

# **External Debt and Macroeconomic Vulnerability**

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## **A Proposal for State-Contingent Debt Contracts to Achieve Low-Income Country Debt Sustainability**

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This dissertation is submitted in partial fulfilment of the requirements for the degree  
of

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## Abstract

We argue that the 'New Debt Sustainability Framework' (DSF), as recently introduced by the Bretton Woods Institutions, is tailored to suit the aid allocation mechanism centred on the Country Policy and Institutional Assessment (CPIA), but fails to take into account low-income countries' economic vulnerability and exposure to exogenous shocks. As a result, the DSF further undermines the effective delivery of aid by the International Development Association (IDA), and fails to support recipient countries in their efforts to achieve lasting debt sustainability. Furthermore, we demonstrate that the findings of the empirical studies underlying the DSF and IDA14 replenishment are not robust to the introduction of vulnerability measures, such as the Economic Vulnerability Indicator (EVI), which undermine the significance of the CPIA in predicting debt distress episodes. In order to overcome the shortcomings of the DSF, we propose the introduction of a Contingency Debt Sustainability Framework (CDSF), which distinguishes between the causes of vulnerability underlying the external debt problem affecting most of the low-income countries. Drawing on the most established strands of sovereign debt and contract theory literature, we argue that state-contingent debt contracts represent the most effective financial instrument to link aid allocation and debt relief to recipient countries' financial requirements, contingent on the state of nature. To implement state-contingent contracts in the specific context of low-income debtor countries, we devise an accounting method by which shock and trend factors in the balance of payments are distinguished by their exogenous or endogenous origin. On the basis of this distinction, the CDSF financially compensates debtor countries for exogenous shock and trend factors, without giving rise to significant moral hazard implications. The CDSF is then simulated for the case of Uganda during the period 1988-2002, demonstrating its effectiveness in dealing with Uganda's severe exposure to price shocks and negative terms of trade.



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## List of Acronyms and Abbreviations

|           |   |
|-----------|---|
| ADB       | African Development Bank  |
| AMT       | Amortization  |
| BOP       | Balance of Payments   |
| BOPS      | Balance of Payments Statistics (IMF)                                  |
| BWI       | Bretton Woods Institutions  |
| BWI-DSF   | Debt Sustainability Framework of the Bretton Woods Institutions       |
| CDSF      | Contingency Debt Sustainability Framework                             |
| COV       | Coefficient of Variation  |
| CPIA      | Country Policy and Institutional Assessment                           |
| DIS       | Disbursement  |
| DSA       | Debt Sustainability Analysis  |
| DSF       | Debt Sustainability Framework   |
| DSF/IDA14 | The combined framework of debt sustainability and IDA14 replenishment |
| ECA       | Economic Commission for Africa (UN)                                   |
| EDT       | External Debt Stock   |
| ERP       | Economic Recovery Programme   |
| ESAF      | Enhanced Structural Adjustment Facility (ESAF)                        |
| EVI       | Economic Vulnerability Index  |
| FAOSTAT   | Food and Agricultural Organization Statistics                         |
| FDI       | Foreign Direct Investment   |
| GDF       | Global Development Finance (World Bank)                               |
| GDP       | Gross Domestic Product  |
| GT        | Gilbert-Tabova  |
| HIPC      | Heavily Indebted Poor Countries                                       |
| HOS       | Handbook of Statistics (UN)   |
| ICA       | International Commodity Agreements                                    |
| ICRG      | International Country Risk Guide                                      |
| IDA       | International Development Association                                 |

|        |   |
|--------|---|
| IDA13  | The 13th Replenishment of the International Development Association |
| IDA14  | The 14th Replenishment of the International Development Association |
| IFS    | International Financial Statistics (IMF)                            |
| IMF    | International Monetary Fund   |
| IPC    | Integrated Programme for Commodities                                |
| KKM    | Kraay-Kaufmann-Mastruzzi  |
| LCU    | Local Currency Units  |
| LIC    | Low-Income Country  |
| LR     | Likelihood Ratio  |
| MA     | Moving Average  |
| MDRI   | Multilateral Debt Relief Initiative                                 |
| MGS    | Imports of Goods and Services                                       |
| ML     | Maximum Likelihood  |
| MT     | Metric Tonnes   |
| NFL    | Net Flows on Debt   |
| NPV    | Net Present Value   |
| NTR    | Net Transfers on Debt   |
| ODA    | Official Development Assistance                                     |
| PC     | Paris Club  |
| PPG    | Public and Publicly Guaranteed Debt                                 |
| PRGF   | Poverty Reduction and Growth Facility (IMF)                         |
| REER   | Real Effective Exchange Rate  |
| SAP    | Structural Adjustment Programme                                     |
| TDS    | Total Debt Service  |
| TOT    | Barter Terms of Trade   |
| U.S.   | United States   |
| UNCTAD | United Nations Conference on Trade and Development                  |
| US\$   | United States Dollar  |
| WDI    | World Development Indicators (World Bank)                           |
| WR     | Workers' Remittances  |
| WTA    | World Trade Analyzer (Statistics Canada - STATCAN)                  |
| XGS    | Exports of Goods and Services                                       |

# Part I

# 1 Introduction and Overview

## 1.1 Background of the study: vulnerability, aid, and debt

Low-income countries (LICs) are extremely vulnerable to exogenous shocks, which they experience with higher frequency and greater intensity than other developing countries (Brooks, 1998; Dehn, 2000a, 2000b; Varangis et al., 2004; Williamson, 2005). An exogenous shock is typically defined as an unexpected event beyond the control of country authorities and with substantial impact on the economy. Among the group of low-income countries, sub-Saharan African countries have long been pointed out as suffering from a particularly acute problem of vulnerability to exogenous shocks (Maizels, 1992; Deaton and Miller, 1996; Collier and Gunning, 1999; Cashin and Pattillo, 2000; UNCTAD, 2003). These countries have been exposed to large and frequent commodity price fluctuations, as well as output shocks caused by natural disasters, with highly disruptive effects on their economies. Moreover, a broad array of other exogenous shock-factors typically affects these economies through various channels of the balance of payments, including aid volatility (Osei et al., 2002; Fielding and Mavrotas, 2005), volatility of foreign direct investment inflows and private remittances<sup>1</sup> (Lensink and Morrissey, 2006), unexpected changes to trade partners' trade restrictions (UNCTAD, 2003), as well as civil unrest and wars in neighbouring countries (Varangis et al., 2004). Indeed, Martin and Bargawi (2005) confirm that most of these factors – typically in combination with each other – have had an extremely high incidence in the case of sub-Saharan African countries since the mid-1990s.

Besides natural disasters, to which both analysis and international policy efforts have devoted special attention, primary commodity prices have long been singled out as the prime causal factor underlying low-income countries' economic vulnerability.

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<sup>1</sup> For a collection of studies about the relationships between workers' remittances and low-income countries' macroeconomic volatility, see the conference proceedings of the research project coordinated by the Global Development Network: <http://www.imf.org/external/np/res/seminars/2005/macro/index>.

Particularly in the case of African countries, such vulnerability is directly related to their structural dependence on a narrow basket of primary export commodities (UNCTAD, 2003), making their economies extremely vulnerable to price volatility. It is now well documented that price volatility has increased both in magnitude and frequency over time (Brooks, 1998; Varangis et al. 2004; Cashin and McDermott, 2001), rendering macroeconomic management and long-term planning by liquidity-constrained LICs increasingly difficult. There are several channels through which shocks to a low-income country's trade balance, or to its balance of payments more generally, feed through into shocks to the real economy. For example, a drop in export prices causes a direct fall in income by lowering export revenue, and affects domestic tax revenue and consumption through the multiplier effect. Furthermore, if the country were to avoid the negative investment and growth effects of curbing imports in response to a shock, it would need to lower international reserve holdings and/or increase foreign borrowing. Ultimately, a negative price shock forces a liquidity-constrained country to choose between lower economic activity, unemployment and more poverty, or an increase in its external indebtedness (Edwards, 2003a, 2003b; Nissanke and Ferrarini, 2004; Williamson, 2005).

Recent empirical work has found these direct and indirect effects of commodity price shocks to be particularly pronounced in terms of low-income countries' economic growth. Deaton (1999) finds a close correlation between real commodity prices and the GDP growth rates of African countries. Dehn (2000a) and Collier and Dehn (2001) find the impact from negative terms of trade shocks to be in the range of 14 per cent of output when their indirect knock-on effects on the real economy are considered, while positive price shocks were not found to increase GDP growth rates significantly. These findings, together with the evidence that price slumps tend to be longer and more accentuated than price booms (Cashin et al., 2002), suggest that LICs' exposure to price shocks has played a particularly important role in undermining economic growth.

Apart from price volatility, low-income countries – and African countries in particular – have been facing a long-term decline in the barter terms of trade of commodity-exporting countries (Prebisch, 1950; Singer, 1950; Spraos, 1983; Bloch and Sapsford, 2000; Cashin and McDermott, 2001). As will be further argued below, the

secular decline in commodity-exporters' relative prices, and in particular the sharp deterioration of low-income countries' terms of trade during the 1980s, is closely related to the incapacity of many of these economies to escape a situation of commodity dependence, and has been causing a progressive deterioration in their external debt positions (Maizels, 1992).

While many of the factors affecting balance of payment sustainability of low-income countries have been of external origin, they have often had such a devastating effect because of the inadequate domestic policies these countries have either chosen or were compelled to pursue. Indeed, over-borrowing, excessive profligacy during good times and the lack of counter-cyclical fiscal policies, misconceived monetary policies, as well as sub-optimal diversification efforts are often listed among the major home-grown factors underlying low-income countries' incapacity to adequately curb the impact of shocks and deteriorating real commodity prices.

However, there has been a long-standing debate with regard to the share of responsibility held by debtor countries themselves in rendering their economies less resilient to the impact of exogenous shocks, as well as the optimal extent of support to be offered by international development agencies. The two major contending positions can roughly be associated with those appertaining to the Bretton Woods Institutions (BWI) on the one hand, and the United Nations on the other. With regard to the African 'tragedy', the dominant interpretation by the BWI has been to place the primary responsibility with forces and constraints inside African countries, emphasising the debilitating role of 'bad policies' and 'poor governance' in their development prospects. An early interpretation along these lines is usually associated with the Berg Report – an influential World Bank analysis published in 1981, laying out an agenda for action in sub-Saharan Africa (World Bank, 1981) – and has since represented the essential tenets of the BWIs in relation to the sub-Saharan African development crisis.

Highly critical of the policies of African governments, the Berg Report singled out overvalued national currencies, industry protection and excessive state intervention among the policies most responsible for the African economic stagnation, and pointed to the region's underdeveloped human resources, political fragility, rapid



population growth and climatic and other environmental factors as the basic internal structural constraints hampering development (Arrighi, 2002; Geda, 2002). Government intervention was thereby considered harmful to the economy due to the limited capability ascribed to the local polity and bureaucracy on the one hand, and the deliberate misuse of political power in the pursuit of illegitimate rents on the other. In this view, "harmful intervention in the economy results not simply from botched performance, but from the normal way that African governments operate" (Schatz, 1996: 241). The remedies proposed by the Berg Report, which are broadly reflective of the broader BWI's development strategy that later came to be known as the 'Washington Consensus', entailed the removal of any policy regime that impeded the operation of market forces and private enterprises (Williamson, 2000, 2003; Fine et al., 2001). African countries were thus compelled to liberalise their current accounts (with mounting pressure to open up their capital accounts too), to enact wholesale privatisation policies across the key sectors of their economies, and to engage in macroeconomic stabilisation programmes with particular emphasis on fiscal restraint and low inflation targets.

Furthermore, as a reflection of the underlying distrust in state intervention at the domestic level, and intervention in world markets at the international level, the BWI approach to solving the African commodity crisis resorted to export diversification as a means to escape the effects of terms of trade deterioration, and risk management to counter short-term price fluctuations. The reliance on market forces turned out to have its pitfalls, however, as African exporters' lack of competitiveness, together with a host of market barriers, severely hampered their diversification efforts over time (UNCTAD, 2003). Similarly, the World Bank's efforts, since the late 1980s, to induce developing countries to use commodity-linked financial hedging instruments in order to counter short-term volatility had barely borne fruit after a decade of operations (Maizels, 2000). Since the late 1990s, new approaches to bridge the wide gap between the international providers of such instruments and the LDC users have been under discussion (e.g. see ITF, 1999).

The Berg Report, and the BWI consensus-thinking more generally, ascribe Africa's balance of payments difficulties to poor export performance resulting from flawed domestic policies, rather than external influences. The 'internalist' and 'state-

minimalist' diagnoses by the BWI (Arrighi, 2002) were forcefully challenged by outside observers (e.g. Helleiner, 1986; Tarp, 1993; Stein and Nissanke, 1999), emphasising the presence of theoretical inconsistencies in the analytical framework underlying the BWI approach, as well as pointing out severe flaws in the methodologies applied to empirically corroborate this framework. Furthermore, on the institutional front, the United Nations Conference on Trade and Development (e.g. see UNCTAD, 2000) and Economic Commission for Africa (e.g. see ECA, 1989) countered the World Bank's approach by pointing out deep structural deficiencies as the main cause of Africa's problems, particularly in terms of economic and social infrastructure. From this viewpoint, balance of payments deficits, macroeconomic vulnerability and overall economic stagnation are considered to be mostly the result of Africa's inherited structural weaknesses, causing these economies' narrow production and export structures to succumb to the international forces unleashed through foreign-imposed openness to international trade and finance. Self-perpetrating structural factors are thus seen as the main elements explaining Africa's development deficit, with the effect of locking its economies into a state of high vulnerability towards balance of payments instability and secular terms of trade deterioration. To break this vicious cycle, the 'structuralists' advocate targeted international support of primary commodity producers, also in the form of coordinated interventions to tame the market forces causing excessive fluctuations in commodity prices.

The fundamental tenets underlying the two contrasting schools of thought have remained substantially unaltered throughout the past decades, and the divide between the positions has not shown any signs of narrowing. Crucially, we argue that this fundamental divide has translated into the long-term failure by the international community to support the African region effectively in its struggle against external vulnerability, and continues to fail the region today. Roughly stated, the two differing perspectives have translated into two distinct areas of international efforts with regard to Africa's development crisis, whereby the implications of the 'structuralist' approach have been kept largely isolated from influencing the international lending policies guided by the BWI. The BWI have been able to promote their policy agenda on the grounds of African countries' dependence on

official finance to close their persistent balance of payments and resource gaps, as an external manifestation of the development crisis. By exploiting their institutional function to validate recipient countries' policy regimes, the BWI were thus in a position to impose upon these countries policy conditionality as a precondition for official lending by bilateral donors and, since the mid-1990s, by increasingly representing themselves the key source of development finance to low-income countries via the soft-loan window of the International Development Association (IDA) (Helleiner, 1986; Stein and Nissanke, 1999).

Reflecting a profound reluctance to accept the structuralist position in relation to the causes underlying low-income countries' debt problems, the BWI have consistently denied that its policy implications have any bearing on the aid and debt relief mechanisms. Instead, the structuralist approach remained mostly confined within the United Nations, most notably as embodied by the UNCTAD since its inception in 1964. International action concretised in 1976, in the form of an Integrated Programme for Commodities (IPC), under the auspices of UNCTAD. The IPC envisaged the establishment of price stabilisation agreements on a range of key primary export commodities, to be financed by a Common Fund and with the aim of avoiding excessive price fluctuations and long-term declines in relative price levels.<sup>2</sup> The main factor triggering international action at the time had been the occurrence of successive shocks to world commodity markets (including petrol) in the early 1970s, which were substantially more intensive and persistent than the shocks previously recorded since World War II (Maizels, 1992). Most crucially however, and in contrast to the situation of sharp price volatility against fairly stable real price levels characterising most of the 1970s, the decade following the second oil shock in 1979 was characterised by a drastic fall in real commodity prices, depressing the barter terms of trade against manufactures. Indeed, over the decade of the 1980s, commodity prices fell by about 45 per cent, and failed to recover from their depressed level over the whole subsequent decade (Maizels, 2000: 3).

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<sup>2</sup> Actually, the establishment of international commodity agreements had previously been approved by the Havana Charter of 1948, leading to price stabilisation agreements for coffee, sugar, tin and wheat (Maizels, 2000; Gilbert, 1995).

International support of commodity producers turned out to be short-lived and largely ineffective. Against the background of extreme volatility and substantial trend deterioration of commodity prices, the limited capitalisation of the Common Fund, as well as the implicit incentive structure of the International Commodity Agreements (ICAs), had proven inappropriate to attain their goal of successfully taming excessive market forces (Gilbert, 1995). By the early 1990s, the existing ICAs had collapsed, with the only exception being natural rubber. As a result, since the 1990s there has been no effective market-stabilising mechanism in place, nor has an international consensus emerged since with regard to the re-establishment of any such mechanism. Maizels (2000: 4-5) thus concludes that

“it is, perhaps, ironic that this impasse in international commodity policy, which has continued throughout the 1990s, began just as the dominant feature of world commodity markets changed [...] from excessive short-term price volatility to a sharp downward trend in real commodity prices. If anything, commodity-exporting countries needed greater support, not less, from the international community during this period.”

After the demise of international intervention in commodity markets, the only remaining international facilities providing BOP support in the face of commodity price volatility were the IMF's Compensatory and Contingency Finance Facility, which provided temporary balance of payments support on a highly conditional basis, and the European Union's STABEX mechanism, which provided compensatory aid in response to fluctuation in agricultural export earnings. Both schemes, however, turned out to be largely ineffective, or even counter-productive, by inducing pro-cyclical aid disbursements (Hermann et al., 1990; Collier et al., 1999; Brun et al., 2001).

With international efforts in support of the primary commodity exporting countries failing to meet their objective of insulating these economies against the effects of sharp price fluctuations and unfavourable terms of trade, the marked overall decline of relative prices during the 1980s and 1990s constituted a prime cause of the accumulation of external debt by these countries. Indeed, the cumulative terms of trade losses led to a huge build-up of external debt over time, initially through increases in their commercial borrowings, and since the late 1980s increasingly in the form of conditionality-tied aid from bilateral and multilateral sources. As a result, the external debt burden of many low-income countries soared, and many commodity-dependent countries were caught in what Maizels (1994: 1688) refers to as a `debt

trap'. That is, the persistent requirement to service large and increasing burdens of external, foreign-currency-denominated debt caused these countries to succumb to a vicious cycle of commodity exports expansion, which further increased the downward pressure on world commodity prices and export revenues, and, in turn, increased these countries' necessity for securing additional loans, recurrent debt restructurings or other forms of relief.

Against the background of commodity-exporting countries' increasing dependence on official concessional aid and/or debt restructurings to close their widening resource gaps, the BWI played an increasingly prominent role in setting policy conditionality according to their internalist agenda, while the demise of the ICAs was largely considered as the ultimate demonstration of the fallacy of any international intervention along structuralist lines. Nissanke (2006) identifies the emergence of policy conditionality in the early 1980s as a consequence of the shift from project aid toward policy-based programme aid, which was delivered conditional upon recipients' pledges to implement stabilisation-cum-structural reforms. In contrast, the mid-late 1990s witnessed a shift from ex-ante to ex-post conditionality, based on a selectivity-based mechanism for allocating aid. As the key motivation for this fundamental shift in the aid delivery system, Nissanke (2006) points to the growing recognition by the donor community that structural adjustment programmes (SAPs) had failed to induce a sustainable path of economic development in the recipient countries, and that ex-ante policy conditionality was largely ineffective in forcing the donors' reform agenda on recipient governments. However, she also emphasises that, far from representing a break from the conditionality-based aid allocation system, the emergence of the 'new aid architecture' rested on the misconceived, though widespread, recognition that the chief culprit for the failure of the SAP-based aid allocation system was 'state failure' of recipient governments. Therefore, in order to avoid allocating aid to 'non-performing governments' enacting 'bad policies', aid allocation had to shift away from an incentives-based mechanism, based on promises for policy change, towards a system rewarding well-performing countries for policy-compliance on an ex-post basis.

Central to the new aid architecture and its selectivity-based allocation rule is the classification of recipient countries according to their ranking in the World Bank's

Country Policy And Institutional Assessment (CPIA). The CPIA was first introduced in the late 1970s and consists of the judgement made by World Bank staff with regard to a set of criteria representing the different policy and institutional dimensions of a recipient country's development strategy and outcome (Gelb et al., 2004; World Bank, 2005a). The criteria have evolved over time, and currently include 16 indicators encompassing the clusters of economic management, structural policies, policies for social inclusion, and accountability and public sector management. Performance is reviewed against specific criteria relating to intermediate variables like trade policy, macroeconomic management, corruption and property rights, and is translated into scores which constitute the central criteria in the aid allocation process. Against the background of the World Bank's uniform application of the CPIA mechanism across developing countries and time (Herman, 2004), Kanbur (2005) notes that the CPIA's criteria-based assessment embodies an 'implicit model of the development process', which privileges the assessment of performance upon needs, and thus acts as a means to effectively enforce upon recipient countries the BWI's own approach to development through the aid leverage. Furthermore, it has been noted that the CPIA assessment system totally neglects the role of exogenous shocks in recipient countries' performance ranking, with a strongly penalising effect on shock-prone countries within the aid allocation system (Nissanke and Ferrarini, 2006). Ultimately, the CPIA-based aid allocation process effectively translates the internalist position of the BWIs into the new aid architecture, with the main effect of keeping intact the aid-leverage of policy conditionality, while neglecting the crucial role played by exogenous factors in determining the development process and outcomes in developing countries.

Similar conclusions can be drawn with regard to the debt relief initiatives characterising the international approach to dealing with the African debt crisis over time. Indeed, the conditionality-tied approach to debt relief failed to achieve the aim of restoring debt sustainability in Africa mainly due to the neglect of vulnerability issues (Nissanke and Ferrarini, 2006), while succumbing to the prerogatives of the CPIA-centred incentive structure of the new aid architecture. Between the mid-1980s and 1996, international efforts were conducted under the aegis of the Paris Club, first in the form of repeated rescheduling and roll-overs of existing loans, and later by

relieving portions of bilateral official debt flow and stocks. Paris Club relief was subject to recipients' implementation of policy conditionality, as dictated by the IMF. Meanwhile, bilateral aid was increasingly switching toward grant financing, with multilateral official lending taking up growing shares of recipient countries' programme and balance of payment loans support. By the mid 1990s, many low-income countries' exposure to the multilateral donors, including the World Bank and IMF, had increased to levels requiring substantial relief operations in order to avoid defaults on multilateral claims and to break their unsustainable drain on poor countries' already scarce resources. Eventually, amidst growing international pressure from civil society and stakeholders, the so-called 'Heavily Indebted Poor Countries' (HIPC) Initiative was launched in 1996 – and later in 1999 expanded in breadth and scope – offering comprehensive relief encompassing also multilateral official debt, and promising a lasting release from the HIPC debt crisis (IMF and IDA, 1998).

Notwithstanding the optimism proclaimed by the sponsoring institutions, it was soon clear to outside observers (e.g. GAO, 2000; Nissanke and Ferrarini, 2001; Gunter, 2002) that the HIPC Initiative was based on severely flawed premises and that it would fail to meet its goal of achieving debt sustainability. For, as a fundamental expression of BWI's 'internalist' position, the HIPC Initiative failed to recognise the close linkage between HIPC's structural fragility and vulnerability to exogenous shocks as the central causal factor underlying these countries' debt problems, and thus lacked any mechanism to address the roots of the debt problem. Instead, the HIPC Initiative was deliberately made conducive to ensuring compatibility with the incentive structure of the extant selectivity-based aid allocation framework, requiring recipient countries to implement policy conditionality according to the newly introduced IMF Poverty Reduction Growth Facility (PRGF)<sup>3</sup> during the years between the so-called 'decision and completion points', and before debt forgiveness would be made binding on the creditors. Furthermore, debt relief was entirely tailored towards the reduction of outstanding debt burden below static thresholds in terms of GDP, exports, or budget revenues, which applied invariably across all

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<sup>3</sup> The PRGF was introduced as the replacement of IMF's Enhanced Structural Adjustment Facility (ESAF).

eligible countries. As a result, the HIPC Initiative ruled out *a priori* any flexibility of debt relief according to country-specific vulnerability (Nissanke and Ferrarini, 2001). Instead, it was laid out for funnelling the bulk of the relieved financial resources towards the implementation of national Poverty Reduction Strategies (PRS), with its main focus on social sector policies and without directing sufficient resources towards structural and macroeconomic policy measures so as to tackle the deep vulnerability issues at the root of the problem (Killick, 2000).

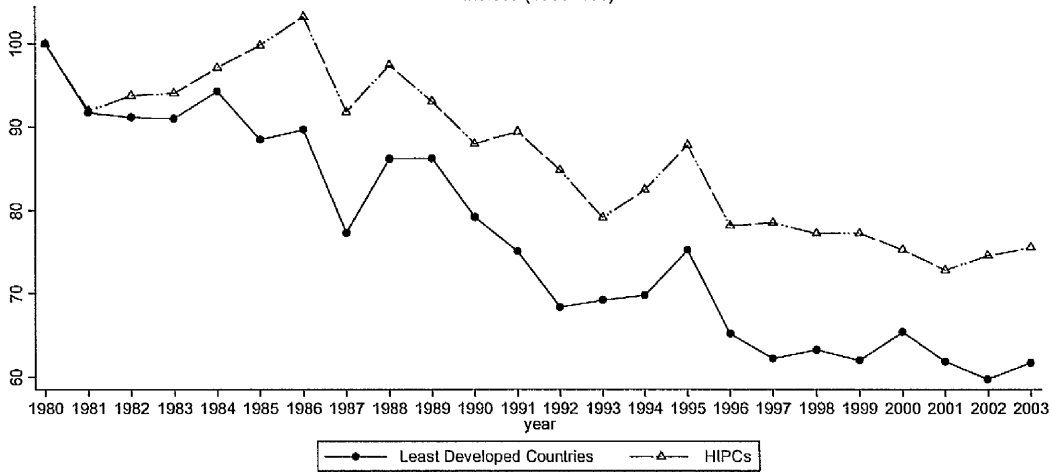
The position held by the international donor community with regard to the HIPC Initiative, and debt relief more generally, underwent a rapid change in the early 2000s. For, it had become increasingly evident that the Initiative would fail to achieve lasting debt sustainability in the case of most recipient countries, despite the massive relief of debt that had already taken place. Most crucially, the second half of the 1990s had signalled a period of severe deterioration in the terms of trade of many HIPCs, which this time fell under the close scrutiny of the international community through the monitoring function entailed by the HIPC debt sustainability assessments. Graphs 1.1 to 1.3 clearly demonstrate the plunge in the net barter terms of trade of the group of heavily indebted and least developed countries, which was mainly accounted for by a drop in the prices of their key export commodities.<sup>4</sup> Against this background, HIPC debt sustainability assessments highlighted the severe miscalculations by the BWI with regard to the prospects of low-income countries for achieving debt sustainability, and the World Bank's own Operations Evaluations Department voiced strong criticism of the HIPC Initiative's severely overoptimistic bias in its underlying projections of recipient countries' export and growth prospects (Gautam, 2003; Lala et al., 2006). Subsequently, against the background of overwhelming evidence, terms of trade shocks started entering into World Bank and IMF reports as a standard explanation of the persistence of external debt problems despite massive debt relief operations, notwithstanding the usual emphasis on home-

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<sup>4</sup> These graphs relate to and update our earlier analysis (Nissanke and Ferrarini, 2004: 36-37 – Figures 2.4 and 2.5). It should be noted that besides the fall in primary commodity prices, the decline in HIPCs' terms of trade is also accounted for by the downward pressure on world prices of low-skill manufactures.

