extra-budgetary fund, then one should consolidate the oil fund operation in the general budget. This consolidation may be especially important if the fund is authorized to undertake expenditure outside the consolidated budget.

After that consolidation, the analysis is structured around the net debt and OSF updating equations, tracing debt-to-output ratios and the OSF assets over time under different non-oil primary deficit and OSF allocation rules depending on the country's oil revenue profile (see Box 4.1). The model can be used to analyze specific scenarios for given assumptions about driving variables such as domestic and foreign real interest rates, the real exchange rate, inflation and world oil prices. These scenarios are useful to test robustness under extreme events and the impact of specific once-off shocks.

A simplified scheme of the proposed practical framework, which also accommodates a fiscal strategy for de-linking public expenditure from current oil revenue, is presented in

Figure 4.1. As shown in the figure, besides the traditional automatic debt dynamics, the path of (gross) public debt depends on the projected stream of oil-related fiscal revenues, the level and the trajectory of the non-oil deficit, and the targeted level of foreign exchange reserves (the oil fund).

The country's oil revenue profile crucially influences the decision about how much to spend out of current oil income. Hence, the FSA analysis also requires estimates of proven reserves, extraction profiles that would determine the nature and the shape of the oil wealth (temporary permanent), long term oil price projections and a fiscal framework that can estimate/project future stream of oil fiscal revenue. Furthermore, since oil income is volatile, check the sensitivity to changes in oil prices/extraction profiles, new oil discoveries and changes in taxation regime is very important.

Next, once estimates of oil wealth become available, a key stage in the FSA analysis is how to set up meaningful fiscal rules for oil-producing countries, rules that would enable fiscal policy to manage volatility, to minimize possible Dutch disease considerations and to lower vulnerability to crises. One component of such a fiscal rule, which triggered significant attention relates to designing Oil Fund Accumulation rules. As discussed in Box 4.1, the essence of Oil Fund Accumulation Rules is captured by specifying the oil transfer to the budget –  $Roil_{SB}$ .<sup>60</sup>

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<sup>59</sup> For debt decomposition derivation in discrete time, see the Appendix 6.

<sup>60</sup> Note the FSA tool assumes that oil fiscal revenue in any given year are first deposited to the Oil Fund and then the



### Box 4.1. Public Debt and OSF Assets Dynamics

The difference equation for the net public debt-to-GDP ratio,  $d$  (measured net of the net foreign assets, public debt holdings of the central bank, and oil fund assets) has the following components:

$$\dot{d} = f - Roil_{SB} + (r - g)d + \alpha e \dot{d} - (Roil - Roil_{SB}) + OF \quad (1)$$

(A) the fiscal rule is captured in the projections of the non-oil primary deficit net of seigniorage revenues,  $f$  (in percent of GDP); (B) growth adjusted real interest rate payments on net public debt ( $g$  is the real GDP growth rate;  $r$  is the real interest rate on public debt, (C) Capital gains or losses on net external debt due to exchange rate changes ( $e$  is the real exchange rate,  $\frac{EP^*}{P}$  with obvious definitions of variables and  $\alpha$  is the share of foreign currency denominated debt in total public debt), (D) Actual oil revenues and (E) O(ther) F(actors), such as fiscal costs related to cleaning up the financial sector.

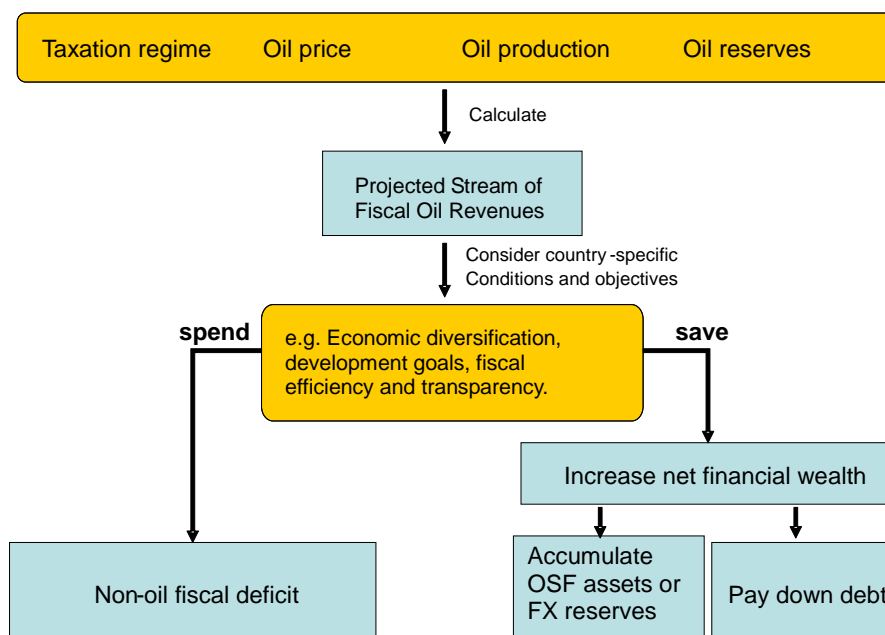
The model also includes a difference equation for the OSF assets-to-GDP ratio,  $OSF$ ;

$$OSF = (Roil - Roil_{SB}) + (r - g + e)OSF \quad (2)$$

The first term in brackets measures the net OSF asset accumulation, or the excess oil revenue over and above that used to finance the non-oil primary deficit, while the second term measures growth adjusted real interest rate earnings on the OSF assets-to-GDP ratio, also accounting for capital gains/losses due to exchange rate changes.

Notes: Eq. (1) and (2) are presented in continuous time. For discrete time derivation, see Appendix 6.

Figure 4.1. Fiscal Sustainability Framework for Oil-Rich Countries



amount of oil revenue to be used towards non-oil deficit financing is transferred from the Oil fund to the budget.

In countries with **limited proven oil reserves**, the oil windfall is going to be short-lived. Saving more out of the current oil revenue boom would dampen volatility while also allowing future generations to share in the oil even if the oil reserves may have been exhausted before they come on stage. The best approach to achieving both goals is to limit spending out of oil income to levels that can be sustained indefinitely by accumulating savings/paying down debt in high revenue years and dis-saving in low income years in line with the *Permanent Income* from oil (van Wijnbergen, 2008). Such a rule would be suitable for a country like Azerbaijan, which is expected to run out of oil around 2025 as shown in Figure 4.2. The approach would require limiting the non-oil primary deficit to the permanent income equivalent of the oil income, which has been estimated at approximately \$5 billion in 2007 prices (the horizontal line in Figure 4.2). This would shift spending out towards the future, thereby reducing the real exchange rate pressure and stretching the spending boom.

**For countries with large proven reserves**, limiting budget transfers out of oil income to revenues calculated at a long term average (reference) price rather than the current high price has similar effects to the PI approach. Oil stabilization funds (OSFs) may be set up to save oil revenues above the reference price. Such a rule has three advantages: simplicity and hence ease in implementation; imparting a measure of fiscal discipline with regard to the non-oil deficit; and breaking the link between government spending and current oil prices, thereby lowering the volatility of the real exchange rate and minimizing Dutch disease. Importantly, an OSF based on a reference oil price should ensure that the non-oil primary fiscal deficit does not exceed the oil revenues transferred to the budget at the reference price. Nigeria after 2003 and Russia have been successful in reducing expenditure volatility by using such a rule and by accumulating assets in an OSF.

Another possible OSF rule that is implemented in the FSA tool is the “bird in hand” rule, which has been used in Norway. This rule implies limiting the oil transfer to the budget to the annual financial return on the assets deposited in the OSF. As in the PI case, oil assets accrue entirely to the oil saving fund, but the rule is simpler than calculating the PI equivalent (the two OSF rules would be equivalent for a country that has exhausted completely its oil reserves). Finally, the FSA framework also allows for OSF rules that target the net accumulation of oil fund assets (which leaves as a residual the oil transfer to the budget).

Oil fund accumulation rules 1 to 3 above aim at stabilizing fiscal revenue from the volatility of oil prices. However, fiscal rules are necessary to prevent the accumulation of unsustainable public debt, consistent with the rules for the accumulation and use of oil reserves. The FSA tool includes 4 rules for NOPD. Each rule would interact with oil assets accrual rules defined above.

A second component, which is equally important for setting up meaningful fiscal rules for oil-rich countries, consists of supplementing the Oil Fund Accumulation rules by limits on the non-oil primary deficits. For example, an implementation of a PI rule requires not only limiting the oil transfer to the budget to the permanent income equivalent of the oil wealth, but equally, important, it also require limiting the non-oil primary deficit to the size of this oil transfer to the budget. Putting money aside with one hand but borrowing on the side with the other obviously would make any Oil Fund Accumulation Rule ineffective.

## 4.2.2 Incorporation of Uncertainty

The second extension to regular FSA is the incorporation of uncertainty. So far we have assumed deterministic paths for the variables underlying the debt dynamics, as spelled out in equations (1) and (2) in Box 4.1. Given that there is uncertainty attached to projections of variables such as interest and growth rates, exchange rate developments, and so on, how sensitive are the results to a given shock in any of the variables used as input in the exercise? One way to address these uncertainties is to introduce *stress tests* to deal with specific risks. In a stress test, a set of sensitivity tests to the baseline scenario is conducted, assuming that the underlying variables swing away from their means by one or two standard deviations. Stress tests are a useful sensitivity check, but they have their limitations. In particular, they are incomplete because they ignore the endogenous interactions between input variables, and so they are not a substitute for a full macroeconomic model-based analysis. But their merit is that they significantly reduce computational complexity and data requirements, and still give meaningful insights about the sensitivity of the model results to exogenous shocks. The most important sensitivity analyses include stress tests with respect to oil prices, real interest rates on domestic and foreign public debt, real output growth, primary balance, and (changes in) the real exchange rate.<sup>61</sup> The purposes of the various alternative scenarios are to facilitate a discussion of key vulnerabilities of the economy and to ensure more realistic fiscal sustainability assessments. In addition, the framework used allows for a fully specified crisis scenario, whereby the fiscal rule is compromised and a country is hit by a severe negative oil price shock.

Furthermore, the FSA tool also introduces the possibility to use a full scale Monte Carlo (MC) simulation of a using the stochastic properties of key variables driving the debt dynamics process (IMF, 2003; and Celasun, Debrun and Ostry, 2005). The input variables for stochastic simulations include oil prices, growth, real interest rates, real exchange rate and inflation. Using estimated parameters of the joint distribution of all input variables, the distribution of these variables can be simulated jointly using MC methods (see Bandiera et al., 2007, for a technical description of the stochastic simulations). This implies that for  $n$  input variables and a horizon of  $T$  years,  $n \times T$  random numbers are generated repeatedly until the generated and empirical distribution are sufficiently close. For each run, the model is applied to derive the full path of debt stocks. In this way the full probability distribution of debt/output ratios at each future point in time is derived. The probability density of the outcomes of debt ratio can be plotted from the stochastic simulations, generating a so called “fan chart” for the debt-to-GDP ratios over the projection period.

One way of obtaining the relevant variance-covariance information is to run a VAR on historical variables and transform the generated random numbers from the MC simulation in such a way that the resulting joint distribution of shocks conforms to the moments of the distribution of residuals estimated through the VAR. In the case of a multi-variate normal, a transformation using the Cholesky decomposition of the empirical covariance matrix can be used to transform iid generated random variables into variables corresponding to the empirical distribution.

Finally, as discussed below, MC simulations may overestimate the impact of exogenous shocks, since the government may take deliberate corrective actions as its debt stock rises. Therefore the FSA tool includes the possibility to combine stochastic simulations with an endogenous fiscal policy reaction function, which introduces a linear feedback effect from deviations from base level debt stocks to deviations from base level primary surpluses. Bohn (1998) shows that, if all other determinants of

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<sup>61</sup> For a more detailed description of all the stress tests, see Bandiera et al. (2007).

fiscal policy are stationary, a positive correlation between the primary surplus and the past level of the public debt-to-GDP ratio is sufficient to guarantee fiscal sustainability.

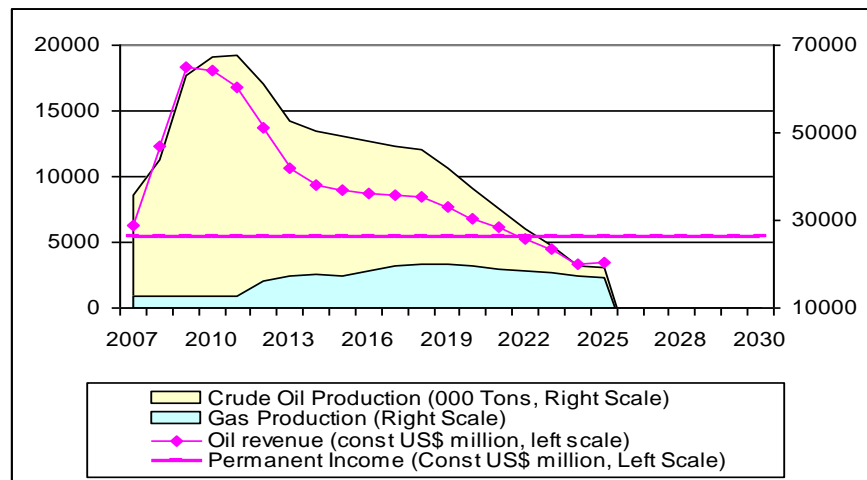
### 4.3 Fiscal Sustainability and Managing Oil Wealth in Azerbaijan

#### 4.3.1 The Value of Azerbaijan’s Oil Wealth and Sustainable Spending

Three strategic questions frame the challenge that Azerbaijan faces in managing its oil windfall: (1) How much oil revenue should be saved and spent every year, or how to set meaningful oil fund/non-oil deficit rules? What is the link between oil fund rule and non-oil deficits and what are their implications for fiscal sustainability? (2) How to deal with uncertainty and manage oil revenue volatility? And (3) What other key (macro or capacity-related) factors constrain overall level of fiscal spending?

Below we sketch answers to these three questions. Simulations use a tool for fiscal sustainability analysis developed to introduce uncertainty on the effect of fiscal policy decisions in resource rich countries. The framework is described in section 4.2 above.

Figure 4.2. An Application of the PI Approach to Oil Wealth in Azerbaijan



The first set of inputs concerns the oil sector. We have used the March 2008 World Bank long term oil prices forecasts (Appendix 5). However, just for comparison purposes we have compared them with the long term oil price forecast as of November 2007 (referred as old oil price forecasts). We also used available forecasts of oil and gas extraction rates and rich data on the costs in each individual oil field. After accounting for the tax structure, royalties, and production sharing schemes, the study was able to specify the relationship between oil revenues and various oil price scenarios. Under baseline oil price assumptions, Azerbaijan will experience a very steep increase in oil fiscal revenues during the next five years (2007-2012). However, without any new oil/gas discoveries, oil revenues are projected to decline quickly, returning to their current levels by 2015 and disappearing by 2025.

Below we calculate the PI equivalent for Azerbaijan before and after recent adjustments in price

expectations to demonstrate this point. The graph lists oil price projections before and after a recent modification (February 2008), and the associated projected fiscal revenues from oil and gas production for the Azeri Government.

In Table 4.2 below we build up the NPV and PI calculation for Azerbaijan. We discount the future income back to 2007 in a Net Present Value calculation, assuming a safe real rate of interest of about 3 percent (equal to the US long term real rate plus a hundred basis points Azerbaijan country risk). This is added to a long term US inflation projection of 2.4 percent to arrive at a safe nominal rate of 5.5 percent. But the income stream being discounted is not a safe stream; it is shrouded in substantial uncertainty. To account for the riskiness, we add a 3 percent risk premium to the basic safe real rate.

Under the most recent oil price assumptions, the NPV of the oil and gas wealth is of course higher: an estimated US\$165 billion, or a massive 594 percent of 2007 GDP, and no less than 1470 percent of 2007 non-oil GDP. The permanent income equivalent corresponding to this higher level of wealth, and again using the safe real rate to discount a flow of income/expenditure that is constant in real terms, is about US\$5 billion in 2007 dollars, or slightly over 18 percent of 2007 GDP and a whopping 45 percent of 2007 non-oil GDP. The PI amount is what can be safely spent on an annual basis indefinitely, thus allowing future generations to share in equal absolute annual amounts in real terms (not per capita or as share of their income).

*Table 4.2. Permanent Income Approach to Oil wealth (in constant 2007 U.S. dollars)*

Oil Price Assumptions	Net wealth (US\$ billion)	Net oil wealth to 2007 GDP ( %)	Net oil wealth to 2007 non-oil GDP, %	Annuity (US\$ 2007 million)
Real Safe rate of interest =3%, Risk premium=3%, Foreign inflation=2.4%				
Old Oil Price Assumptions	143	515	1274	4.4
New Oil Price Assumptions (Febr 2008)	165	594	1470	5.1

Note: In addition to the assumptions on oil prices and exploitable oil reserves, the results depend on the profile of the extraction, the pace of investments, and financial and operational decisions of the operators that may change the path of revenue that the government receives from oil operations.

<sup>1</sup> This annuity can be interpreted as the sustainable level of annual spending.