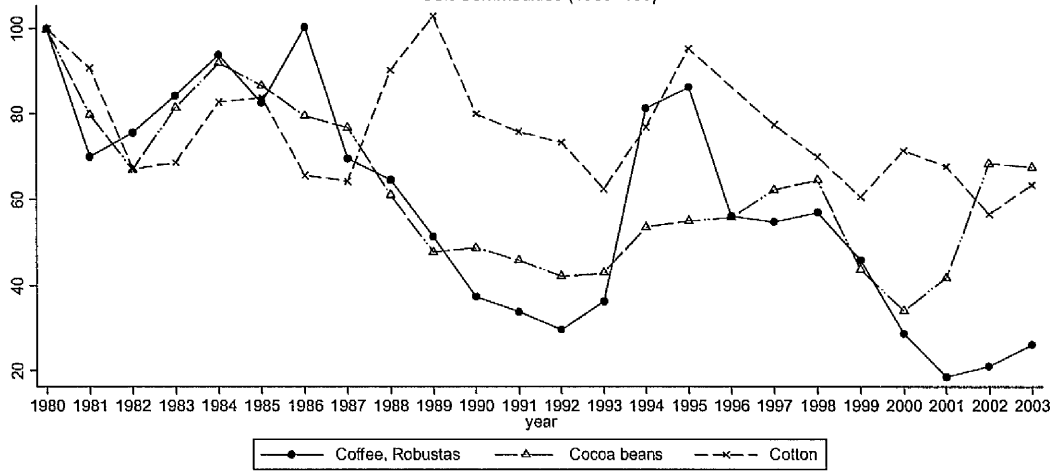


Graph 1.1: Net Barter Terms of Trade (1980-2003)  
Indices (1980=100)



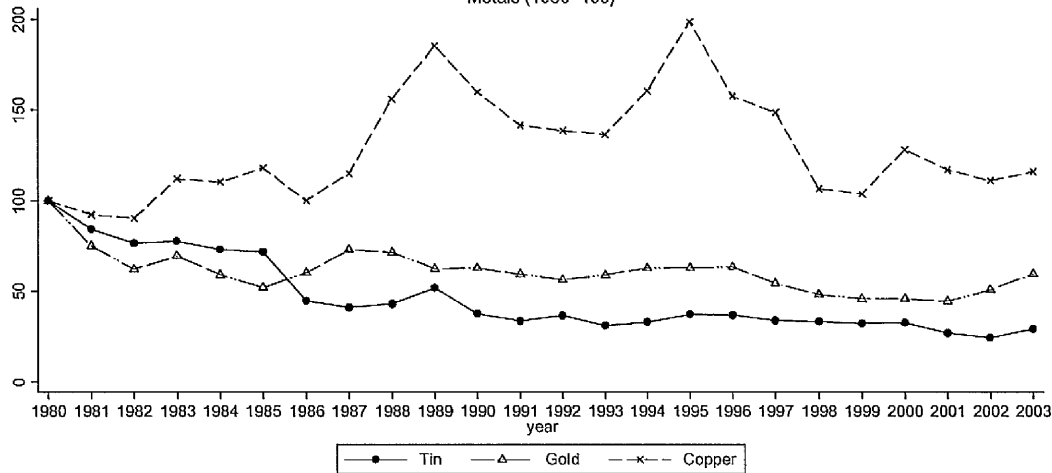
Data Source: UNCTAD Handbook of Statistics

Graph 1.2: Price Indices of Selected Export Commodities (1980-2003)  
Soft Commodities (1980=100)



Data Source: UNCTAD Handbook of Statistics

Graph 1.3: Price Indices of Selected Export Commodities (1980-2003)  
Metals (1980=100)



Data Source: UNCTAD Handbook of Statistics

grown policy mistakes and underperformance against policy targets (e.g. IMF, 2003).<sup>5</sup>

This change in BWI rhetoric was soon followed by important policy actions. In 2004, the BWI launched their proposal for a New Debt Sustainability Framework (DSF), based on the premise of more closely taking into account the role of exogenous shocks in determining low-income countries' debt sustainability (IMF and IDA, 2004a, 2004b). In 2005, the DSF was followed by the 14<sup>th</sup> replenishment of the IDA, establishing a direct link between debt sustainability concerns and aid allocation, and implementing a partial shift from multilateral loans to grant financing under the auspices of the United States Treasury (IDA, 2005a; Sanford, 2002; Cohen and Reisen, 2005). Also in 2005, the heads of state of the G8, as the major shareholders of the BWIs, endorsed the Multilateral Debt Relief Initiative (MDRI), leading to 100 per cent cancellation of debt owed by HIPC countries to the World Bank, the IMF, and the African Development Fund (IDA, 2005c; IMF and IDA, 2006a, 2006c).

There can be no doubt about the significance of these multilateral responses in signalling the donor communities' deep dissatisfaction with the outcome of the HIPC Initiative. Despite appearances, however, the recent shift in the BWI approach does not mark a break with its internalist view, nor any opening up towards the inclusion of the more structuralist concerns in their dealings with low-income countries' external vulnerability. In contrast, our detailed analysis in the second part of this study demonstrates that what the 'new' approach actually achieves is to consolidate further the fundamental tenets of past BWI approaches, by subordinating the new debt sustainability framework and vulnerability concerns entirely to the prerogatives of the extant CPIA-centred aid delivery mechanism and the desired shift from loan to grant financing. Furthermore, low-income countries' vulnerability to exogenous shocks continues to be largely unaddressed by the new aid and debt sustainability framework, which lacks any effective financial support mechanism in the face of exogenous shocks. Finally, the BWI framework still fails to correct its aid allocation in relation to the resource gap resulting from unfavourable terms of trade. Thereby, the multilateral approach crucially fails to acknowledge the causal relationship between

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<sup>5</sup> In contrast, earlier IMF studies pointing to the role of terms and trade shocks in exacerbating low-income debt problems (e.g. Brooks et al., 1998) were promoted far less vigorously.

the terms of trade and debt sustainability of low income countries, which has been a key reason for the HIPC Initiative's inability to curb external debt stocks.

In sum, the World Bank and IMF approach to aid and debt relief has mutated over the decades, keeping the multilateral agencies' policy leverage through conditionality-tied assistance largely intact. Despite the repeated failures of past initiatives, the LIC debt problem is now dealt with under the aegis of a multilateral approach with a new outfit but the same old shortcomings, undermining any possibility of achieving lasting debt sustainability.<sup>6</sup> Moreover, to the extent that the current approach lacks any mechanism to avoid low-income countries again being forced to build up unsustainable debt positions in the face of declining terms of trade and substantial shocks to their balance of payments, the BWI approach is bound to undermine the positive effects arising from debt cancellation by the MDRI.

## 1.2 Objectives and structure of the study

This thesis pursues two related objectives. The first consists in a detailed assessment of the current debt sustainability framework (DSF), as recently endorsed by the World Bank and the IMF. Looking beneath the rhetoric of the official reports, and investigating more closely the analytical and empirical grounds on which they rest, we pursue the objective of highlighting the unjustifiably long list of shortcomings affecting all the central components of the DSF and IDA aid allocation mechanism. In the light of the central importance these frameworks have for low-income countries, it is all the more remarkable that such a detailed investigation of the DSF had not already been conducted, at least to the best of our knowledge.

The second and central focus of analysis is on the introduction of our own proposal for a so-called 'Contingency Debt Sustainability Framework'. The CDSF represents

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<sup>6</sup> Except if one were willing to contemplate the scenario of radical structural breaks along the future development path of low-income countries, such as a sudden success of diversification strategies, catapulting LICs into export sectors they are competitive in and which are characterised by stable, upward-sloping real relative prices. However, such a scenario appears to be even more remote if it is considered that diversification strategies tend to move LICs also toward low-skill manufactured exports, the terms of trade of which have been declining against high-skill technology-intensive goods. Furthermore, the benefits from temporary windfalls, such as the price hikes in mineral commodities experienced during recent years, will depend on the future demand induced by the 'Southern engine of growth', with the well-known risks for LICs of experiencing particularly severe disruptions from a sudden bust following years of price boom.

an attempt to lay out the basic mechanisms of an innovative approach to multilateral development finance, which makes aid delivery and debt relief contingent on the specific shock and trend factors experienced by low-income country recipients. With the CDSF, we thus aim to demonstrate – without the presumption of having found the definitive answer – that the long-standing argument in favour of such innovative financial mechanisms is indeed feasible, and would be highly effective according to our case study simulations. Moreover, we argue that in contrast to the current multilateral framework, the CDSF provides the basis for incentive-compatible development financing, making recipient countries more responsible for their own actions and policies. Again, we feel compelled to build our argument on the basis of a critical examination of the few preceding analyses with regard to debt-service modulation schemes that have been emerging recently, and to test their implications against our own, more comprehensive framework.

This study does not aim to espouse any of the antagonistic positions characterising the multilateral approaches to low-income countries' debt and development crises. Moreover, it deliberately abstracts from an evaluation of policy conditionality and actual policy regimes per se, as well as from the broader structural and macroeconomic debates that are central to understanding the likely impact of development finance on low-income recipients. Such abstraction is certainly most tangible in the definition of the performance-assessment mechanism of the CDSF, which leaves substantial room for subsequent calibration of the scheme in terms of the scope, depth and type of monitoring required by the specific debtor country in question. However, while signalling due consideration of the key incentive concerns characterising the BWI approach to aid and debt relief, this study is hopefully also suitable for showing that the BWI position lacks any such reciprocal consideration for the well-founded structuralist concerns, and chooses to impose its approach on misleading empirical grounds instead.

The presentation of the above elements is structured along the following lines. Following this introduction (Ch.1), Part I of the study features a review of the main theoretical contributions advocating the case for contingent debt contracts (Ch.2). Part II contains the two chapters evaluating the extant Debt Sustainability Framework (Ch.3) and the recent proposals for debt service modulation schemes

(Ch.4). Part III outlines our proposal for a state-contingent scheme (Ch.5), the main implications of which are then analysed on the basis of the Uganda country study (Ch.6). Finally, the last chapter summarises our main conclusions and outlines the agenda for further research (Ch.7).

## 2 The Rationale for State-Contingent Claims in the Face of Low-Income Countries' Exposure to Exogenous Shocks

### 2.1 Introduction

The international debt crisis of the 1980s led to a surge of literature analysing the causes of and possible remedies for sovereign debt crises. Reflecting the hugely disruptive effects on the international financial markets posed by defaulting Latin American middle-income countries with large debts owed to commercial banks, most of the early discussions of external debt problems were exclusively focused on this group of debtors.<sup>1</sup> In contrast, the external debt of low-income countries was mainly owed to foreign governments, and therefore posed no direct threat to the international financial system. Only in the late 1980s did the literature begin to focus increasingly on this group of mostly sub-Saharan African countries, and even more so during the 1990s, as the debilitating impact on development of these countries' external debt problems became more evident.

With appropriate caveats in mind, the basic tenets of the sovereign debt literature apply to both middle- and low-income countries: in both cases, the lender-borrower relationship is fraught with a more or less severe agency problem, arising from asymmetry of information and the divergence of interests between the principal (bank syndicate, donors) and the agent (borrower). Furthermore, the borrower is a sovereign entity, thus largely immune from the outright enforcement of a debt contract imposing any particular behaviour or action deemed favourable in terms of the lenders' (donors') objective function. Against this background, the bulk of the early debt literature focussed its attention mainly on explaining the reasons why lending to sovereign nations takes place, particularly in relation to the limited enforcement mechanisms available to the lenders. It found that if a debt contract cannot be enforced through the domestic legal system, the contract must necessarily

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<sup>1</sup> For detailed analyses relating to the 1980s debt crisis involving the middle-income countries, see Smith and Cuddington (1984), Husain and Diwan (1989), Frenkel et al. (1989), Cline (1994).

be conducive to inducing a sovereign's compliance with repayment obligations in a largely self-enforcing manner. Consequently, a debt crisis could be explained in relation to an incentive failure, i.e. by a decline in the sovereign's actual or perceived willingness to repay outstanding debts, instead of taking an exclusive concern with actual capacity to pay.

Although a debtor's capacity and willingness are both necessary conditions for lending and repayment to occur from an ex-ante perspective, the principal focus of any ex-post crisis analysis is to identify the factors affecting actual repayment capacity. With regard to repayment capacity, a key concept across the sovereign debt literature relates to the distinction between a debtor's liquidity and solvency. Simply put, a debtor is said to be illiquid if it temporarily lacks the necessary cash to stay current on its debt obligations. New lending, either by the provision of new loans, or the rescheduling of principal and interest payments, should then be sufficient to solve the temporary problem in relation to a debtor's current financial situation.

In contrast, insolvency denotes a more severe situation of distress, or negative net worth, whereby a debtor's repayment obligations exceed its expected stream of resources in present value terms. A crucial contribution of the debt literature has been to demonstrate that in the presence of a large debt overhang and looming insolvency, it is debt relief, rather than new lending alone, which can actually bring about welfare-enhancing effects for both parties to the debt contract.<sup>2</sup> In the context of the debt crisis involving low-income countries, this strand of literature – usually referred to as the 'debt overhang hypothesis' – has provided the central theoretical grounds on which to base the debt relief initiatives, first under the aegis of the Paris Club, and since the mid-1990s in the form of the HIPC Initiative. More specifically, these contributions revealed the debilitating effects a large debt overhang can have on a country's economic growth prospects, both directly, by diverting scarce productive resources towards debt service, and indirectly, by distorting incentives to invest in productive capital, or to enact the necessary structural adjustments and economic reforms.

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<sup>2</sup> See, for example, Krugman (1988) and Sachs (1990).

Our discussion below shows that, despite having been given much emphasis as the key guiding criteria underlying lenders' policy actions in dealing with debtors in distress, the distinction between insolvency and illiquidity represents a largely misleading concept in the context of sovereign borrowers. For, it is fundamentally impossible to determine a country's solvency in the context of an infinite and uncertain horizon concerning its income stream. Instead, a borrower's solvency is shown to be determined by the largely self-fulfilling expectations of the lender community with regard to repayment capacity, which in turn guides the lending decisions and thus the borrower's liquidity implications. In such a context, then, insolvency ceases to be of any analytical relevance, and the crucial question concerns the identification of the key factors determining a debtor's liquidity over time. Moreover, the most appropriate lenders' response to averting a crisis must not to be conducted within the over-simplistic policy space relating to the lending versus adjustment decision accruing from the illiquidity/insolvency assessment, but needs to focus on distinguishing between the liquidity-debilitating factors that are under the control of the debtor and those which are not. Put differently, we show that in an uncertain environment determining a country's repayment capacity, the sovereign debt literature is largely univocal about the necessity of a debt contract to make a distinction between endogenous and exogenous factors affecting repayment capacity, in order to achieve incentive compatibility in the lender-debtor relationship.

The crucial insights relating to the potential benefits from so-called contingent debt contracts are not novel. They were first pointed out in the seminal contributions by Sachs (1988, 1989) and Krugman (1988a), arguing for debt contracts to contain a 'contingency' element in determining a country's repayment schedule, in relation to the state of nature and its effects on payment capacity and a debtor country's overall degree of sustainability. The central thrust of these models has subsequently been further elaborated by the sovereign debt literature, demonstrating the supremacy of state-contingent contracts over simple loan contracts, and emphasising the need for contract indexation and ex-ante renegotiation in order to bring about optimal alignment of incentives and to maximise a debt contract's welfare implications. Surprisingly, however, these important branches of the debt literature received little attention in the policy debates of the 1990s and early 2000s, in contrast to the great



attention given to the literature dealing with debt overhang and relief issues, and despite the recent emphasis on the role played by exogenous shock factors in rendering LICs' debt positions unsustainable. As mentioned in the previous chapter, a few tentative proposals for state-contingent debt contracts have been emerging recently<sup>3</sup>, but these discussions too appear to be widely detached from the classic debt literature. As a result, the rationale for contingent debt relief is typically advocated on superficial grounds, failing to fully acknowledge the crucial implications of *ex-ante* contracting.<sup>4</sup>

In an attempt to re-establish the central thrust of state-contingent debt contract argument, this chapter provides a selective review of the seminal contributions relating to the 'classic' sovereign debt literature. It thereby aims not only to fill the apparent gap left open by the current debate surrounding the issue, but also to provide the theoretical underpinning of our own proposal for a contingency debt sustainability framework, outlined in Part III of this study. However, it should be noted that the sovereign debt literature is rich in excellent contributions, spanning over more than two decades of fervid academic writing. Therefore, it is clearly beyond the scope of this chapter to provide even the semblance of a comprehensive review of this heterogeneous body of literature, or any one of its many strands. Rather, we organise the following discussion along the lines of the seminal contribution by Krugman (1988a), integrating the argument with a number of crucial insights from the broader literature in the fields of sovereign debt and contract theory. Furthermore, it should be noted that we devote our attention exclusively to the narrower theoretical aspects relating to state-contingent debt contracts, at the expense of a discussion of the broader theoretical literature on foreign aid. The latter body of literature is however relevant to the broader context relating to contingency instruments' implications for the aid allocation process, and has been reviewed elsewhere.<sup>5</sup>

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<sup>3</sup> In particular, see Guillaumont et al. (2001), Combes and Guillaumont (2002), Gilbert and Tabova (2004), as well as the World Bank proposals for debt service linked to repayment capacity, analysed in Chapter 4 below.

<sup>4</sup> For example, see the contributions referred to in the previous footnote.

<sup>5</sup> The interested reader is referred to Nissanke (2006) and Nissanke and Ferrarini (2006) for an extensive outline of the most relevant aspects relating to the specific aid context of state-contingent debt contracts.

This chapter is organised as follows: Section 2.2 provides a brief introduction to the key features characterising the sovereign debt relationship; Section 2.3 outlines the debate surrounding illiquidity, insolvency, and debt sustainability; Section 2.4 discusses the creditor's dilemma, relating to the optimal response in terms of new lending and debt relief in the presence of debt overhang; Section 2.5 outlines the key features of state-contingent sovereign debt contracts, with particular focus on contract indexation and renegotiation; Section 2.6 concludes.

## **2.2 A sovereign's capacity and willingness to pay**

Sovereign debt differs from private debt in at least two crucial aspects. First, a sovereign usually has a limited scope for providing collateral to guarantee the value of loans. In the event of repudiation, the collateralised assets available to creditors would be worth only a small fraction of their financial claims on the country and offer insufficient assurance of repayment. Second, in contrast to private debt, sovereign debt typically cannot be enforced through the domestic legal system. A foreign court has thus very limited ability to force a sovereign to comply with the obligations of the debt contract. In a sense, this limit of enforceability puts a sovereign 'above the law' governing domestic debt. The important implication of the enforcement limit, which also embodies the main element characterising the sovereign debt literature as a distinct body of analysis, is that in addition to being capable of repaying its debts, a country must also be willing to do so.

A country's willingness to fulfil its obligations depends on its incentives to do so, which in turn are influenced by the existence of some sort of enforcement mechanism imposing a sufficiently high cost on default. Without the prospect of incurring significant costs, a country would always default on its debts, and, therefore, no lending would occur in the first place. In order to explain the existence of sovereign lending, the early sovereign debt literature took up the task of explaining how and to what extent alternative enforcement mechanisms may induce a sovereign entity to

repay its debts. Without aiming to be comprehensive, the major strands of this literature can briefly be summarised as follows.<sup>6</sup>

First consider the example of a country that can credibly commit to a full repayment of its debts. Assume that foreign debt is used for the purpose of smoothing consumption over time, so that the country maximises a constrained inter-temporal utility function. Borrowing from Eaton and Fernandez (1995), the latter can be expressed as:

$$\max_{C_t} U = \sum_0^{\infty} \beta^t u(C_t) \quad (1)$$

$$\text{s.t.} \quad \sum_0^{\infty} \frac{C_t}{(1+r)^t} \leq \sum_0^{\infty} \frac{Y_t}{(1+r)^t} \quad (\text{feasibility constraint}) \quad (2)$$

Where  $U$  denotes utility,  $C_t$  is consumption,  $Y_t$  is output measured as GDP,  $\beta$  is the country's discount factor,  $r$  represents the world interest rate, and subscript  $t$  indicates the time period to which the variables refer. The feasibility constraint defines the limit to consumption: in present value terms, consumption cannot exceed output over the entire time horizon contemplated. Given the standard assumption  $\beta < r$ , expressing willingness to consume out of future income at the given cost of capital, the country chooses the feasible consumption path that maximises utility. Doing so involves net transfers of debt, the stock of which evolves according to:

$$D_{t+1} = (D_t + C_t - Y_t)(1+r) \quad (3)$$

Clearly, for the feasibility constraint to hold, a period of positive net capital transfers to the country will have to be followed by a period of repayment (i.e. negative net transfers, with  $C_t < Y_t$ ). Assume that output is exogenous and deterministic. Then, if lenders know for certain that the country will repay its debts, they are willing to lend up to a level equalling the present value of the future output stream.

Consider now a sovereign that cannot credibly commit to repaying its debts. Rather, the country will repay if and only if the utility associated with following a given repayment path is at least as high as the utility associated with defaulting on debt,

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<sup>6</sup> The literature now contains a large number of often only slightly different models of enforcement mechanisms. A more comprehensive survey can be found in Eaton and Fernandez (1995).

and suffering the consequences of the resulting penalty. Assuming, for example, that the penalty from defaulting consists in the exclusion from future access to capital markets, the country will repay only if the utility from doing so is higher than the utility from defaulting now and consuming its autarkic output thereafter. That is, the country will have the incentive to repay if:

$$\sum_{\tau=t}^{\infty} \beta^{\tau} u(\tilde{c}_{\tau}) \geq \sum_{\tau=t}^{\infty} \beta^{\tau} u(y_{\tau}) \quad (\text{incentive compatibility constraint}) \quad (4)$$

The left-hand side of the incentive compatibility constraint represents the present value of the utility accruing from following some specific repayment path (marked by the sign  $\sim$ ), and the right-hand side expresses the utility associated with consuming the autarkic output at any time subsequent to the period of default, denoted by  $\tau$ . Without a perfect enforcement mechanism, the country has no incentive to repay, since after period  $\tau$ , consumption would have to fall below the level of current output, for all  $t > \tau$ . Without a strong enforcement mechanism at the disposal of the creditor<sup>7</sup>, the country would therefore be strictly better off by breaching the contract and consuming the full level of output thereafter.

The central analytical question is thus to identify enforcement mechanisms that make the compliance with sovereign debt contracts incentive-compatible. The most influential literature has proposed the answer in terms of punitive enforcement, relating to the reputational argument mentioned in the above example.<sup>8</sup> The argument was first introduced in a seminal paper by Eaton and Gersowitz (1981)<sup>9</sup>, based on simple intuition: rather than facing the stick of some other punitive action by creditors, a sovereign is rewarded with the carrot of increasing its reputational asset if it does repay debt, thereby assuring continued access to foreign loans in the

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<sup>7</sup> It should be noted that the term 'creditor' is used here interchangeably with 'creditors'. For the sake of simplicity of the exposition of the key arguments, we therefore abstract from the important collective action problems affecting creditors' decisions as a group. Furthermore, the term 'creditor' may be thought of as including also the group of concessional creditors, or the donor community as a whole, with regard to its loan (not grant) disbursements.

<sup>8</sup> Without counting elements such as honour, national pride, or guilt, as enforcement mechanisms, given that they are based on a debtor's ethical values, rather than on coercion. Nevertheless, this is not to argue that such elements may not play a decisive role in determining a country's decision to repay (honour) its debts.

<sup>9</sup> It was further elaborated, among others, by Kletzer (1984), Eaton, Gersowitz and Stiglitz (1986), Grossman and Van Huyck (1988), Eaton (1990, 1993), Atkeson (1991), Cole, Dow, and English (1995), Cole and Kehoe (1996).

future too.<sup>10</sup> Technically, this *quid-pro-quo* mechanism requires both repeated interaction (i.e. a repeated game) to be effective, and the ability by creditors to cooperate in carrying out the punishment in the event of default (Fafchamps, 1996). Moreover, it would be ineffective if a defaulting debtor were able to buy insurance contracts, so as to allow for consumption smoothing (Bulow and Rogoff, 1989a).<sup>11</sup> Also, this mechanism is not suited to inducing continued payment by countries progressing along their development path, from a low-capital and low-growth period, to a period of capital abundance. For in the period of relative capital abundance, the carrot of continued access to external capital might offer too weak an incentive for inducing repayment (Eaton, Gersowitz, and Stiglitz, 1986). While such a scenario is still out of reach for most sub-Saharan African countries<sup>12</sup>, a more relevant argument in the context of LIC debt is the variant of the reputation argument put forward in relation to these countries' strong incentive to ensure continued access to aid flows. Indeed, Fafchamps (1996) shows that the threat of reduced aid flows to non-complying debtors has usually represented a sufficiently strong (binding) incentive to ensure repayment in this group of countries.

Ultimately, the presence of some sort of enforcement mechanism ensures that a defaulting country at least faces the possibility of penalties. International lending is thus made possible to the extent that the expectation of penalty costs provides the debtor with the incentive to repay. At the same time, however, as long as the possibility of default persists, total credit to a country is constrained, and the effectiveness of the enforcement mechanism determines the level of constraint. Clearly, if both lenders and borrowers knew the costs of default with certainty, full

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<sup>10</sup> If the reputational asset is assumed to increase with every loan repaid, the terms of lending should ameliorate accordingly. Alternatively, the reputational asset could be assumed to be lost at the first instance of default, with players choosing the punishing strategy at any time thereafter. In this case, the reputational argument amounts to a stick, rather than a carrot.

<sup>11</sup> However, Bulow and Rogoff's argument concerning the possibility for a post-default debtor to enter some sort of income-insurance contract is not particularly compelling, as it is rather unlikely that a debtor would be given access to such instruments, but not to regular loans. Moreover, the authors do not consider the enforceability limit the debtor may face itself when trying to enforce the insurance contracts. See Sachs (1989) for a critique on Bulow and Rogoff (1989a). See Cline (1994) for a broader review of the key points raised in the literature.

<sup>12</sup> However, the argument might still apply in relation to the availability of alternative sources of concessional or commercial debt. For example, China's emergence as an alternative source of lending to African countries is increasingly cited as having a potentially debilitating effect on debt enforcement (e.g. see the Financial Times article by Beattie and Callan, 2006).

repayment would be assured by setting the constraint just below the cost of default. With country risk equal to zero, lending would take place at world interest prices. In the presence of uncertainty, however, the cost of default is unknown. Krugman (1985) demonstrates that a credit constraint persists even in equilibrium. Assume, for example, that the enforceable penalty consists of the seizure of the defaulter's foreign trade receipts, which in turn depends on export volumes and prices. The overall cost associated with the penalty will then be uncertain: for example, it may be lower than expected if an unanticipated shortfall in either export volumes or a worsening in the terms of trade occurs. Hence, Krugman (1985) concludes that lenders would react to this uncertainty by charging a risk premium to highly indebted countries, as they are more likely to default. Higher interest rates in turn increase the expected future debt burden, causing excess demand for credit (i.e. a credit constraint) to persist in equilibrium. The crucial message, echoed by most of the sovereign debt literature, is that in the presence of an incentive constraint, a first-best allocation of resources is rarely attainable.

In sum, the sovereign debt literature shows that both repayment capacity and incentive compatibility constrain a sovereign's borrowing. As to which constraint is more binding, this depends on the enforcement mechanism at the disposal of the creditors. With perfect enforcement only capacity to pay matters. Otherwise, a debtor's repayment incentive will bind, which in turn determines the credit constraint imposed by the creditors. Although willingness to pay is a necessary condition for repayment of debt by a sovereign to occur, it is not sufficient: first and foremost, a country must have the financial capacity to service its debts. Therefore, to determine the appropriate policy-response to a debtor's manifested inability to repay, creditors are first required to assess the debtor's state of solvency. Indeed, a country may merely be suffering a temporary shortage of cash, or a more severe problem that is also likely to debilitate repayments in future periods. A central thrust of the sovereign debt literature thus lies in defining the optimal response by creditors on the basis of the illiquidity-insolvency dichotomy, which is formally outlined in the next section.

### 2.3 Illiquidity versus insolvency, and the concept of debt sustainability

Drawing on the standard models from the sovereign debt literature, this section defines the so-called solvency or transversality condition, distinguishing illiquid from insolvent borrowers. We show that such distinction is essentially impossible to make in the presence of uncertainty about a debtor country's future stream of income or repayment capacity, since it is partly determined by factors outside its control. Consequently, the emphasis typically placed on the distinction between lending versus adjustment requirements on the grounds of a debtor country's degree of solvency is largely misleading and suboptimal. Indeed, under conditions of uncertainty, creditors' choice of optimising actions in response to a debtor in apparent distress will largely depend on their own subjective assessment and expectations regarding its state of insolvency, and thus assume a self-fulfilling character. Essentially, it will be shown that the potential supremacy of state-contingent contracts is argued on the grounds of this fundamental indeterminacy problem relating to a sovereign debtor's solvency, which abstracts from the illiquidity-insolvency dichotomy typically referred to.

Borrowing from Cohen and Katseli (1985) and Krugman (1988a), we set out to state the solvency condition more rigorously, assuming first that there is no uncertainty about a debtor country's future income stream. Consider an indebted country, which services debt out of current export revenues.<sup>13</sup> Further assume that the country's rate of growth of export value exceeds the interest rate it pays on outstanding debt. Since the amount devoted to repayment would grow at a higher rate than the outstanding debt itself however small a fixed fraction of export proceeds the country were to allocate to the repayment of debt, it would always be sufficient to repay the outstanding debt in full by some finite date  $t$ . By the measure of the present value of export earnings over time, the country's gross (external) wealth would be infinite,

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<sup>13</sup> Depending on whether the focus of analysis is more on the internal or the external transfer problem associated with a high debt burden, repayment capacity will be expressed in terms of alternative measures or indicators. Cohen and Katseli (1985), for instance, choose to emphasise the external transfer problem relating to the broadest proxy of a debtor country's payment capacity, measured by gross national product. Alternatively, it may be assumed that the fiscal constraint is binding a country's internal transfer capacity, and thus solvency is assessed in terms of a country's debt burden as the ratio of tax and non-tax revenue (e.g. see Agenor and Montiel, 1999).

and there would be no reason to question its solvency, regardless of the country's level of outstanding debt.

Some simple algebra helps to illustrate the basic concept. Let the value of outstanding debt at time  $t$ ,  $D_t$ , be equal to the discounted value of future payments,  $x_t$ :

$$\frac{D_0 - D_t}{(1+r)_t} = \frac{x_1}{(1+r)} + \frac{x_t}{(1+r)^t} \quad (\text{Present value of outstanding debt in } t) \quad (5)$$

$$D_t = (1+r)D_{t-1} - x_t \quad (\text{Nominal value of outstanding debt in } t) \quad (6)$$

where  $D_0$  is the initial value of debt, and  $r$  is the world interest rate.

Equations (5) and (6) are the standard formulae for computing the present value of a financial asset, which is equal to the present discounted value (PV) of its income stream. Consider now a debtor that pays interest falling due in every period, but no principal. The value of outstanding debt would remain constant, and principal would have to be re-financed each period. Then, considering a period  $t$  in the far distant future – at the limit of infinity,  $t \rightarrow \infty$  – the present value of future debt would be zero:

$$\lim (t \rightarrow \infty) \frac{D_t}{(1+r)^t} = 0 \quad (\text{Transversality or solvency condition}) \quad (7)$$

As long as the transversality condition holds, i.e. if debt grows at a slower rate than the interest rate and regardless of whether interest is paid partially or in full<sup>14</sup>, a debtor is said to be solvent. Moreover, if equation (7) is true, the above equation (5) shows the PV of debt to be exactly equal to the future export stream. This is the same as saying that, in conditions of certainty, the market value ( $V$ ) of outstanding debt would be same as its face value ( $D_0$ ):

$$D_0 = \frac{x_1}{(1+r)} + \dots + \frac{x_t}{(1+r)^t} = \sum_1^{\infty} \frac{x_t}{(1+r)^t} = V \quad (8)$$

In contrast, if debt is not serviced at all, and both principal and interest are instead rolled over in each period, the PV of future debt (growing at rate  $r$ ) is equal to its initial value (i.e. constant):

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<sup>14</sup> For example, with payment of interest equal to some fraction  $a$ ,  $D_t = (1+r(1-a))D_{t-1}$ , with  $D_t$  growing at rate  $r(1-a) < r$  when  $a > 0$ .



$$D_0 = \frac{D_t}{(1+r)^t} \quad (9)$$

Or, more generally, if debt grows at a faster rate than the interest rate:

$$\lim_{t \rightarrow \infty} \frac{D_t}{(1+r)^t} > 0 \quad (10)$$

And, therefore, the face value of debt is larger than the discounted value of debt service, which also implies that the market value of debt falls short of its face value:<sup>15</sup>

$$D_0 > \frac{x_1}{(1+r)} + \dots + \frac{x_t}{(1+r)^t} = \sum_1^{\infty} \frac{x_t}{(1+r)^t} = V \quad (11)$$

Consider now a country whose export (i.e. repayment) capacity is growing at rate  $n$ <sup>16</sup>, facing a real world interest rate  $r$ . If  $r > n$ , the country's wealth is not infinite, and solvency requires equation (7) to hold. In other words, the solvency condition requires country debt to grow at a rate strictly lower than the interest rate. The country's wealth is finite, and to stay solvent, the present value of future debt must converge to zero. For instance, a country's export capacity growing in steady state at rate  $n=3$  and  $r=6$  could simply pay half the interest falling due and still keep its debt-to-exports ratio constant. That is, under these conditions, debt would be growing at the same rate as exports do. An obvious implication of  $r > n$  is that the country's debt is worth no more than the present value of its repayments. In contrast, if  $r < n$ , the present value of country wealth is infinite, and solvency is not even an issue. Any positive fraction  $a$  of export revenue is sufficient to repay any value of initial debt within a finite time horizon. Furthermore, there is no solvency requirement to impose a constraint on the country's future generation of export revenue, as outstanding debt can simply be serviced by the sale of new debt. If  $r < n$ , outstanding debt may well be worth more than the present value of the repayment stream.

In sum, under conditions of certainty, a debtor's solvency is deterministically assessable. Consequently, a country will not have to face credit constraints when  $n > r$ , and will be able to borrow up to a ceiling equal to the present value of its export

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<sup>15</sup> Note that with no repayment:  $P_t=0$ ,  $D_0=D_t/(1+r)^t$ .

<sup>16</sup> Of course, the same applies to any other measure of repayment capacity, such as growth in gross national product, or total government tax revenue.

stream if  $r > n$ . Consequently, up to the solvency ceiling a borrower would never have to face liquidity constraints, as it would be extended new credits in each and every period. Abstracting from collective action problems affecting creditors as a group, rational lenders would thus simply have to follow deterministic rules in their lending decisions.

Krugman (1988a) takes the analysis a step further, to assess the strategic lending decision by a creditor dealing with a potentially insolvent, or 'problem', debtor. Typically for this class of models, the author adopts a two-period framework, where all future periods are collapsed into the second period, so that the effects of period-one actions on debt repayment are most easily determined.<sup>17</sup> Assume, still, that there is no uncertainty about future income and that in each period the debtor services debt up to its full capacity. Then, a country with inherited debt  $D_0$ , repayment capacities  $x_1$  and  $x_2$  in periods one and two, respectively, and creditor opportunity cost given by the world interest rate  $r$ , can be thought of as having the following sequence of repayment and new disbursements:

| $D_0, r$                      | Period 1    | Period 2 |
|-------------------------------|-------------|----------|
| Repayment capacity (earnings) | $x_1$       | $x_2$    |
| New lending                   | $D_0 - x_1$ | 0        |

That is, the country repays  $x_1$  in period one, leaving it with the amount  $D_0 - x_1$  of outstanding debt, to be fully repaid at the end of period two.<sup>18</sup> Since repayment in period two cannot exceed  $x_2$ , creditors will refinance debt in period one if and only if:

$$(1+r)(D-x_1) < x_2 \quad \Rightarrow \quad (D-x_1) < x_2 / (1+r) \quad \Rightarrow \quad x_1 + x_2 / (1+r) > D \quad (12)$$

Otherwise, creditors would be lending an amount equal to  $x_2 - (1+r)(D-x_1)$  at a certain loss. Indeed, if the discounted value of income is lower than total debt, i.e.

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<sup>17</sup> One could think of period-two values as the present discounted value (i.e. a stock) of all future disbursement and repayment streams (i.e. flows).

<sup>18</sup> Note that repayment capacity, i.e. the maximum resource transfers to creditors, is assumed to be given. The bargaining problem between debtors and creditors about the amount of resource transfers will be considered below. Here it is sufficient to assume that resource transfers in each period are equal to the maximum amount of resources available to a country for the purpose of debt servicing, minus a fraction reserved to maintain a minimum subsistence level.

$x_1+x_2/(1+r)<D$ , creditors know they will not be paid back the full amount of new lending, and therefore refuse to lend at any level of interest. Creditors reckon that the problem is one of insolvency, since outstanding debt cannot possibly be repaid, and are left with no choice other than to forgive part of outstanding debt. Debt relief then takes the form of either reduced principal (lowering  $D_0$ ), or reduced rate of interest (on  $D_0$  and/or  $D_0-x_1$ ), or a combination of the two. In sum, with no uncertainty about future resource transfers, a liquidity problem cannot exist: either the country is able to pay, or, if it is not, the problem is exclusively one of insolvency and can only be dealt with by forgiving the fraction of debt exceeding its ability to pay.

Consider now how uncertainty about the country's value of future stream of earnings, and thus its future repayment capacity, changes the analysis. Uncertainty is introduced by assuming repayment capacity to be stochastically determined by a number of factors, some of which are exogenous to the borrower (i.e. any exogenous shock affecting the country's repayment capacity, such as a drop in the world prices of a country's key export commodities), and others that are endogenously determined by the country itself (e.g. its investment decisions and adjustment efforts). Adding uncertainty, period-two earnings become a stochastic variable, which for the sake of simplicity is assumed to take only two possible realisations of a random process: one associated with a 'good state' of nature, denoted  $x_G$  and occurring with probability  $p$ , and the other with a 'bad state',  $x_B$ . The time flow of *expected* repayments and new disbursements changes accordingly:

| $D_0, r$                      | Period 1  | Period 2        |
|-------------------------------|-----------|-----------------|
| Repayment capacity (earnings) | $x_1$     | $px_G+(1-p)x_B$ |
| New lending                   | $D_0-x_1$ | 0               |

As a result, the expected value of repayment consistent with the solvency condition is now:

$$(1+r)(D-x_1) < px_G + (1-p)x_B \quad \Rightarrow \quad (D-x_1) < (px_G + (1-p)x_B) / (1+r) \quad (13)$$

In contrast to the condition of certainty considered above, here the question as to whether or not the debtor is solvent is not well defined. Certainly, with (13) holding

true, and provided that lenders are risk-neutral, the country will be able to attract voluntary lending of the amount  $(D-x_1)$ . However, even then it is not to be taken for granted that the country will actually earn enough to repay its debt, depending obviously on the realisation of either state of nature. Therefore, it is up to creditors' subjective assessment of a country's solvency – i.e. condition (13) – to determine whether the country will experience a liquidity crisis. What if the inequality condition (13) is not fulfilled? At first sight, it would appear that creditors would not extend further loans  $(D-x_1)$  to the country, since the expected value of new funds would fall short of the amount lent (i.e. their face value). If so, a liquidity crisis would occur in period one, and creditors would be able to collect only a fraction  $Z$ , in present value terms, of outstanding debt. Assuming that  $Z < (px_G + (1-p)x_B)/(1+r)$ <sup>19</sup>, creditors can, however, improve on their outcome by rolling over the debt, and holding out until period two. This is so because partial default is possible, but not certain. If the good state is realised, the creditors may be paid back in full after all. If the bad state occurs, they will still have improved upon the outcome associated with a period-one liquidity crisis, as long as they are able to extract from the country an interest rate  $(i)$  high enough to enable creditors to receive all potential resource transfers in either state. This interest rate is maximised by the lenders setting it so as to exhaust the resource transfer in the good state:  $(D-x_1)(1+i) = x_G$ .<sup>20</sup> Accordingly, the scenarios would involve:

| $D_0, r$                         | Period 1    | Period 2   |
|----------------------------------|-------------|--|
| Liquidity crisis (no re-lending) | $x_1$       | $Z < (px_G + (1-p)x_B)$  |
| New lending                      | $D_0 - x_1$ | $x_G$ full payment $(D_0 - x_1)(1+i)$<br>$x_B$ partial default, but $\max_i (px_G + (1-p)x_B)$ |

<sup>19</sup> Assuming costs of default arising, for instance, from an imperfect enforcement mechanism, such as the inability to seize all available assets of the debtor, or simply from a variety of transaction costs associated with default.

<sup>20</sup> That is, with  $i > r$  if  $x_G/(1+i) > D - x_1$ , and  $i > r$  if  $x_G/(1+i) < D - x_1$ . Creditors, however, will always perceive new lending always as concessional, since it exceeds expected value of repayment. Note also that if there is some probability of the good state occurring, new lending will always be at  $i > r$ .

Krugman (1988a) emphasises that only existing lenders have the incentive to extend new borrowing. By doing so, they maximise the potential resource transfer on total outstanding debt, so to say 'defending' its net present value. By contrast, new lenders would not offer any loans, since the expected value of new lending falls short of its face value:

$$(px_G + (1-p)x_B)/(1+r) < (D-x_1)(1+i) = x_G \quad (14)$$

Viewed in isolation, new loans to the country are lower than expected repayment, which obviously deters *new* lenders from entering a contract with that country.<sup>21</sup>

With this simple but insightful analysis, Krugman (1988a) was among the first to highlight two crucial characteristics involving sovereign debt strategy. First, it demonstrates that the analytical dichotomy of insolvency versus illiquidity is essentially flawed: if it could be known with certainty that a country is solvent, lenders would extend new loans in all cases, so as to ensure full repayment of outstanding loans. In contrast, a country known to be insolvent would consequently also be illiquid, while the opposite would not be true. A similar logic applies when future payment capacity is uncertain: as long as creditors deem the expected value of resource transfers higher than outstanding debt, new lending will still take place. With uncertainty, however, it is creditors' subjective expectations that can bring about a liquidity crisis of a solvent borrower. Illiquidity occurs out of expected insolvency, whether or not expectations prove to be wrong *ex post*. Second, Krugman's analysis explains the typical pattern of 'defensive lending', characterising the lenders' attitude toward highly indebted borrowers, particularly LICs. In particular, defensive lending is shown to occur even in a situation of expected insolvency, since existing creditors have the incentive to defend their existing loans by maximising potential returns (or minimising expected losses) on their overall stake in the debtor country.

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<sup>21</sup> There are many alternative ways to show the rationale for new lending by existing creditors. Suppose, for example, that creditors believe that without concerted lending a problem-debtor will default, with creditors receiving only a fraction  $d$  of the nominal value of their claims ( $D$ ). Further, they believe that by collectively lending an amount  $L$  to the country, the expected loss on outstanding claims falls to a fraction  $d^* < d$ . Although the expected loss on new lending is  $d^*L$ , and thus unprofitable *per se*, new lending increases the value of existing debt by  $(d-d^*)D$ . New lending will thus be profitable as long as  $d^* < (d-d^*)D$  (Krugman, 1988b).



Before turning to the discussion of the strategic choices open to the creditor community to deal with a problem debtor, it should be emphasised that the indeterminacy relating to the illiquidity-insolvency dichotomy is particularly pronounced in the case of aid-dependent low-income countries. Indeed, aid dependency can be defined as a situation in which the sustainability of a country's entire economy, rather than its external debt position alone, crucially hinges upon its reliance on official flows. As a result of economic dependency on foreign aid, the concept of 'solvency', although fully applicable in the theoretical terms laid out above, is thus usually replaced with the concept of 'debt sustainability', denoting a condition that allows a country's debt to be "[...] serviced without resort to exceptional financing or a major future correction in the balance of income and expenditure."<sup>22</sup> By definition, then, a low-income country's debt sustainability hinges on the condition of positive net transfers in every period. In contrast, if the net transfers are negative, the country's debt becomes unsustainable, as current debt service cannot be met out of current disbursements of new loans. Besides the change in notation, however, the basic insights of the model outlined in this section fully apply: in order for net transfers to remain positive, (existing) creditors have an incentive to provide relatively higher shares of gross transfers to countries with higher debt service. Moreover, the creditors' expectations with regard to a country's debt sustainability are of a self-fulfilling nature, since debt will be fully serviced, or suddenly become unsustainable, depending on the willingness of donors to provide positive net transfers through grants and loans.

#### **2.4 The debt overhang hypothesis: new lending versus debt relief**

Notwithstanding the indeterminacy problem relating to a sovereign debtor's solvency, creditors have essentially three strategies to choose from in dealing with a non-performing or so-called 'problem' debtor:

- (S1) stop lending to the country;
- (S2) re-lend the amount necessary to avert a liquidity crisis and maximise collectable returns;

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<sup>22</sup> IDA and IMF (2004a: 8)

(S3) reduce outstanding debt so as to align the scheduled repayment stream with expected repayment capacity.

It was shown above that as a group, creditors should prefer strategy (S2) to strategy (S1). In contrast, each individual creditor would prefer (S1) to (S2), thereby free-riding on the extension of new loans by other creditors. The debt literature shows this typical free-rider problem to require collective action measures, as opposed to pure market solutions, to bring about an efficient outcome. Such collective action measures may either take the form of voluntary collaboration among creditors, for example by means of syndicated actions and information sharing, or be enforced by coercive measures by creditor governments and multilateral institutions (Bulow and Rogoff, 1988b; Cline, 1994; Krugman 1988a).

However, abstracting from the free-rider problem and focussing instead on the optimal response function relating to the group of creditors as a whole, one of the major contributions of the sovereign debt literature has been to demonstrate that the lending strategy (S2) is less efficient than strategy (S3), involving partial relief, or forgiveness, of outstanding debt. Indeed, the debt overhang hypothesis, first advocated by Krugman (1988a, 1988b) and Sachs (1989), shows that if a debtor's response to a creditor's lending strategy is anticipated and internalised by the latter, debt relief can actually benefit both the creditor and the debtor, by contrast to the strategy involving new lending alone. This crucial insight found great resonance in the arguments put forward by the debt relief advocates<sup>23</sup>, and has since been adopted as the key rationale underlying the HIPC Initiatives, discussed in the previous chapter.

Debt overhang is typically defined as a situation in which creditors do not expect to be fully repaid because of the presence of a large debt burden affecting a country's willingness or capacity to service its commitments. More specifically, the debt literature<sup>24</sup> distinguishes two major channels through which an external debt overhang affects a debtor country's economic performance and repayment capacity: a disincentive effect, lowering the expected returns from investment (adjustment) that

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<sup>23</sup> Such as the Jubilee 2000 campaign, or Eurodad.

<sup>24</sup> Besides Krugman (1988a, 1988b) and Sachs (1989), see Dooley (1989), Froot (1989), Froot et al. (1989), and the literature reviews by Basu (1997) and Cline (1994).

will be partly taxed away through debt service obligations; and a cash-flow effect – or liquidity constraint – as the result of debt service on the current level of investments (adjustment). This latter effect applies to any given level of future debt, and is thus different from the former incentive effect, which relates exclusively to the debt stock as such.

#### **2.4.1 The pure disincentive effect from debt overhang**

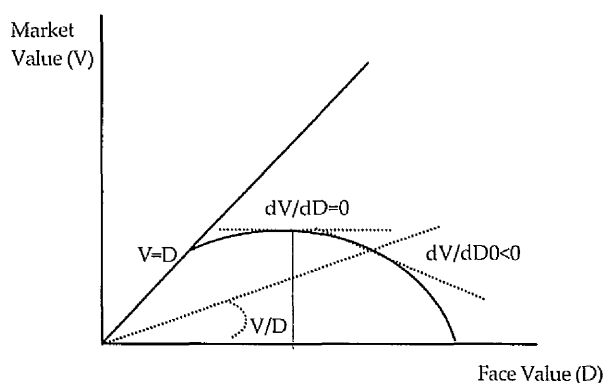
Turning first to the pure disincentive effect of a debt overhang, it is typically posited that the presence of a large debt stock distorts the incentives of both the creditor and the debtor. As was shown in the previous section, creditors could have an incentive to continue lending to a problem debtor in order to avoid a loss in terms of nominal reflows, in the hope that the debtor will eventually improve its economic conditions and repay all its debts at some point in the future. Similarly, the debtor may have the incentive to invest less, be it in terms of physical capital or overall development effort, because it expects any gains to be siphoned off by the debt service obligations ensuing from the large debt burden. By eliminating or reducing these distortions, debt relief could benefit both lenders and debtors, because the lenders could increase the likelihood that the remaining debt will be repaid in full, while the debtor would benefit from the growth-enhancing returns of otherwise unexploited investment opportunities.

These key intuitions have been best described in the simple terms of the Debt Laffer Curve, which was first introduced by Krugman (1988b) and has since entered the vocabulary used in the literature and policy debates alike. As shown in Figure 2.1, the Debt Laffer Curve relates the face and market values of a country's external debt, assuming that a secondary market for sovereign debt contracts exists. Up to some point in the upward-sloping section of the curve, the market value of debt ( $V$ ) is equal to its face value ( $D$ ), as the agents in the market expect debt to be fully repaid. Up to this amount of outstanding debt, both existing creditors and new lenders are willing to extend further loans to the country. Beyond this level of debt,  $V/D$  falls below the 45 degree line from the origin, and market price of outstanding debt ( $\tan V/D$ ) begins to decrease in  $D$ . Up to the point where the curve reaches a maximum



( $dV/dD=0$ ), incremental units of debt increase the market value of total outstanding loans. Thus, existing lenders would be keen to extend further loans to the country,

**Figure 2.1: The Debt Laffer Curve**



while new lenders would be reluctant to do so since new loans would immediately trade at a discount. The situation of debt overhang occurs when the debt level rises to a level high enough so that any further increase in  $D$  lowers the market value of outstanding debt ( $D/V$ ) and its unit price ( $\tan D/V$ ). That is, above a certain threshold level, the market views the debtor as being not likely (or incapable) to repay debt in full and values outstanding debt accordingly. Therefore, if the debt overhang is such that  $dV/dD<0$ , creditors are made better off by partially writing off their collective claims. Creditors' collective gain from a reduction in contracted payments is proportional to the impact on investment of the change in incentives, which is maximised where  $dV/dD=0$ . Of course, debt relief will make the debtor similarly better off, by reducing the country's discouragement about increasing its repayment capacity, and thus economic growth and development.

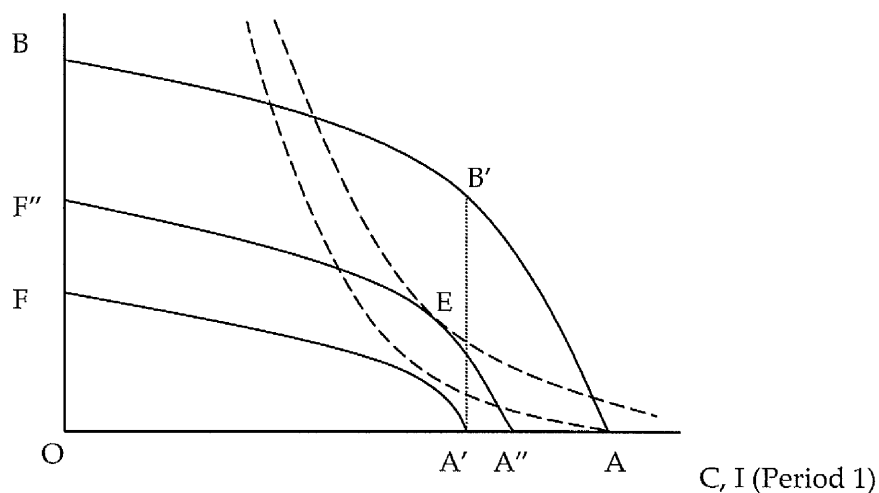
Dooley (1989), Froot (1989), Obstfeld and Rogoff (1996), and Basu (1997) further emphasise the bilateral nature of benefits from debt relief accruing from increased investment and repayment capacity, as synthesised along the lines of Figure 2.2.<sup>25</sup>

<sup>25</sup> This figure is proposed by Basu (1997: 143 - Figure 6.6), who borrows from Dooley (1989).

Adopting a two-period framework, involving a problem-debtor who is temporarily cut off from access to fresh lending, the above figure displays the country's production possibility frontier along the line  $AB$ , with total production, as well as investment and consumption, measured on the two axes. With no access to foreign capital, the country can only invest the fraction of output it decides not to use up in current consumption. If the country chose to consume all available production in period 1 (equal to the distance  $OA$ ), consumption in period two would have to be zero. Alternatively, a country could choose to invest part of its output in period one,

**Figure 2.2: The Benefits from Debt Relief**

C, I (Period 2)



say  $A'A$ , and consume the return on investment equal to  $A'B'$  in period two. If, however, the country has inherited a debt from previous periods that forces it to pay an amount  $A'B'$  to its creditors in period two, its effective production frontier in the I-C space would shrink to  $FA'$ .<sup>26</sup> Any investment less than  $A'A$  in period one would be both forgone consumption in period one, and a loss of consumption in period two, as creditors would confiscate whatever output available. The effect of the country's debt

<sup>26</sup> Assuming that creditors can force the country to fully comply with its debt obligations, i.e. by making the so-called 'gunboat' assumption.

burden on its investment decision obviously depends on its indifference curves. Assume, as shown in Figure 2.2, that one indifference curve goes through point  $A$ , without intersecting  $FA'$ : the country would clearly be better off consuming  $OA$  in period one, and investing nothing. This is the inefficiency of the disincentive effect, similarly to that emphasised in the Debt Laffer Curve above. Both debtors and creditors benefit from the removal of the incentive-distorting effect of a debt overhang. With first-period consumption at  $OA$ , creditors will be paid nothing. In contrast, if they were to forgive part of outstanding debt, say equal to the amount  $FF''$ , the effective production function would shift to  $A''F''$ . The debtor could now reach a higher indifference curve at point  $E$ , associated with positive investment in period one, and creditors would be repaid the difference between the original amount of debt and the portion of debt forgiven,  $FF''$ . Compared to the scenario of no forgiveness, this would clearly represent a Pareto-improvement, as both debtor and creditor(s) would be made better off.