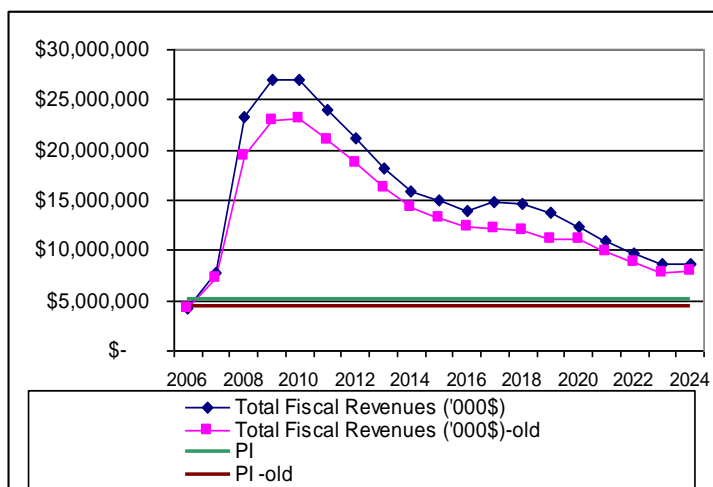
Furthermore, Table 4.2 shows the different PI calculations compared to the two revenue forecasts. An increase of more than US\$20 billion in oil wealth (measured in NPV terms) results in an increase of less than \$ 700 million of the annual spending limit because the windfall gain is spread out over the entire future. Of course the increase in the spending limit is linked to world inflation. Hence, under the assumption of the old (lower) long term oil price forecast, the NPV of the oil wealth is brought down to \$143 billion, or only 12.7 percent of non-oil GDP, while the corresponding permanent income equivalent is now estimated at \$4.4 billion.

### 4.3.2 Deficit Rules, Oil Income and Fiscal Sustainability

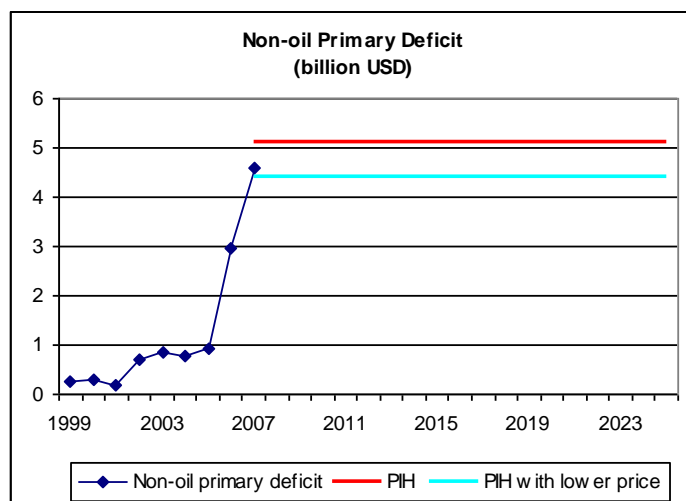
As shown in Table 1, the PI out of the oil windfall for two different oil price projections varies between US\$4.4 billion and US\$5.1 billion in constant 2007 dollars. The permanent income levels shown in Figure 4.3a indicate that Azerbaijan, on this rule, should save substantial amounts of its oil revenues over the next 20 years, and that current levels of expenditure may be somewhat high, but are not very far out of line with what the PI approach would dictate (Figure 4.3b) based on current wisdom in terms of oil price projections (see Appendix 5).

Figure 4.3. (a) PI for Two Oil Price Assumptions in Constant 2007 Dollars; and (b) Actual Non-Oil Primary Deficit

a. PI for two oil price assumptions (2007 US. dollars)



b. Actual non-oil primary deficit



The measures of PI should be compared to the NOPD, as it represents the net claim on non-oil resources, to be covered by the PI amount transferred from the Oil Fund. Azerbaijan has wisely chosen to reduce spending volatility below the levels of oil revenue volatility by diverting a stable flow of resources from oil revenues to the budget, and allocating the remainder to a stabilization fund. To be effective, such an allocation rule needs to be complemented by a rule on the non-oil deficit; there is little point to adding money to a fund with the one hand, and borrowing against future oil revenues with the other. The Fiscal Sustainability Analysis tool (FSA) presented in Section 4.2 and in Appendix 6 is designed to analyze the interaction between these two rules (oil fund allocation rule and non-oil primary deficit rule).

Some concern remains however about the *pace* of the increase in spending, even as its current *level* does not seem very far out of line with what the PI approach coupled with current non-oil public revenues allow. Public expenditure increased by 80 percent in 2006 alone and tripled over the past three years. Managing such rapid expenditure increases is a challenge under the best of circumstances; the fact that Azerbaijan’s public institutions are still in a build up phase adds further complications. There is for example not yet a public investment evaluation capacity in any of the existing ministries.

Given the challenge to manage future expenditure increases, we present three illustrative fiscal strategies for the non-oil deficit to GDP ratio: the first strategy assumes that the non-oil deficits in the next five

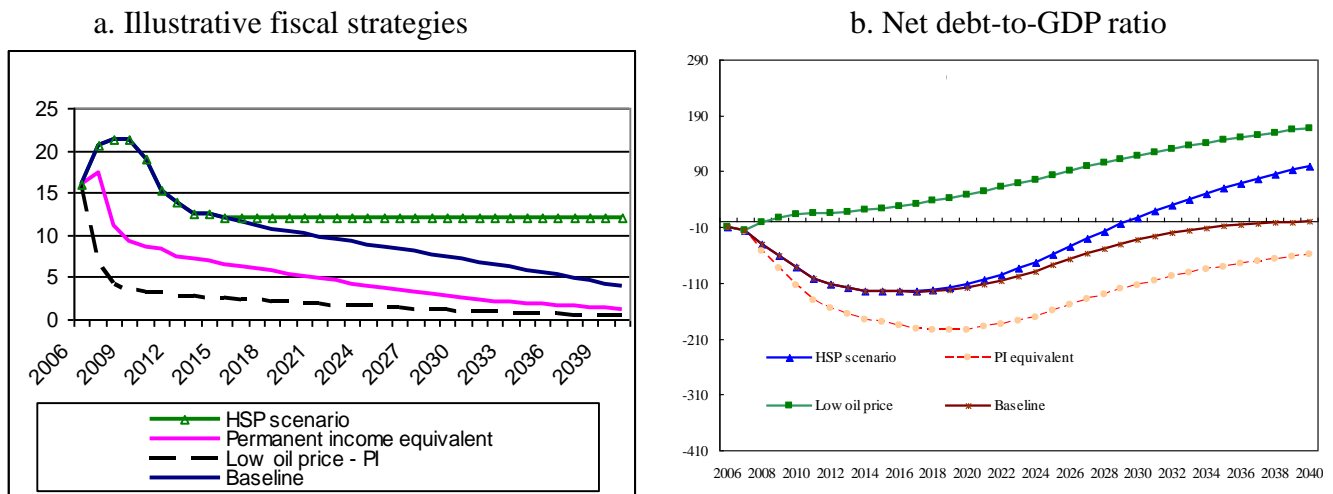
years and beyond are bounded by the flow of oil revenue to the budget, which in turn assumes the deficit will be declining as a ratio of GDP. This is a reasonable sharing rule since over-all GDP growth is projected to be based not on population growth but on capital accumulation and productivity growth. Constant real amounts with a constant population imply equal amounts (in real terms) for current and future generations on a per person basis.

Furthermore, a base case strategy, guided by the medium term fiscal framework (MTEF) for the next three years, envisages non-oil primary deficits in excess of its “permanent income” equivalent in order to accommodate high infrastructure requirements strategy (Figure 4.4a). Thereafter, it is assumed that the non-oil primary deficit gradually declines from about 20 percent of GDP to 12 percent by 2015 (its 2007 level), reaching 4.3 percent of GDP by the end of the projection period.

Finally, a “high spending” strategy, whereby public spending increases according to the MTEF for the next three years, but as oppose to envisaged decline, public spending remains at its 2010 level (30 percent of GDP). Provided that the non-oil revenue remains the same as in the base case, this implies a constant NOPD of 12 percent of GDP from 2015 onwards.

With the different fiscal strategies specified, we run the fiscal sustainability tool to derive projections for net public debt throughout the projection period (Figure 4.4b). Note that as explained in section 4.2, this framework also incorporates the dynamics of the oil fund assets and consequently, an oil fund rule to deal with the large but volatile oil revenue in Azerbaijan.

Figure 4.4. (a) Illustrative Fiscal Strategies and (b) Stress Tests for Net Debt-to-GDP ratio



Under the PI scenario sustainability is of course not under threat because it is explicitly designed as a sustainable strategy; the net debt position remains basically unchanged over the planning horizon. Initial net saving are positive as oil revenues exceed the PI transfer and a NOPD that exactly matches the PI transfer; later on net savings stop but the overall net debt position remains essentially stable.

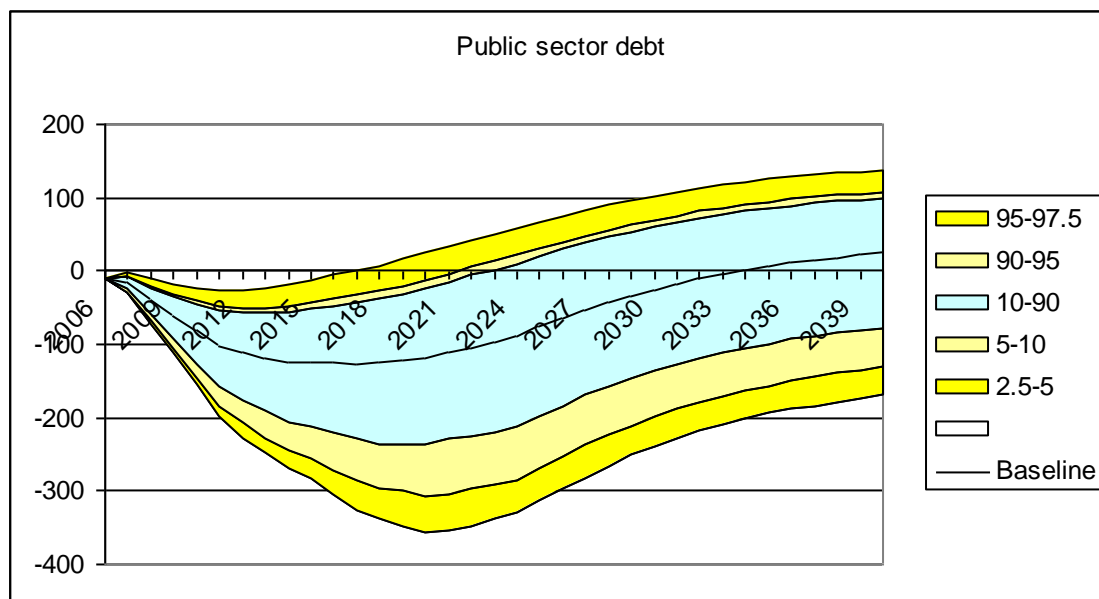
Under the high spending scenario, the government will maintain primary spending at 30 percent of GDP, and corresponding NOPDs at 12 percent of GDP. The net asset position deteriorates and reaches zero in 2030. Thereafter, Azerbaijan will become a net debtor again, to reach a net debt of 90 percent by 2040, a deterioration of no less than 80 percentage points of GDP.

Finally, we also perform a stress test to the high spending scenario (HSP), to check the sensitivity of this strategy to a negative oil price shock. This stress test assesses the impact of a permanent oil price drop back to its long term historical average (see Figure 4.4b above) of about US\$35 ppb in real terms while maintaining the high spending levels of the HSP scenario. The stress test indicates that this ‘high spending’ scenario once again establishes Azerbaijan as a major debtor.

### 4.3.3 Fiscal Sustainability Under Uncertainty: Monte Carlo Simulations

The dominant feature of the Azeri economy is the high volatility of its main source of income, oil and gas. Thus a Monte Carlo analysis around base line predictions is useful: because of the high volatility, scenarios that seem reasonable in expected value terms may nevertheless mask substantial risks. Value at risk (V@R) approach to public debt is implemented using stochastic simulations of two key variables: changes in the real exchange rate and the price of oil. The FSA tool runs full scale Monte Carlo simulations, using historical variances of two variables being simulated, simulates the full probability distribution of future debt/output ratios and plots distributions resulting from stochastic simulations in a so called “fan chart” for the debt-to-GDP ratio.

Figure 4.5. Distribution of Future Debt Stocks under the Base Line Scenario



The runs reflect the baseline outcome, a net asset position that evaporates as time goes by; in about 30 years, Azerbaijan is expected to become a net debtor once again under this scenario. Such a rule introduces considerable uncertainty in the sense that the resulting distributions become very wide (i.e. the long term risks are large). Moreover based on historical variances and the complete lack of any feedback of rising debt levels on fiscal policy, the net debt position can become very large over the next three decades. With 95% certainty we can only say that the net debt will not become larger than 100% of GDP, indicating that the risk of major debt problems is very real under this strategy (cf Figure 5). One response would be to introduce feedback strategies: if net debt raises faster than planned a larger non-oil surplus is implemented;

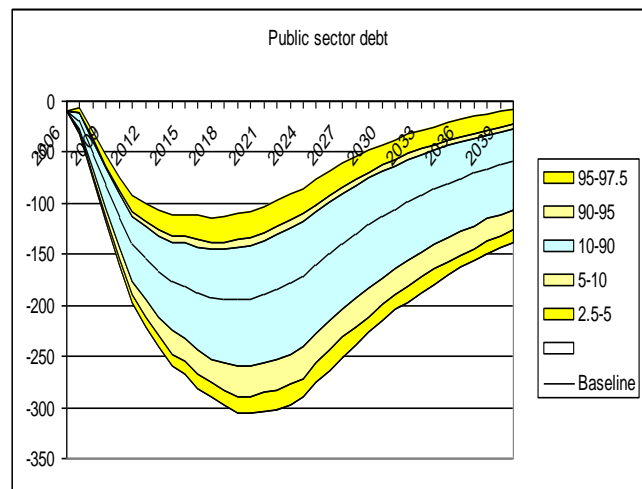
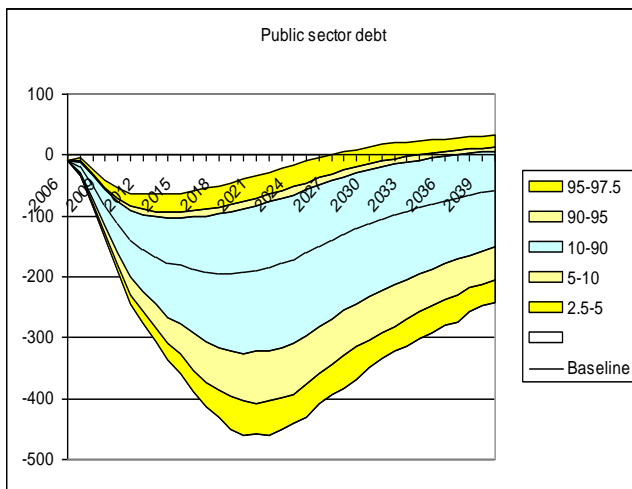


But first we will show what happens under the PI strategy. We run two variants: one using historical variances for both variables being simulated (Figure 4.6a), and one where the variance of the real exchange rate is reduced by 50 percent, reflecting the fact that this run has a more stable expenditure policy (Figure 4.6b). The simulations summarized in Figure 4.6a and b show that reduced real exchange rate variance helps: the 95 percent range now falls from net debt of about 30 percent of GDP to net assets of about 10 percent of GDP. In the Figure 4.6b scenario, Azerbaijan will stay out of debt with more than 95 percent certainty during the entire horizon. Thus we can safely conclude that the PI scenario provides Azerbaijan with a reasonably safe environment.

Figure 4.6. PI at (a) Historical Variances and (b) Historical Variance for Oil Prices and 50% of Historical Variance for the Real Exchange Rate

a. Historical variances

(b) Historical variance for oil prices and 50% for the real exchange rate



However, there are legitimate reasons why spending levels during the initial years maybe higher than the one based on the PI approach. In particular, the need to improve both quantity and quality of the country’s infrastructure may well require more financing than possible under the strict PI approach. This will add to exchange rate pressure, but may improve future competitiveness and therefore growth.

#### 4.3.4 Fiscal Sustainability Under Uncertainty: Debt Feedback Rules

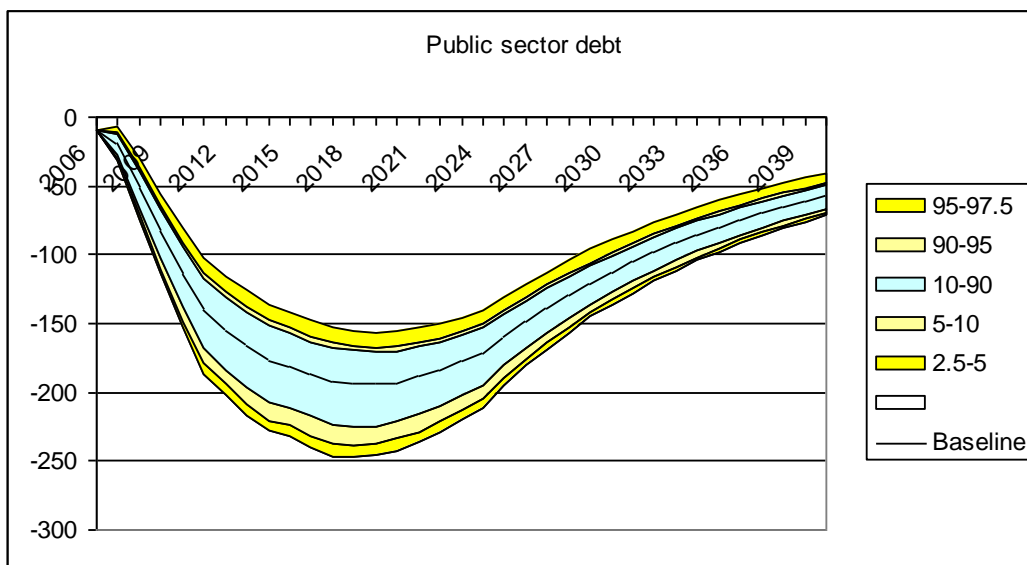
All simulations presented so far assume a fixed fiscal rule, for example a NOPD equal to the ex ante calculated PI level of oil revenues. The lack of any *ex post* response to adverse shocks then leads to a great deal of uncertainty about future debt stocks; even the use of a fixed PI rule turns out not to be enough to get manageable levels of debt variance. This matters a great deal: default risk premia will depend on the likelihood that debt levels are larger than a threshold level beyond which political problems will block debt service (Schabert and van Wijnbergen, 2008). Although we do not know those thresholds, for any given value of such a threshold, greater uncertainty about future debt levels implies

a greater probability of future crises.