The important abstraction made in the basic overhang models is to treat the debtor country as a single economic agent. This assumption is made not only to manage the country's external debt, but also to take investment and consumption decisions. Combined with the 'gunboat'-assumption of creditors being fully able to extract maximum repayments, this automatically maximises the implicit marginal tax on investment, and therefore the debt overhang effect. In practice, however, this chain is unlikely to be as tight as assumed on at least two distinct levels. At the governmental level, debt management is typically conducted by a small fraction of the finance ministry, with limited influence on investment and consumption decisions, which often need to be endorsed by the parliament, and therefore with little overall influence over eventual repayment capacity (Sachs, 1990). At the level pertaining to the government's interaction with the private sector, the debt overhang effect will depend on the government's ability to raise revenues from its citizenry. Indeed, Husain (1997) shows that the taxation ability of the debtor government is critical in determining the magnitude of the debt overhang effect. He concludes that

"In order for the investment disincentive effects of external debt to be large enough to place a country on the wrong side of the debt Laffer curve, the government must have at its disposal a tax tool with a very high marginal tax rate. [...] Hence, the analysis

implies that efficiency-enhancing debt reduction is possible only if domestic taxes in the debtor country are very high." (p.520)

Husain and Diwan (1989) make a related point by noting that individual investors do not necessarily internalise in their investment decisions the marginal tax faced by the government and the domestic investor community as a whole. It thus appears reasonable to agree with Froot (1989) in arguing that investment-incentive effects

"[...] should be interpreted in the broadest possible sense. They include concerns about debtor-government taxation as well as penalties imposed by creditors. They might also include the uncertainty about (not just the expectation of) future creditor and/or debtor-government policies. These uncertainties may discourage physical investment which are costly to reverse and encourage capital flight and investment in other non-productive liquid assets." (p.68)

Numerous empirical analyses have investigated the presence of a negative causal relationship between the levels of external debt and investment, postulated by the debt overhang hypothesis. Overall, the empirical results from both cross-sectional and longitudinal data analysis<sup>27</sup>, as well as country case studies<sup>28</sup> confirm the hypothesis, although most of the estimates tend to show the investment-depressing effect to be of low intensity. While these findings have also been confirmed in relation to the low-income countries<sup>29</sup>, we agree with Hansen (2004), who notes that the pure disincentive effects on investment ensuing from debt overhang are likely to be smaller for low-income than for middle-income countries, since the net transfers to the former have generally been positive and thus reduced the scope for negative incentives.

#### **2.4.2 The liquidity-constraint from an excessive level of external debt**

Besides the pure disincentive effect associated with a debtor's moral hazard problem, a debt overhang exerts a strong direct effect in the form of a liquidity constraint on a debtor's investment and growth opportunities. On the one hand, a country that is cut off from the credit markets or faces a binding limit in concessional disbursements

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<sup>27</sup> For example, see Fry (1989), Eaton (1990), Greene and Villanueva (1991), Diwan and Rodrik (1992), Cohen (1993), Kaminsky and Pereira (1996), Deshpande (1997), Pattillo et al. (2002), Clements et al. (2004), Imbs and Romain (2005).

<sup>28</sup> For example, see Arrau (1990) on Mexico, Morriset (1991) on Argentina, Borensztein (1990) for a case study involving a 'representative' debtor country.

<sup>29</sup> Many of the above studies (re: footnote no. 27) include a mixed panel of low- and middle-income countries. Other studies, such as Elbadawi et al. (1997), focus on the group of LICs as such.

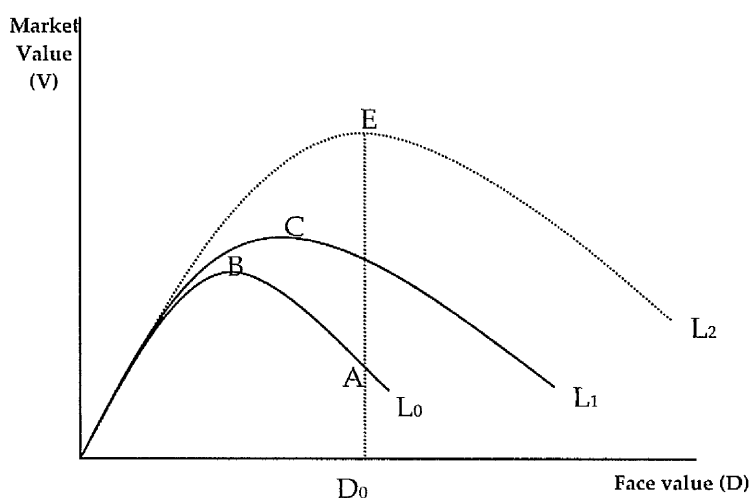
lacks the necessary funds to exploit high-yielding investment opportunities. As a result, its investment and growth opportunities, and thus repayment capacity and creditors' perception of solvency will be impaired. On the other hand, the liquidity shortage from a debt overhang may introduce further inefficiencies from its distorting effects on the debtor country's willingness to adopt reforms and adjustments, or generally lower its incentives for undertaking broader development efforts.

With regard to the direct effects of a liquidity constraint, it should be noted that these offer a theoretically distinct rationalisation of debt relief, compared to the pure disincentive argument discussed above. Indeed, for the liquidity-constrained country debt relief can only be beneficial insofar as it effectively releases resources to the country, and this will only be the case if the amount forgiven lowers debt service requirements below the level of actual debt service capacity before relief. In contrast to the effects of relief on a country's disincentive to invest, operating through the level of stock of debt, the liquidity effect works through a reduction in the actual, as opposed to legal debt service obligations. Therefore, debt relief will have an impact through the liquidity channel only insofar as it lowers debt service obligation to a level below the debtor's payment capacity (Bird and Milne, 2003).

Furthermore, the debt literature points out that if debt relief can alleviate a debtor's liquidity constraint and the associated inefficiencies, the same logic must also apply to the provision of liquidity through new lending. This role of new lending, as opposed to its 'defensive' role, as outlined by Krugman (1988a), emphasises the stimulatory function of additional capital on debtor's investment, by taking advantage of high-return projects that would otherwise have been foregone, and allowing it to raise repayment capacity in the future. For example, Froot et al. (1989) emphasise this role of new lending, as a strategy maximising the value of creditors' claims, as compared to the strategy of debt relief alone, which exclusively raises expected returns. Indeed, they argue that if the liquidity effect of a debt overhang is considered, rather than a creditor's choice between financing and forgiving, there will be an optimal combination of the two. Following Froot et al. (1989), the basic

insight can be simply illustrated along the mechanisms of the Debt Laffer Curve, as shown in Figure 2.3.<sup>30</sup> Consider a country with initial debt at  $D_0$  and liquidity  $L_0$ . The expected market value of debt is equal to the vertical distance from the horizontal axis at point A. The removal of the disincentive effect by effect of debt relief would bring about the Pareto-improving movement to point B along the same Laffer curve. New lending releases the liquidity constraint on unexploited investment opportunities (or avoids the inefficiencies and distortions associated with 'bad'

**Figure 2.3: The Benefits from Releasing the Liquidity Constraint**



policies), further increasing the benefits to creditors and the country. Also, new lending eases the liquidity-constrained debtor's time-discount constraint, lowering marginal utility of consumption. At point C, associated with new lending that shifts the curve to  $L_1$ , creditors have increased the expected value of their claims through the alleviation of the liquidity constraint, while the debtors still benefit from the removal of the disincentive effect plus higher investment from new lending. At point E, associated with an increase in liquidity up to  $L_2$ , the benefits from new lending are maximised, and cannot be increased without being more than offset by the increase

<sup>30</sup> Froot et al. (1989 – Figure 4).

in the disincentive effect.<sup>31</sup> It follows, therefore, that while debt relief alone can be a Pareto-improving strategy, it is not necessarily welfare-maximising. Further improvements, both in terms of debtor's and creditors' welfare, can be achieved by offering new lending, thereby easing the liquidity-constraint on the debtor economy, exploiting foregone investment opportunities offering positive returns, and raising the expected value of repayments.

Sachs (2002, 2004) makes a related argument, with a specific focus on the least developed countries and the poverty trap they face due to an excessive debt burden. Assuming that the saving rate falls to zero when income is below subsistence levels<sup>32</sup>, Sachs (2002) sets real growth as a function of the stock of physical capital, which is assumed to be accumulating as a function of the rates of saving, capital depreciation, and population growth. He then postulates that below a certain benchmark value of capital, the saving rate plunges, so that the capital growth rate, thus economic growth, becomes negative and the country is effectively caught in what Sachs calls a 'poverty trap'. In order to escape such a trap and the growth-impeding effects from the severe liquidity constraint on investment, only a big push of new lending and investment can help these countries to raise their stock of physical capital beyond the critical threshold. Furthermore, similarly to Froot et al. (1989), Sachs' model emphasises the requirement that debt relief accompany new lending, in order to eliminate the risk of a renewed build-up of a liquidity-constraint over time, and thus to ensure lasting debt sustainability.

Beyond the saving and physical capital gaps emphasised by Sachs (2002), an important insight into the broader policy effects on liquidity-constrained debtor countries accrues from the structuralist three-gap models, first put forward during the early 1990s by Bacha (1990) and Taylor (1993). These authors emphasise the multiple requirements on external capital to overcome the three main gaps that typically influence a developing country's growth and debt sustainability prospects

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<sup>31</sup> Whether this point can be reached with zero debt relief depends on the profitability of investment opportunities relative to world interest rates, and the rise in the country's marginal utility from debt relief. Figure 2.3 displays a theoretical benchmark case for the sake of argument. In practice, creditors would most likely choose a combination of debt relief and new lending (see Froot, 1988).

<sup>32</sup> More precisely, Sachs (2002) assumes that there are non-linearities in the saving, investment and production functions.

during the early stages of development, namely to provide: additional financial liquidity, filling the savings gap; additional foreign exchange to finance the required intermediate and investment imports; and the necessary fiscal liquidity to overcome the internal transfer problem. In contrast to the earlier two-gap models, such as the seminal contribution by Chenery and Strout (1966) stressing the importance of the saving-investment and trade-balance gaps as the binding forces on developing countries' growth prospects, Bacha and Taylor emphasise the double transfer problem accruing from the fact that debtor nations are required not only to run a trade surplus in order to service external debt denominated in foreign currency, but also to run a fiscal surplus in order to finance the inter-linked foreign transfers accruing from indebtedness. Ultimately, as a result of excessive debt burdens, debtor countries would have to cut down on productive investment and forego long-term economic growth and debt sustainability prospects.

In sum, the sovereign debt literature provides a strong rationale for debt relief as a means to overcome the weakening effects of the liquidity constraints resulting from a country's debt overhang. It thereby distinguishes between the liquidity-releasing effect of debt relief and the incentives-adjusting function, which the empirical literature has mostly shown to be of minor intensity. A key implication is that debt relief can also prove welfare-improving when a country is on the upward-sloping side of the Debt Laffer Curve, in contrast to its more limited scope as implied by Krugman's original specification and subsequent interpretations.<sup>33</sup> Furthermore, a clear case is made in favour of the welfare-maximising potential of a strategy involving a combination of debt relief and new lending, whereby the welfare-increasing potential from new lending is proportional to the severity of the liquidity constraint faced by the debtor country. The crucial policy issue is thus to address optimally the trade-off between the benefits from new lending – reducing the liquidity constraint – and the resulting upward pressure on the level of outstanding debt stock, which increases the disincentive implications over time.

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<sup>33</sup> This clearly counters the arguments by those claiming that debt relief would be beneficial only in the context of countries who are on the 'wrong', i.e. down-ward sloping side of the curve (e.g. Cline, 1995).



It was shown above, however, that under conditions of uncertainty, the attainment of an optimal, incentive-compatible, solution to the trade-off between new lending and debt relief constitutes a dilemma in the creditor's choice of the optimal strategy for maximising the value of existing debt. Such difficulties are exacerbated by informational asymmetries characterising the creditor-debtor relationship, which introduce important strategic elements complicating the definition of efficient mechanisms for solving a situation of debt overhang. Clearly, the basic theory of debt overhang outlined above does not sufficiently account for the complex dynamics involved in the debtor-creditor relationship. For example, the assumption of creditors making a take-it-or-leave-it offer involving some amount of debt relief and new lending certainly fails to capture the debtor's ability to bargain over the offer being made; the implicit assumption of a strong enforcement mechanism, e.g. that conditionality will be enforced by creditors to the full extent possible, overlooks the costs of punitive actions to the lenders themselves; the assumption that renegotiation of the original debt contract will only take place when the debtor is either incapable or unwilling to repay disregards the opportunity for strategic renegotiations to occur in an attempt to change the original conditions of the contract. In order to account for these crucial aspects of the creditor-debtor relationship, a strand of theories within the sovereign debt literature has focussed on the optimal design of loan contracts, accounting for the effects of the terms and conditions of original loan contracts on the contracting parties' incentives, as well as the distribution of the bargaining power during subsequent renegotiations. By following a variety of alternative approaches, the predominant literature has long pointed to the potential role of state-contingent debt contracts, as an optimal instrument to resolve the trade-off between creditors' lending and relief provisions in an incentive-compatible manner. The next section highlights the central insights accruing from this literature, focussing on state-contingent and incomplete contract theory.

## **2.5 Contract indexation and renegotiation – the case for state-contingent sovereign debt contracts**

Contract theory focuses on the optimal design of contracts, inducing economic agents to comply fully with the obligations entailed. It thereby draws an essential distinction between the complete and incomplete nature of contracts. Consider that, ideally, a

loan contract would specify all the obligations of the contracting parties in every possible future contingency. This would imply a complete definition, for all periods during the contracted relationship and of all actions to be taken by both the lender and the debtor in the event of every possible state of nature. For example, a complete debt contract would have to specify the amount and direction of net transfer flows (i.e. repayment and additional loans), the interest on the remaining debt, as well as the set of policy actions to be enacted by the borrower (investment decisions, adjustment). Of course, uncertainty about the future makes the writing of a complete contract essentially unfeasible. Furthermore, the inclusion of covenants covering all conceivable contingencies at the time of writing a contract would be prohibitively costly. As a result, the first-best situation of writing complete contracts, allowing risk-sharing over all possible future states of nature, does not occur in practice. Rather, contracts are vague or silent on a number of key features, and are typically subject to renegotiation after the occurrence of events that are not envisioned by the provisions of the contract.<sup>34</sup>

From the late 1980s onwards, the literature started to concentrate on the specific features of incomplete contracting. It does appear, however, that there is still no universally accepted definition of what actually constitutes an incomplete contract. For example, Tirole (1999: 743) notes that “while one recognises one when one sees it, incomplete contracts are not members of any well-circumscribed family; at this stage an incomplete contract is rather defined as an ad hoc restriction on the set of feasible contracts in a given model.” In short, Tirole hints at the fact that while it makes sense to classify the approach of the modeller as either complete or incomplete, it is not very useful to make this distinction on contracts as such. For example, an observer contemplating only a limited set of contracts can identify the optimal contract among those considered, but could not exclude with confidence the possibility that another contract, outside the observation set, is superior. Hence, this individual would have chosen an incomplete contracts approach. If, on the other hand, the observer had found the same contract to be optimal by considering the whole set of possible contracts, he would have chosen a complete contracts approach. Hence,

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<sup>34</sup> For an introduction to basic contract theory, see Freixas and Rochet (1997). For a more comprehensive review of incomplete contract theory, see Tirole (1999).

incompleteness can be most broadly thought of as referring to the justification of the analyst's choice.

In the subsequent discussion, we choose to define incompleteness by negation, i.e. as the category of contracts comprising all those that do not completely specify and regulate future states of nature. A typical case involving an incomplete contracts approach is when the states of nature are observable by the two parties, but cannot be verified by an outside party. A court, therefore, would not be able to observe the state of nature, and hence would be unable to determine the contracted obligations of either party. In such cases, an incomplete contract would typically invest one party with the right to choose among a set of actions (e.g. sanctions) contingent on the realisation of a verifiable signal (e.g. default). However, to the extent that these verifiable signals are not perfectly correlated with the unverifiable states of nature, the invested party will act according to its own objective function and not necessarily choose the most efficient action. In other words, in the presence of moral hazard, there is scope for efficiency-enhancing renegotiation. In the context of incomplete contracting, the role of a contract is then to limit the tendency of agents to behave inefficiently, and also to set the stage for the bargaining game of renegotiations.

Within the narrow class of models that are of particular relevance to the present study, the reference to incomplete contracting is usefully made in relation to the comparison of two alternative mechanisms of debt workouts: state-contingent instruments indexing repayment obligations to observable states of nature, on the one hand, and constant renegotiation mechanisms on the other. Before turning to our review of the most relevant contributions in the field, a more general framework outlines of the key issues involved and defines the analytical context for the following discussion.

### **2.5.1 A general conceptual framework of contract theory**

Central to any contract is the enforcement mechanism that punishes non-complying behaviour. The various enforcement mechanisms discussed in the debt-literature will be recalled from our discussions in Section 2.2 above. Consider now that any combination of reputational and/or coercive punishment measures constitute the cost of default to the non-complying party. A rational debtor fulfils all contractual

obligations if the costs (or, equivalently, the benefits) of doing so are smaller than the costs (benefits) of breaching the contract and suffering the penalties. That is, applying the most general notation:<sup>35</sup>

$$C_C(D, t, n) \leq C_B(t, n) \quad t \in \{T\}; n \in \{N\} \quad (15)$$

Where the cost to comply  $C_C$  is the cost to repay debt of amount  $D$ , as a function of the characteristics of the debtor making up its typology,  $t$ , and the state of nature,  $n$ .  $C_B$  denotes the costs associated with the breach of contract obligations. These costs are also a function of type and nature. Clearly, penalties will depend on the specific state of nature, such as the occurrence of shocks, since the latter affect a debtor's likelihood of compliance. They also depend on the debtor's characteristics, such as a sovereign's ruling class time horizon of staying in power determining its valuation of reputational capital; the strength of ethical self-enforcement mechanisms; the structure of the debtor economy, for example in relation to production methodologies and exporting capacity.

Incapacity, as opposed to unwillingness to pay, can be thought of as an infinite level of  $C_C$ .  $T$  constitutes the set of all possible types the debtor can belong to, including any characteristic that is of relevance in the lender-borrower relationship (e.g. national pride, productivity, quality of the bureaucracy, etc). The cost of compliance varies with the debtor's type.  $N$  constitutes the set including any possible contingency, therefore any exogenous shock that could possibly influence the debtor's compliance with contractual obligations. More generally, it is assumed that the debtor's type influences its resilience, i.e. the degree to which exogenous shocks (the state of nature) affect compliance. For example, a well-run finance ministry is likely to fulfil the technical requirements better in the wake of a crisis; export diversification may put an economy in a position to cope better with a sudden drop in the export prices of primary commodities.

The most crucial set of assumptions in contract-theoretic models relate to the distribution of information. Clearly, symmetric and complete information about the set of possible and actual realisations of both  $t$  and  $n$  would pose few problems in

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<sup>35</sup> Borrowing and adapting from Tirole (1999), and Freixas and Rochet (1997).

writing optimal contracts. The typical problems arise from asymmetric information, inducing adverse selection and moral hazard problems in relation to the type and actions of the debtor, against the background of a state of nature that is neither observable by the creditor nor verifiable by an outside court (or some arbitrator). Assuming that the debtor generally has a more complete set of information relating to both  $t$  and  $n$  than does any other party to the contract, the dynamic relationship between the parties to a debt contract will be extremely complex, starting with the ex ante-conditions necessary for both the creditor and the debtor to even agree to a debt contract in the first place.

To see the implications, consider that a rational creditor, assumed to have no prior information about the debtor's type, gathers all information about  $t$  and  $n$  it can, so as to form its beliefs about the likelihood of default not occurring (i.e. for condition (15) to be fulfilled). Assuming the sets  $T$  and  $N$  to be finite, to allow for analytical tractability, the creditor can be thought of as forming and ordering its beliefs about the expected value of repayment across all possible types and contingencies. Somewhat abusing notation, this is most easily expressed by equalling the expected value of repayment conditional on the creditor's belief,  $E(D|B)$ , to the space delimited by the lower and upper delimitations to the sets of possible types and states of nature ( $T_l - T_h$ , and  $N_l - N_h$ , respectively).

$$E(D|B) = D \int_{T_l}^{T_h} \int_{N_l}^{N_h} dD(t, n | B) \quad (16)$$

The creditor will then accept the contract under the condition that the expected value of repayment is higher than the opportunity cost of  $D$ , at the time of making the contract. That is, with  $\beta$  denoting the subjective time discount between the period of investment and expected return:

$$E(D|B) > D\beta \quad (17)$$

Similarly, the borrower accepts the contract only if the expected benefits from doing so exceed the expected costs. In contrast to the lender, however, the borrower knows its type,  $t'$ . Clearly, this makes the borrower's maximisation problem a far easier task than the lender's:

$$E(D|t') \geq \int_{N_l}^{N_m} C_C(t', n) df(n|t') + \int_{N_m}^{N_h} C_B(t', n) df(n|t') \quad (18)$$

Where  $N_m$  denotes the state of nature, drawn from an ordered set of states of nature, and which marks the point of indifference by the debtor between complying and breaching the contract, conditional on being of a certain type. Inequality (18) therefore expresses the ex-ante condition that the expected benefits from entering the contract be greater than the expected costs when compliance occurs (the first right-hand term), plus the expected costs associated with the breach of the contract (the second right-hand term).

It is now possible to see the ex-ante problems of writing the optimal, incentive-compatible contract: in the extreme case, creditors adjust penalties to a level that raises  $C_B$  to a point where it will always be too costly to breach the contract. That is, they set  $C_B > C_C \forall n, t$ . By lowering the expected benefits from agreeing to the contract below the penalties, there will exist for every type of debtor the possibility that some states of nature occur that will make compliance impossible. Hence, no contract will be made. Similarly, if the creditor sets penalties at a level too low to create incentives to repay, say equal to zero to take the extreme case, the expected return to its investment will fall to zero, and therefore no contract comes into existence. For all other levels of penalties, which fall between the two extreme cases, contracts could be made on the basis of ex-ante incentives, but all of them are fraught with the problems of adverse selection and moral hazard arising from asymmetric information about  $n$  and  $t$ . In the ex-ante context, the adverse selection problem arises when the type of the debtor is unobservable to the creditor. 'Bad' type debtors have the incentive to apply for the loan even when they know they will not be able to repay it. As a result, if creditors cannot distinguish 'good' from 'bad' type borrowers, credit rationing will occur, for example along the lines of the model by Stiglitz and Weiss (1981). Similarly, debtors have an incentive to misrepresent their type when filing for debt relief, in order to induce an increase in the amount offered. In contrast, moral hazard concerns the incentive problem affecting the actions of the debtor after the contract has been signed (i.e. ex post). To the extent that repayment capacity is affected by debtor's actions, the creditor's return on investment is determined by the latter's ability to identify actions that lower returns and credibly enforce penalties. However,

while higher penalties partially alleviate moral hazard problems ex post, they exacerbate the adverse selection problem ex ante, thereby tightening the credit constraint (Froot et al., 1989). Moreover, the threat of enforcing the penalty, although making lending possible ex ante, may not be credible ex post, after the actual breach of contract. Indeed, if imposing the penalty is costly to the creditor, the debtor will exploit the strategic situation and offer to renegotiate the contract, for example by offering a side-payment that leaves the creditor indifferent between accepting the payment and enforcing the penalty (Gale and Hellwig, 1989). More generally, the optimal contract solution does not concern the optimisation of ex-ante efficiency, but rather its ex-post efficiency, once the true type of debtor ( $t$ ) has been revealed and the state of nature ( $n$ ) has been realised, and incentives have changed accordingly. Therefore, when writing the initial contract, lenders and borrowers foresee renegotiation, and the ensuing sub-game equilibrium, which will be different from the equilibrium envisioned in the original contract. Rationally, the contracting parties will then consider the outcome of the sub-game equilibrium when calculating expected benefits. If, however, the renegotiation game has multiple equilibria, and the parties typically cannot pre-commit strategies due to the time-inconsistency problem, the outcome of the initial contract is essentially indeterminate.

Gale and Hellwig (1989) note in this respect that contract theory solves this indeterminacy by assuming that the parties will select the sub-game equilibrium that Pareto-dominates all others, at the time of writing the initial contract. It will be further shown below, in the discussion of the specific models, how such an assumption is typically implemented. Here, the key point relates to the insight that in order to alleviate adverse selection and moral hazard problems, creditors would optimally distinguish excusable default, due to unanticipated events, from inexcusable breach of contract due to negative characteristics of the debtor. From a theoretical point of view, this essentially leaves two options to allow for the necessary contractual flexibility in high-risk or uncertain environments. If, in the period of scheduled repayment, information about the type of borrower and the realisation of the state of nature is observable by both parties and verifiable by the court, the optimal contract is made contingent on the state of nature. If, in contrast, information about  $t$  and/or  $n$  is asymmetric, a complete contract cannot be written, and the

function of the contract is essentially to influence the bargaining power of each party in the bargaining process during the renegotiations of the original contract. The key contributions in relation to the two options are now outlined in turn.

### 2.5.2 State-contingent contracts and the incentive to invest (adjust)

The history of sovereign borrowing suggests that defaults are usually associated with identifiable bad states of the world (nature). This is certainly true for low-income countries, and has widely been shown to be the case during the 1930s and 1980s debt crises.<sup>36</sup> An important branch of the 1980s and 1990s debt literature has shown compellingly that if lenders are able to differentiate excusable defaults that are associated with identifiable contingencies outside the debtor's control, from outright debt repudiation and misbehaviour by the debtor, debt contracts can be designed in such a way that the debtor chooses in all states of the world to validate the lender's expectations. Furthermore, to the extent that lenders can distinguish the effects of exogenous shocks (nature) on repayment capacity from the effects of factors controlled by the debtor country, state-contingent repayment eliminates the disincentive effects of a debt overhang, and effectively solves the lending-relief trade off relating to lenders' choice of action.

Again, Krugman's (1988a) seminal contribution provides an ideal starting point to illustrate the crucial advantages of indexed, or state-contingent, contracts. Returning to Krugman's two-period model with reference to standard debt contracts, as introduced in Section 2.3 above, consider now a country that has inherited a stock of debt  $D$ , repays  $x_1$  in period one, and has the following uncertain resource transfer potential in the second and final period:

$$x_2 = n + t \quad (19)$$

Where  $n$  is a random variable ranging from  $N_l$  to  $N_h$ , and  $t$  is now the choice variable capturing the outcome of the debtor's effort to adjust. In period two, the country consumes output  $x_2$  net of payment to the creditors,  $P$ .

$$C_2 = x_2 - P \quad (20)$$

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<sup>36</sup> E.g. see Eichengreen and Portes (1986) and Sachs (1982).



The country's social planner maximises utility by maximising consumption in period two net of the adjustment costs incurred in period one,  $v(t)$ .

$$U = C_2 - v(t) = x_2 - P - v(t) = (n+t) - P - v(t) \quad (21)$$

The incentive problem arising from new lending, and the trade-off between new loans and debt relief was shown above. Now, consider instead that the creditor's claim is set to vary with the debtor's ability to repay, by making repayment a function of second-period expected output, where  $A$  and  $B$  are two constant parameters set by the creditor:

$$P = A + Bx_2 \quad 0 < B < 1 \quad (22)$$

Thus,

$$C_2 = x_2 - P = -A + (1-B)x_2 \quad (23)$$

And the debtor maximises expected utility over the whole range of possible states of nature:

$$U^{\text{exp}} = \int_{N_l}^{N_h} [-A + (1-B)(n+t)] f(n) dn - v(t) \quad (24)$$

Crucially, the first-order condition maximising expected utility,

$$\partial U / \partial t = (1-B) - v'(t) = 0, \quad (25)$$

shows that in the case of output-indexation the incentive problem is not fully resolved, since the country will receive only a fraction  $(1-B)$  of the improved repayment capacity from adjustment. Hence, the trade-off between new lending and debt forgiveness is still present if the claim is linked to the debtor's broad ability to pay. Put differently, as long as effort  $(t)$  co-determines repayment by raising the expected value of period-two output, a fraction of the benefits will go to creditors. Therefore, a debtor in overhang will have less incentive to exert the optimal level of effort and increase repayment capacity.

Krugman (1988a) goes on to show that only by devising a mechanism linking payment exclusively to the state of nature, that is on  $n$  only, can the incentives problem be completely resolved. Crucially, the author has to adopt the assumption of perfect symmetry of information between the creditor and the debtor, both with

regard to the exogenous ( $n$ ) and the endogenous component ( $t$ ) relating to payment capacity in period two. If such an assumption does hold, a complete contract could specify payment to be independent from  $t$ :

$$P=A + n \quad (26)$$

And the first-order condition would correspondingly be:

$$\delta E/\delta t = 1 - v'(t) = 0 \quad (27)$$

Thus indicating that the benefits from increased effort would accrue to the country in full, since the payment only would depend on the realisation of  $n$ .

Krugman (1998a: 26) notes that creditors could still have the incentive to set the parameter  $A$  in the repayment equation (26) high enough to set it equal to the optimal level  $t$ , "[...] so that they would provide the debtor with a marginal incentive to adjust yet in the end capture all of the debtor's potential resource transfer." However, this would not be possible, since implying that in the event of low  $n$  actual repayment would exhaust the entire possible resource transfer capacity of the debtor, who, knowing this, would again have a disincentive to adjust.

Krugman further notes that the model equally applies to new lending. Indeed, if creditors impose conditionality on new loans and demand maximum resource transfer ( $t+n$ ) in every state of nature, the country will have no incentive to adjust. In contrast, by linking new lending to the state of nature, the country will benefit from adjustment, and therefore the incentive to adjust will be higher. As a result, state-contingent loan instruments effectively resolve the trade-off between the two strategic choices open to the creditor community in dealing with debt overhang.

The main thrust of Krugman's insightful model of contingent debt service is to have demonstrated in the simplest possible terms that repayment indexed to the state of nature is a superior way of addressing the debt overhang problem, compared to simple loan contracts. Obviously, the optimality of indexation schemes crucially hinges upon the assumption of a creditor's ability to observe all exogenous factors affecting repayment capacity. To the extent that they cannot, either because the state of nature can never be fully specified, or because it can only be imperfectly observed

and verified by anyone other than the debtor itself, some degree of disincentive limiting a country's willingness to perform will still be in place.

Krugman's basic insights have found unusually wide acceptance – and no substantial challenge – in the subsequent literature. Similar acceptance and broad resonance has greeted two further influential contributions of the late 1980s, which elaborate on the implications of state-contingent debt contracts. One study, already mentioned above, is that of Froot et al. (1989), which confirms the central thrust of Krugman's analysis, but further emphasises the limits resulting from asymmetric information. It argues that under symmetric information, contracts made contingent on variables that are not controlled by the debtor create no disincentive effects and lead to the first-best level of investment. In contrast, payment made contingent on variables under partial control of the debtor country, such as output and GDP, lead to moral hazard and a sub-optimal level of investment. However, Froot et al. (1989) also find that this may not be so under conditions of asymmetric information. In particular, they argue that if the creditors cannot fully observe the characteristics of the debtor, the latter will have an incentive to misrepresent its private information so as to receive higher debt relief and/or more new loans. The authors conclude that this type of bargaining may thus raise the amount of relief, but may also easily cause the negotiation process to break down, with creditors offering zero relief and debtors refusing to adjust - a situation they call a 'stonewalling' equilibrium.

A second study, by Grossman and Van Huyck (1988), elaborates a model of contingent debt service, which assumes that creditors are able to distinguish excusable default from unjustifiable repudiation. In contrast to the models devised by Krugman and Froot et al., however, which implicitly downplay the debtor's ex-post incentive to repudiate debt by focussing instead on the benefits from state-contingent claims on investment decisions and the ensuing capacity to repay, Grossman and Van Huyck put at the centre stage of their analysis the role of contingent debt service in validating the lenders' expectations so that the sovereign chooses in all states to validate these expectations. The authors derive a reputational equilibrium where consumption smoothing is achieved by making debt service contingent on the realisation of income. That is, the sovereign services the full amount due only when the state of nature is such that the realisation of income is high. Otherwise, the

sovereign defaults either in full or in part. However, continued access to loans is assured to the sovereign even after the event of default, as long as it validates lenders' expectations on debt service. A crucial assumption for this to hold is to abstract from savings by the sovereign, so that the Eaton-Gersowitz (1981) punishment strategy of no future borrowing in the case of inexcusable default would limit the sovereign's future consumption stream to future realisations of income. More specifically, the main analytical structure of the model is based on the following assumptions: The sovereign invests in a concave risk-free productive technology<sup>37</sup> and services debt in such a way as to shift to creditors the risk associated with negative stochastic shocks on income. The authors emphasise the insurance role of state-contingent debt service, noting that

"By borrowing an amount equal to the maximum indemnity for which it would contract, a large agent like a sovereign who wants to insure itself against the effects of bad states of the world can draw on the resources of many small and anonymous insurers, with whom it would be costly to write and to enforce contracts requiring the payment of an indemnity after the realisation of a bad state of the world."  
(Grossman and Van Huyck, 1989: 1089)

The essential assumption, as in Krugman and Froot et al. (1989), is that the exogenous stochastic component of income is verifiable, so that lenders can distinguish excusable from unjustifiable repudiation. Lenders are assumed to be also informed about the sovereign's time discount rate and its utility function  $U(c)$ . The analysis further assumes that current consumption is exclusively made out of past borrowing, and not of current debt issuance or domestic savings. Thus, current consumption ( $c_t$ ) in period  $t$  is equal to the return from the last period's borrowing  $f(b_{t-1})$ , plus the stochastic income component  $z_t$ , minus current debt service  $s_t$ .

$$c_t = f(b_{t-1}) + z_t + s_t \quad b_{t-1} \geq 0, s_t \geq 0 \quad (28)$$

Where  $[f(b_{t-1}) + z_t]$  can be regarded as the sovereign's real national income, with  $z_t$  reflecting the randomness of factors affecting national income, such as shocks affecting export commodity prices. The realisations of the state of nature,  $z_t$  range from a good state  $Z$ , to a worst state,  $z$ , and are assumed to have a stationary

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<sup>37</sup> Which is assumed to be available only to itself and not to the creditors. Furthermore, the technology is assumed to be risk-free for the purpose of focussing exclusively on the risks accruing from the realisations of bad states of nature, and not the economic risk of investment itself.

probability distribution,  $p(z_t)$ , with mean  $z^a$ . These assumptions imply that the sovereign faces a repeated static problem, in which the sovereign's objective in each period  $t$  is to maximise utility given the expectations conditional on information available in  $t$ :

$$U_t = u(c_t) + E_t \sum_{\tau=t+1}^n \beta^\tau u(c_\tau) \quad (0 \leq \beta \leq 1) \quad (29)$$

The expected value of repayment is the product of repayment associated with each state of nature and the probability of such a state of nature occurring, across all possible states of nature. This expected value sets the credit constraint imposed by lenders:

$$\sum_z p(z_t) S_{t-1}^e(z_t) = (1 + \rho) b_{t-1} \quad (30)$$

Where  $S_{t-1}^e(z_t)$  denotes the debt service lenders in period  $t-1$  expect to be made in period  $t$ .

If creditors were able to irrevocably and credibly commit in period  $t-1$ , to repay debt according to the state-contingent contract, such a commitment would allow excusable default, depending on  $z_t$ , but would exclude debtor's repudiation. In short, if lenders' expectations on repayment due to the perfect commitment technology are:

$$s_t = S_{t-1}^e(z_t) = S_{t-1}(z_t) \quad (31)$$

the sovereign's choice in period  $t-1$  concerns uniquely the amount of new borrowing, that is  $b_{t-1}$ , and the debt servicing commitment on new debt, but not the amount of income to be devoted to servicing existing debt,  $s_t$ . Hence, the solution to the social planner's maximisation problem (29) under constraints (28), (30) and (31) are such that, in each and every period:

$$b^* = \max [f'(b_{t-1}) = 1 + \rho; (z^a - z)/(1 + \rho)] \quad (\text{for all } t) \quad (32)$$

Where  $b^*$  represents the efficiency-maximising level of debt, which is high enough both to allow for the maximisation of returns on investment [marginal return on the investment  $f'(b_{t-1})$  equal to the risk-free interest rate  $(1 + \rho)$ ], and, as Grossman and Van Huyck (1989: 1091) put it, "for its lenders to prepay the indemnity associated with the worst possible state of the world". This indemnity corresponds to the discounted risk

factor expressed as the difference between the stationary mean and the worst state of the world ( $z^a - z$ ). Clearly, then, if  $f'(b_{t-1}) = 1 + \rho \geq (z^a - z)/(1 + \rho)$ , full risk-shifting would require borrowing beyond the level required for efficient investment alone.

Moreover, optimisation requires debt service commitment to be fully contingent, so that:

$$S^*(z_t) = z_t - z^a + (1 + \rho)b^* \quad (\text{for all } t) \quad (33)$$

That is, the 'normal' debt service requirement  $(1 + \rho)b^*$  is increased (or decreased) by the difference between the realisation of  $z$  and the mean value of  $z$ ,  $z^a$ .

It is easy to see that in the best state of world, such a repayment commitment would allow debt to be serviced in full (as  $Z - z^a$  represents the maximum payable), while in the worst state ( $z - z^a$ ) total default would occur. In contrast, all other realisations  $z < z_t < Z$  would imply partial default. In sum, this repayment scheme would shift all the risk to the lenders, so that consumption would be independent from the realisations of  $z$ :

$$c^* = f(b^*) - (1 + \rho)b^* + z^a \quad (34) \quad (\text{for all } t)$$

Since the model assumes consumption smoothing to be the function of international borrowing, utility is maximised with consumption at  $c^*$ , for all  $t$ .

The first key result in the Grossman and Van Huyck model is thus to show that shifting the risks associated with exogenous shocks affecting repayment from the borrower to the creditor is the optimal repayment strategy when lenders are informed about the debtor's characteristics (here  $\beta$ ), and if the latter is able to irrevocably commit to repay up to its capacity. In this model, the lender thus explicitly acts as the insurer, who takes upfront all the indemnity payment by factoring it, via  $\sum_z p(z_t) S_{t-1}^c(z_t)$ , into its expectations of repayment. It is important to emphasise, however, that indemnity relates to the sovereign's exposure to risk, and not to the risks associated with the investment technology itself, which is purposely assumed to be risk-free. What creditors do, instead, is simply to acknowledge ex ante

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<sup>38</sup> Note that equation (34) is derived by substituting for  $b^* = (z^a - z)/(1 + \rho)$  and  $S^*(z_t) = z_t - z^a + (1 + \rho)b^*$  into equation (28).

the risk component of investment associated with verifiable realisations of  $z_t$ . Clearly, there would be no lending if the borrower were not able to treat the lenders' expectations on debt service as a choice variable, depending on its own actions to validate those expectations. In other words, if the borrower were to choose  $s_t$  in a way to increase current consumption  $c_t$ , instead of choosing  $s_t$  so as to validate the lenders' expectations on  $s_t$ , utility maximisation would imply setting  $s_t$  equal to zero. Without commitment, lenders would thus expect  $s_t$  to equal zero in all periods, and, typically, lending would not take place.

In relation to all the intermediate instances, characterised by imperfect commitment mechanisms by the borrower, the authors demonstrate that a reputational equilibrium can be achieved as long as actual debt service validates the lenders' expectations in a self-confirming manner. That is, even in the case of  $s_t$  being a choice variable of the borrower, it will validate debt service expectations, if "the amount of debt and associated debt-servicing expectations are such that the short-run gains from repudiation are smaller than the long-run costs from loss of trustworthy reputation." Thus, the authors conclude, "although sovereigns sometimes excusably default, they always resist the temptation, which is greater in the good state of the world, to repudiate their debts" (Grossman and Van Huyck, 1989: 1097).

In sum, although seen from three slightly different angles, all three models reviewed in this section represent widely acclaimed contributions, which have highlighted the supremacy of state-contingent contracts over simple loan contracts. As the most crucial assumption to make for this proposition to be true, they point to the requirement that lenders be fully able to observe contingent realisations affecting a debtor's repayment capacity, so as to distinguish between excusable and unjustifiable default. If that is the case, fully contingent debt contracts that never call for payment higher than either the debtor's actual capacity to pay, or the amount the country would expect to receive by initiating the bargaining process of renegotiation, would never be required to actually be formally renegotiated. In this sense, full state-contingency of a debt contract rules out renegotiation. In all other circumstances, renegotiation will occur at any time the original contract is considered inefficient *ex-post*. This last scenario is the focus of our next section.

### 2.5.3 Contract renegotiation and the bargaining game

There are essentially two reasons for renegotiation: the occurrence of events that are not envisioned in the original contract, and limited contract enforceability. In the first case, renegotiation is either a substitute for costly contractual complexity, or the response to surprise factors that could not have been foreseen *ex ante*. Whether due to bounded rationality or simply myopic behaviour by the contracting parties, the latter specify only a small subset of actions in the event of the most likely circumstances. In the second case, if the enforcement agency is unable to observe some actions or parameters of the contract, the set of feasible contracts is restricted to those that can be fully validated in court. In principle, if both parties to the contract symmetrically observe the source of uncertainty about future states of the world, and the realisations of contingencies can be validated by an outside entity (court, arbitrator), it would be possible to implement efficient state-contingent contracts. More generally, if the set of possible contracts were unlimited, the need for renegotiation would never arise. This is so, because rational agents would be able to fully anticipate *ex ante* the outcome from renegotiation of the original contract by backward induction, and could fully account for sub-game equilibria in the initial contract. With no limit to the complexity of the contract, any possible sub-game equilibrium that would be achievable by renegotiation can be substituted by a contract, which simulates *ex-ante* all possible *ex-post* announcements by the parties and describes for any such announcement the interpretation to be given. The result is thus a complex, fully-comprehensive contract with no renegotiation.<sup>39</sup> However, writing complex contracts is costly, therefore simple and incomplete contracts are likely to be more efficient even if it were possible to write complete contracts. Indeed, an important strand of literature demonstrates the desirability of simple, incomplete contracts, which can achieve *ex-post* efficiency at low contracting costs, by allocating the bargaining power between the parties (e.g. residual control rights) in such a way as to induce them to bargain towards the Pareto-frontier.<sup>40</sup> In any case, if contract parameters (e.g. actions) are unverifiable, making the validation by an outside entity

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<sup>39</sup> See Tirole (1999) for an interesting discussion on the limits of writing complete contracts.

<sup>40</sup> See Schmitz (2001) and Hart and Moore (1998) for an extensive discussion on this point. See Grossman and Hart (1986) for their seminal contribution on contractual theory relating to the allocation of residual rights.



impossible, renegotiation of the contract cannot be prevented by the original contract. As a result, renegotiation will occur whenever the parties' preferences over the feasible set of contracts change after the values of unverifiable parameters are realised.

Any analysis taking stock of the advances made in the vast literature focussing on the broad implications of optimal contract renegotiation would lead our discussion far beyond the issues of interest to the later parts of this study. Therefore, the attention in this section will be limited to providing a brief overview of the basic theoretical structure underlying renegotiation games along the lines of Huberman and Khan (1988), whose framework ideally illustrates the main implications. In line with the typical approach adopted in this category of models, the authors make the standard assumptions of limited contract enforceability, on the one hand, and high costs associated with extreme contract complexity on the other. While appearing reasonable, these assumptions are conducive to showing that it will still be possible for renegotiation to occur for strategic reasons, even if there is no uncertainty about future contingencies and the drafting of a complete contract would thus in principle be feasible. Indeed, if some parameters of the contract are unverifiable, hence not enforceable, renegotiation will occur whether or not unforeseen contingencies arise.

To see this, consider the most general structure of a game underlying the relation between two players, say a borrower (Player I) and a creditor (Player II). Here, the relation is assumed to originate from a loan disbursed to the borrower in a previous period. The payoffs of the sequential game depend on the choice of action (Invest, Consume) taken first by Player I, and afterwards by Player II (Penalty, No Penalty). Both actions are observable by either player, but only Player II's choice is assumed to be verifiable by an outside court. The pay-offs are co-determined by the debtor's investment decision, and the state of nature. The latter is observable by the debtor, but not by the creditor. Table 2.1 lists the payoffs corresponding to each combination of actions. The pair of actions ( $I, N$ ) is assumed to represent the Pareto-optimal move. That is,  $g+h > e+f$ ,  $i+j$ ,  $r+s$ . Assume that both parties can make contract offers between subsequent moves. Having assumed the actions of Player I to be unverifiable, a contract specifies a pay-off to be made by Player II to Player I as a function of its actions, but not the other way round. In terms of Table 2.1, this is achieved by

superimposing the contracting structure over the technological structure of the underlying game.<sup>41</sup> The total payoff to either party is the sum of the game pay-offs plus the side-payments  $p$  and  $n$ , which can also be negative. Assume that contracts can be renegotiated at any time between subsequent moves, and that the surplus of renegotiation is split between the parties in proportions  $(c, 1-c)$ .

| Table 2.1: Renegotiation Model<br>(adopted from Huberman and Khan, 1988) |             | Player II (Creditor) |                |
|--|-------------|----------------------|----------------|
|  |             | Penalty (P)          | No penalty (N) |
| Player I<br>(Debtor)   | Invest (I)  | $e+p, f-p$           | $g+n, h-n$     |
|  | Consume (C) | $i+p, j-p$           | $r+n, s-n$     |

Consider first the no-contract case. Assume player I moves first, playing I, i.e. the debtor chooses to invest the amount borrowed. Consequently, if  $h > f$ , Player II plays  $h$ , thereby reaching the Pareto optimum outcome. Clearly, there will be no contract acceptable to either party, as no contract exists that could increase both Player I and II's pay-offs above  $g$  and  $h$ , respectively. This is not so if  $h < f$ , whereby player II would play  $P$  as a response to player I's choice to invest. It may be assumed, for instance, that the pay-off is low because of the realisation of the bad state of nature, which is unobservable by the creditor. With pay-offs equal to the pair  $(e, f)$ , both players can be made better off by negotiating an agreement, before player II moves, which specifies suitable side-payments of the amounts  $p, n$ ,<sup>42</sup> so as to change the gross pay-off structure in such a way as to ensure Player II is better off by playing  $N$ . This will be the case if  $(h-n) > (f-p)$  or, equivalently,  $(h-f) > (n-p)$ . The joint gains, i.e. the Pareto-

<sup>41</sup> See Tirole (1999) and Salanié (2005) for a discussion on the super-imposing characteristic of contract theory upon game theory.

<sup>42</sup> In the specific example at hand, it makes sense to view the side-payments from player II to I as assuming a negative sign, as it is more likely that the debtor will have to make concessions in order to avoid punishment. However, the general logic applies either way round.

improvement, from writing such a contract are therefore  $(g+h)-(e+f)$ . Depending on the bargaining power of the parties in the negotiation over the side-payments  $n$  and  $p$ , the contracting gain is split in proportions  $(c, 1-c)$ . Thus, the pay-off structure after renegotiation is  $c[(g+n)-(e+p)]$  for Player I, and  $(1-c)[(h+n)-(f+p)]$  for player II, which defines the division of the gains from contractual cooperation.

It should be noted that the above example applies to any possible combination of moves, demonstrating that if parties can renegotiate an original contract, they will always have an incentive to do so if a contract exists that leaves them both better off after renegotiation. Moreover, since both debtors and creditors are time-inconsistent with regard to their ex-ante and ex-post incentives to invest and penalise, respectively, ex-ante efficient contracts will have to be renegotiated so as to adapt to the change in the incentives to take Pareto-optimal actions ex post. Ultimately, renegotiation will always take place if contracts are not fully state contingent, and the fulfilment of contractual obligations cannot be validated.

## 2.6 Concluding remarks

The sovereign debt literature constitutes a vast and fascinating area of study, to which a brief review cannot possibly do justice. This chapter has therefore focussed on highlighting some of the most crucial insights from this literature, which we believe are sufficiently compelling in order to provide a sound theoretical underpinning of the proposal for state-contingent debt contracts advanced in this thesis. In particular, we have shown that since the late 1980s a number of important contributions have provided a clear demonstration of the desirability for debt contracts to be indexed to a sovereign's repayment capacity, as determined by the state of nature. We have laid out the conditions under which fully indexed debt contracts will be feasible in achieving an incentive-compatible solution to the debt overhang problem affecting sovereign debtor nations, and serve as an instrument solving the lending-relief dilemma characterising the lender's optimal response strategy.

Of course, such conditions will never be fulfilled in practice, as there will always be some degree of asymmetry of information pertaining to the factors determining a debtor's repayment capacity. However, far from undermining the case for incomplete

contingent contracting, such imperfections in the distribution of information have been shown to be optimally addressed by timely renegotiation, whereby the residual rights are carefully allotted according to the revelations of the parties to the contract. Ultimately, it would appear that the orderly solution to debt overhang would have to involve a combination of state-contingent mechanisms, capturing a debtor country's payment capacity for all possibly observable and verifiable states of nature, and allow for renegotiations according to the residual factors affecting the contract's outcome. In relation to the latter, an important and often neglected insight from the literature relates to the incentive-compatibility of new lending in response to situations of illiquidity, provided that a sufficiently strong enforcement mechanism be in place to control for the debtor's actions outside the realm of the self-enforcing contingency mechanisms.

Despite the almost univocal call for state-contingent debt contracts from the vast pool of theoretical wisdom, it appears so far to have been largely ignored or misinterpreted by the donor community in dealing with the daunting task of putting an end to the debt crisis involving the low-income countries. Indeed, as the second part of this study demonstrates, the current debate and international efforts are still far from moving towards an implementation of state-contingent debt contracts as advocated on theoretical grounds. Rather, the recent thinking appears to be evolving through some feeble attempts at linking low-income countries' debt payments to narrow measures of servicing capacity, thus failing to make the crucial distinction between a debtor's repayment capacity as such and the role of the state of nature in determining it. Against the wealth of contributions dealing with these crucial aspects in almost every imaginable detail, the current state of affairs in international policy-making takes on an even more dire aspect if considered against the background of low-income countries' universally acknowledged exposure to exogenous shocks. Indeed, as mentioned in the previous chapter, it is largely such shocks, mostly accruing from unfavourable states of the world, that have been shown to be primarily responsible for further deterioration of the debt problem in low-income countries, despite massive relief operations. In an attempt to rectify the current approach to state-contingent debt contracts and to align it with the key tenets from the literature

reviewed in this chapter, the third and final part of this study outlines our own proposal for a comprehensive contingency debt sustainability framework.

## Part II

### 3 The Shortcomings of the New Debt Sustainability Framework

#### 3.1 Introduction

The widespread recognition of the HIPC Initiative's limited achievements in providing lasting resolution to poor countries' external debt problems induced the International Development Association of the World Bank and the International Monetary Fund to devise a New Debt Sustainability Framework (DSF) for low-income countries. Breaking with the HIPC Initiative's rigid application of uniform benchmarks, in early 2004, a series of joint staff papers introduced the notion of policy-dependent debt thresholds, as the central pillar on which to base the new multilateral approach. Essentially, this approach consists in the assessment of low-income countries' debt sustainability against indicative threshold values of external debt burden indicators, which vary according to any country's ranking according to the World Bank's Country Policy and Institutional Assessment (CPIA). The empirical underpinning of the CPIA-based approach to debt sustainability assessment arises from two separate background studies by the World Bank and IMF. There, the BWI claim to have found robust evidence for a positive relationship between policy performance, vulnerability to external shocks and the level of external debt, which low-income countries are normally<sup>1</sup> able to sustain without experiencing a situation of distress over time. As a corollary to this finding with regard to policy performance, the BWI argue that low-income countries' external debt sustainability would optimally have to be assessed against indicative threshold values informed by CPIA rankings, rather than against thresholds that are uniformly applied across all the LICs, as it had hitherto been practised by the HIPC Initiative and the Debt Sustainability Analyses (DSA). However, in contrast to the central role assigned to the CPIA, and despite acknowledging the existence of a causal link between LICs'

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<sup>1</sup> 'Normally' is here intended to signify as an average assessment across low-income countries, along the cumulative density function of the (normal) Gaussian distribution.

vulnerability to external shocks and the occurrence of debt distress, the BWI have chosen to relegate vulnerability merely a subsidiary importance within the new DSF.

The stated aim of the DSF is to “guide borrowing decisions of low-income countries in a way that matches their need for funds with their current and prospective ability to service debt, tailored to their specific circumstances.”<sup>2</sup> However, with negotiations for the 14th replenishment of IDA financing (IDA14) well under way at the time of its release, the DSF proposal was mainly tailored towards accommodating the incorporation of debt sustainability considerations into the IDA lending process. After all, the 13<sup>th</sup> IDA replenishment, concluded in 2002, had introduced debt sustainability concerns as one of the criteria for accessing LICs’ eligibility for IDA grant financing, but without making the degree of grant financing dependent on a country’s actual or potential risk of debt distress. By providing this missing element, the proposed DSF was centrally instrumental to the ongoing IDA14 negotiations, in the sense of integrating the framework’s implications for multilateral grant financing, far beyond the aim of addressing debt sustainability concerns per se.

To that end, and concomitantly with the discussions relating to the DSF, a series of IDA background papers further elaborated on the options for incorporating the proposed CPIA–debt burden thresholds nexus into a viable formula for determining the grants share of the overall IDA country financing envelope. Borrowing from the typical WTO nomenclature, it was eventually agreed to devise a so-called ‘traffic light system’, which classifies countries according to their risk of debt distress on the basis of CPIA-dependent debt thresholds. Thereby, policy-dependant debt threshold rankings are effectively translated into debt distress risk rankings, on the basis of which the grants share of a country’s overall IDA financing is to be determined.

By critically evaluating each of the building blocks underlying the new DSF, including the empirical underpinning put forward by the BWI, we assess in this chapter the likely implications of this framework on low-income countries’ debt sustainability prospects and the broader aid allocation process. We reach the conclusion that despite its desirable aim of bringing about a closer inter-linkage between the decision-processes guiding aid allocation and debt sustainability, the

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<sup>2</sup> IMF and IDA (2004a: 4)



new DSF-IDA14 framework actually causes debt sustainability to succumb to the prerogatives of the aid allocation framework, at the cost of severely undermining low-income countries' debt sustainability prospects. For, to ensure compatibility with the performance-based framework characterising the aid allocation process, the DSF has been hinged upon a fictitious CPIA-centeredness, which is largely unrepresentative of the causal factors determining debt sustainability. Put differently, we posit that while the new approach is certainly supportive of the existing aid allocation framework and the movement toward increasing shares of multilateral grant financing, its benefits in terms of debt sustainability would ultimately hinge on the validity of the postulated relationship between LICs' CPIA performance and their debt-carrying capacity. However, after re-assessing the empirical evidence put forward in support of the causal link between CPIA and debt distress, we find that the centrality of CPIA is essentially unsubstantiated, and that all evidence points to the crucial role of economic vulnerability and external shock factors in explaining LICs' distress episodes. On these grounds, we reach the conclusion that by failing to devise a mechanism to effectively protect vulnerable countries against the impacts from external shocks, the DSF-IDA14 framework is inevitably bound to fail the LICs, once again, in meeting their aim of achieving lasting debt sustainability.

The remainder of this chapter is organised as follows: Section 3.2 outlines the central elements of the DSF-IDA14 framework. Section 3.3 discusses the main shortcomings of the framework, and reassesses the IMF empirical analysis featuring the CPIA as a key predictor of debt distress. Section 3.4 summarises our main findings and draws the conclusions.