Figure 4.7 show how a feedback of unanticipated higher debt levels to larger (smaller) primary surpluses (deficits) leads to much less uncertainty about future debt stocks, and therefore to much lower crisis expectations. Figure 4.6b above assumed that the non-oil primary deficit equals the permanent income value (as currently estimated) of oil revenues, and that the increased stability of spending would reduce the variance of the real exchange rate by 50 percent. Although Azerbaijan can be said with 95 percent certainty to stay out of net debt, there is a very wide range of expectations about future debt stocks.

Next we assume a feedback rule from higher than anticipated debt stocks to a stricter fiscal policy. In particular, we assume a simple linear feedback rule where a fixed percent of last year’s excess debt (higher than projected in the base run for given NOPD assumptions) is offset by a lower NOPD. Budina and van Wijnbergen (2007) show that Turkey throughout the nineties used a strong feedback rule, with 20 percent of any debt surprise corrected the following year by tightening fiscal policy. If we add such a feedback rule to the simulations of Figure 4.6b, we obtain the results summarized in Figure 4.7.

Figure 4.7. *PI Spending, at Historical Variance for Oil Prices and at 50% of Historical Variance for Real Exchange Rate: Feedback from Debt Surprises to Primary Surplus Correction<sup>1</sup>*



<sup>1</sup> The policy reaction function assumes a correction of the primary surplus of 20 percent of deviation of debt from the baseline.

The simulations show a dramatically improved outlook. While the expected value of future debt stocks (the black line in the middle) is not affected, the distribution around that line narrows dramatically. The 95 percent worst outcome line now stays at a positive net assets position of 40 percent of GDP, instead of touching zero; and the range between the 95 percent worst outcome and 95 percent best outcome narrows down to about 30 percentage points in 2040, down from a high 140 percent of GDP.

The conclusion should be obvious. It is advisable to complement the fiscal deficit strategy (non-oil deficits equal to the permanent income level of future oil revenues) by a target level for net debt, with a rule that any excess over that target level will result in a smaller NOPD by for example 20 percent of that excess. This should have a strong impact on confidence; while it does not affect the average spending level of the Government, it will greatly reduce the variance of debt outcomes and thereby lower crisis expectations. A fiscal policy reaction should translate in lower costs of debt servicing and less volatility in the capital account.

#### **4.4 Conclusions**

Azerbaijan faces a major challenge managing its sudden high but temporary oil wealth. Because of the temporary nature of Azerbaijan's likely oil and gas revenues, intergenerational fairness is a major issue, as are concerns about post oil economic performance. Finally the highly volatile nature of oil revenues add further policy challenges; if it would translate in highly volatile spending levels and associated volatility of the real exchange rate, an effective tax on private investment would result with negative consequences for economic growth.

In this paper we argue that explicitly adopting a permanent income approach to the decision on how much to spend out of oil revenues provides an adequate response to all three questions. We use a fiscal sustainability analysis tool to evaluate the outcomes of different scenarios. The baseline simulations, where non-oil deficits are initially at currently budgeted levels but eventually return to 12 percent of GDP with lower levels of expenditure, shows the re-emergence of Azerbaijan as a net debtor in the future once oil revenues start declining. This is even more so if spending levels do not decline and remain at the high levels currently foreseen under the medium term framework. The worst scenario of all, high spending but low oil prices, where oil prices would collapse to their historical average of about \$35 dollars in 2007 ppb will see clearly unsustainable levels of net debt.

But limiting the net claim on resources by the public sector (the non-oil primary deficit) to the Permanent Income equivalent of Azerbaijan's oil wealth will result in sustainable spending programs. Under this scenario Azerbaijan is not expected to run into a net debt position at any time during the projection period.

Of course such simulations do not reflect the uncertainty that dominates any claim on future outcomes. Therefore we ran stochastic simulations deriving the entire distribution of future debt stocks based on historical variances of the simulated driving variables. In particular we looked at shocks in oil prices and to the real exchange rate. Future debt levels are characterized by a very wide distribution as uncertainty accumulates. This matters a great deal: projections of crises will depend on the likelihood that critical debt levels will be exceeded, so the wider the distribution of future debt stocks around a given baseline, the greater the associated estimates of crisis probabilities, even if the baseline itself would stay below any crisis trigger level. We show that under all but the PI scenarios, in a variant on the Value at Risk approach used by commercial banks, the maximum net debt levels that can be expected with 95 percent confidence reach as high as 100 percent of GDP under the baseline scenario. Thus this scenario exposes Azerbaijan to considerable risk. The PI approach considerably reduces that risk. If we also assume a reduced variance of the real exchange rate in response to more stable expenditure patterns, we can say with 95 percent confidence that Azerbaijan will remain out of debt for the entire simulation horizon, thereby essentially reducing crisis probabilities to zero.

Finally the assumption made in the stochastic simulations, that there would be no feedback from higher than expected debt stocks to the non-oil primary deficit, was replaced in the final section by an active feedback loop: under this extension to fiscal policy reminiscent of the European stability pact, targets for deficits are extended by targets for debt; and any excess of debt over that target path results in a deficit reduction equal to a given percentage of the excess debt stock of the previous year. We have simulated the impact of a feedback loop with a high correction percentage of 20 percent, equal to empirical estimates obtained for Turkey, simply as an example. Such a feedback policy leads to a dramatic narrowing of the range that future debt stocks will stay in, according to simulations. In particular the 95 percent certainty maximum debt level actually stays widely negative under the PI scenario: with 95 percent certainty net assets will stay at 40 percent of GDP or higher. Such a feedback policy will not raise the average burden of fiscal policy but will greatly reduce estimated crisis probabilities by further reducing variance in the economy.

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## 5 Drivers of Growth in Fragile States

### Has the HIPC Process Helped Fragile Countries Grow?

Luca Bandiera, Jesus Crespo Cuaresma, and Gallina A. Vincelette<sup>62</sup>

#### *Abstract*

Using Bayesian Model Averaging techniques, the paper assesses the growth experience of fragile states and heavily indebted poor countries (HIPCs), half of which are also fragile states. We find that the drivers of growth are widely heterogeneous among the two groups of countries, and hence reveal specific determinants for sub-groups of the sample. We find evidence of decreasing overall level of debt stock-to-GDP ratio associated with higher economic growth in non-fragile HIPCs. We argue that fragility has hindered progress under the HIPC Initiative, while the staggered debt relief structure of the HIPC process does not seem to have aggravated fragility. Countries that benefited from debt relief while improving the quality of their policies and institutions seem to have also benefitted from economic growth after receiving debt relief.

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## 5.1 Introduction

Fragile states are a group of low-income countries that share certain common characteristics, such as a poor record of economic growth, predominantly young populations, and rapid rates of population growth.<sup>63</sup> These countries are home to more than 300 million poor people living on less than a \$1 a day—more than a third of the world’s extreme poor. They have the highest concentration of extreme poverty and are farthest away from reaching the United Nations’ Millennium Development Goals. Most fragile states have been affected by wars in recent years, and many remain at a high risk of conflict or political instability. All fragile states have suffered periods of prolonged contraction, usually around the time of conflict and political instability.

For the purpose of this chapter, we define fragile states as low-income countries with a score of less than 3.2 on the World Bank Country Policy and Institutional Assessment (CPIA) rating.<sup>64</sup> According to this method, 34 states and territories are classified as fragile. Twenty of these fragile states are also heavily indebted (Figure 5.1).

The Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI) have helped qualifying countries reduce extreme external debt burdens and contributed to creating fiscal space for channeling resources into poverty-reducing activities and economic development. Per capita income in fragile HIPCs is less than half that of fragile non-HIPCs, and their social indicators across the board are, on average, lower. Their annual economic growth rates remained negative until the mid-1990s, significantly lower than those of fragile non-HIPCs. Total investment growth in fragile HIPCs has been substantially lower and real exchange rate volatility higher than in fragile non-HIPCs.

Apart from being consistently at the bottom of the fragile states group, the 20 fragile HIPCs are not homogeneous. They are at different stages of the HIPC Initiative. At end-2008, four countries (The Gambia, Mauritania, São Tomé and Príncipe, and Sierra Leone) have reached the completion point and received irrevocable HIPC Initiative and MDRI debt relief. Ten countries (Afghanistan, Burundi, Central African Republic, Republic of Congo, Democratic Republic of Congo, Guinea, Guinea-Bissau, Haiti, Liberia, and Chad) have reached the decision point and started to receive interim assistance. Another six (Comoros, Cote d’Ivoire, Eritrea, Somalia, Sudan, and Togo) have yet to reach the decision point. In addition, three HIPCs that were fragile states according to the CPIA-based definition (Cameroon, Ethiopia, and Niger) when they reached the HIPC Initiative decision point lost their fragile-state status in the following years.

This chapter explains the economic growth differentials in fragile states and analyzes variables that appear to be robust determinants of economic growth in these countries. Do the differences across groups of fragile states suggest that there are fundamental differences in the drivers of economic prosperity in these countries? If so, has the HIPC Initiative process helped countries improve their prospects for growth?

A large body of literature supports the possibility that countries in different states of the world

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<sup>63</sup> For a comprehensive review of characteristics and economic policies in fragile states, see Favaro (2008) and Lluch (2008).

<sup>64</sup> The CPIA rates countries on a scale from 1 to 6, with higher values indicating better quality of policies and institutions. For different definition of fragile states, see Bourguignon and others, 2008.

do not follow a homogeneous growth process (see Begun 2008). In this sense, the literature has traditionally considered parameter heterogeneity based on initial income levels (see Brock and Durlauf 2001) and, in a parallel branch of literature, model uncertainty concerning the choice of variables in the specification. (An exception, in which both issues are treated simultaneously, is Crespo and Doppelhofer 2007).

This study uses Bayesian model averaging (BMA) to assess and identify economic growth determinants in low-income countries in the presence of both model and parameter uncertainty. It explores the factors affecting the growth of fragile HIPCs and compares them with the robust determinants of income growth in both nonfragile HIPCs and in fragile non-HIPCs. This technique recognizes that the “true” underlying growth model is not known and assesses the relevance of a broad set of covariates for groups of countries differing in their initial characteristics.

The chapter is structured as follows. In the next section, we present some descriptive statistics with which we assess the proposition that the very dimension of large debt stock and its macroeconomic consequences makes the group of fragile HIPCs significantly worse off in terms of economic growth prospects than other fragile states. In the following section, we present the methodology used to address the issue of relevant determinants to growth in these countries. In the third section, we report the results of the BMA analysis for the various groups of countries considered. The last section summarizes the chapter’s main conclusions.

## 5.2 Characteristics of Fragile States

There are stark differences among the subgroups of fragile states and HIPCs. The group of countries belonging to both groups, the Fragile HIPCs, are worse off in economic and social aspects of development, compared to both the group of other non-HIPC fragile states and the group of other non-fragile HIPCs, composed by countries which have all reached the completion point under the HIPC Initiative (henceforth, CP-HIPCs).<sup>65</sup> The gap has widened in recent years: fragile non-HIPCs, with an average level of per capita income of \$1,079, were almost three times richer than their HIPC counterparts in 2006.

For the 1990–2006 period, the average headcount ratio (the poor as a share of the population) was 20 percentage points higher in fragile HIPCs than in fragile non-HIPCs (56 percent versus 35 percent). Persistent poverty is also revealed in aspects of human development such as health and education. While under-five mortality declined in all fragile states between 1990 and 2006, it was 41 percent higher in fragile HIPCs than in other fragile states. Primary school completion rates were about 37 percent lower in fragile HIPCs than in other fragile states (40 percent versus 70 percent). Primary school enrollment in fragile states over the same period was 58 percent in HIPCs and 77 percent in non-HIPCs. Such differences remain over time. Along a variety of human development indicators, the group of fragile HIPCs ranks lower than the group of CP-HIPCs (Table 5.2).

Important differences along human development indicators distinguish the CP-HIPCs from other fragile states, partly explaining their gains on the development front. HIPC debt relief, especially

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<sup>65</sup>. The list of nonfragile CP-HIPCs includes Benin, Bolivia, Burkina Faso, Cameroon, Ethiopia, Ghana, Guyana, Honduras, Madagascar, Malawi, Mali, Mozambique, Nicaragua, Niger, Rwanda, Senegal, Tanzania, Uganda, and Zambia.



the cancellation of debt stocks under the MDRI, aims to increase the fiscal space for the beneficiary government and allow it to direct expenditures into poverty-reducing activities. Indeed, the HIPC Initiative frequently includes education or health completion-point triggers, negotiated at the decision point. The CP–HIPCs exhibit the largest drop in poverty rates and significant advances in school enrollment (and even greater gains may be expected with a few years’ lag). Primary school drop-out rates decrease significantly in CP–HIPCs as well (Crespo and Vincelette 2008). Gains are less pronounced in other areas of human development.

Macroeconomic indicators are also weaker in fragile HIPCs (Figure 5.3), and growth rates of fragile states are much more volatile than those of CP–HIPCs (Figure 5.2). Half of the fragile HIPCs experienced negative growth until the mid-1990s. All fragile states have undergone periods of prolonged contraction, usually around the time of conflict and political instability. Moreover, the average growth rate of income in countries that have gone through the HIPC Initiative has been higher than that of fragile states, especially given the CP-HIPC lower dependence on resource exports. Resource-rich primary commodity exporters have benefited from high commodity prices, fueling their output growth. Similarly, total investment as a share of output has been roughly 50 percent lower in fragile HIPCs than in other fragile countries and CP–HIPCs.

Fragile non–HIPCs have demonstrated stronger improvement of their institutional environment than fragile HIPCs, whose average CPIA rating remained unchanged in the past 25 years. This rating has stayed well below that of CP–HIPCs.

Fragile HIPCs as a group also exhibit lower quality of governance institutions than other fragile states (Figure 5.4). On average, along all six dimensions of the World Bank governance indicators, fragile non–HIPCs fare better than fragile HIPCs. The largest differences (also carrying statistical significance) are on the indicators of political stability and government effectiveness. No significant differences are found on the dimension of control of corruption, hinting at the complexity of removing patronage and vested interests of groups frequently linked to lucrative opportunities in the extractive industry.

While governance quality in HIPCs did not play a significant role in the decision of creditor countries to forgive debt in the 1990s, CP–HIPCs had notably better governance than any either group of fragile states (Freytag and Pehnelt forthcoming). This suggests that the presence of fragility is associated with lower-quality governance and that alleviation of the debt burden in poor developing countries has been associated with improving not only the availability of financial resources of these countries but also the quality of their governance institutions.

### **5.3 Data and Methodology**

To determine if the determinants of income growth differ in HIPCs, fragile non–HIPCs, and CP–HIPCs, we collected data for the period 1984–2004 and used panel data for the five resulting four-year nonoverlapping subperiods. Growth rates are therefore defined as averages over these four-year subperiods. Variables are evaluated at the beginning of each four-year period to address eventual endogeneity problems.

The potential growth determinants considered in the analysis are defined in Table A1 in Appendix 7. They include some standard determinants implied by neoclassical growth theory, such as the initial level of per capita GDP and the physical capital investment rates, as well as other variables deemed important economic growth covariates for developing countries, such as the private-credit-to-

GDP ratio, life expectancy, and openness and macroeconomic stability, among others. Given the presence of high levels of external debt burden in HIPCs, we also include the present value of the debt-to-output ratio as a covariate in the growth regression.

We then assess two situations: first, whether a reduction in the external debt burden would prove to be growth enhancing for HIPCs in spite of their fragility status; and second, whether with improvement in policies and institutions only, a lower debt burden would positively contribute to growth. In the first case, we can infer that fragile HIPCs would benefit from an upfront debt reduction. In the second case, we could argue that the two-step HIPC process (which requires countries to implement structural reforms, maintain macroeconomic stability and implement a country-owned poverty reduction strategy) is important for debt relief to be beneficial for growth.

We first analyze which variables appear to be robust determinants of economic growth in different group of developing countries using BMA techniques, which have recently become a workhorse of empirical economic growth research. (For two of the most influential contributions in this branch of the literature, see Fernández, Ley, and Steel 2001 and Sala-i-Martin, Doppelhofer, and Miller 2004). BMA aims to assess explicitly the issue of model uncertainty when estimating parameters of a model whose specification is not perfectly known. This is usually the setting in empirical economic growth research, where many (partly complementary) theories lead to different variable choices for the model specification. BMA is used to estimate the parameters of interest in our model as weighted averages of parameter estimates from individual models, where the weights are obtained as the posterior probability of the corresponding models being the true specification.