### **3.2 The IDA-IMF Debt Sustainability Framework and IDA Aid Allocation**

In April 2005, the Executive Boards of the IMF and the World Bank endorsed the New Debt Sustainability Framework for low-income countries, which had previously been outlined and discussed in a number of official reports released since early 2004.<sup>3</sup> In March 2005, the IDA concluded the negotiation process with regard to its 14<sup>th</sup> replenishment period, establishing the guidelines for the allocation of aid among

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<sup>3</sup> IMF and IDA (2004a, 2004b, 2005a)

eligible member countries during the period 2005-2008. Since the main focus of the discussions relating to the IDA replenishment had been on the debt sustainability implications of IDA financing, the new DSF constituted an integrating component of the new terms of aid allocation.<sup>4</sup> Finally, in recognition of the unsuitability of the newly established debt sustainability and IDA allocation frameworks for dealing with low-income countries' exposure to large exogenous shocks, in 2005 the World Bank released its report evaluating a number of proposals to address the apparent gap left open by the extant frameworks.<sup>5</sup>

Chart 3.1 shows how the main elements of the DSF and IDA14 frameworks relate to each other, and also includes as a third, related, pillar the recently envisaged World Bank proposals for linking concessional debt service to debtors' capacity to pay. The various building blocks of both the DSF and IDA allocation are described in turn, before turning to an in-depth examination of their shortcomings in relation to the overall implications of the DSF.

#### The Performance Based Allocation System:

The core of the IDA14 allocation process results is essentially unchanged with respect to previous replenishments, to the extent that it centres on the Performance Based Allocation (PBA) system. The PBA rewards IDA-eligible countries<sup>6</sup> achieving a positive assessment in terms of high CPIA scores and broad compliance with IDA policy prescriptions with a higher proportion of overall IDA allocation. The upper left-hand panel of Chart 3.1 shows the country's performance-based rating (PBR) to be derived from a LIC's combined score in the Country Policy and Institutional Assessment (CPIA), the Annual Report on Portfolio Performance (ARPP) relating to World Bank lending, and a special governance factor which is mostly derived from the CPIA. To a lesser extent, IDA allocation is also informed by borrowing countries' population and per capita gross national income, used as a measure of these countries' need for aid. Both measures of performance and needs are then entered into a simple PBA allocation formula, which has been criticised for assigning a

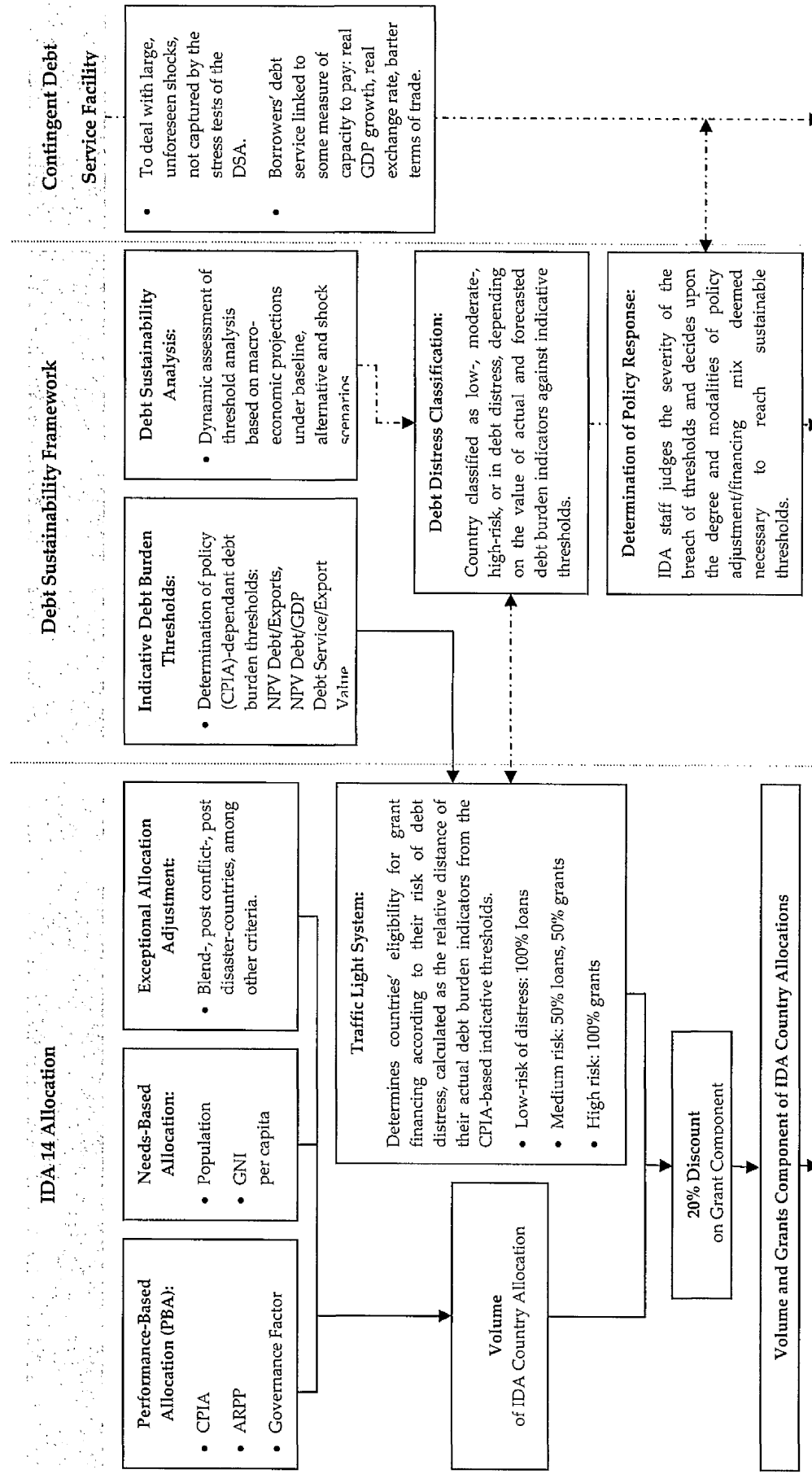
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<sup>4</sup> As discussed in IDA (2004a, 2004b, 2005a).

<sup>5</sup> IDA (2005b)

<sup>6</sup> The criteria for eligibility are relative poverty (less than U.S. Dollars 965 in terms of 2004 GNI per capita) and a country's substantial lack of access to the international private capital markets.

Chart 3.1: Schematic illustration of the building blocks of the aid allocation and debt sustainability frameworks of IDA and IMF



IDA Country Allocation Strategy

Note: ——— Implemented in IDA14      - - - - - Envisaged for future allocations

disproportional weight to the performance factor, thus introducing a substantial conditionality bias to the allotment mechanism of IDA finance (Kanbur, 2005; Nissanke, 2006). Indeed, the distribution of shares to eligible recipient countries out of the overall IDA envelope is determined essentially on the basis of CPIA and governance rankings alone. Only in exceptional circumstances is the overall IDA Country Allocation Strategy (CAS) adjusted in light of countries' access to alternative World Bank lending, or their emergence from conflict or natural disaster (Chart 3.1).

The crucial novelty introduced by the new DSF and IDA14 concerns the methodology applied to assess borrowing countries' debt sustainability, which, in turn, determines the share of grants in country allocations. As mentioned above, IDA13 replenishment had already introduced grant financing in the year 2002, for the first time in World Bank's long history of credit disbursements. It did so by making eligibility for grant disbursements contingent on a country facing an unsustainable debt position, among other criteria. However, IDA13 allocation lacked the specification of a mechanism by which a country's risk of debt distress, or debt sustainability, could be assessed in a manner that could be used to directly inform the appropriate share of grant financing. Rather, grant allocation to a specific country was bound to an upper limit of 40 per cent, and the actual share was made dependent on the specific criteria determining its eligibility for grants.<sup>7</sup> In contrast, IDA14 closes this gap by devising a system for classifying countries according to their risk of encountering debt distress, which in turn is determined on the basis of the new DSF. The latter applies a two-pronged approach to assessing a country's ability to service debt over time on the one hand, and to determining a sustainable path of borrowing/lending decisions, on the other. The first step consists in defining external debt burden thresholds against which a country's external debt is to be assessed. This static approach is then integrated by a second, more dynamic analysis, which consists in forward-looking threshold assessments in the context of macroeconomic projections under alternative scenarios. The central column of Chart 3.1 stylises the two central elements of the DSF and their role in determining the

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<sup>7</sup> The criteria determining grant eligibility included post-conflict situations, natural disasters, HIV/AIDS and debt sustainability. For a detailed description of IDA13, see IDA (2002).

grants/loan mix of IDA financing: (i) indicative debt-burden thresholds and (ii) debt sustainability analysis.

#### Indicative Debt-Burden Thresholds:

The main element of the DSF consists in the definition of country-specific debt burden thresholds. Similarly to the earlier debt sustainability analyses conducted by the BWI, the debt burden is expressed against broad measures of repayment capacity, including the ratio of the Net Present Value (NPV) of debt to exports or GDP, as well as the ratio of yearly debt service payments to exports. However, instead of establishing common threshold values of debt ratios across all LICs, the new DSF makes these indicative values contingent on a country's CPIA ranking, based on the presumption that "countries operating in a weaker institutional and policy environment are likely to experience debt distress at significantly lower debt ratios, as such countries tend to be more prone to misuse and mismanagement of funds and less capable of using their resources productively".<sup>8</sup> Both the methodology to derive indicative thresholds and the empirical evidence allegedly supporting the BWI's hypothesis are based on the probabilistic panel analyses conducted independently by the staff of the IMF and World Bank, which are evaluated below. It suffices here to focus on their main outcome, listed in the left-hand panel of Table 3.1: categorising countries as poor, medium or strong quality, in accordance with their CPIA score, the DSF threshold analysis establishes the upper limits of the debt burden ratios each category of countries can sustain with a 75 per cent likelihood of not falling into debt distress in any given year. As is evident from the ensuing thresholds matrix, the debt burden indicators are substantially higher for countries with higher CPIA ranking, in accordance with their allegedly greater capacity to carry external debt. For example, at the same probability of falling into distress (25 per cent), strong performers are deemed capable of bearing three times as much debt in relation to total exports value (300 per cent), as are countries with poor performance (100 per cent). Table 3.1 shows a similar trade-off between debt and CPIA in terms of total debt service: strong performers' likelihood of remaining sustainable is associated with a total debt

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<sup>8</sup> IMF and IDA (2004a: 19)

service-to-exports-ratio (35 per cent) that is more than twice as high as that of poor performers (15 per cent).

**Table 3.1: CPIA-Dependant Debt Burden Thresholds (DSF vs. IDA14)**

| DSF Thresholds (#1)   |   |             |         | IDA14 Thresholds (#2) |   |             |         |
|-----------------------|---|-------------|---------|-----------------------|---|-------------|---------|
| Performance Category: | Thresholds of Debt Burden Indicators (%): |             |         | CPIA Score:           | Thresholds of Debt Burden Indicators (%): |             |         |
|                       | NPV EDT/GDP                               | NPV EDT/XGS | TDS/XGS |                       | NPV EDT/GDP                               | NPV EDT/XGS | TDS/XGS |
| Poor                  | 30  | 100         | 15      | $CPIA \leq 3.25$      | 30  | 100         | 15      |
| Medium                | 45  | 200         | 25      | $3.25 < CPIA < 3.75$  | 40  | 150         | 20      |
| Strong                | 60  | 300         | 35      | $3.75 \leq CPIA$      | 50  | 200         | 25      |

**Notes:**

NPV EDT = net present value of publicly and publicly guaranteed external debt (U.S. Dollars)

XGS = total exports of goods and services (U.S. Dollars)

(#1) Categories defined along the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the CPIA index. Source: IMF and IDA (2004a: 21)

(#2) Categories defined under the alternative specification of cut-off points. Source: IDA (2005a: 4)

The indicative debt burden thresholds of Table 3.1 are central to both the BWI debt sustainability analysis, outlined below, and the IDA14 traffic light system, which is addressed next.

The Traffic-Light System:

Representing the central link between the DSF and IDA (Chart 3.1), a so-called traffic light system combines the information accruing from actual debt burdens and CPIA-dependent thresholds into a ranking of countries according to categories of risk of distress. This is achieved by calculating the average distance of a country's actual debt burden indicators from the indicative thresholds associated with its performance category. These categories are based on empirical grounds that are identical to those underlying the DSF, and differ only in the cut-offs applied between the three CPIA categories. That is, while the DSF thresholds are assessed for CPIA categories defined along the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the CPIA distribution across LICs, the IDA14 thresholds set the CPIA lower and upper cut-offs at scores 3.25 and 3.75, respectively. The right-hand panel of Table 3.1 demonstrates that the alternative cut-offs applied by the traffic light system result in a substantial downward revision of thresholds compared to those underlying the DSF, thus introducing a safety-

cushion in the assessment of country risks of distress. For example, the IDA14 classification reduces the gap between strong and poor performers in terms of the sustainable debt-to-exports ratio from 200 to 100 per cent. Against these IDA14 thresholds, the grants-loan mix of IDA's country allocation of aid is then determined according to the rule outlined in Table 3.2.

**Table 3.2: The Traffic Light System to determine the share of grant financing**

| Actual debt burden minus threshold (#1) | Traffic Light (Risk of Distress) | Share of grant financing |
|---|----------------------------------|--------------------------|
| > 10 %                                  | Red (high risk)                  | 100%                     |
| < +/- 10%                               | Yellow (moderate risk)           | 50%                      |
| < 10 %                                  | Green (low risk)                 | 0%                       |

Notes: (#1) Computed as the larger distance among the average of the relative distances of NPV EDT/GDP and NPV EDT/XGS and the proportional distance of the TDS/XGS indicator.

Source: IDA (2005a)

The distance of the actual debt burden ratios from the CPIA-specific threshold values classifies LICs as having a high, moderate, or low risk of distress, which, in turn, determines the share of grant financing they are entitled to within the overall IDA envelope. The grant share is zero in the case of low risk, 50 per cent for countries with debt sustainability deemed to carry moderate risk, and 100 per cent for high-risk countries. Put differently, according to the traffic light system, high-risk countries receive the entire IDA financial support in the form of grants, since they are deemed unable to carry any further loans without posing serious risks to the sustainability of their overall debt exposure.

It should be noted that the passage from CPIA-debt burden thresholds to risk rankings within the IDA allocation marks the crucial step of making the DSF instrumental to IDA14, in particular with regard to its aim of moving towards increasing shares of multilateral grant financing. Indeed, only by devising a CPIA-centred concept of debt carrying capacity, can the DSF effectively accommodate the prerogatives of the performance-based IDA allocation mechanism, which itself is crucially based on an ex-post reward system according to CPIA rankings. However, it will be demonstrated below that the CPIA-anchorage of the debt sustainability framework fails to accommodate the vulnerability concerns most central to the

achievement of debt sustainability itself. Therefore, the incorporation of the DSF in the broader aid allocation framework carries serious risks of undermining LICs' debt sustainability prospects.

#### The Volume Discount:

Once volume and grant share of IDA country allocations is determined, the last step in the IDA allocation process involves the application of an upfront discount to the grant component (Chart 3.1). Much discussion among the main IDA stakeholders seems to assume that such a discount would be strictly necessary to address the implicit incentive distortions of an allocation system allocating higher shares of grants to countries whose risk of distress is assessed as being higher on the basis of CPIA-dependent thresholds.<sup>9</sup> The typical argument posits that a country could well have the incentive to increase the grant share of its IDA allocation by failing to improve upon its current state of policies and institutions or, in the extreme case, by putting in place actions that lower its CPIA ranking far enough to enable it to fall into a lower threshold category. Although such an argument may have some validity, to the extent that it is simply impossible to rule out that some degree of incentive distortions will result from any such mechanism, it can hardly be accepted as a general tenet justifying the substantial subtraction of aid by the volume discount. Ultimately, the degree of incentives distortion will depend on a government's perception regarding the trade-off from having a high scoring in the CPIA exercise against the pursuance of its own policy prerogatives.<sup>10</sup> However, any attempt to measure, let alone address, such a trade-off would lead to insurmountable complications in the actual applicability of the DSF across a largely heterogeneous group of LICs, while the BWI are notably reluctant to making any concession with regard to the CPIA's application across countries. As a result, the IDA has opted for a simplistic approach to dealing with the eventuality of negative incentive implications, settling for a flat upfront volume discount of 20 per cent.<sup>11</sup>

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<sup>9</sup> See, for example, the discussion in IDA (2005a).

<sup>10</sup> On the incentive compatibility of alternative debt sustainability frameworks, see also the discussion in Chapter 5.

<sup>11</sup> Nine per cent of the volume discount are then redistributed among all eligible countries, through the PBA allotment mechanism.



It should be noted that the major drawback of the performance-based allocation system in light of this substantial volume discount concerns the retraction of overall financial flows to those countries deemed to suffer from the greatest risk of distress. To the extent that the traffic light system implies an inverse relationship between a LIC's CPIA ranking and the volume of grant financing, it further reduces the overall volume of aid allocation to those countries whose risk of distress is deemed highest (everything else being the same). As will be further argued below, while the IDA14-DSF would thus appear to be most paradoxical in light of its liquidity implications for a country in distress, the framework's internal consistency crucially hinges upon its reliance on the CPIA as the central measure informing debt carrying capacity, risk of distress, and overall eligibility for aid. Since a debtor's liquidity concerns have no bearing on the CPIA, and only marginally affect the traffic light mechanism via the debt service ratio, it may thus be concluded that the BWI's framework *de facto* assigns the primary causal factors and manifestations of debt distress a marginal importance, with no bearing on the actual aid allocation mechanism. Instead, the liquidity aspects of external indebtedness enter the mostly informative nature of forecasting exercises, by way of DSF debt sustainability analysis, which is outlined next.

#### Debt Sustainability Analysis:<sup>12</sup>

Beyond threshold analysis based on the assessment of actual debt burden indicators against indicative thresholds, the DSF/IDA14 framework recognises the need for forward-looking debt sustainability analysis (DSA) to assess debt burden indicators over time and under alternative scenarios. Representing the second pillar of the debt sustainability framework outlined in Chart 3.1, DSAs consist in long-term projections (20 years) of a country's debt burden indicators and the key macroeconomic, fiscal and external debt factors determining its debt dynamics. A first template, assessing external debt sustainability, projects the evolution of a country's debt stock and service against the macroeconomic factors (mostly in relation to the balance of payments) which influence its repayment capacity and debt dynamics more generally. The evolution of actual and projected debt burden thresholds is thus

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<sup>12</sup> For a detailed description of the new DSA, see further below, as well as World Bank (2005b) and IMF and IDA (2004a, 2004b).

assessed over time, against the CPIA-dependent debt burden thresholds of Table 3.1, and under alternative scenarios. The first of these scenarios, the so-called 'baseline', embodies the macroeconomic and borrowing projections derived from IDA/IMF forecasting models and assumptions. In order to check for over-optimism, which characterised past forecasting exercises by both the IDA and the IMF<sup>13</sup>, the template explicitly states the assumptions underlying macroeconomic items, and makes these comparable to the projections taking variables at their ten-year historical average (the so-called 'historical' scenario). The distance between baseline and historical scenarios thus represents a measure of optimism in IDA's assessment of future country performance. A third scenario envisages higher interest rates on new borrowing. Together, these scenarios provide some insight into the likely development of debt burden indicators against the indicative thresholds over time, which is further integrated with an accounting methodology for exogenous shocks.

To understand the DSF's approach to exogenous shocks, it should be recalled that it is based on empirical studies identifying three predictors of a country's debt distress: CPIA performance, the external debt burden, and vulnerability to external shocks. As noted above, CPIA performance is taken as the central criterion for identifying indicative debt thresholds, which in conjunction with actual debt burden indicators determine a country's risk of distress as the basis of eligibility for grant financing. However, by acknowledging that countries' vulnerability to external shocks is thereby left out the process defining indicative thresholds<sup>14</sup>, the DSF recognises the need to capture separately the effects of shocks through so-called 'stress tests'. It chooses to do so by defining scenarios that incorporate variations in some of the variables affecting debt sustainability, occurring with an average 25 per cent probability over a simulation period of 10 years. This ex-ante approach to dealing with so-called 'plausible shocks' is implemented by so-called 'bound tests', simulating a two-year one-standard deviation from historical averages of key

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<sup>13</sup> It has been mentioned above that the BWI themselves have recently acknowledged the presence of over-optimistic assumptions in their forecasting exercises. For example, see Gautam (2003).

<sup>14</sup> More precisely, a cross-country average vulnerability to external shocks is considered to the extent that it is indirectly reflected in the indicative thresholds derived from probabilistic regressions including both CPIA and shock variables. However, the degree to which shocks are reflected by the indicative thresholds is marginal at best, and depends on the exact specification used in the empirical exercises determining the coefficient of CPIA.

macroeconomic variables. In the DSA approach, these variables include the real GDP growth, export value growth, the U.S. Dollar GDP deflator, and non-debt creating financial flows (including FDI and workers' remittances).<sup>15</sup>

The second template of the DSA concerns the sustainability of public sector external debt and is structured similarly to the external debt template. It assesses debt sustainability over time on the basis of comparison between the likely development of three indicators (NPV Debt/GDP, NPV Debt/XGS and TDS/XGS) against indicative thresholds and under alternative assumptions relating to the key factors driving public debt dynamics (most importantly, the primary fiscal deficit).

Contingent on DSAs for IDA countries being implemented in the future, the IDA14 framework envisages integrating, and later replacing, the current debt distress classification based on the traffic light system and indicative thresholds with a ranking system based on the forward-looking templates of the DSA. Thereby, a country's risk of debt distress would be assessed according to a comparative analysis of debt indicators and thresholds over time and under the baseline, alternative and shock scenarios. According to the overall severity of breach of thresholds, a country would be ranked using a traffic light system to determine its grant eligibility. At the same time, the insights from dynamic sustainability assessments would inform the IDA's decision regarding the adjustment/financing mix deemed appropriate for a specific debtor country, as an input to the overall IDA country allocation strategy. The contemplated integration of the currently static DSF modules with those representing the more dynamic forecasting exercises under alternative simulation scenarios, is indicated in Chart 3.1 by broken lines, connecting debt sustainability analysis, debt distress classification, the traffic light system, as well as the judgement-based policy response informing country allocation strategy.

#### Contingency Instruments:

Finally, Chart 3.1 includes a third pillar, which is not part of the DSF as currently envisaged, but represents a recent attempt by the World Bank to address the

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<sup>15</sup> Any of these indicators enters the macroeconomic and debt ratio projections either singly or in combination. See World Bank (2005b).

framework's shortcomings in dealing with the occurrence of exogenous shocks. Indeed, in a recent report<sup>16</sup>, the World Bank addresses the need to integrate the DSF with a contingent debt service facility linking borrowers' debt service to some broad measure of their actual capacity to pay. In order to comprehend the World Bank's rationale for addressing this apparent weakness of the newly devised DSF, it should be recalled from the preceding discussion that the bound tests of the DSA consist of simulations of temporary shocks to projected trends of macroeconomic variables. The magnitude of trend deviations is derived to represent a 25 per cent likelihood of such shocks to occurring in a 'representative' (i.e. average) low-income country. While these simulations are considered suitable to control for a normal degree of volatility across the sample of LICs, the IDA and IMF themselves acknowledge that this approach is not suitable for capturing the (likely) effects of all the large exogenous shocks occurring with low probability. Furthermore, by focussing on the CPIA and debt stock rather than the liquidity dimension of debt sustainability, the IDA14-DSF lacks any mechanism by which the disruptions resulting from such shocks could effectively be countered. As already mentioned in Chapter 1, it is now generally accepted that large exogenous shocks have been responsible for undermining LICs' repayment capacity despite the substantial amounts of HIPC debt relief. Against the background of a substantial body of evidence pointing to the debilitating effects of exogenous shocks on LICs' debt sustainability, and amidst growing calls by the broader community of observers for the establishment of measures capable of countering the debilitating effects resulting from the latter, the World Bank eventually found itself forced to confront the issue within the framework of official aid and debt sustainability, rather than exclusively through the market-based approaches it had been advocating for several years.<sup>17</sup>

The proposals put forward in the World Bank report on managing the debt risk of exogenous shocks in low-income countries focus on the introduction of debt service modulation schemes, aimed at linking low-income countries' debt service payments

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<sup>16</sup> IDA (2005b)

<sup>17</sup> For example, see the World Bank sponsored feasibility studies by the international Task Force on Commodity Risk Management, which was established in 1999 (e.g. see ITF, 1999; and the dedicated website, [www.itf-commrisk.org](http://www.itf-commrisk.org)).

to some broad aggregate of repayment capacity. The envisaged schemes include indexation to real GDP growth, the real exchange rate, or the barter terms of trade, and are thoroughly assessed in Chapter 4 of this study. By simulating the likely effectiveness of each of the proposed schemes, our analysis shows that they would largely fail to address the liquidity needs induced by exogenous shocks, for reasons related to the inappropriateness of the indexing mechanisms employed and constraints imposed on the modulating potential of the contingency facilities per se. Here, in the context of these debt service modulation schemes' bearing on the overall DSF/IDA14 framework, it is sufficient to note that, if ever implemented, they would have the effect of superimposing a liquidity-oriented mechanism onto the core modules of the DSF, but without altering its CPIA-based allocation effects as such. Put differently, the debt service modulation schemes would have the desirable, though limited, effect of countering liquidity shocks facing the LICs by front- or back-loading debt service in accordance with contingent repayment capacity. However, these mechanisms, as envisaged by the World Bank, would have no effect on the actual amount and terms of aid allocation over a longer time period, thus leaving the basic DSF/IDA structure largely intact. Again, we identify the main problem of the BWI approach to be in the subordination of the liquidity-focused contingency mechanism to the extant CPIA-centred allocation and sustainability assessment framework, which hampers the potential effectiveness of this otherwise desirable (potential) evolution in the multilateral approach. Unfortunately, the final outcome resembles instead a patchwork of inconsistent measures, unable to address exogenous vulnerability, which is at the heart of the debt problem facing the low-income countries.

### **3.3 The major shortcomings of a CPIA-centred debt sustainability framework**

Taken at face value, the IDA/IMF debt sustainability framework would appear to be an important step forward in the multilateral approach to dealing with low-income countries' debt crisis. By guiding borrowing and lending policy in accordance with LICs' debt burden, the quality of 'policies and institutions' and the average vulnerability to exogenous shocks, the DSF is said to provide the appropriate tool for lowering unsustainable debt positions over time and/or to avoid the renewed build-

up of unsustainable debt. In contrast to previous approaches, the DSF attempts to render operational a more country-specific concept of debt sustainability, involving debt burdens assessed against CPIA-dependent thresholds in a forward-looking framework of alternative scenarios. Moreover, the scenarios envisaged by the DSA are based on more conservative forecasts with regard to the variables determining repayment capacity, and contemplate the realisation of likely shocks to these variables. Complementary to dealing with the debt sustainability aspects, the IDA14 replenishment is put forward as an attempt to align multilateral aid allocation with debt sustainability concerns. By making the grant share of IDA disbursements contingent on a country's perceived risk of distress, the magnitude of further debt accumulation for high-risk countries is lowered. Thereby, the IDA14 determines a direct link between IDA allocation and debt sustainability concerns, which was absent from previous IDA replenishment periods.

Although its proponents exhibit confidence about its potential to support LICs' difficult path toward sustainability, our more critical assessment of the DSF/IDA14 framework unveils a series of shortcomings, which we deem severe enough to make inevitable a renewed failure in the multilateral attempts to tackle the LICs' debt crisis. More specifically, we identify two significant problems underlying the new DSF: first, with regard to the empirical approach by which the factors determining a country's debt carrying capacity are identified and, second, the arbitrary way in which the empirical results are chosen to inform both the debt sustainability assessment and aid allocation process. The following sections address each of these issues in turn.

### **3.3.1 When is external debt sustainable?**

The empirical basis underlying the DSF is remarkably flimsy, relying on the results of only two related studies: a preliminary and incomplete World Bank working paper (Kraay and Nehru, 2004)<sup>18</sup>, and the IMF replication of a similar analysis, outlined in

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<sup>18</sup> A shortened version of this study has recently been published (Kraay and Nehru, 2006). Our discussion relates to the more comprehensive World Bank working paper, which was circulated in 2004.

an appendix to the DSF proposal.<sup>19</sup> Both studies attempt to identify the key variables explaining the occurrence of debt distress situations in developing countries (or low-income countries in the case of the IMF analysis). They are fundamental to deriving the CPIA-dependent debt thresholds (such as those presented in Table 3.1 above), as well as constituting the analytical underpinnings of the CPIA-centred linkage between the DSF and IDA14 frameworks. Hence, the overall credibility and effectiveness of the framework hinges upon the reliability and robustness of its underlying empirics.

Essentially, the World Bank and IMF analyses represent an attempt to demonstrate and quantify the importance of the CPIA as a predictor of debt distress episodes across countries and time. In line with the approach adopted by some other recent IMF studies to predicting sovereign debt crisis<sup>20</sup>, the empirical method rests on the binary probit regression model. The functional form of this model is typically presented as<sup>21</sup>:

$$\Pr(y_j = 1 | x_j) = \Phi(x_j b), \quad (1)$$

where the left hand side of the equation denotes the conditional probability of the binary dependent variable  $y_j$  taking unit value, and the right-hand side is the standard cumulative normal distribution of the probit score of the explanatory variables,  $x_j$ , with a vector of coefficients,  $b$ .

In either study, the probit model is fitted to previously identified debt distress versus non-distress episodes as the dependent variable  $y_j$ , taking value one or zero, respectively. The explanatory variables  $x_j$  are identified *ad hoc*, as the most plausible determinants of debt distress. Table 3.3 summarises the distinctive features of the World Bank and IMF approach. The former, shown in the left column, identifies debt distress periods on the basis of an unbalanced panel dataset including all developing

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<sup>19</sup> A similar specification also underlies the two studies under consideration. See Appendix I of IMF and IDA (2004a: 53-)

<sup>20</sup> Among the most recent IMF studies, see Manasse et al. (2003), Reinhart et al. (2003). For a brief review of these and older contributions, see Kraay and Nehru (2004).

<sup>21</sup> An early contribution to logistic regression analysis can be found in Aldrich and Nelson (1984). A more recent approach is shown in Powers and Xie (2000). Also see Greene (2003) for a general overview on logistic regression analysis.

countries, with time-series spanning from 1970 to 2001, according to country-specific data availability. Following McFadden et al. (1985), debt distress episodes are defined as periods of at least three consecutive years during which a country is observed as having experienced either one or a combination of the following: a high ratio of accumulated arrears on total outstanding external debt; the occurrence of Paris Club debt rescheduling or reduction; and the recourse to IMF non-concessional lending. In contrast, non-distress episodes are defined as a period of five consecutive years during which none of the manifestations of distress is observed. Thereby, Kraay and Nehru (2004) identify a total of 57 distress and 227 non-distress episodes across countries and time. To this subset of observations they then fit the standard binary probit regression model outlined above, with debt distress as the binary dependent variable (setting the latter equal to zero in normal periods and equal to one during debt distress episodes), and three sets of explanatory variables. These variables include alternative measures of: countries' external debt burden (the ratio of NPV debt to exports or GDP, and the ratio of total debt service to exports); the quality of their policies and institutions (as measured by the CPIA, or the Kaufmann-Kraay-Mastruzzi Rule of Law Index<sup>22</sup>); and shocks (real GDP growth or deviations in the real exchange rate and the barter terms of trade). The actual data points entering estimations are limited by the concurrent availability of all explanatory variables employed in the unbalanced longitudinal data, and are measured for the first year of normal periods and at one year prior to debt distress episodes (to control for endogeneity during distress). This yields a total of 163 observations during 1980-2001, available for estimations. As shown in the bottom row of Table 3.3, the core

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<sup>22</sup> The Kaufmann-Kraay-Mastruzzi (KKM) index includes six measures of 'governance quality', labelled voice and accountability, political instability and violence, government effectiveness, regulatory burden, rule of law, control of corruption. For a detailed description of the KKM measures, see Kaufman et al. (2004), as well as the World Bank website: [www.worldbank.org/wbi/governance/govdata2002](http://www.worldbank.org/wbi/governance/govdata2002). For a description of the Rule of Law Index employed by Kraay and Nehru (2004), see Annex Table A3.1.

It should be noted that the BWI typically treat the KKM as the closest available substitute to the CPIA. For example, Gelb et al. (2004) show that there is a strong correlation between CPIA and KKM rankings in the case of both sub-Saharan African and non-African countries. However, while we agree that the public availability of the KKM makes it a useful substitute for the widely undisclosed CPIA for the purpose of empirical analyses, we see no other reason why the two indicators should *a priori* be treated as substitutes. Indeed, we share the view of Herman (2004), who emphasises that the main thrust of the KKM measures has been to highlight the CPIA's susceptibility to misclassification errors.



**Table 3.3 – Main features of the World Bank and IMF probit analyses underlying the DSF**

| Feature  | Kraay and Nehru (2003)  | IDA and IMF (2004a)   |
|--|---|---|
| <b>Dataset</b>   | Unbalanced panel, including data for all developing countries (World Bank definition), 1970-2001  | Unbalanced panel, covering 59 low-income countries (World Bank definition)  |
| <b>Definition of Debt Distress Periods</b><br>$(y_j = 1)$  | Periods of at least three years during which a country experienced either one or a combination of:<br><br>(a) Ratio of accumulated arrears to total external debt stock > 5%<br><br>(b) Ratio of IMF country commitments to IMF country quota > 50%<br><br>(c) Access to Paris Club rescheduling or debt relief   | Periods in which:<br><br>(a) Ratio of accumulated arrears on official external debt to total external debt stock (PPG) > 5%   |
| <b>Definition of Normal Periods</b><br>$(y_j = 0)$   | At least five consecutive years during which none of the three debt-distress characteristics are observed.  | At least three consecutive years during which the above condition does not hold.  |
| <b>Explanatory Variables</b><br>$(x_j)$<br><br>Note: all variables are lagged by one period to control for endogeneity | <b>(a) Debt Burden Indicators:</b><br>PV Debt/Exports, Debt Service/Exports, Debt/Exports, Debt Service/Reserves<br><br><b>(b) Quality of Policies and Institutions:</b><br>CPIA, Kaufmann-Kraay-Mastruzzi Rule Of Law Index<br><br><b>(c) Measures of shocks:</b><br>Real GDP growth (local currency)<br>Real exchange rate growth<br>Income effect of terms of trade change | <b>(a) Debt Burden Indicators:</b><br>NPV Debt/GDP, NPV Debt/Exports, NPV Debt/Revenue<br><br><b>(b) Quality of Policies and Institutions:</b><br>CPIA, Trade Openness, Real Exchange rate and inflation deviations from three-year moving average, International Country Risk Guide (ICRG) indices on political risk and the quality of bureaucracy.<br><br><b>(c) Measures of shocks:</b><br>Real GDP growth (overall shocks measure)<br>GDP per capita (proxy of a country's capacity to cope with external shocks)<br>African Dummy (capturing vulnerability to price shocks due to primary commodity dependence) |
| <b>Probit estimation results from the core specifications employed</b>   | Estimated effect on the probability of debt distress:<br><br>Combined, these variables are significant, with coefficients taking positive (+) or negative (-) sign, as indicated:<br><br>- NPV of Debt/Exports (+) or Debt Service/Exports (+)<br><br>- CPIA (-)<br><br>- Real GDP Growth (-)   | Estimated effect on the probability of debt distress:<br><br>Any of the debt burden indicators are significant and take positive sign (+), entering the regressions in combination with:<br><br>- CPIA(-)<br><br>- Exchange rate volatility (+)<br><br>- Inflation (+)<br><br>- ICRG Bureaucracy Index (-)  |

estimations reported in Kraay and Nehru (2004) yield coefficients that enter the regressions significantly and with the expected sign, for of each of the key predictors: debt burdens, CPIA, and the real GDP growth. According to the two World Bank researchers, these findings confirm that countries with high debt burdens, low CPIA scores and low GDP growth are more likely to experience debt distress. An assessment of the predictive power of the core specifications employed, as well as a series of robustness tests, is then shown to corroborate the relevance and statistical significance of CPIA, debt burden, and real GDP growth as predictors of distress. However, when they replace real GDP growth – their central proxy for shocks – with real exchange rate depreciation and changes in the terms of trade, these alternative shock measures are shown to be statistically insignificant. Without investigating the relevance of shocks any further, the authors seem content to emphasise the superior statistical performance of the policy variable (CPIA) among the core regression models they estimate. Moreover, besides attesting the statistical significance of debt burden indicators and GDP growth as a measure of shocks, the authors acknowledge that “[...] the predictive power of the combined specification is considerably better than any univariate prediction, suggesting that it is important to take all three factors into account when assessing the likelihood of debt distress”<sup>23</sup>.

In sum, the key message of the World Bank study is unequivocal: high CPIA scores, that is sound policy performance, is the key to increased debt carrying capacity by developing countries, while their exposure to shocks is of secondary, yet statistically relevant, importance. Similarly explicit are its policy implications with regard to IDA aid allocation: (i) allotting more aid to countries with a higher CPIA ranking is compatible with debt sustainability concerns; (ii) allotting a higher grant share and lower aid share to countries with a lower CPIA ranking is likely to increase their debt sustainability.

The second column of Table 3.3 summarises the IMF approach to derive CPIA-dependent debt burden thresholds. In an attempt to reproduce and corroborate the main results of Kraay and Nehru (2004), IMF staff applies essentially the same methodology to a sample including low-income countries only, and with the

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<sup>23</sup> Kraay and Nehru (2004: 18)

inclusion of policy measures alternative to CPIA. Moreover, since the IMF researchers find real GDP growth – World Bank’s key proxy of shocks – to be insignificant in several of their estimations, they replace growth with GDP per capita and an African dummy in the fitted models. The former is taken as a measure of countries’ capacity to cope with external shocks, while the latter is supposed to capture the exceptionally high degree of vulnerability to commodity price shocks characterising the low-income African countries within the group of LICs as a whole. Among their so-called policy variables, the IMF focuses primarily on the CPIA, but also includes some additional measures, such as the International Country Risk Guide index, trade openness, inflation, and exchange rate volatility.

The IMF results are fully reported in Appendix Table A3.2. Finding the CPIA to be a statistically significant predictor of arrears accumulation, the IMF analysis corroborates the central thrust of the World Bank study. Moreover, the IMF study finds that trade openness, exchange rate volatility and the bureaucracy index all display significant predictive power when used in place of CPIA, thus leading to the conclusion that policy performance, however measured, represents a reliable predictor of distress. Finally, they find the African dummy and per capita GDP to enter regressions significantly, if tested jointly, which is interpreted as a confirmation of the role of shocks in determining debt distress. In sum, the DSF framework paper features the IMF staff analysis as a highly robust validation of the World Bank findings, thereby justifying the adoption of the CPIA as the central indicator guiding the new debt sustainability framework proposed.

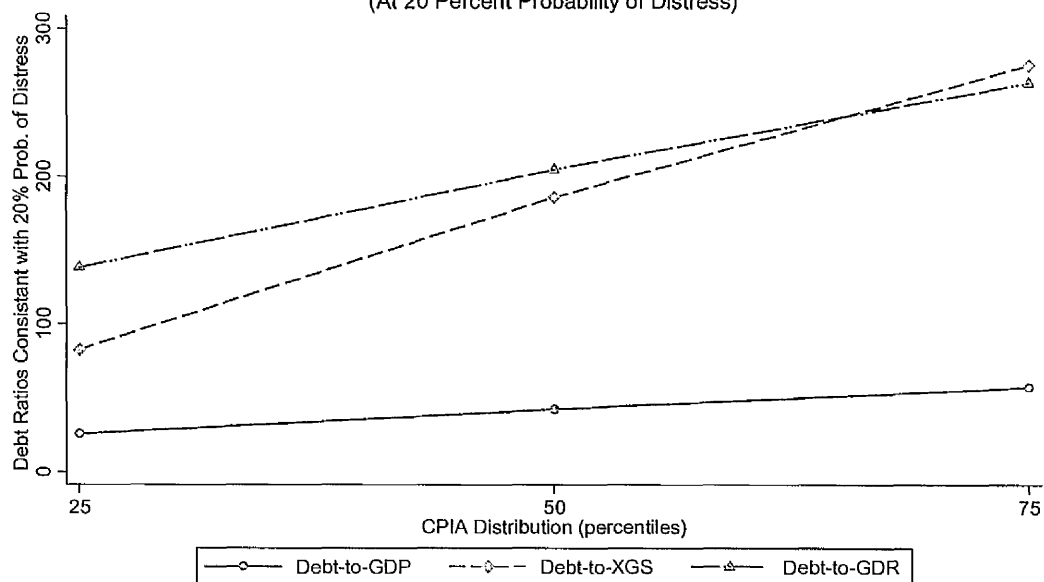
Having affirmed an inverse relationship between countries’ policy performance and the occurrence of debt distress, the next crucial step in the World Bank and IMF analyses consists in quantifying the implicit trade-off between debt indicators and policy variables. Thereby, they derive the CPIA-dependent thresholds underlying the DSF. As already mentioned, the thresholds directly result from the estimated probit coefficients, under the assumption of some acceptable degree of distress probability. The World Bank approach chooses distress probability to represent the average unconditional probability of experiencing a situation of distress across countries in their sample of identified episodes, which is found to be 25 per cent. Taking a slightly

different approach, the IMF sets the probability at 20 per cent. The predicted standard normal scores, or probits, accrue from the core estimations, and are translated into probabilities along the normal cumulative density function. For example, the World Bank's core specification includes among the explanatory variables a constant, the NPV debt-to-exports ratio, the CPIA and the real GDP growth rate. On the basis of the estimated vector of coefficients,  $b$ , and the sample percentile distribution of the explanatory variables, the trade-off between debt burden thresholds and CPIA ratings is readily established by solving the following identity for the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile of CPIA rankings, keeping real GDP growth at the sample average:

$$\Pr(y_j = 1) = 0.25 = \Phi(b_0 + b_1 * NPVDebt / EXP + b_2 * CPIA_{P,MS} + b_3 * \overline{GDPgrowth}) \quad (2)$$

This way, the authors are able to derive the NPV Debt/Exports thresholds compatible with poor, medium, or strong CPIA scores (i.e. at the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile of the CPIA ranking, respectively), and with a 25 per cent probability of debt distress occurring. Similarly, the authors derive debt thresholds for NPV-debt to GDP and debt service to export ratios.<sup>24</sup>

Graph 3.1: Sustainable Debt Level and CPIA  
(At 20 Percent Probability of Distress)



Data Source: IMF and IDA (2004a: 60 - Table 2). Also see Table A3.1 in the appendix to this chapter.

<sup>24</sup> See IMF and IDA (2004a: 20 - Table 1) and Kraay and Nehru (2004: 39 - Figure 5).

By the same method, the IMF derives policy-dependent debt and debt-service thresholds, as outlined in the left-hand panel of Table 3.1 above, as well as in Appendix Table A3.2.<sup>25</sup> The ensuing trade-off between the debt ratios and the CPIA, consistent with a 20 per cent probability of distress, is illustrated by Graph 3.1. It can be seen that the postulated relationship between policy performance and the debt ratios is highly positive. For example, in the case of the debt-to-exports ratio, a policy country with a 'good' policy (CPIA at the 75<sup>th</sup> percentile) is supposed to be able to carry three times as much external debt as a badly performing country (CPIA at the 25<sup>th</sup> percentile).

The choice of 20 per cent distress probability, or 25 per cent in the case of the World Bank study, is, of course, a matter of subjective judgement. However, it should be noted that while minor changes to the chosen distress value can be shown to have a significant influence on the absolute values of the derived debt thresholds, the relative distance between the latter in relation to poor, medium and strong performers remains largely unaffected. Since the implications for the DSF and IDA allocation are relevant in relation to relative distance, rather than absolute thresholds, a matter of greater concern with regard to the reliability of the indicative debt burden thresholds should actually be that the probit coefficients from which the latter are derived tend to vary significantly among alternative specifications in the regression models. While this is evident from the detailed results underlying the World Bank study<sup>26</sup>, the IMF fails to report any alternative specifications including the CPIA, besides the single column included in Table A3.2. In any case, because probit regressions are notably vulnerable to misspecification errors, and lack several of the standard testing procedures applicable to regression analysis, there cannot be any degree of confidence that the IMF specifications chosen to underlie threshold estimates represent an accurate and reliable predictor model of debt distress. Furthermore, it should be noted that the trade-off identity shown above (equation (2)) implies that the relationship between debt burden and quality of policy and

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<sup>25</sup> The thresholds of Table 3.1 are rounded values, indicating rough approximations the IMF applies for operational purposes. In contrast, Annex Table A3.2 shows the actual threshold values, as derived from the estimated coefficients.

<sup>26</sup> See Tables 4 to 7 in Kraay and Nehru (2004).

institutions is established by keeping real GDP growth rate at the sample average (or taking GNI per capita and the African dummy at the average, in the case of the IMF study). In Kraay and Nehru's sample, GDP growth is 4.4 per cent.<sup>27</sup> However, GDP growth being the only proxy for external shocks entering the actual specification underlying the determination of debt thresholds, calculating debt-policy trade-offs at the sample growth average effectively implies excluding the estimated effect from the shocks variable. It is precisely this exclusion of countries' vulnerability to shocks from the determination of indicative thresholds, underlying the rationale for a forward-looking assessment of the effects of shocks on debt sustainability, as operated by the second pillar of the DSF. Ultimately, the deliberate exclusion of shocks in the derivation of policy-dependent thresholds testifies to the extreme bias of this approach towards emphasising the CPIA, rather than shocks, as a determinant of debt distress. As mentioned above, CPIA is thereby made the operational variable, determining volume and grant share of aid allocation, while shocks are relegated to a secondary importance, merely informing the forecasting scenarios.

Unfortunately, the shortcomings of the empirical approach applied by the World Bank and IMF run even deeper, and severely undermine the reliability of the entire empirical framework underlying the new DSF. In particular, we identify the following shortcomings:

(a) Definition of debt distress

Alternative definitions of distress lead to large discrepancies in the identification of distress episodes, as witnessed by a comparison between the World Bank and IMF episodes. Since minor changes in the definition of distress lead to substantial alterations in the estimated coefficients, the computed debt burden thresholds are highly sensitive to alternative distress definitions. Indeed, Table A3.3 in the appendix to this chapter shows large discrepancies between the distress episodes calculated according to the IMF definition, and those resulting from use of the data made available by Kraay and Nehru. Furthermore, if the debt distress episodes are calculated according to the World Bank definition (see Table 3.3 above) and on the

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<sup>27</sup> As observed from the actual dataset, kindly made available by the authors, but not reported in their research paper.

basis of the available World Bank databases, these are seen to be different from those computed by Kraay and Nehru on the basis of their own dataset. As a result of these large discrepancies, the magnitude and degree of statistical significance of estimated coefficients vary according to the alternative debt distress episodes employed, rendering any precise and robust statistical assessment impossible.

Furthermore, it should be noted that the definitions of distress periods applied by the World Bank and IMF refer to 'last-instance' manifestations of debt distress, rather than capturing the precursor signs of illiquidity, such as the financial gap or illiquidity facing a country. If countries are assumed to have an incentive to avoid the accumulation of official arrears or IMF lending, thus buffering liquidity shortfalls through reduced imports and reserves accumulation, the BWI's distress variables are likely to provide an unreliable indicator of actual distress situations.

(b) Explanatory variables (predictors of distress)

The BWI's typical set of explanatory variables includes the CPIA, GDP growth, and various debt burden ratios. None of the specifications include measures of disbursement or volatility of aid, which, appropriately lagged, should explain a high portion of illiquidity and repayment problems. Furthermore, the significance of CPIA is likely to proxy aid disbursement and to some extent aid volatility, since aid allocation is mostly CPIA-driven. Put differently, the significance of CPIA is likely to result from it being endogenous to the aid allocation system itself. Finally, CPIA is as much a measure of policy performance, as it is of vulnerability to exogenous shocks, as well as of an undefined set of other factors affecting a country's CPIA score.<sup>28</sup> Without the introduction of further control variables, the CPIA's significance, even if confirmed, would thus have to be appropriately acknowledged as representing an indicator partly determined by external shocks. Consequently, the interpretation with regard to the predictive power of policy and shock variables would have to shift toward shocks and away from an exclusive focus on governance and policy.

Besides applying to the CPIA, this is certainly the case for all the policy variables included in the IMF study. For example, trade openness is a measure distorted by

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<sup>28</sup> See Nissanke and Ferrarini (2006).

shocks to imports and exports values; the real effective exchange rate is affected by a number of shocks to the trade, monetary and financial aggregates; inflation is strongly influenced by exogenous monetary and financial shocks, such as unexpected fluctuations in aid flows.

A similar argument can be put forward in relation to GDP growth, which the BWI consider to represent a shocks variable. On the contrary, economic growth should be taken to represent both the outcome of endogenous (policy) and exogenous (shocks) factors affecting a debtor country's economy. Similarly inadequate are the other shocks measures adopted in the IMF approach. For, there is no reason to assume the African dummy as representing a shocks measure per se, rather than capturing a number of unidentified structural features. In that sense, the African dummy would represent a measure of resilience to exogenous shocks, rather than measuring shocks per se, which however would make it partly redundant if used in conjunction with gross national income per capita.<sup>29</sup>

Ultimately, it would appear that the choice of predictors deployed in the various BWI probit specifications has resulted from a trial-and-error approach, or so-called horse-racing of variables, rather than being informed by a more solid underlying theoretical structure.

### c) Technical inaccuracies

A number of technical inaccuracies and more or less questionable choices in the statistical method are evident in both studies. Firstly, the basic choice of the empirical method, favouring probit analysis, is left unqualified, both with regard to the alternative choice of applying the logistic method instead<sup>30</sup>, and the application of non-parametric approaches, such as binary recursive tree analysis<sup>31</sup>. More generally,

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<sup>29</sup> This is the case because GNI per capita can be viewed as the central proxy of a country's resilience to shock factors.

<sup>30</sup> The logit approach has better properties in the presence of a pronouncedly uneven distribution of the binary independent variable, as appears to be the case of the World Bank distress episodes variable featuring a disproportionate number of non-distress (0) versus distress (1) events.

<sup>31</sup> Binary recursive tree analysis (BRT) is particularly suited in the presence of complex non-linear relationships among explanatory variables. A number of IMF studies have adopted this approach in the prediction of debt or currency crises, in particular Gosh and Gosh (2002) and Manasse et al. (2003). It is not clear why the IMF paper underlying the DSF apparently failed to apply similar analysis to further test its results for robustness.



there is nothing in the BWI approach that would resemble a more rigorous approach to estimation, as for example is evident from some of its precursor studies, such as that of Manasse et al. (2002).

Secondly, the derivation of policy-dependent thresholds assumes linearity in the coefficients derived from the probit model, while in fact they are non-linear. More specifically, the basic probit model of equation (1) above can be derived from the latent variable model<sup>32</sup>

$$y_i^* = x_j b_i + u_i, \quad (2)$$

by mapping the infinite space (of unobservable magnitude) of the latent variable onto the dichotomous dimension of the binary variable:

$$y_i = 0 \quad \text{if} \quad y_i^* < 0 \quad \text{and} \quad y_i = 1 \quad \text{if} \quad y_i^* \geq 0. \quad (3)$$

Therefore, while it is evident that the explanatory variables,  $x_j$ , have a linear effect on  $y_i^*$ , such linearity does not translate onto the dichotomous probability space of  $y_i$ , i.e. on the probability that  $y_i = 1$ . By wrongly making such an assumption, the BWI analyses disregard the fact that the marginal effects of the predictors, including the CPIA, are not constant, but change along the percentile distribution within the sample. As a consequence, the linear relationship assumed in the indicative debt burden thresholds and shown in Graph 3.1 introduces an upward bias in the trade-off between debt burden indicators and CPIA.

In a forthcoming companion paper to the present study, Ferrarini (2007) outlines the full results of an empirical reassessment of both the World Bank and IMF analyses, addressing the above caveats. While the final results from binary recursive tree analysis are still partly outstanding in relation to our re-estimation of the World Bank approach involving all the developing countries, it is possible here to present our key empirical findings in relation to the IMF study, involving the group of low-income countries.<sup>33</sup> We limit the following discussion to the results from that part of our

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<sup>32</sup> Following Baum (2006).

<sup>33</sup> However, it should be noted that the key findings presented below are essentially mirrored by those of our broader, fully-fledged deconstruction of the two BWI studies.

broader analysis, which refutes the IMF conclusions on the same methodological grounds as applied by the IMF. Our approach evolves along several steps, outlined next.

By adopting the IMF's distress classification to identify debt distress and non-distress episodes as the independent variable (Table A3.3), we first fit the above probit model (equation (1)) involving the same set of predictors as applied in the IMF approach. That is, we estimate a series of probit regressions, including among the explanatory variables alternatively one of three debt burden measures, the various policy indicators adopted by the IMF study, plus the control variables. Annex Table A.3.1 contains a detailed description of the various variables and data employed, and Annex Table A3.3 lists the distress episodes underlying estimations.

Table 3.4 below reports the results from this first tier of probit specifications in line with the IMF methodology. Note that for each specification reported in the table, the dependent variable is the debt distress dummy taking a value of one or zero, while the explanatory variables are: the three debt ratios, entering regressions alternatively; a so-called 'Indicator', referring to the variable specified at the top of each cell of the table (e.g. CPIA, Trade Openness); and the 'Controls', referring to the IMF control variables defined above. As can be seen, the results reported in the first two rows of the table are roughly (in qualitative terms) compatible with those reported by the IMF (Annex Table A3.2): the debt burden ratios are all highly significant, and the other indicators also enter the regression significantly and with the expected sign (with the exception of trade openness, when estimated in conjunction with the debt-to-GDP ratio, which mirrors the IMF result).<sup>34</sup> The CPIA coefficient is statistically significant, but at a lower confidence level than many of the other policy indicators, including various measures of governance. Unfortunately, a direct comparison with the IMF result is not possible in this case, since the CPIA data series employed in this study does not fully correspond to the original series available to the BWI (as

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<sup>34</sup> The negative sign of the estimated coefficients on Governance, ICRG, Rule of Law, results from the fact that a higher score in these indicators is associated with relatively worse country performance. It should also be noted that in probit regressions, the magnitude of the estimated coefficients depends on the scale of the underlying variable. As a result, the estimated magnitudes are not directly comparable to each other and the reader is advised to focus mainly on the level of significance instead.