Consider a model relating the growth rate of per capita GDP ( $y$ ) to some covariates

$$y = \alpha + \mathbf{X}_k \beta + \varepsilon$$

where  $\mathbf{X}_k = (x_1, x_2, \dots, x_k)$  is a subset formed by  $k$  variables corresponding to elements of  $\mathbf{X}_K = (x_1, x_2, \dots, x_K)$ , which contains all possible regressors ( $K$  of them);  $\beta = (\beta_1 \dots \beta_k)'$  is a vector of parameters; and  $\varepsilon$  is a vector of independently and normally distributed error terms with constant variance. We can assess the issue of model uncertainty by averaging over all the alternative models implied by the combinations of variables among those in the set of  $K$  covariates. Given a prior structure on model size and the model parameters, Bayes factors (the ratio of marginal likelihoods of two competing models) can be used to compare models with different variables.<sup>66</sup> Inference about a quantity of interest,  $y$ , can then be based on its posterior distribution, taking into account model uncertainty through the use of posterior model probabilities as weights

$$\mathbf{P}(y | \mathbf{X}) = \sum_{m=1}^{2^K} \mathbf{P}(y | \mathbf{X}, M_m) \mathbf{P}(M_m | \mathbf{X}),$$

where  $X$  is a given set of data and a model  $M_m$  is defined by the choice of independent variables. The posterior model probabilities,  $\mathbf{P}(M_s | \mathbf{X})$ , are given by

$$\mathbf{P}(M_s | \mathbf{X}) = \frac{\mathbf{P}(\mathbf{X} | M_s) \mathbf{P}(M_s)}{\sum_{m=1}^{2^K} \mathbf{P}(\mathbf{X} | M_m) \mathbf{P}(M_m)},$$

which is, in turn, the normalized product of the integrated likelihood for each model  $\mathbf{P}(\mathbf{X} | M_k)$  and the prior probability of the model  $\mathbf{P}(M_k)$ . This implies that, for a given prior on the model space, the

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<sup>66</sup>. See Hoeting and others (1999) for a formal treatment of BAM technique.

posterior distribution of  $\mathbf{y}$  can be obtained as a weighted average of the model-specific estimates using posterior probability of the respective models as weights. We can simplify this expression by using the Bayesian information criterion (BIC) approximation (Leamer 1978; Schwarz 1978)

$$\mathbf{P}(M_s | \mathbf{X}) = \frac{\exp(-\frac{1}{2}\mathbf{BIC}(M_s))\mathbf{P}(M_s)}{\sum_{m=1}^{2^K} \exp(-\frac{1}{2}\mathbf{BIC}(M_m))\mathbf{P}(M_m)}$$

where the BIC is given by  $\mathbf{BIC}(M_k) = -2\log(\text{Likelihood} | M_k) + k \log(N)$ , and *Likelihood* is the value of the likelihood function evaluated at its maximum,  $k$  is the number of estimated parameters, and  $N$  is the sample size. If the cardinality of the model space is computationally tractable, these expressions can be obtained directly.<sup>67</sup> The posterior mean and variance of the parameters of interest can be used to make inference on the quantitative effect of changes in the covariates on economic growth explicitly taking into account the existence of model uncertainty. In the same fashion, we can evaluate posterior inclusion probabilities for the different variables proposed, which we obtain by summing the posterior probability of models containing each individual variable (or groups of it). This measure captures the relative importance of the different covariates as determinants of economic growth. It can be interpreted as the probability that a given variable belongs to the true specification.

## 5.4 Results

For the BMA estimation, we assume a uniform prior over the model space, which results in a 0.5 prior inclusion probability for each potential explanatory variable. The results are based on averaging over models that, in all cases, include fixed country effects as well as global subperiod fixed effects common to all countries in the sample. This implies that we obtain our estimates by extracting information from the variation within rather than between countries. We describe the variables used for the BMA analysis in Appendix 7.

The analysis is presented for three partially overlapping groups: (1) the full set of fragile states, (2) the entire group of HIPCs, and (3) the group of fragile HIPCs (Table 5.1). The posterior inclusion probabilities for the full set of fragile states (1) reveal great heterogeneity across these countries with respect to their determinants of economic growth. Only two variables present greater evidence that they actually belong to the model after observing the data as compared to their prior inclusion probabilities: the initial level of income and physical capital formation in percent of GDP. These results indicate that along with convergence dynamics, it is the differences in physical capital investment that matter most when explaining the growth experience of fragile states in the last two decades: an increase in investment of 1 percent of GDP at the beginning of a 4-year subperiods, with respect to the previous one, contributes to 0.4 percent higher growth, on average, in the subperiod.

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<sup>67</sup>. When the cardinality of the model space makes the problem intractable, several methods have been proposed for approximating the posterior model probability. Raftery (1995) proposes the use of a leaps and bounds algorithm, Fernández, Ley and Steel (2001) use a simple Markov Chain Monte Carlo Model Composite algorithm to evaluate the posterior distribution based on the work of Madigan and York (1995) and Sala-i-Martin, Doppelhofer and Miller (2004) use a particular type of importance sampler.

Table 5.1. BMA Results: Pooled Data with Country and Subperiod Fixed Effects

	Low PV of debt 1/				Completion Point HIPCs			
	All Fragile States	All HIPCs	All fragile HIPCs	All Fragile States	All HIPCs	All CP-HIPCs	Non-Fragile CP-HIPCs	CP-HIPCs with Low PV of Debt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial income	<b>-0.1163</b> *	-0.0149	-0.0260	<b>-0.2800</b> *	<b>-0.2552</b> *	<b>-0.0424</b> *	<b>-0.0860</b> *	<b>-0.2022</b> *
Gross fixed capital formation	<b>0.4121</b> *	0.0090	0.1058	<b>0.8766</b> *	<b>0.5041</b> *	-0.0018	0.0056	<b>0.2617</b> *
Openness	-0.0169	-0.0041	-0.0147	-0.1019	0.0188	0.0009	0.0018	0.0295
Agricultural VA	0.0001	0.0021	0.0097	0.1307	-0.0113	0.0074	0.0109	<b>0.3147</b> *
Inflation	-0.0071	0.0000	-0.0014	-0.0092	<b>-0.0504</b> *	0.0000	0.0000	<b>-0.0523</b> *
Life expectancy	0.0012	0.0002	0.0001	<b>0.0039</b> *	<b>0.0062</b> *	0.0000	0.0001	<b>0.0085</b> *
Mineral exports	-0.2360	0.0299	-0.1312	<b>4.1919</b> *	<b>3.4151</b> *	0.7612	<b>1.4988</b> *	<b>3.5910</b> *
Conflict	-0.0019	<b>-0.0459</b> *	<b>-0.0227</b>	0.0013	-0.0023	<b>-0.0754</b> *	<b>-0.0660</b> *	0.0011
Present value of debt over GDP	-0.0003	-0.0034	-0.0017	-0.0157	-0.0002	-0.0096	<b>-0.0290</b> *	<b>-0.0683</b> *
CPIA	-0.0012	0.0000	-0.0001	-0.0003	-0.0001	-0.0006	0.0001	0.0000
Number of countries	32	40	22	..	..	23	19	..
Number of observations	66	123	53	33	61	77	65	37

Note: Variables in bold have posterior inclusion probabilities larger than their 50% prior probability of model inclusion. \* denotes variables with a ratio of posterior mean to standard deviation above 2 in absolute value.

1/ It includes data for countries with the NPV of debt-to-GDP ratio below the median in each of the 5 4-year non-overlapping subperiods.

In all HIPCs (2) and in fragile HIPCs (3), economic growth does not seem responsive to investment in physical capital. Instead, only the recurrence of armed conflict robustly explains growth differences within the HIPCs, including fragile HIPCs. Given the ambiguity of such results, concentrating on more homogenous subgroups of countries is warranted.

To account for some of the heterogeneity that appears to be driving the results for the broad groups of fragile states and the HIPCs, we reassess the robustness of economic growth determinants, focusing on subsamples of fragile states (4) and HIPCs (5) with debt-to-GDP ratios below the median for each of the evaluated groups. We label each of these subgroups as countries with low debt burdens. The results yield estimates for the full set of fragile states and for the entire group of HIPCs (Table 5.1). The analysis based on within-country variation and period effects identifies a broader set of robust growth covariates in these three low-debt burden subgroups of countries.

For fragile states with low debt burdens (below the median value of the present value of the debt-to-GDP ratio), economic growth responds robustly to investment in physical capital. In fact, the estimated coefficient of the elasticity of the growth-to-investment ratio appears high in this group of countries, where debt stocks are low relative to output, supporting the debt overhang theory. The convergence speed to the country-specific equilibrium income level is also notably faster than that in the entire group of both HIPCs and fragile states. In addition, the results reveal the importance of health improvements (measured through changes in life expectancy) and positive changes in the share of mineral exports to GDP and agricultural value added as variables contributing to economic growth in the low-debt fragile states.

Table 5.1 also presents the results for the subgroups of HIPCs with relatively low debt burdens. The findings for low-debt HIPCs are similar to those for low-debt fragile states. Growth in low-debt HIPCs seems to be responsive to improvements in health, investment, inflation, and mineral exports. The speed of convergence to the country-specific equilibrium level of income also seems similar to that in low-debt fragile states. The results for low-debt HIPCs point also to the importance of macroeconomic stability (as captured in the inflation rate) as an extra driver of economic growth. Interestingly, however, the effect of armed conflict on economic growth, while negative, loses its robustness as a driver of growth for this subgroup of HIPCs. This finding implies (by inference) that the negative effect of armed conflict for the full set of HIPCs is strongly driven by the effect of wars and political instability for the economic prosperity of HIPCs with relatively high levels of debt. For these countries, none of the variables that were considered as potential growth covariates appears robustly related to growth. In particular, there is no robust link between economic growth and physical capital accumulation, further supporting the debt overhang hypothesis. Put differently, high debt burdens decrease the quantity or efficiency of investment in this group of countries.

As an extra robustness check, we also include net official development assistance (ODA) as a repressor in the BMA estimates. The results do not yield robust effects from this variable but enforce the findings reported above.

Has fragility negatively affected economic growth in HIPCs? To address this issue, we exploit determinants of growth within countries that have graduated from the HIPC Initiative and have benefitted from irrevocable debt relief. While it would be valuable to reveal the determinants of growth in the group of fragile CP-HIPCs, the small number of observations (only four countries) does not allow us to run a fully-fledged analysis on this subgroup. The estimates in Table 1 reveals that as a broad group post-completion-point HIPCs (including the four fragile countries) are not generally different from the entire group of HIPCs (column 6), with the notable exception that they experience a faster speed of convergence to their country-specific steady state level of income compared to the full group of HIPCs. However in non-fragile completion-point HIPCs (7), convergence is faster, conflict hurts growth less negatively, and mineral exports contribute significantly to growth. Importantly, decreases in overall level of debt burdens (proxied by the present value of debt stock-to-GDP) tend to be associated with higher economic growth in CP-HIPCs than in the group of all HIPCs that reached completion point, including the 4 fragile countries (6), and the entire group of HIPCs (2).

These results are further reinforced in the group of CP-HIPCs with low debt burdens (8), for which a low level of debt, coupled with stronger policies and institutions, positively contribute to growth, in addition to macroeconomic stability, investment, agricultural value added, mineral exports and health improvements. This finding suggests that fragility does hinder progress under the HIPC Initiative, because countries failing to improve the quality of their policies and institution and to reach the completion point of the HIPC Initiative would not benefit of the extra growth bonus that seems to be associate with low debt levels.

As an extra robustness check, we also substitute the fixed time effects with a step dummy for the HIPC group in order to control for the effect of launching the HIPC process in 1996. The results, which are not shown here but are available from the authors upon request, indicate that, after controlling for all other covariates, non-fragile HIPCs have grown faster after 1996. This result engenders two hypotheses: first, suggesting that the HIPC Initiative process has successfully facilitated economic development in non-fragile HIPCs; and second, implying that the best performers have been adversely selected and completed the HIPC Initiative process. While this exercise cannot be used to safely infer causality, the HIPC Initiative process and economic development in non-fragile HIPCs have gone hand in hand.

## 5.5 Conclusions

Interpreting the growth experience of the 54 developing countries falling into the group of fragile states or HIPCs in the 20-year period under consideration is not straightforward. Overall, the analysis reveals that the drivers of growth are widely heterogeneous and that a great deal of model uncertainty plagues the econometric analysis. Economic growth responds to the differences in the initial level of physical capital investment and the initial level of income in fragile states. However, economic growth in HIPCs, including fragile HIPCs, seems to respond robustly only to the recurrence of armed conflict. None of the other factors is systematically helpful in explaining economic growth differences.

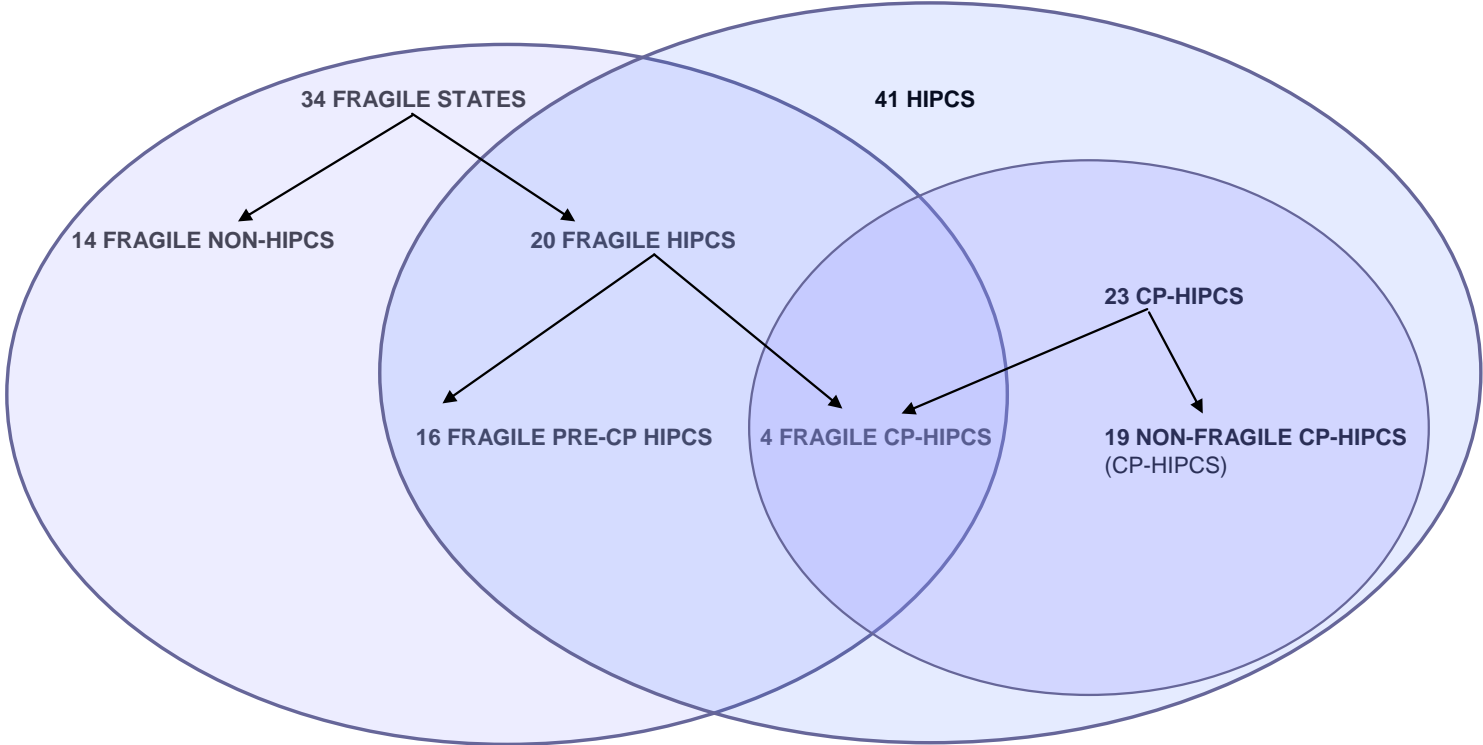
To overcome the issue of heterogeneity, we split the groups and look at countries with debt-to-GDP ratios below and above the median for HIPCs. For countries with relatively low debt burdens, economic growth is more responsive to improvements in health, investment, and primary exports. The speed of convergence to country-specific equilibrium levels of income in each of the two groups also appears similar. The results for relatively low-debt HIPCs suggest the importance of macroeconomic stability as an extra driver of economic growth.

In addition, the results on the determinants of the economic growth process in fragile states yield an important insight into the HIPC process. Fragile HIPCs suffer from the largest reduction in economic growth as a result of armed conflict; have the lowest volume of investment and returns to investment; converge to their long-run equilibrium level less rapidly; and depend more on mineral exports than nonfragile HIPCs. Moreover, convergence is faster, conflict hurts growth marginally less, and mineral exports contribute significantly more to growth in nonfragile CP–HIPCs than in either group of fragile states, especially, fragile HIPCs. CP–HIPCs are less dependent on mineral resources than the other two groups of countries, although mineral exports tend to contribute positively and strongly to economic growth in these countries.

Importantly, we find evidence of decreases in overall level of debt stock-to-GDP ratio associated with higher economic growth in non-fragile completion-point HIPCs. As the debt overhang theory would imply, investment is positively associated with growth in the presence of low debt burden. As expected, this link appeared to be the strongest in low debt (mainly post-completion) HIPCs, where the quality of policies and institution is on average the highest, compared to other HIPCs and fragile states.

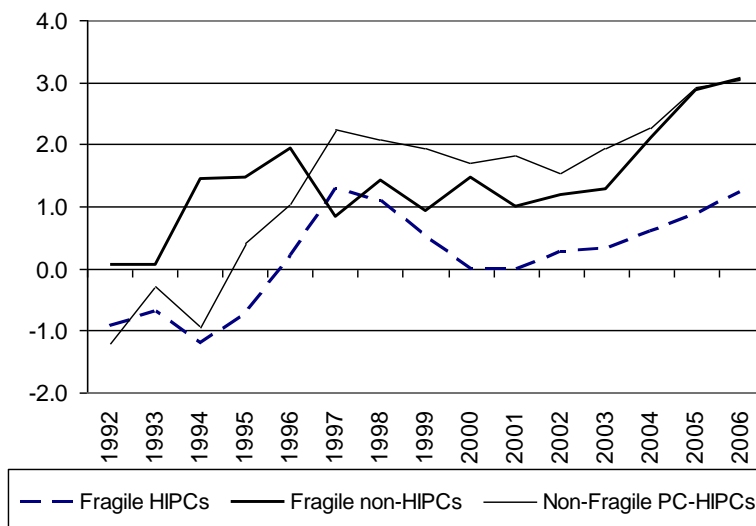
This finding suggests that fragility has hindered progress under the HIPC Initiative, while the staggered debt relief structure of the HIPC process does not seem to have aggravated fragility. For the broad group of fragile state, i.e. countries with a poor quality of policies and institutions, there seem to be no link between debt burden and growth. Also, most standard growth covariates are not found to contribute to economic prosperity in the presence of fragility, independently from the level of debt. Countries that instead benefited from debt relief while improving the quality of their policies and institutions seem to have also benefitted from economic growth after receiving debt relief.

Figure 5.1. Groups of Fragile States and HIPCS



Source: "Establishment of a State- and Peace-Building Fund" March 25, 2008, The World Bank.

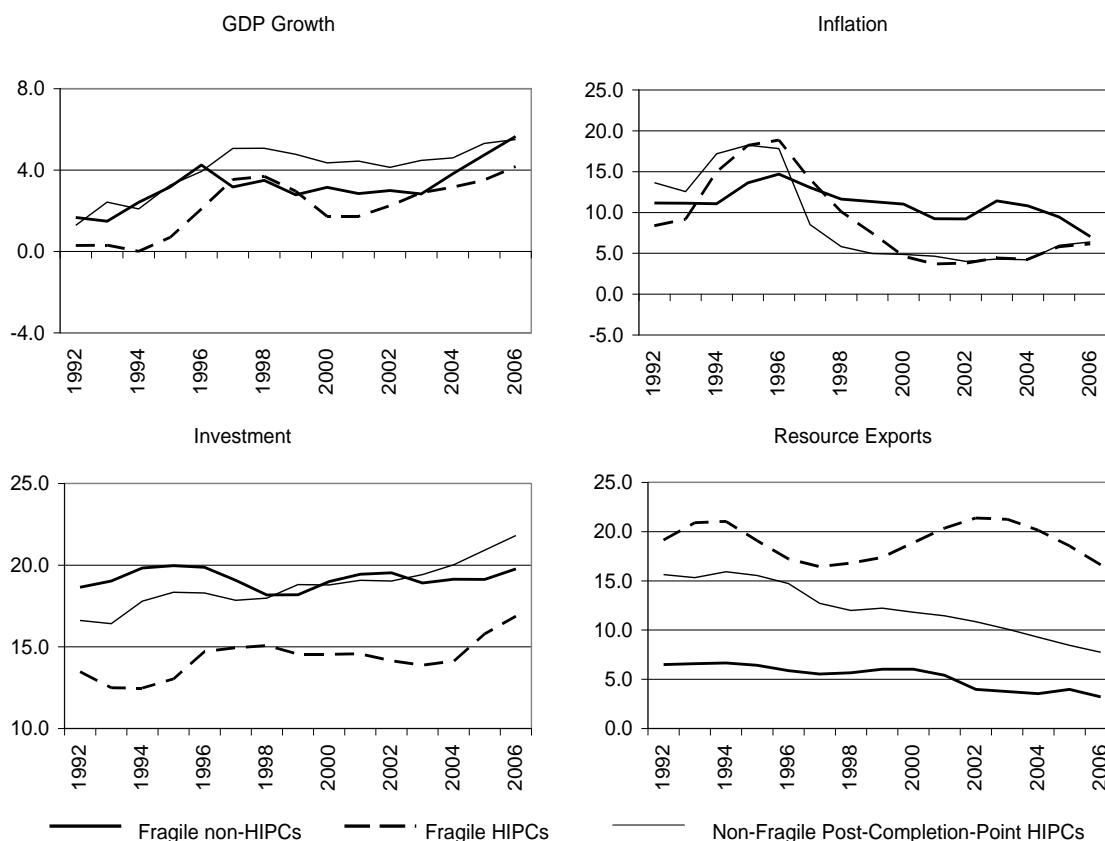
Figure 5.2. Annual Growth of per Capita Income in Fragile States and HIPCs, 1992–2006



Source: Global Development Finance, The World Bank

Figure 5.3. Selected Macroeconomic Indicators in Fragile States and HIPCs, 1992–2006

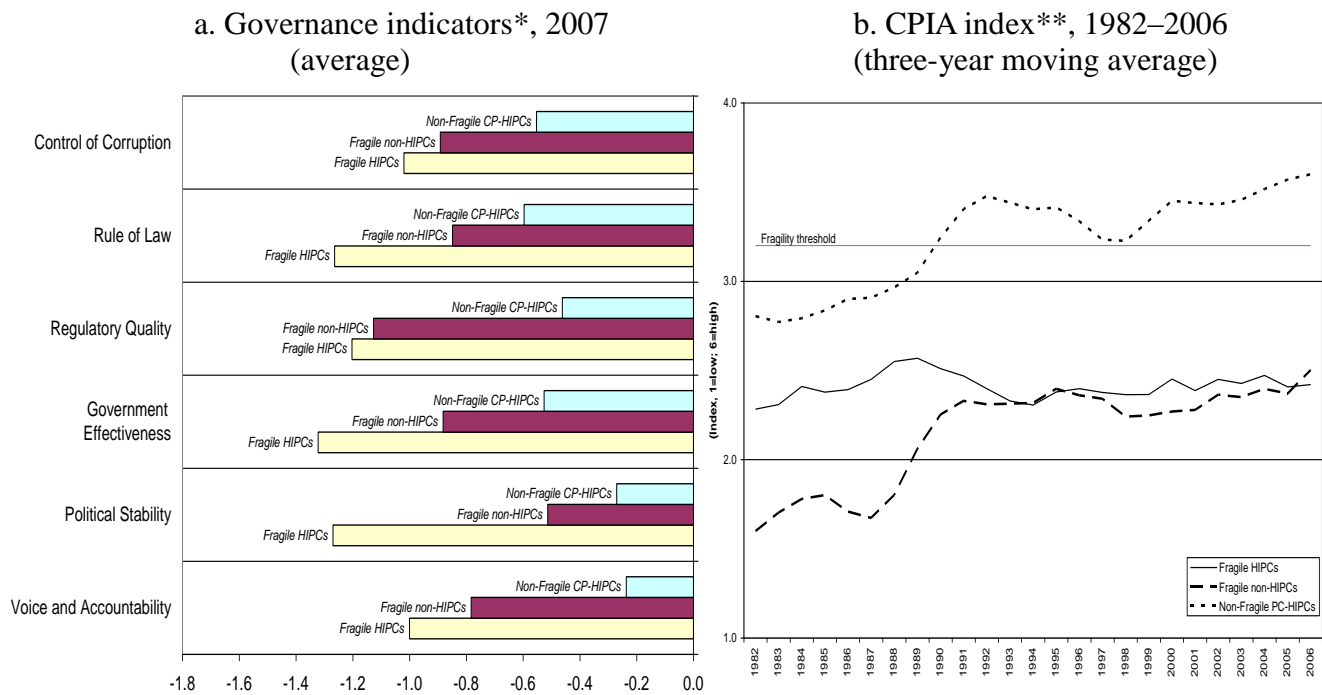
(three-year moving average of annual median)



Source: Global Development Finance, The World Bank ; and UN Comtrade..



Figure 5.4. CPIA and Governance in Fragile HIPCs and Non-HIPCs



Source: World Bank Governance Indicators, [www.worldbank.org/wbi/governance](http://www.worldbank.org/wbi/governance)

\*The six governance indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes.

\*\*The CPIA Index ranks countries from 1 to 6, with higher values corresponding to better quality of policies and institutions.

Table 5.2. Human Development Indicators in Fragile HIPCs, Fragile Non-HIPCs, and Nonfragile Completion Point HIPCs

	Fragile HIPCs	Fragile non-HIPCs	Nonfragile CP- HIPCs
<i>Indicator</i>	<i>Average 1990–2006</i>		
Poverty headcount ratio at national poverty line (percent of population)	56.4	35.9	50.7
Net primary school enrollment (percent)	57.6	76.7	65.4
Total primary completion rate (percent of relevant age group)	40.0	69.6	47.1
Life expectancy at birth (years)	23.3	26.9	25.2
Under-five mortality rate (per 1,000)	158.3	112.3	147.4
	<i>Last available year</i>		
Poverty headcount ratio at national poverty line (percent of population)	70.2	35.0	28.5
Net primary school enrollment (percent)	60.6	81.1	77.6
Total primary completion rate (percent of relevant age group)	54.9	82.1	59.8
Life expectancy at birth (years)	50.8	58.4	55.6
Under-five mortality rate (per 1,000)	146.8	96.3	130.7

Source: *Global Development Finance*, The World Bank.

## References

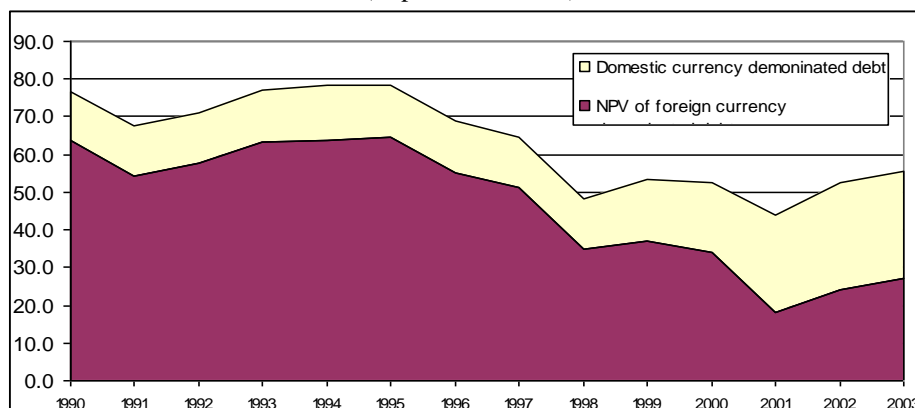
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[http://ec.europa.eu/development/icenter/repository/mdg\\_paper\\_final\\_20080916\\_en.pdf](http://ec.europa.eu/development/icenter/repository/mdg_paper_final_20080916_en.pdf).
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## Appendix 1. Summary of Case Studies

### 1 Bolivia

**Figure 1.1. Bolivia: PV of Public Sector Debt**

(In percent of GDP)

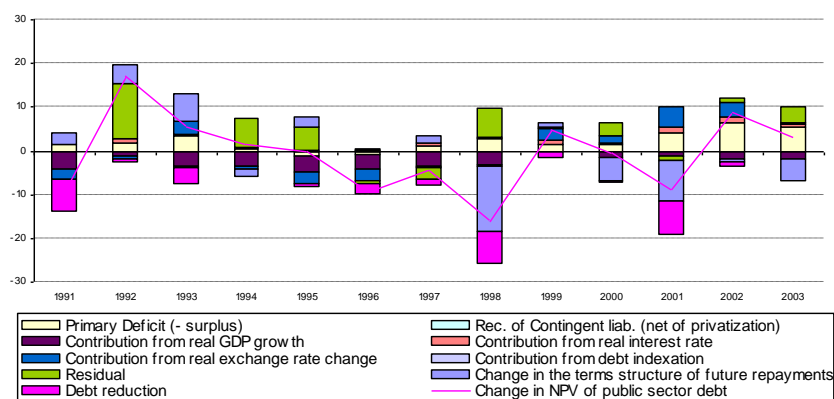


**Table 1.1. Bolivia: Cumulative public debt decomposition**

<i>Public Debt Decomposition</i>	1991-03	1991-95	1996-98	1999-03
Change in public sector debt	-21.1	1.7	-30.0	7.2
Primary Deficit (- surplus)	28.5	6.2	3.0	19.2
Off-budget govt. expenditure (net of privatization)	0.0	0.0	0.0	0.0
Contribution from real GDP growth	-33.4	-16.8	-10.1	-6.5
Contribution from real interest rate	3.8	-1.6	1.2	4.2
Contribution from real exchange rate change	6.6	-2.9	-3.2	12.7
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-30.1	-12.3	-7.6	-10.2
Contribution from grant element of foreign debt	-14.6	13.7	-9.1	-19.2
Residual	18.1	15.4	-4.3	7.0

Source: Annual Statistical Abstract, Central Bank of Bolivia, various issues, IMF and World Bank Staff Reports and calculations

**Figure 1.2. Bolivia: PV of Public Debt Dynamics**



Data Sources for Figures and Tables: Annual Statistical Bulletin, Central Bank of Bolivia, various issues; IMF and World Bank Staff Reports and HIPC country reports; and World Bank Staff calculations.

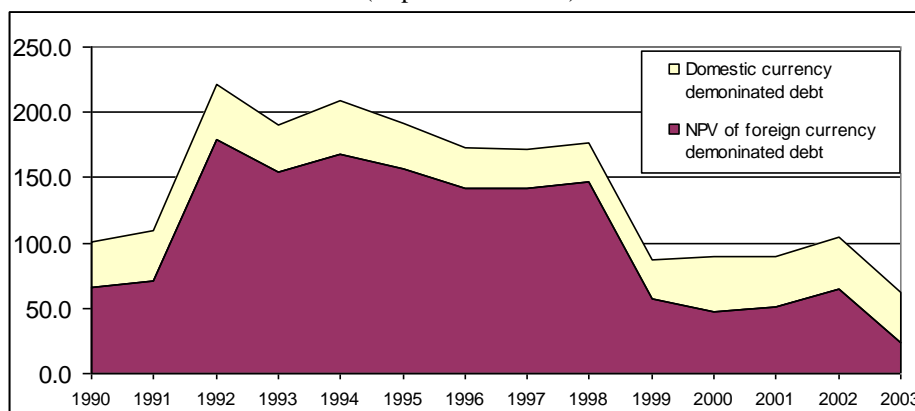
## 1.1 Main Lessons

- The period of macroeconomic stability and sustained GDP growth helped Bolivia to stabilize the public debt ratios. Notwithstanding high level of foreign financing to fund public investments, the concessionality of new borrowing and stable exchange and inflation rates helped stabilize the debt burden.
- Bolivia's risk of debt distress depends on its economic structure. Bolivia is a highly dollarized economy, whose economic growth has been principally driven by exports and investments to support the export sector during the 90's. However, regional economic slowdown in the wake of the 1999 financial crises has reduced economic growth potential and increased the local cost of external debt and of dollar-denominated domestic debt.
- Debt relief is the second largest contributor of debt reduction. From 1996, debt relief is the factor which contributed the most to the decrease of the overall debt burden. However, after HIPC relief, Bolivia is not eligible for additional debt relief according to the existing mechanisms and new non-concessional financing could substantially increase the risk of debt distress in the medium term. The government's pension reform in 1997 was supported by optimistic projections and resulted in an unexpected increase in domestic debt burden.

## 2 Ethiopia

**Figure 2.1. Ethiopia: PV of Public Sector Debt**

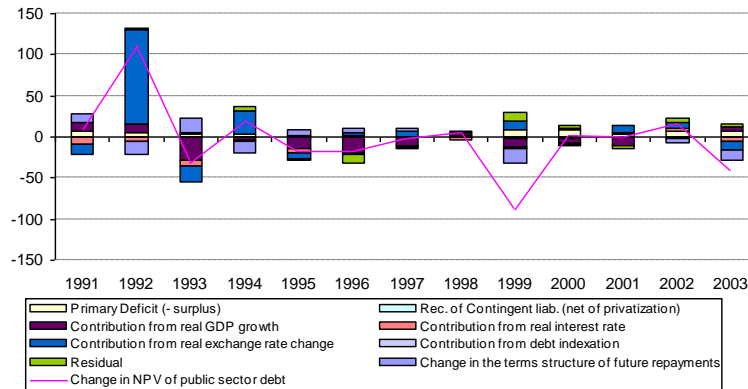
(In percent of GDP)



**Table 2.1. Ethiopia: Cumulative public debt decomposition**

<i>Public Debt Decomposition</i>	1991-03	1991-94	1995-98	1999-03
Change in public sector debt	-38.2	108.5	-33.0	-113.8
Primary Deficit (- surplus)	61.2	20.8	5.8	34.6
Off-budget govt. expenditure (net of privatization)	-5.3	0.0	-1.5	-3.7
Contribution from real GDP growth	-73.9	-10.9	-40.9	-22.1
Contribution from real interest rate	-35.0	-22.8	-11.0	-1.2
Contribution from real exchange rate change	128.1	108.8	4.0	15.4
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-109.3	4.7	5.5	-111.9
Contribution from grant element of foreign debt	-20.6	-1.7	18.7	-37.5
Residual	16.5	9.6	-13.5	12.7

**Figure 2.2. Ethiopia: PV of Public Debt Dynamics**



Data Sources for Figures and Tables: Annual Statistical Bulletin, Central Bank of Ethiopia, various issues; IMF and World Bank Staff Reports and HIPC country reports; and World Bank Staff calculations.

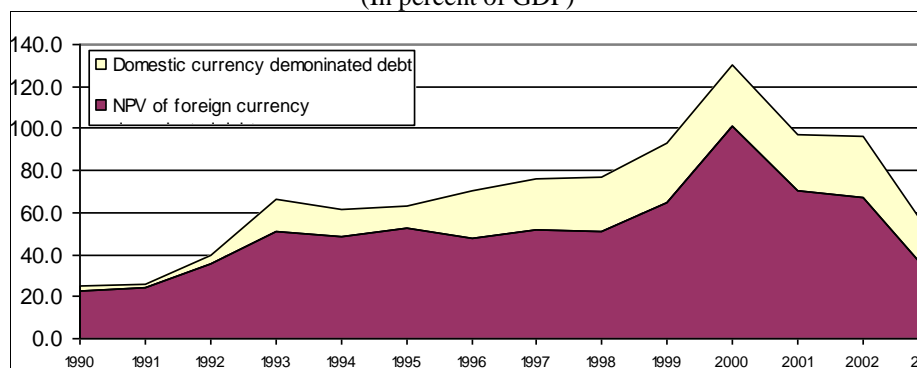
## 2.1 Main Lessons

- During 1990-2003, real exchange rate devaluation and debt relief were the main factors explaining the increase and the decrease of the PV of public debt with respect to GDP. However, real devaluation took place in 1992 and was followed by a period of macroeconomic stability until 2003. Ethiopia has negotiated debt relief agreements with the Paris Club since 1992 and obtained further relief in 1997, 1990, 2001 and 2003. Over the period, Ethiopia continued to accumulate arrears to external creditors and only with the agreement with Russia, relief granted by the HIPC Initiative and additional relief Ethiopia's debt indicators were reduced to comfortable levels.
- The large debt reduction in the wake of a severe drought masked the structural weakness of Ethiopia that failed to achieve prolonged and sustained growth over the period. Absent debt relief, the sensitivity of the economy to shocks could have increased the debt burden once again.
- A closer look to shocks helps understand that Ethiopia, over time became more resilient to exogenous shocks. The PV of debt remains more stable with respect to exports than with respect to GDP or fiscal revenue, but the public debt burden can increase as a consequence of policy decisions.

## 3 Ghana

**Figure 3.1. Ghana: PV of Public Sector Debt**

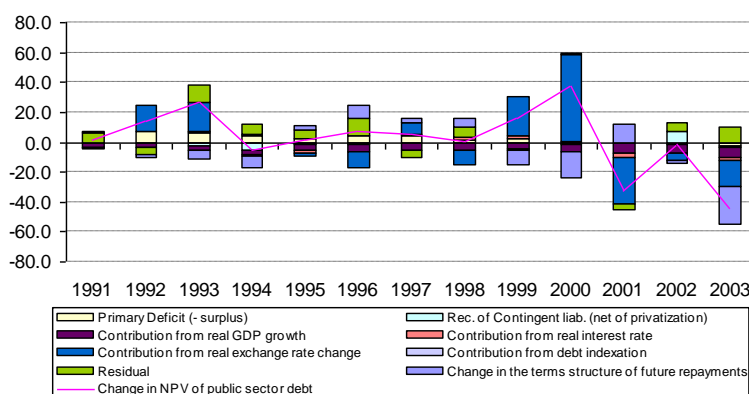
(In percent of GDP)



**Table 3.1. Ghana: Cumulative public debt decomposition**

<i>Public Debt Decomposition</i>	1991-03	1991-93	1994-98	1999-00	2001-03
	<i>Percent of GDP</i>				
Change in public sector debt	26.3	41.6	10.5	52.9	-78.8
Primary Deficit (- surplus)	27.9	12.9	16.1	3.0	-4.1
Off-budget govt. expenditure (net of privatization)	-5.9	-2.1	-8.9	-1.4	-0.7
Contribution from real GDP growth	-61.5	-9.8	-21.8	-9.2	-20.6
Contribution from real interest rate	-0.4	1.4	1.8	1.0	-4.7
Contribution from real exchange rate change	53.5	35.2	-13.2	85.2	-53.7
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-2.8	-1.5	-1.0	0.2	-2.5
Contribution from grant element of foreign debt	-36.1	-7.7	12.1	-26.3	-14.2
Residual	51.6	13.2	25.4	0.4	21.6

**Figure 3.2. Ghana: PV of Public Debt Dynamics**



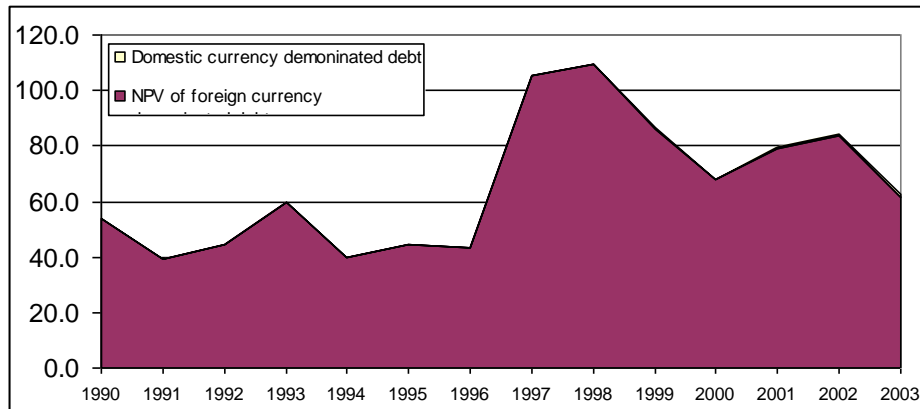
Data Sources for Figures and Tables: Annual Statistical Bulletin, Central Bank of Ghana, various issues; IMF and World Bank Staff Reports and HIPC country reports; and World Bank Staff calculations.

### 3.1 Main Lessons

- Ghana's dependence over the exports of few commodities increased the risk of debt distress arising from a terms of trade shock. Prolonged real growth and access to highly concessional financing were not sufficient to counteract the negative effect of the decrease of commodity prices in 1991-1993 and 1999-2000.
- The failure to reform the energy market and to restructure SOEs was a key factor in the rapid accumulation of domestic debt starting in 1995. The high real interest paid on domestic debt and the short maturity structure increased the cost of refinancing on the budget.
- Public expenditure exceeded the availability of foreign financing and increased the resort to domestic financing and the use of foreign reserves. Financing through domestic debt further increased the overall cost of servicing public debt and the run down in reserves increased Ghana's vulnerability to debt crises.

## 4 Laos

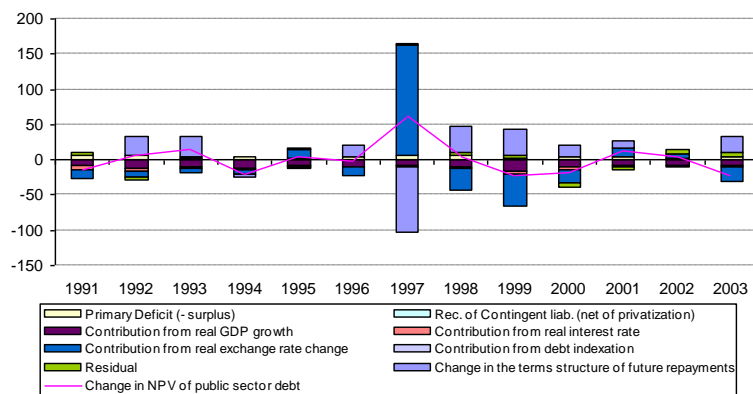
**Figure 4.1. Laos: PV of Public Sector Debt.**  
(In percent of GDP)



**Table 4.1. Laos: Cumulative public debt decomposition**

<i>Public Debt Decomposition</i>	1991-03	1991-96	1997-98	1999-03
Change in public sector debt	8.9	-10.6	66.4	-46.9
Primary Deficit (- surplus)	56.5	25.5	12.4	17.9
Off-budget govt. expenditure (net of privatization)	0.0	0.0	0.0	0.0
Contribution from real GDP growth	-127.7	-58.0	-18.5	-51.2
Contribution from real interest rate	-32.9	-17.7	-3.3	-11.3
Contribution from real exchange rate change	23.0	-34.5	127.2	-69.7
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-25.8	0.0	0.0	-25.8
Contribution from grant element of foreign debt	99.5	67.8	-57.2	88.9
Residual	16.4	6.2	5.8	4.4

**Figure 4.2. Laos: PV of Public Debt Dynamics**



Data Sources for Figures and Tables: Annual Statistical Bulletin, Central Bank of Lao P.D.R., various issues; IMF and World Bank Staff Reports; and World Bank Staff calculations.

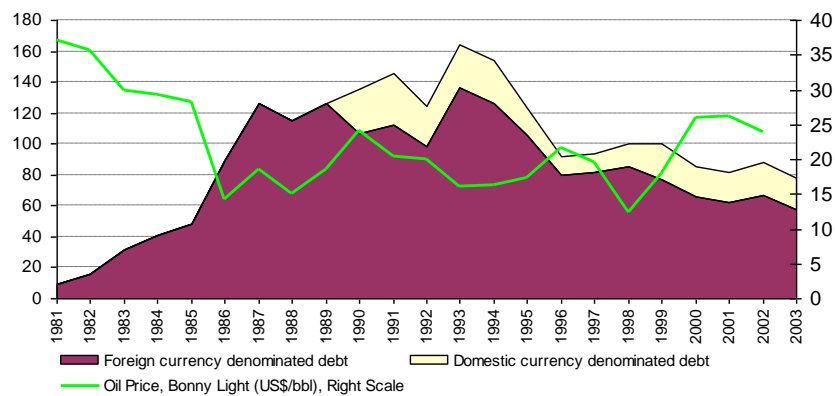
## 4.1 Main Lessons

- Sustained economic growth and stabilization policies were the main sources of the reduction of the debt burden in 1991-2003, accounting for 186 percentage points of the reduction in the ratio of PV of debt to GDP.
- The financial crises at end-1997 and the slowdown of economic growth in Thailand seems to be the major factors associated with Laos's economic slowdown and the increase in the external debt burden. In the subsequent period debt relief becomes an important factor to avoid rising debt burden in the face of sustained fiscal outlays.
- The pace of implementation of structural reforms is key to assess the risks of contingent liabilities to the central government. The Government has not addressed the problems related to the size of the public sector and the relations between the financial and nonfinancial public sectors. Delay in the reform process could have a negative impact on economic growth.

## 5 Nigeria

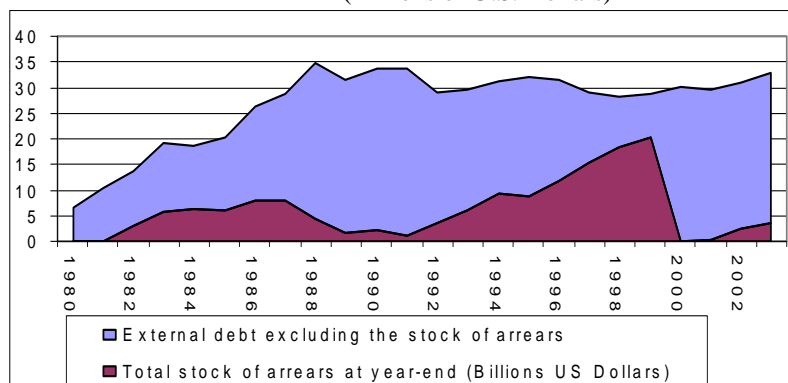
**Figure 5.1. Nigeria: Public Sector Debt**

(In percent of GDP)



**Figure 5.2. Nigeria: Total External Debt**

(Billions of U.S. Dollars)



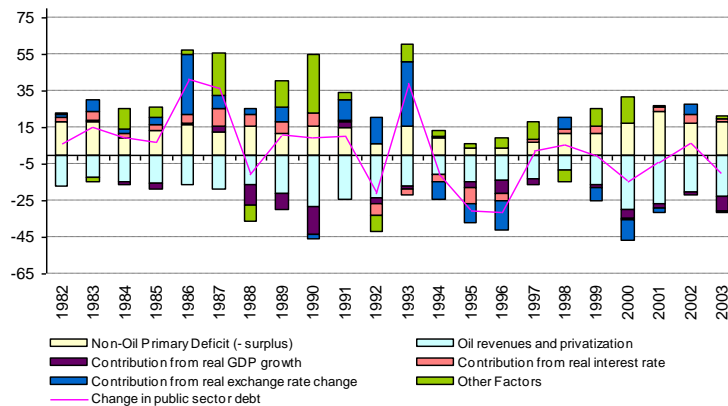


**Table 5.1. Nigeria: Cumulative public debt decomposition<sup>68</sup>**

<i>Public Debt Decomposition</i>	1980-03	1980-93	1994-96	1997-99	2000-03
	<i>Percent of GDP</i>				
Change in public sector debt	71.1	157.5	-71.9	7.9	-22.3
Non-oil Primary Deficit (- surplus)	336.5	210.4	17.5	30.7	77.9
Oil revenues and privatization	-418.0	-242.5	-38.9	-37.4	-99.2
Contribution from real GDP growth	-67.9	-35.7	-10.2	-4.6	-17.4
Contribution from real interest rate	39.8	39.4	-15.6	8.1	8.0
Contribution from real exchange rate change	77.4	123.1	-36.1	-1.4	-8.1
Contribution from Change in Foreign Reserves	-2.7	-9.2	5.2	2.6	-1.5
Other factors	106.1	72.0	6.1	9.9	18.0
Memo					
Primary Deficit (- surplus)	-81.5	-32.1	-21.3	-6.7	-21.3

**Figure 5.3. Nigeria: Public Debt Dynamics**

(% of GDP)



Data Source: Annual Statistical Abstract, Central Bank of Nigeria, various issues, IMF and World Bank Staff Reporting

## 5.1 Main Lessons

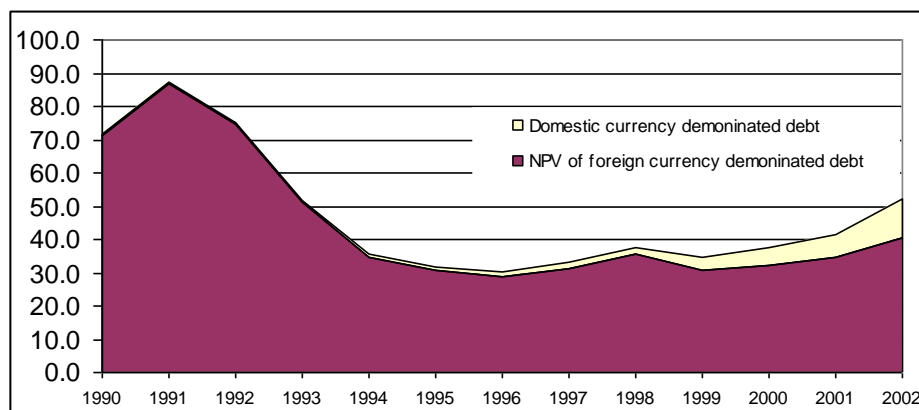
- Poor management of the economy, especially of its oil and gas wealth, is at the roots of Nigeria's debt problem. Despite of its vast oil and gas wealth, Nigeria has little to show in terms of economic development and poverty reduction. Real exchange rate volatility, related to the inability to de-link government spending from current oil revenues has been a major issue. Nigeria also suffered from problems of weak institutions, corruption and rent-seeking. These problems led to waste of oil wealth and inefficient borrowing, which actually exacerbated the debt problem and had a negative impact on the non-oil economy.
- The adoption of an oil-price based fiscal rule (OPFR) in the 2004 budget is seen so far an important step in the implementation of the reform agenda, as it attempts to link government spending to some notion of a long-run oil price, thereby de-linking government spending from current oil revenues.
- Debt restructuring deals reached with Commercial and Paris Club official bilateral creditors did not prevent the re-accumulation of arrears in 2003.

<sup>68</sup> See Appendix 3 for a debt decomposition applied to resource rich countries.

## 6 Uganda

**Figure 6.1. Uganda: PV of Public Sector Debt**

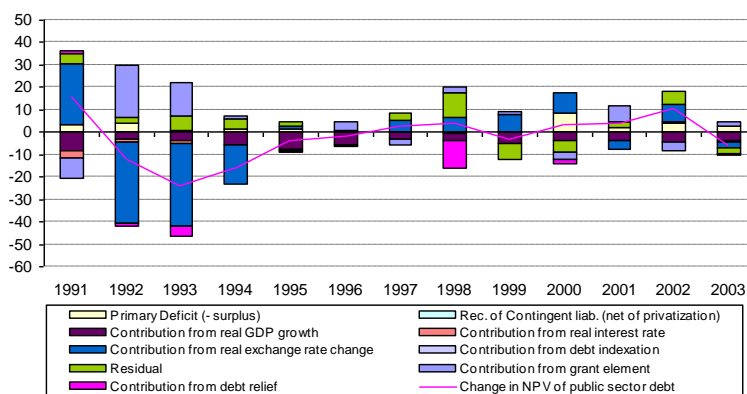
(In percent of GDP)



**Table 6.1. Uganda: Cumulative public debt decomposition**

Public Debt Decomposition	1991-03	1991-92	1993-97	1998-03
	Percent of GDP			
Change in public sector debt	-25.1	3.8	-42.0	13.1
Primary Deficit (- surplus)	30.0	7.4	5.5	17.0
Off-budget govt. expenditure (net of privatization)	0.0	0.0	0.0	0.0
Contribution from real GDP growth	-59.6	-11.3	-25.0	-23.3
Contribution from real interest rate	-7.3	-4.1	-2.6	-0.6
Contribution from real exchange rate change	-34.1	-9.5	-49.3	24.7
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-20.2	0.2	-4.8	-15.6
Contribution from grant element of foreign debt	37.6	13.8	17.9	5.9
Residual	28.5	7.3	16.2	5.0

**Figure 6.2. Uganda: PV of Public Debt Dynamics**



### 6.1 Main Lessons

- During the 1990s, the reduction of the ratio of the PV of debt to GDP was mainly achieved through sustained positive growth and successful stabilization policies. High growth, low inflation

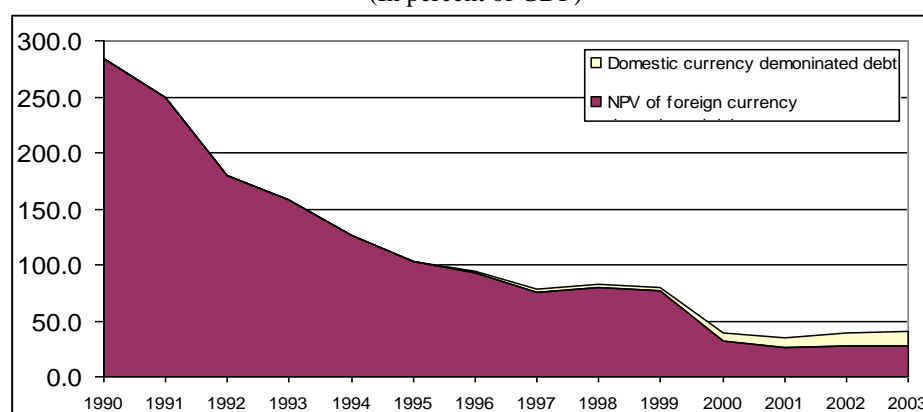
and stable exchange rates explain most of the decrease in the ratios of the PV of debt to GDP from 87 percent in 2001 to 33 percent in 1997.

- The HIPC Initiative provided adequate level of debt relief to maintain a stable ratio of the PV of debt to GDP from 1997 to 2003. However, high levels of foreign lending and the inability of Uganda to reach agreements with all creditors participating in the HIPC Initiative prevented a further decrease in the level of debt.
- Uganda seems over-dependent on foreign aid to finance public investment. Since 1992, concessional official assistance has averaged more than 10.4 percent of GDP, whereas exports of goods averaged merely 7.2 percent of GDP. Even though there is no clear indication that foreign aid harms exports, the structural weaknesses of the export sector needs to be addressed to reduce the risks of debt distress.

## 7 Vietnam

**Figure 7.1. Vietnam: PV of Public Sector Debt**

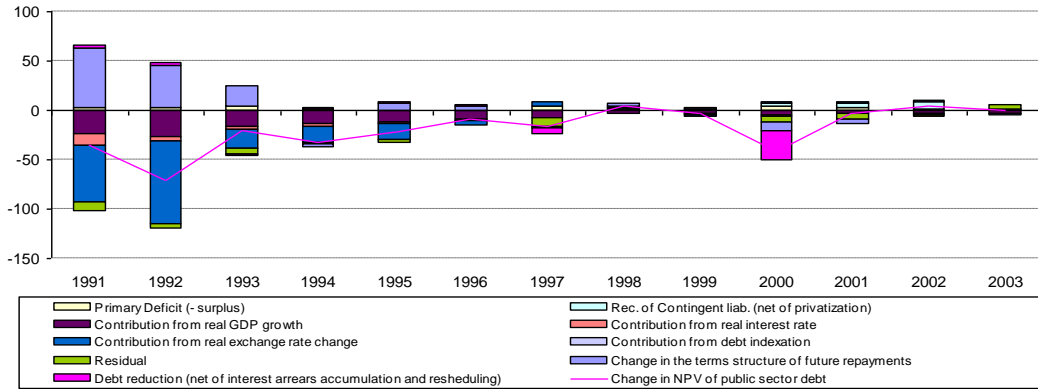
(In percent of GDP)



**Table 7.1. Vietnam: Cumulative public debt decomposition**

<i>Public Debt Decomposition</i>	1991-03	1991-96	1997-99	2000-03
Change in public sector debt	-244.2	-190.1	-14.5	-39.6
Primary Deficit (- surplus)	29.6	12.7	7.0	9.9
Off-budget govt. expenditure (net of privatization)	11.5	0.0	0.0	15.2
Contribution from real GDP growth	-125.9	-98.8	-12.9	-14.2
Contribution from real interest rate	-27.0	-24.6	-1.9	-0.5
Contribution from real exchange rate change	-192.6	-199.5	4.1	2.8
Contribution from debt reduction (net of interest arrears accumulation and rescheduling)	-25.7	8.7	-5.3	-29.2
Contribution from grant element of foreign debt	122.0	133.1	1.5	-12.6
Residual	-35.9	-21.7	-7.0	-11.0

**Figure 7.2. Vietnam: PV of Public Debt Dynamics**



Data Sources for Figures and Tables: Annual Statistical Bulletin, Central Bank of Lao P.D.R., various issues; IMF and World Bank Staff Reports; and World Bank Staff calculations.

## 7.1 Main Lessons

- Sustained economic growth, stabilization policies and prudent debt management were the main sources of the reduction of the debt burden from in 1991-2003, accounting for 224 percentage points of the reduction in the ratio of PV of debt to GDP.
- Financial crises (1997-1999) and the global economic slowdown (2000-2003) are the major factors associated with Vietnam's economic slowdown. In period of lower growth, debt relief has become important in helping to avoid a rising debt burden.
- The pace of implementation of structural reforms is key in assessing the risks of contingent liabilities to the central government. Even though the government implemented measures to reduce such risks in the early stages of the reform program, the size of the public sector in the economy and the relations between the financial and nonfinancial public sectors could delay the reform process and have a negative impact on economic growth.

## Appendix 2. Decomposition of the change in the PV of public debt

This appendix derives the changes of the ratio of the PV of public debt to GDP to distinguish between:

- 1) changes in the public external and domestic debt;
- 2) change in the concessionality of debt.

Definitions of variables:

$PV_t$  Present value of public debt in local currency (LC)

$D_t^d$  nominal public domestic debt in LC

$D_t^f$  nominal public external debt in U.S. dollars (USD)

$e_t$  end-of period exchange rate: LC per US dollars unit;

$s_t$  percent change in  $e_t$ ;

$g_t$  GDP growth rate at time  $t$ , in constant prices

$\pi_t$  change in GDP deflator from time  $t-1$  to time  $t$ ;

$\pi_t^*$  change in the U.S. GDP deflator from time  $t-1$  to time  $t$ ;

$\phi_t$  is a function of the interest rate, discount rate, maturity and grace period of debt.

$PV_t^f$  Present value of public external debt in dollar terms is equal to  $\phi_t D_t^f$

$PD_t$  primary fiscal deficit

$NDFS_t$  Other non debt financing sources

$RXR_t$  change in bilateral real exchange rate, with  $RXR > 0$  indicating *real* exchange rate appreciation

defined as: 
$$\frac{1}{1 + RXR_t} = \frac{(1 + s_t)(1 + \pi_t^*)}{1 + \pi_t}$$

Total public debt is the sum of domestic public debt and public external debt, expressed in local currency:

$$D_t = D_t^d + e_t D_t^f$$

The present value of public debt is the sum of domestic public debt and the present value of external public debt in local currency:

$$PV_t = D_t^d + e_t PV_t^f$$

The stock of public debt in local currency is determined by:

$$D_t^d + e_t \cdot D_t^f = PD_t + NDFS_t + D_{t-1}^d \cdot (1 + i_d) + e_t \cdot D_{t-1}^f \cdot (1 + i_f) \quad (1)$$

The PV of total public debt is defined as:

$$D_t^d + e_t \cdot PV_t^f = PD_t + NDFS_t + D_{t-1}^d \cdot (1 + i_d) + e_t \cdot D_{t-1}^f \cdot (1 + i_f) - e_t \cdot D_t^f + e_t \cdot PV_t^f \quad (2)$$

Let divide equation (2) by nominal GDP in local currency  $Y_t$  and use lower case variables to define ratios to GDP

$$pv_t = pd_t + ndfs_t + \frac{d_{t-1}^d}{(1 + g_t)(1 + \pi_t)} \cdot (1 + i_d) + \frac{d_{t-1}^f \cdot (1 + i_f)(1 + s_t)}{(1 + g_t)(1 + \pi_t)} - d_t^f + pv_t^f \quad (3)$$

Let define  $\alpha_t = \frac{D_t^f}{D_t}$  and  $\hat{i}_t = (1 - \alpha_t) \cdot i_d + \alpha_t i_f \cdot (1 + s_t)$

Equation (3) becomes:

$$pv_t = pd_t + ndfs_t + \frac{d_{t-1}}{(1+g_t)(1+\pi_t)} [\hat{i}_t + 1 + \alpha_{t-1}s_t] - d_t^f + pv_t^f \quad (4)$$

The change over time of the PV of Debt in local currency is defined as:

$$pv_t - pv_{t-1} = pd_t + ndfs_t - \frac{g_t}{(1+g_t)} d_{t-1} + \frac{d_{t-1}}{(1+g_t)} \left[ \frac{\hat{i}_t - \pi_t}{1+\pi_t} - \frac{\alpha_{t-1}(\pi_t^* - \pi_t)}{(1+\pi_t) \cdot (1+\pi_t^*)} \right] - \alpha_{t-1} \frac{RXR_t}{(1+\pi_t^*)(1+RXR_t)} \frac{d_{t-1}}{(1+g_t)} - (1-\phi_t)(d_t^f - d_{t-1}^f) + (\phi_t - \phi_{t-1})d_{t-1}^f \quad (5)$$

Therefore, the PV of debt-to-GDP ratio can be decomposed into:

- 1) the change in the ratio of nominal value of public debt to GDP given by:

$$d_t - d_{t-1} = pd_t - ndfs_t - \frac{g_t}{(1+g_t)} d_{t-1} + \frac{d_{t-1}}{1+g_t} \left[ \frac{\hat{i}_t}{1+\pi_t} - \frac{\pi_t}{1+\pi_t} - \frac{\alpha_{t-1}(\pi_t^* - \pi_t)}{(1+\pi_t)(1+\pi_t^*)} \right] - \alpha_{t-1} \frac{RXR_t}{(1+\pi_t^*)(1+RXR_t)} \frac{d_{t-1}}{1+g_t}$$

- 2) the grant element of new external borrowing

$$(1-\phi_t)(d_t^f - d_{t-1}^f)$$

- 3) the change in the concessionality of the outstanding stock of external debt

$$(\phi_t - \phi_{t-1})d_{t-1}^f$$

### Appendix 3. Basic Rule of Debt Dynamics in an Oil-Rich Country

To account for the fact that a substantial share of fiscal revenues is derived from exhaustible natural resources (oil and gas, referred to simply as “oil”), the primary fiscal deficit is replaced with the non-oil primary deficit, effectively treating net oil revenues as a financing flow. This leads to the following modified debt decomposition equation:

$$(1) \quad \Delta d_t = f_t - Roil_t - \frac{g}{(1+g)} d_{t-1} + \frac{\hat{i} - \hat{\pi}}{1+g} d_{t-1} - \alpha RXR \frac{d_{t-1}}{1+g} + Otherfactors$$

In (1),  $\Delta d_t$  is the change in public debt-to-GDP ratio,  $f_t$  is the non-oil primary deficit as a share of GDP,  $g$  is the real GDP growth rate,  $\hat{i}$  is the nominal weighted average of domestic and foreign interest rates typically calculated as the ratio of total interest payments to the debt stock,  $\hat{\pi}$  is the weighted average of domestic and foreign inflation rates (percentage change in GDP deflator),  $\alpha$  is the share of foreign currency denominated debt in total public debt, and  $RXR$  is the appreciation in real exchange rate of foreign currency per Naira.<sup>69</sup>

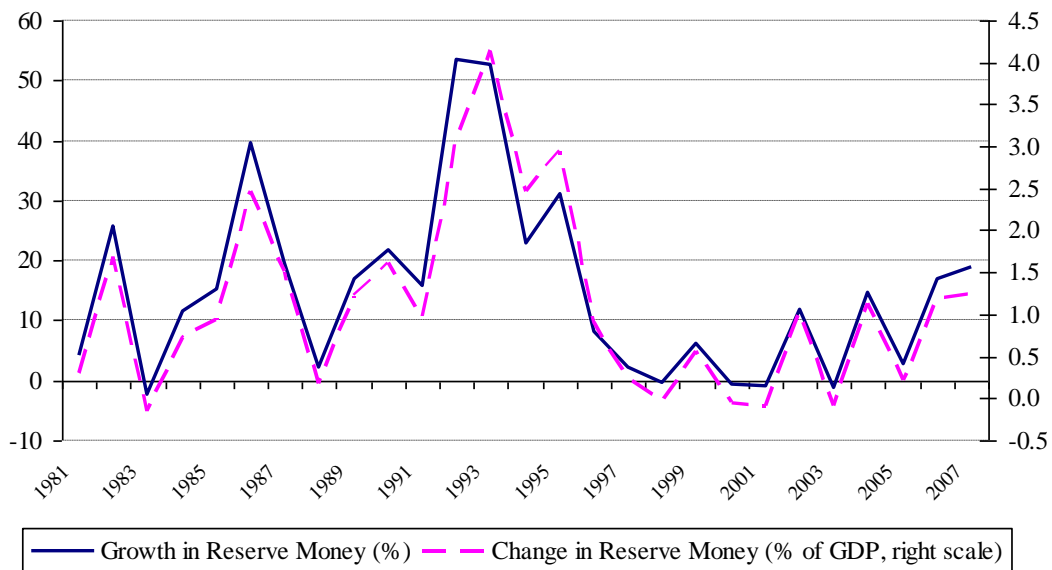
As can be seen from equation (1), the public debt-to-GDP ratio can increase as a result of larger non-oil primary deficits,  $f_t$ ; it can also grow as a result of “automatic debt dynamics”, which are determined by the difference between the real interest rate and the real growth rate. If a large share of public debt is denominated in foreign currency,  $\alpha$ , the public debt-to-GDP ratio can also change because of capital gains/losses due to real exchange rate appreciation/depreciation. Finally, accumulation of external debt arrears, domestic expenditure arrears, including on pensions and past cash calls, as well as implicit subsidies (e.g., subsidized oil prices for domestic consumption, or foreign exchange allocations for importers at official exchange rates which are at a discount to the market rate) also increase the public debt-to-GDP ratio. The gross public debt-to-GDP ratio may decrease as a result of larger current oil revenues,  $R_{oil}$  (related to a faster depletion of oil wealth or higher oil prices), or as a result of using foreign exchange reserves to pay down debt. The path of public debt level is thus sensitive to the level and the trajectory of the non-oil deficit; the size of oil fiscal revenues; and the level of foreign exchange reserves.

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<sup>69</sup>Equation (1) is a simplified, continuous time approximation of the equation actually used for the DSA. To account for the fact that a large fraction of external debt is not denominated in U.S. dollars, the real exchange rate contribution to debt dynamics is using not the bilateral exchange rate, but rather the weighted average of the bilateral exchange rates of Naira to Deutsche Mark, Pound Sterling, French Franc, Japanese Yen, and U.S. dollar, weighted by the weights of the debt in corresponding currencies in total external debt.

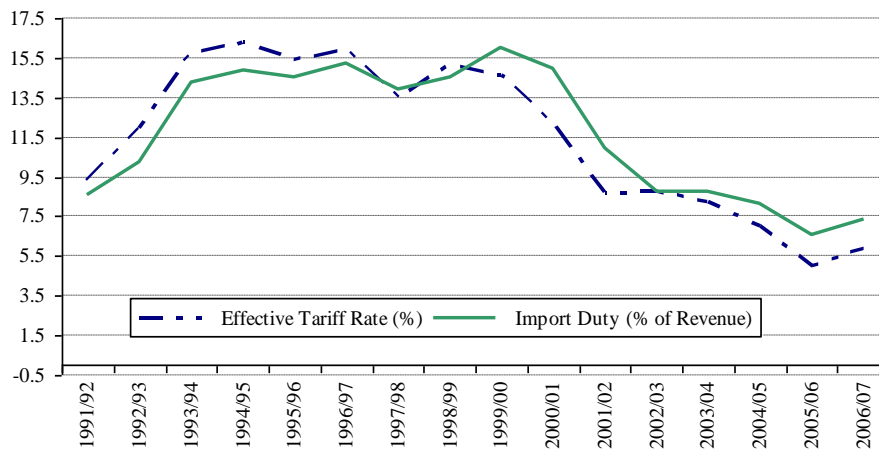
## Appendix 4 Kenya's Quest for Growth

Figure A1 Reserve Money



Source: IMF Staff Reports and author's estimates.

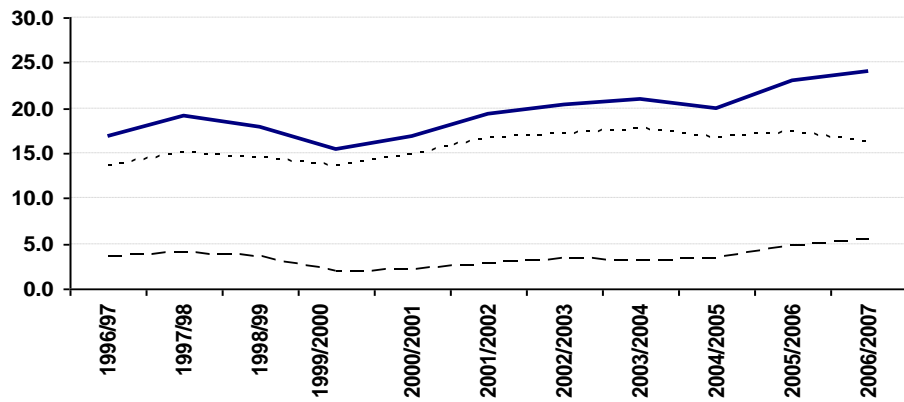
Figure A2 Import Duty and Effective Tariff Rate



Source: IMF Staff Reports and author's estimates.



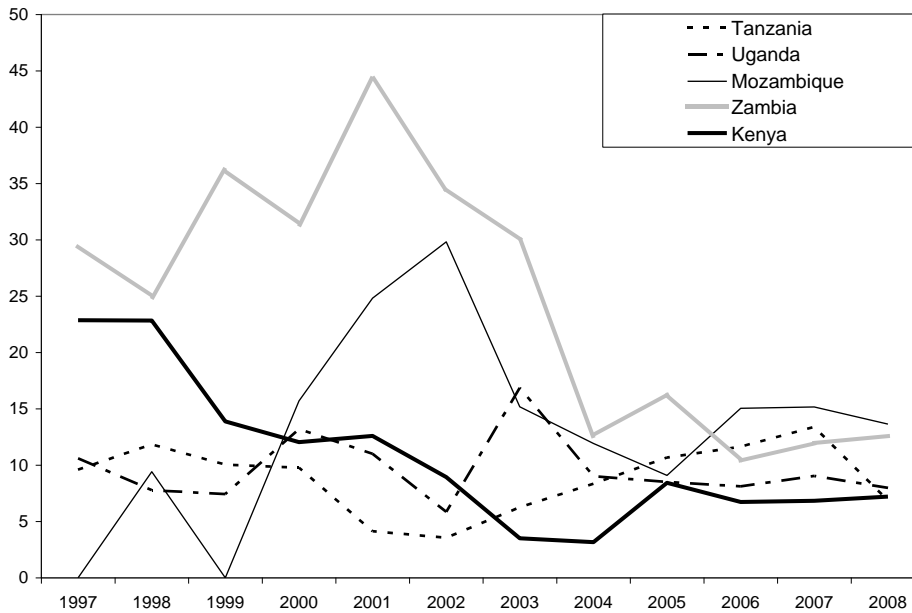
Figure A3 Primary Expenditure  
% of GDP



— Primary excl drought ..... o/w Recurrent - - - - o/w Development excl net lending

Source: IMF Staff Reports.

Figure A4. 3-Month T-bill Rates  
(Annual averages, in percent)



Source: International Financial Statistics.

## Appendix 5 World Bank Oil Price Forecasts

### Annex Table

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
WB Oil Price Projections:										
International Oil Price \$/Bbl - New	64.3	71.1	84.1	78.4	73.1	68.0	63.2	58.8	54.7	52.7
International Oil Price \$/Bbl - old	64.3	67.9	72.4	68.2	64.2	60.3	56.7	53.2	50.0	48.5
Total Projected Fiscal Revenues from oil ('000\$)	4231284.7	7775139.8	23314562.5	26945654.7	27015457.3	24084305.2	21122418.3	18242664.3	15913804.3	15038386.7
Total Fiscal Revenues ('000\$)-old oil prices	4231284.7	7154242.9	19450961.6	22945221.4	23114485.6	21018269.3	18639343.0	16280122.0	14351972.8	13186209.8
PI - new Oil prices	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1
PI - old Oil Prices	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9
	2016	2017	2018	2019	2020	2021	2022	2023	2024	
WB Oil Price Projections:										
International Oil Price \$/Bbl - New	52.9	53.2	53.5	53.7	54.0	54.3	54.5	54.8	55.1	
International Oil Price \$/Bbl - old	48.7	48.9	49.2	49.4	49.7	49.9	50.2	50.4	50.7	
Total Projected Fiscal Revenues from oil ('000\$)	13950719.9	14906494.5	14565839.7	13730952.6	12270220.1	10943518.2	9684165.7	8591444.3	8669189.7	
Total Fiscal Revenues ('000\$)-old oil prices	12348286.4	12226900.6	11932629.9	11178946.7	11121534.3	9920191.5	8776848.9	7786636.4	7861064.2	
PI - new Oil prices	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	4251601.1	
PI - old Oil Prices	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	4388561.9	

## Appendix 6 Public Debt Dynamics

Increases in net public debt (that is, measured net of the net foreign assets, public debt holdings of the central bank, and oil fund assets) can be decomposed in various contributing factors, which, in turn, can be linked to the macroeconomic projections available. By switching to ratios to GDP, public debt dynamics can be broken down into several components: (1) the primary fiscal deficit net of seigniorage revenues; (2) growth adjusted real interest rate payments on domestic debt; (3) the real cost of external borrowing, including capital gains and losses on net external debt due to changes in the real exchange rate; and (4) other factors. This can be expressed in the following formulas:<sup>1</sup>

$$\dot{d} = (pd - \sigma) + (r - g)b + (r^* + \hat{e} - g)(b^* - nfa^*)e + OF \quad (1)$$

where  $d$  is the net public debt-to-GDP ratio (that is, measured net of the net foreign assets, public debt holdings of the central bank, and oil fund assets);  $pd$  is the overall primary deficit as a share of GDP;  $g$  is the real GDP growth rate;  $r$  is the real interest rate on domestic debt,  $r^*$  is the real interest rate on external debt;  $e$  is the real exchange rate  $EP^*/P$ , with obvious definitions of variables; and  $OF$  refers to other factors.  $OF$  collects residuals due to cross product terms arising because of the use of discrete time data (see Bandiera e.a. (2007) for explicit discrete time formulas) and the impact of debt increasing factors that in a perfect accounting world would be included in deficit measures, but in the real world are not. Examples are contingent liabilities that actually materialize, such as the fiscal consequences of a bank bail out, one-off privatization revenues, and so on. Of course, if countries borrow in more than one foreign currency (for example, dollars and euros or yen), more than one foreign debt stock should be kept track of in an analogous manner. Note that in this single equation exercise, debt levels are generated, but all other variables are considered exogenous (i.e. feed backs from shocks to debt levels are not incorporated).

Given the special features of oil revenue, in particular, its exhaustibility and volatility, the next step requires the incorporation of various non-oil deficit rules in the public debt dynamics equation. To do that, we break the overall primary balance to two components: the non-oil primary balance  $f$ , which measures the true fiscal effort in an oil-producing country, and the projected oil fiscal revenues  $Roil$ , (revenue projected using World Economic Outlook [WEO]/ Development Prospects Group oil prices), which reflects the fact that oil windfall due to high prices or faster oil extraction would result in much lower primary deficit. Similarly, isolating oil revenue also allows us to assess the impact of oil shocks on the overall net debt/net asset position.

$$pd = f - Roil \quad (2)$$

After expressing  $pd$  in eq.(1) in terms of non-oil primary deficit,  $f$  we obtain:

$$\dot{d} = (f - \sigma) + (r - g)b + (r^* + \hat{e} - g)(b^* - nfa^*)e - Roil + OF \quad (3)$$

Hence, public debt dynamics equation (eq.3) now renders transparent the fact that net public debt could increase because of higher non-oil primary deficit, and decrease because of higher oil revenues due to high prices or faster oil extraction. Isolating oil revenue also allows us to assess the impact of oil shocks on the overall net debt/net asset position.

Furthermore, given the oil price uncertainty and the possibility of volatility clustering, many oil-rich countries have introduced fiscal/oil fund rules that aim at stabilizing the oil revenue flow to the budget. Some countries aimed at stabilizing the oil revenue flow to the budget using a conservatively chosen budget reference price of oil. In what follows, we are referring to a so-called reference price rule, whereby all revenues due to actual prices in excess of this reference price are diverted to an oil fund. Commensurately, revenue shortfalls due to prices falling short of the reference price can be met from the oil fund. The implementation of such a price stabilization rule is especially relevant for mature oil producers with

<sup>1</sup> Note that, to simplify the exposition, we present a continuous time formula. See Bandiera et al. (2007) for a discrete derivation of formulas for public debt dynamics. A similar debt decomposition formula also has been used in World Bank (2005).

relatively constant extraction profile, so it is oil price volatility that matters most.

Such an oil fund rule, however, needs to be modified for countries with new oil discoveries (such as Azerbaijan), which might find that they can suddenly and substantially raise the non-oil deficit. Whereas the same considerations--such as absorptive capacity, impact on real exchange rate and non-oil economy, and intergenerational equity--apply, the relative emphasis would be different, with absorptive capacity becoming much more important. For countries where oil is running out (such as Yemen), the emphasis on the non-oil economy and diversification should receive more prominence.

Finally, it is also important to stress that, to be meaningful at all, any oil fund accumulation rule should be complemented with targets for the non-oil deficit. Putting money aside with one hand but borrowing on the side with the other obviously would make the oil fund rule ineffective.

Hence, to be able to assess fiscal sustainability implications of oil fund/non-oil deficit rules, we break down further the oil fiscal revenues,  $Roil$ , in two parts: (i) oil revenue flow to the budget  $Roil_{sb}$ , and (ii) net inflow in the oil fund, or the difference between total oil revenue and the oil revenue flow to the budget,  $Roil - Roil_{sb}$ . Furthermore, by subtracting and adding the oil revenue flow to the budget,  $Roil_{sb}$ , in the RHS of eq. 3, we also express the public debt dynamics equation in terms of these two components of the total oil fiscal revenue:

$$\dot{d} = (f - Roil_{sb} - \sigma) + (r - g)b + (r^* + \hat{e} - g)(b^* - nfa^*)e - (r^* + \hat{e} - g)oa^*e - (Roil - Roil_{sb}) + OF \quad (4)$$

We also assume that the excess oil revenue above the oil revenue flow to the budget and interest earned on the stock of oil fund assets are saved in a ring-fenced oil fund:

$$\dot{oa}^* = (r^* + \hat{e} - g)oa^*e - (Roil - Roil_{sb}) \quad (5)$$

Hence the change in the net public debt to GDP ratio now also accounts for the accumulation of assets in a ring-fenced oil fund,  $oa^*$ -dot.

$$\dot{d} = (f - Roil_{sb} - \sigma) + (r - g)b + (r^* + \hat{e} - g)(b^* - nfa^*)e - \dot{oa}^*e + OF \quad (6)$$

The modified public debt dynamics equation (6) also isolates the impact of oil on public finances. In particular, it reflects the following major changes. First, it renders transparent the fact that a substantial share of fiscal revenues is derived from oil; the primary fiscal deficit (noninterest spending minus revenues) is replaced with the non-oil primary deficit, isolating net oil revenues evaluated at reference price as a financing flow,  $Roil_{sb}$ . Second, the change in net debt-to-GDP ratio now also accounts for fiscal savings out of oil, accumulated in a ring-fenced oil fund,  $oa^*$ -dot.<sup>2</sup> Third, given the higher volatility of the oil fiscal revenue, the uncertainty about the net debt trajectory for oil-rich countries is likely to be much higher; hence, fiscal sustainability assessment should pay much more attention to the issues of uncertainty and risk.

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2 Ring-fenced oil funds can be successful only if complemented with a rule that limits the non-oil deficit or public debt. Otherwise, the government will accumulate assets in the oil fund while borrowing, so the net asset position may even deteriorate because the cost of borrowing is typically higher than the interest earned on oil fund assets.

Table A1. Variables Used in BMA Estimates

Variables	No. of obs. per country	All countries		Fragile		HIPCs		Fragile-HIPCs		Non-Fragile CP HIPCs		Source
		Average	St. Dev.	Average	St. Dev.	Average	St. Dev.	Average	St. Dev.	Average	St. Dev.	
Growth rate of GDP per capita												
Initial level of GDP per capita (log)	25	0.3	6.3	0.2	6.9	0.0	6.6	-0.4	7.8	0.4	5.2	Annual average GDP per capita growth (PPP corrected), WDI database
Gross fixed capital formation (as % of GDP)	22	17.8	7.5	17.6	8.7	17.4	7.6	16.7	9.4	18.0	5.8	WDI database
Trade over GDP	25	67.5	35.9	74.2	34.3	61.8	34.5	65.6	32.1	58.8	36.1	WDI database
Domestic credit to private sector (% of GDP)	24	14.7	14.7	13.5	15.4	14.1	14.3	11.5	14.9	16.4	13.4	WDI database
Population growth	27	2.5	1.2	2.4	1.2	2.5	1.3	2.5	1.2	2.5	1.3	WDI database
Inflation rate	21	55.0	734.7	67.0	859.5	56.4	822.0	77.6	1072.6	37.3	496.5	IFS database
Agricultural output (% of total value added)	23	29.1	17.8	27.1	19.5	31.2	16.9	30.1	19.4	32.1	14.4	WDI database
Life Expectancy	12	24.0	27.3	23.4	27.1	23.5	26.7	22.0	25.7	24.9	27.5	WDI database
Mineral exports (% of total exports)	21	30.2	79.6	40.1	104.6	30.0	82.7	42.9	115.9	17.9	19.7	UNCTAD statistics
Years of Armed Conflict	28	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	UCDP/PRIO Armed Conflict Dataset
Net ODA (percent of GDP)	22	14.4	12.4	15.1	14.4	15.1	12.6	16.8	15.2	13.6	9.6	WDI database
No of countries		51		32		40		22		19		

Note: no data have been included for Somalia, Timor Leste and the territory of Kosovo.

Table A2. BMA Results: Pooled Data with Country Fixed Effects

Variable	All fragile states			All HIPCs			All fragile HIPCs		
	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)
Initial income	<b>0.9846</b>	<b>-0.1163</b>	<b>0.0420</b>	0.3786	-0.0149	0.0243	0.3879	-0.0260	0.0442
Gross fixed capital formation	<b>0.9914</b>	<b>0.4121</b>	<b>0.1360</b>	0.1314	0.0090	0.0405	0.4444	0.1058	0.1581
Openness	0.2749	-0.0169	0.0389	0.1535	-0.0041	0.0146	0.2395	-0.0147	0.0398
Agricultural value added	0.1138	0.0001	0.0369	0.0964	0.0021	0.0159	0.1535	0.0097	0.0618
Inflation	0.4491	-0.0071	0.0104	0.0975	0.0000	0.0001	0.1783	-0.0014	0.0055
Life expectancy	0.4430	0.0012	0.0017	0.1439	0.0002	0.0006	0.1370	0.0001	0.0012
Mineral exports	0.2102	-0.2360	0.7213	0.0997	0.0299	0.2467	0.1692	-0.1312	0.6033
Conflict	0.1368	-0.0019	0.0108	<b>0.9899</b>	<b>-0.0459</b>	<b>0.0147</b>	<b>0.5186</b>	<b>-0.0227</b>	<b>0.0290</b>
Present value of debt over GDP	0.1235	-0.0003	0.0094	0.2037	-0.0034	0.0092	0.1440	-0.0017	0.0111
CPIA	0.1693	-0.0012	0.0047	0.0860	0.0000	0.0015	0.1270	-0.0001	0.0035
Number of observations	66			123			53		

Source: Authors' estimates.

Note: Variables in bold have posterior inclusion probabilities larger than their 50 percent prior probability of model inclusion.

Table A3. BMA Results: Pooled Data with Country Fixed Effects for Countries with Low Present Value of Debt

Variable	All fragile states			All HIPCs		
	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)
Initial income	<b>1.0000</b>	<b>-0.2800</b>	<b>0.0646</b>	<b>1.0000</b>	<b>-0.2552</b>	<b>0.0469</b>
Gross fixed capital formation	<b>1.0000</b>	<b>0.8766</b>	<b>0.1606</b>	<b>0.9819</b>	<b>0.5041</b>	<b>0.1615</b>
Openness	<b>0.8103</b>	<b>-0.1019</b>	<b>0.0863</b>	0.1959	0.0188	0.0647
Agricultural value added	<b>0.6133</b>	<b>0.1307</b>	<b>0.1662</b>	0.1567	-0.0113	0.0586
Inflation	0.2071	-0.0092	0.0607	<b>0.9274</b>	<b>-0.0504</b>	<b>0.0272</b>
Life expectancy	<b>0.9301</b>	<b>0.0039</b>	<b>0.0022</b>	<b>0.9758</b>	<b>0.0062</b>	<b>0.0022</b>
Mineral exports	<b>0.9740</b>	<b>4.1919</b>	<b>1.9270</b>	<b>0.9408</b>	<b>3.4151</b>	<b>1.5887</b>
Conflict	0.1850	0.0013	0.0188	0.1605	-0.0023	0.0110
Present value of debt over GDP	0.2714	-0.0157	0.0493	0.1150	-0.0002	0.0183
CPIA	0.1711	-0.0003	0.0095	0.1383	-0.0001	0.0038
Number of observations		33			61	

Source: Authors' estimates.

Note: Variables in bold have posterior inclusion probabilities larger than their 50 percent prior probability of model inclusion.

Table A4 BMA Results: Pooled Data with Country Fixed Effects for CP–HIPCs

Variable	All CP–HIPCs			Nonfragile CP–HIPCs			CP–HIPCs with low present value of debt		
	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)	Posterior inclusion probability	Posterior E(b)	Posterior SD(b)
Initial income	<b>0.7652</b>	<b>-0.0424</b>	<b>0.0322</b>	<b>0.9751</b>	<b>-0.0860</b>	<b>0.0339</b>	<b>1.0000</b>	<b>-0.2022</b>	<b>0.0500</b>
Gross fixed capital formation	0.1186	-0.0018	0.0365	0.1377	0.0056	0.0407	<b>0.9815</b>	<b>0.2617</b>	<b>0.1218</b>
Openness	0.1252	0.0009	0.0109	0.1445	0.0018	0.0130	0.3888	0.0295	0.0637
Agricultural value added	0.1839	0.0074	0.0245	0.2335	0.0109	0.0297	<b>0.9931</b>	<b>0.3147</b>	<b>0.1379</b>
Inflation	0.1118	0.0000	0.0001	0.1176	0.0000	0.0001	<b>0.9982</b>	<b>-0.0523</b>	<b>0.0164</b>
Life expectancy	0.1032	0.0000	0.0004	0.1411	0.0001	0.0005	<b>0.9997</b>	<b>0.0085</b>	<b>0.0017</b>
Mineral exports	0.5059	0.7612	0.9764	0.7960	1.4988	1.0864	<b>0.9887</b>	<b>3.5910</b>	<b>1.4015</b>
Conflict	<b>1.0000</b>	<b>-0.0754</b>	<b>0.0179</b>	<b>0.9905</b>	<b>-0.0660</b>	<b>0.0215</b>	0.1617	0.0011	0.0148
Present value of debt over GDP	0.3796	-0.0096	0.0161	<b>0.8137</b>	<b>-0.0290</b>	<b>0.0200</b>	<b>0.9184</b>	<b>-0.0683</b>	<b>0.0461</b>
CPIA	0.1551	-0.0006	0.0025	0.1245	0.0001	0.0020	0.1591	0.0000	0.0035
Number of observations	77			65			37		

Source: Authors' estimates.

Note: Variables in bold have posterior inclusion probabilities larger than their 50 percent prior probability of model inclusion.