Table 3.4: IMF-Style Probit Analyses - Table of Results. Dependent variable: Debt Distress (1/0)

|                | CPIA                               |          |          | Trade Openness       |          |          | REER Overvaluation           |           |          | REER Volatility                |           |          |
|----------------|------------------------------------|----------|----------|----------------------|----------|----------|------------------------------|-----------|----------|--------------------------------|-----------|----------|
|                | Debt/GDP                           | Debt/XGS | Debt/DGR | Debt/GDP             | Debt/XGS | Debt/DGR | Debt/GDP                     | Debt/XGS  | Debt/DGR | Debt/GDP                       | Debt/XGS  | Debt/DGR |
| Debt Ratio     | 0.017***                           | 0.003*** | 0.004*** | 0.019***             | 0.003*** | 0.005*** | 0.018***                     | 0.004***  | 0.004*** | 0.013***                       | 0.003***  | 0.004*** |
| Indicator      | 0.072**                            | 0.074**  | 0.011    | -0.591***            | 0.643*** | 0.184    | 0.002                        | 0.002     | 0.004**  | 0.000                          | 0.000     | 0.000**  |
| Controls       | 0.000                              | 0.000    | 0.937    | 0.000                | 0.000    | 0.944    | 0.000                        | 0.000     | 0.265    | 0.001                          | 0.018     | 0.487    |
| Thresholds:    | Consistent with 25% Distress Prob. |          |          |                      |          |          |                              |           |          |                                |           |          |
| Low Policy     | 32                                 | 126      | n/a      | 35                   | 146      | n/a      | n/a                          | n/a       | 397      | n/a                            | n/a       | 410      |
| Average Policy | 41                                 | 177      | n/a      | 41                   | 205      | n/a      | n/a                          | n/a       | 442      | n/a                            | n/a       | 410      |
| High Policy    | 45                                 | 203      | n/a      | 50                   | 242      | n/a      | n/a                          | n/a       | 479      | n/a                            | n/a       | 410      |
|                | Inflation                          |          |          | Inflation Volatility |          |          | ICRG                         |           |          | Rule of Law                    |           |          |
|                | Debt/GDP                           | Debt/XGS | Debt/DGR | Debt/GDP             | Debt/XGS | Debt/DGR | Debt/GDP                     | Debt/XGS  | Debt/DGR | Debt/GDP                       | Debt/XGS  | Debt/DGR |
| Debt Ratio     | 0.016***                           | 0.003*** | 0.004*** | 0.019***             | 0.003*** | 0.004*** | 0.018***                     | 0.003***  | 0.004*** | 0.018***                       | 0.003***  | 0.004*** |
| Indicator      | 0.003*                             | 0.005**  | 0.003    | -0.014**             | -0.012*  | -0.014   | -0.370***                    | -0.285*** | -0.091   | -0.627***                      | -0.528*** | -0.480** |
| Controls       | 0.000                              | 0.001    | 0.979    | 0.000                | 0.000    | 0.874    | 0.080                        | 0.002     | 0.184    | 0.000                          | 0.001     | 0.595    |
| Thresholds:    | Consistent with 25% Distress Prob. |          |          |                      |          |          |                              |           |          |                                |           |          |
| Low Policy     | 45                                 | 203      | n/a      | 49                   | 231      | 383      | 29                           | 125       | 292      | 30                             | 111       | 308      |
| Average Policy | 47                                 | 221      | n/a      | 50                   | 232      | 384      | 29                           | 125       | 305      | 42                             | 178       | 344      |
| High Policy    | 48                                 | 229      | n/a      | 50                   | 234      | 386      | 50                           | 210       | 328      | 53                             | 242       | 385      |
|                | Governance                         |          |          | EVI (*)              |          |          | Export Instability Index (*) |           |          | Export Concentration Index (*) |           |          |
|                | Debt/GDP                           | Debt/XGS | Debt/DGR | Debt/GDP             | Debt/XGS | Debt/DGR | Debt/GDP                     | Debt/XGS  | Debt/DGR | Debt/GDP                       | Debt/XGS  | Debt/DGR |
| Debt Ratio     | 0.017***                           | 0.003*** | 0.004*** | 0.019***             | 0.003*** | 0.005*** | 0.020***                     | 0.003***  | 0.005*** | 0.018***                       | 0.003***  | 0.004*** |
| Indicator      | -0.086***                          | -0.061*  | -0.052   | 0.021***             | 0.020*** | 0.035*** | 0.051***                     | 0.029***  | 0.051*** | 0.825***                       | 1.393***  | 1.823*** |
| Controls       | 0.000                              | 0.000    | 0.894    | 0.000                | 0.002    | 0.079    | 0.000                        | 0.000     | 0.390    | 0.000                          | 0.021     | 0.133    |
| Thresholds:    | Consistent with 25% Distress Prob. |          |          |                      |          |          |                              |           |          |                                |           |          |
| Low Policy     | 32                                 | 132      | n/a      | 33                   | 129      | 289      | 24                           | 106       | 341      | 31                             | 95        | 293      |
| Average Policy | 39                                 | 164      | n/a      | 41                   | 176      | 340      | 50                           | 199       | 367      | 42                             | 206       | 370      |
| High Policy    | 47                                 | 198      | n/a      | 48                   | 221      | 407      | 59                           | 229       | 410      | 48                             | 265       | 418      |

Notes: (\*) In the case of vulnerability indices, 'low policy' (high policy) thresholds are associated with high (low) vulnerability.

n/a indicates missing threshold values, when the estimator is not statistically significant.

\*\*\*, \*\*, \* denote significance at the 0.1%, 1% and 5% level respectively

Source: Author's calculations, based on the data described in Annex Table A3.1. For a list of debt episodes, see Annex Table A3.3.

**Table 3.5 : Probit Regression Results – CPIA and Governance vs. EVI and Instability Indicators**

| Dependent Variable:        | CPIA vs. EVI and Instability Indicators |           |           |           |  | KKM Indicators vs. EVI and Instability Indicators |           |           |           |           |           |           |           |
|----------------------------|---|-----------|-----------|-----------|--|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                            | Probit 1                                | Probit 2  | Probit 3  | Probit 4  | Probit 5   | Probit 6  | Probit 7  | Probit 8  | Probit 9  | Probit 10 | Probit 11 | Probit 12 | Probit 13 |
| Debt Distress (I/O)        |   |           |           |           |  |   |           |           |           |           |           |           |           |
| NPV Debt/Exports           | 0.003***                                | 0.004***  | 0.003***  | 0.003***  | 0.003***   | 0.004***  | 0.003***  | 0.003***  | 0.003***  | 0.004***  | 0.003***  | 0.003***  | 0.003***  |
| CPIA                       | 0.031                                   | 0.089*    | 0.046     | 0.027     | 0.027  |   |           |           |           |           |           |           |           |
| EVI                        | 0.021***                                |           |           |           |  |   |           |           |           |           |           |           |           |
| GT Index (ToF)             |   | 0.003*    |           |           |  | 0.003*  |           |           |           | 0.003     |           |           |           |
| Export Instability Index   |   |           | 0.023***  |           |  | 0.028***  |           |           |           | 0.022***  |           |           |           |
| Export Concentration Index |   |           |           | 1.392***  |  |   | 1.502***  |           |           |           | 1.423***  |           |           |
| Instability*Concentration  |   |           |           |           | 0.037***   |   |           | 0.042***  |           |           |           | 0.037***  |           |
| KKM Factor                 |   |           |           |           |  | -0.017  | -0.024    | -0.018    |           |           |           |           |           |
| Rule of Law (KKM)          |   |           |           |           |  |   |           |           | -0.299*   | -0.378**  | -0.335**  | -0.301*   |           |
| Constant Term              | -2.199***                               | -1.612*** | -1.724*** | -2.027*** | -1.619***  | -1.320***   | -1.649*** | -1.574*** | -1.554*** | -1.837*** | -2.192*** | -1.766*** |           |
| LR: CPIA or KKM            | 0.365                                   | 0.013     | 0.225     | 0.427     | 0.443  | 0.544   | 0.337     | 0.134     | 0.485     | 0.017*    | 0.001***  | 0.003**   | 0.010**   |
| LR: Vulnerability          | 0.000***                                | 0.014*    | 0.001***  | 0.000***  | 0.000***   | 0.021*  | 0.000***  | 0.000***  | 0.000***  | 0.091     | 0.001***  | 0.000***  | 0.000***  |
| Pseudo R2                  | 0.303                                   | 0.239     | 0.235     | 0.259     | 0.245  | 0.230   | 0.239     | 0.263     | 0.252     | 0.234     | 0.246     | 0.271     | 0.257     |
| Predictive Power WS        | 74                                      | 74        | 74        | 76        | 74   | 74  | 74        | 77        | 75        | 74        | 74        | 78        | 75        |
| Predictive Power OS        | 61                                      | 68        | 66        | 71        | 68   | 69  | 65        | 72        | 67        | 69        | 63        | 75        | 68        |
|                            | <b>Combined Specifications</b>          |           |           |           |  |   |           |           |           |           |           |           |           |
|                            | Probit 14                               | Probit 15 | Probit 16 | Probit 17 |  |   |           |           |           |           |           |           |           |
| NPV Debt/Exports           | 0.004***                                | 0.004***  | 0.004***  | 0.004***  | Degree of confidence in significance tests: (***) 0.1% (**) 1% (*) 5% ( ) >5%                              |   |           |           |           |           |           |           |           |
| CPIA                       | -0.024                                  |           |           | -0.033    | <b>Description of predictors:</b>  |   |           |           |           |           |           |           |           |
| EVI                        | 0.014**                                 | 0.013**   | 0.011**   |           | Net present value of debt as a ratio to total exports of goods and services, Kraay and Nehru data.         |   |           |           |           |           |           |           |           |
| GT Index (ToF)             | 0.004**                                 | 0.004**   | 0.005**   | 0.005**   | Country Policy and Institutional Assessment, World Bank data.  |   |           |           |           |           |           |           |           |
| Instability*Conc.          |   |           |           | 0.026**   | Economic Vulnerability Index, UN CDP data.   |   |           |           |           |           |           |           |           |
| KKM Factor                 |   | 0.001     |           |           | Gilbert-Tabova Terms of Trade Index (weighted export and import price deviations from 4-year average).     |   |           |           |           |           |           |           |           |
| Rule of Law (KKM)          |   |           |           |           | Instability and concentration interaction term.  |   |           |           |           |           |           |           |           |
| Aid (MA3)                  | -0.653**                                | -0.616**  | -0.555**  | -0.709*** | The principal component extracted from the singly five Kaufmann, Kraay and Mastruzzi indicators.           |   |           |           |           |           |           |           |           |
| Constant Term              | -1.695***                               | -1.755*** | -1.786*** | -1.264*** | Rule of Law is one of the Kaufmann, Kraay and Mastruzzi indicators.  |   |           |           |           |           |           |           |           |
| LR: CPIA or KKM            | 0.540                                   | 0.967     | 0.255     | 0.411     | Aid (MA3) is the average flow of loans and grants during the three preceding years.                        |   |           |           |           |           |           |           |           |
| LR: Vulnerability          | 0.011*                                  | 0.015*    | 0.045*    | 0.003**   | The regression constant.   |   |           |           |           |           |           |           |           |
| Pseudo R2                  | 0.279                                   | 0.274     | 0.271     | 0.282     | The likelihood-ratio test of significance of the CPIA and governance indicators, as described in the text. |   |           |           |           |           |           |           |           |
| Predictive Power WS        | 76                                      | 76        | 75        | 76        | The likelihood-ratio test of significance of the CPIA and governance indicators, as described in the text. |   |           |           |           |           |           |           |           |
| Predictive Power OS        | 71                                      | 71        | 68        | 71        | The test of overall fit in the context of maximum-likelihood estimation.                                   |   |           |           |           |           |           |           |           |

Notes: The database underlying probit analysis includes all observations over the distress and non-distress episodes outlined in Appendix Table A3.3. See Table A.3.1 for a detailed description of the database.

described in Annex Table A.3.1).

For each specification, Table 3.4 reports the test of joint significance of the two control variables, i.e. the African dummy and the logarithm of per capita GNI. We employ a two-tailed Wald test, testing the null hypothesis that both coefficients are jointly zero:  $H_0: \beta_{AD} = \beta_{GNI} = 0$ . The reported p-values of the test lead to the conclusion that the null hypothesis can be rejected with a high degree of confidence, with the exception of the model specifications including the NPV debt-to-domestic government revenue ratio. However, the lack of significance of the control variables in these cases is caused by the overall scarcity of revenue data, which reduces the number of available episodes in comparison to the alternative debt burden ratios. Since the typical problem of revenue data limitations in the case of low-income countries leads to insurmountable constraints also in the context of the present analysis, we tend to disregard the estimation results involving the revenue data, and choose to focus on the other two debt ratios instead.<sup>35</sup> Finally, the bottom rows in each of the estimation results reported in Table 3.4 list the implicit thresholds, computed in line with the methodology described by equation (2) above. It can be seen that the thresholds' magnitudes are roughly in line with those computed by the IMF.

At this point in the analysis, our empirical investigation departs from that of the IMF. Whereas the IMF investigation interprets results similar to those reported above as sufficient evidence to corroborate the World Bank's finding of the central relevance of the CPIA and other policy variables in explaining the occurrence of debt distress, we are compelled to further investigate the performance of vulnerability indexes in the context of the probit analysis laid out. For, the significance of the control variables in the above estimations, mirroring those of the IMF, should be interpreted as indicating the omission of a number of undefined latent variables explaining the particular degree of vulnerability characterising the sub-Saharan African countries among the group of LICs. However, as mentioned above, the IMF probit specifications fail to

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<sup>35</sup> The revenue data underlying this analysis was drawn from Kraay and Nehru's dataset, which displayed a slightly higher availability of observations than the revenue data available from the World Development Indicators and International Financial Statistics datasets.

include any variable suitable to appropriately isolating the debt distress effect of vulnerability factors. Instead of controlling directly for vulnerability, the IMF inappropriately subsumes vulnerability factors through the inclusion of so-called policy variables, whose magnitude however is affected by exogenous determinants. In light of these considerations, it should be clear that the central thrust of the IMF's findings and conclusions would be undermined if we were to find the underlying probit regressions to be unsuitable for upholding the statistical significance of policy variables upon the inclusion of vulnerability indices.

We investigate the role of shocks, in connection with CPIA and governance indicators, by first testing the performance of instability indices within the IMF-style probit specifications. The bottom row of Table 3.4 shows the outcome from testing the significance of the Economic Vulnerability Index (EVI) and two of its components, the Export Instability Index and the Export Concentration Index.<sup>36</sup> Each of these indices is shown to be highly significant, and enters the regressions with the expected sign: on average, the higher a country's instability, concentration or overall economic vulnerability, the greater its likelihood of experiencing distress. Interestingly, the results show that the null hypothesis of the control variables is still not rejected, which would point to the presence of further factors of vulnerability, not captured by the indices deployed.<sup>37</sup>

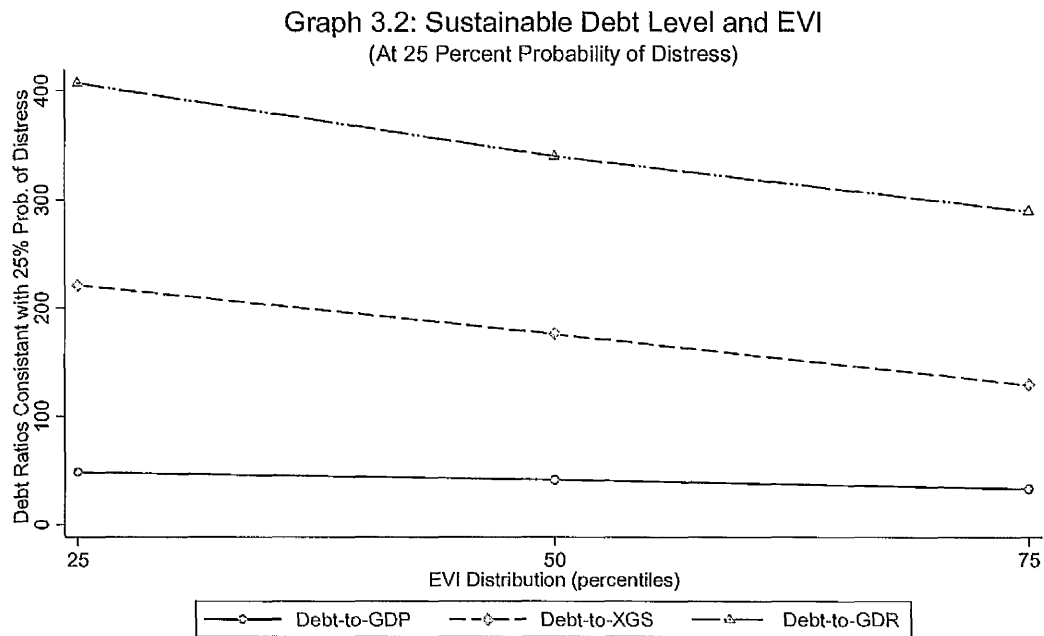
On the basis of these results, we are now able to deduce debt thresholds in relation to economic vulnerability, as an alternative to the IMF's CPIA-dependent thresholds. Graph 3.2 illustrates the trade off between debt ratios and the EVI, computed on the basis of the estimation results reported in Table 3.4. At 25 per cent likelihood of distress, highly vulnerable countries (i.e. those allocated at the 75<sup>th</sup> percentile distribution of the EVI) are deemed compatible with debt ratios that are far lower than those associated with the low-vulnerability countries in the sample. Therefore, it may be argued that at this stage of analysis our reassessment leads to a policy conclusion putting the EVI on equal footing with the CPIA. Put differently, the

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<sup>36</sup> The EVI and its components are described in Annex Table A3.1.

<sup>37</sup> However, we also note that the control variables are less significant now, than in the previous regressions, if individually tested (these tests are not reported here, but can be made available upon request).

application of the IMF methodology would be conducive to assigning the EVI a central role in guiding the volume and grant allocation of IDA aid, in the same



manner and with the same degree of confidence as the IMF analysis attempts to establish the primacy of the CPIA. The policy implications from this assertion should be clear. For example, with aid and grant allocation centred around the EVI, rather than CPIA, countries with low vulnerability (25<sup>th</sup> percentile) would be deemed capable of carrying almost twice the volume of debt as low-vulnerability countries (75<sup>th</sup> percentile), while facing the same probability of debt distress consistent with the debt-to-exports ratio. As a result, the relative share of aid allocation would tilt towards low-vulnerability countries, while the relative weight of grant financing would increase in favour of highly vulnerable countries. While it should be emphasised that we would not necessarily argue in favour of centring aid allocation on the EVI in such a mechanical fashion and with the implications described, our key point of contention is that the IMF empirics is geared towards an essentially unsubstantiated establishment of the CPIA as a guiding principle of debt sustainability, at the expense of vulnerability concerns.

Next, we test the statistical significance of economic vulnerability indicators in conjunction with the central policy indicators deployed by the IMF, fitting a number

of alternative probit models to the same dataset underlying the previous regressions. Adopting debt distress episodes (identified, as before, according to the IMF definition) as the binary dependent variable, the performance of each predictor is first tested in conjunction with the debt-to-exports ratio and a constant term. Annex Table A3.4 summarises the outcome of the preliminary estimations, while Table A3.5 lists pair-wise correlations among the predictors. It should be noted that we do not report the results relating to regressions involving the debt-to-GDP ratio, instead of the exports ratio, since they are qualitatively identical across all the specifications envisaged. Moreover, we exclude the debt-to-revenue ratio from our analysis, due to the above mentioned data limitations relating to domestic government revenue series in the available databases. Again, all explanatory variables used for regressions are described in Annex Table A3.1. With the exception of the aid flows and the terms of trade indexes, all predictors are lagged by one period to control for endogeneity.

With regard to the single probit estimations listed in Table A3.4, we find that all the indicators are significant and enter the regressions with the expected sign. That is, countries associated with higher debt ratios; a relatively higher (i.e. worse) CPIA ranking; a lower (i.e. worse) governance or rule-of-law ranking; a higher (i.e. worse) economic vulnerability ranking (as measured by either the EVI, instability, or concentration indices, or by a combination of the instability and concentration indices); and those with relatively lower aid inflows are associated with a higher likelihood of experiencing debt distress over time. With regard to the GT Index, measuring the terms of trade deviation from four-year moving averages, we note a relatively lower significance of its estimated coefficient (at the five per cent level), taking a positive sign.<sup>38</sup> If confirmed by the more elaborate model specifications below, we are inclined to interpret this indicator's positive sign as an indication of the distress-inducing effect of relatively lower terms of trade in the years preceding the distress episodes, considering that it enters the regressions with no time lag. As a result, the relative terms of trade increase occurs at a time when distress is already

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<sup>38</sup> Also the pair-wise correlation of the GT Index with the remaining predictors is far lower (see Annex Table A3.5).



manifest, and the indicator marks a situation of improvement on the previous years of relatively depressed price conditions.

Table 3.5 summarises the results from three further series of probit estimations, testing the performance of CPIA and alternative measures of policy performance against the various vulnerability indices. The first group of estimations (labelled Probit 1 to Probit 5) assesses the significance of the CPIA after including each of the vulnerability indicators taken individually. The outcome is striking: the CPIA ceases to be significant when tested in conjunction with the EVI, its instability and concentration components, or the joint instability and concentration term. Instead, each of the economic vulnerability indicators enters the regression with the expected sign and with the highest degree of significance (i.e. with a p-value below the 0.1 per cent threshold). As an exception, the CPIA is shown to maintain a low degree of statistical significance in combination with the GT Index, which is however explained by the generally low performance of the GT Index if used in isolation from the more comprehensive vulnerability indices (see below). Finally, the debt-to-exports ratio confirms, as expected, its high degree of significance in predicting debt distress episodes.

In order to test these central results more thoroughly for statistical robustness, we apply the likelihood-ratio (LR) test in addition to the standard Wald test, the results of which are associated with the number of stars next to the estimated coefficients in Table 3.5. In the case of maximum-likelihood (ML) estimations, the Wald test involves assessing the null hypothesis with regard to any of the coefficients' taking value zero, along a standard two-tailed test on the basis of the z-statistic.<sup>39</sup> In contrast, the LR test assesses the same hypothesis by comparing the log-likelihood from the full model with those of a restricted model imposing certain constraints. For example, in order to test for the significance of the CPIA and EVI in the case of the Probit 1 model in Table 3.5, we first compute the log-likelihood of the full model, including the debt ratio, CPIA, EVI and a constant term. We then re-estimate the log-likelihood

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<sup>39</sup> Essentially, the Wald test for ML estimations mirrors the Wald test for ordinary least squares regression analysis, with the difference that the latter is conducted on the basis of Student's t-statistic. Of course, for the Wald test to be reliable, the underlying assumption must hold that the ML estimators be distributed asymptotically normally.

twice, first excluding the CPIA and subsequently the EVI, before comparing the full model with each of the restricted models. If the constraints implied by the null hypothesis (e.g.  $H_0 : \beta_{CPIA} = 0$ ) significantly reduce the log-likelihood, according to the standard assessment along the  $\chi^2$  test statistic, then the null hypothesis is rejected.

The reason for applying the LR test to our analysis is its greater degree of reliability in the presence of finite samples in the context of ML estimation.<sup>40</sup> Implementing the test in our probit models one to five (Table 3.5), we find that it fully validates the outcome of the Wald test, thereby confirming the statistical significance of the economic vulnerability indicators, and the lack thereof in the case of the CPIA. Furthermore, the LR test fails to confirm the five per cent level of significance resulting from the Wald test in relation to the CPIA when it is estimated in combination with the GT Index, while it confirms the significance of the latter. In sum, all the LR tests confirm our central finding, which rejects the significance of the CPIA and governance indicators, while emphasising the role of economic vulnerability indicators in predicting low-income countries' debt distress.

As a test of overall fit, Table 3.5 displays the pseudo-R-squared statistic at the bottom of each of the models estimated. Its value oscillates around 0.25, indicating an acceptable degree of fit. However, ML estimation does not allow for a proper R-squared to be applied, and the pseudo-R-squared represents a rather unreliable substitute.<sup>41</sup> A more suitable test in the context of logistic regressions is the assessment of each model's predictive power.<sup>42</sup> We choose to implement two alternative estimates of predictive power. The first assesses a model's capacity to predict correctly the actual occurrence of debt and non-debt episodes within the entire sample underlying estimations. The number of correctly predicted episodes, as a ratio of the overall number of episodes, provides an indication of the model's predictive power. Table 3.5 reports this ratio in percentage terms (see 'Predictive Power WS'). At an average value of 75 per cent of correctly predicted episodes, it

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<sup>40</sup> However, the LR test is asymptotically equivalent to the Wald test. For a detailed exposition of post-estimation issues relating to ML regression, see Greene (2003: 492-).

<sup>41</sup> See Greene (2003).

<sup>42</sup> A similar method is applied by Kraay and Nehru (2004).

indicates a generally strong predictive power across all the models, with slightly higher ratios associated with the less parsimonious models (i.e. those with a higher number of predictors). However, since the set of observations underlying estimation and prediction by the within-sample test is the same, a stronger variant of the test involves estimation of coefficients on the basis of one sub-sample of data, and prediction on the basis of another. We therefore implement a so-called out-of-sample test of predictive power by first fitting the probit models to a subset of data including all available observations between the years 1970 and 1987, and then predict the distress events over the years 1988 to 2002 on the basis of the estimated coefficients of the various predictors. Table 3.5 ('Predictive Power OS') shows the out-of-sample predictive power of our models to be generally lower than that of within-sample assessments. Of course, this outcome confirms our expectations, since the relationships between predictors and a dependent variable cannot be assumed to remain constant across the two periods of time covered by the sub-samples. Nevertheless, Table 3.5 shows that the out-of-sample power of the specifications involving a more comprehensive set of predictors exceeds 70 per cent, confirming the remarkably good fit of the models employed.

In light of the above results, it may still be argued that they ultimately fail to prove the lack of significance of the CPIA in predicting debt distress episodes, when used in conjunction with economic vulnerability indicators. For, the CPIA series underlying the regressions is based on rankings by quintiles and also includes fewer observations, than in the full set of CPIA scores available to the analyses conducted by the World Bank and IMF. While this is obviously the case, the simple fact that the broader research community is precluded from accessing the original CPIA series is hardly an acceptable argument for validating the outcomes and robustness of empirical research conducted by the BWI on the basis of CPIA data.<sup>43</sup> However, Kraay and Nehru (2004) claim that their main results hold also when tested on the basis of country-rankings along the Kaufmann-Kraay-Mastruzzi (KKM) governance indicators, instead of the CPIA. We test this with a second series of estimations,

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<sup>43</sup> All requests for access to the original CPIA series underlying the BWI analyses for the purpose of the present study have been refused.

shown in Table 3.5 as Probit 6 to Probit 13. To operationalise the KKM data for use in our estimations, we first extract the principal component from the six dimensions constituting the KKM indicator: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Finding that the first factor obtained from principal component analysis explains about 70 per cent of the overall variation in its single dimensions, we decided to retain its predicted score as the representative KKM factor for probit analysis (see Annex Table A3.5). In addition, we decided to adopt one of the KKM indices, Rule of Law, as an alternative predictor in regressions, following Kraay and Nehru (2004), who show that this measure of institutional quality is a significant predictor of distress if used as an alternative to the CPIA.<sup>44</sup>

The upper-right panel of Table 3.5 summarises the estimation outcomes assessing the performance of the KKM factor (Probit 6 to 9) and the Rule of Law index (Probit 10 to 13), in conjunction with the debt-to-exports ratio and the vulnerability proxies. An interesting pattern emerges from these regressions: both the Wald and LR-tests clearly confirm the lack of significance of the comprehensive KKM factor, while attesting the high degree of significance of the vulnerability indexes. By mirroring the previous results in relation to the estimations involving the CPIA, this finding crucially corroborates the failure of comprehensive policy or governance indicators to explain, or successfully predict, debt distress episodes. Surprisingly, however, the narrower rule of law component is found to be consistently significant when tested against the various EVI measures alternatively enter the regressions, though to a lesser degree. Although this finding would appear to confirm Kraay and Nehru's results with regard to the KKM rule of law index, it is somehow puzzling if considered in the context of the KKM principal component's evident lack of explanatory power. For, the KKM factor displays a substantially higher correlation with the CPIA (see Annex Table A3.4) and is, by construction, a qualitatively superior synthesis of the KKM governance indicators than the rule of law index. Indeed, the rule of law index is merely one out of six dimensions of governance, and

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<sup>44</sup> However, the Rule of Law index features a weaker explanatory power than CPIA in their regressions. See Kraay and Nehru (2004: 18-19).

Kraay et al. (2004) themselves provide little reason for privileging one over another. Perhaps more relevantly, Kraay and Nehru (2004) omit to explain their choice of this particular index as an alternative to CPIA, and neglect even to envisage the use of a more comprehensive surrogate for the KKM indices. While these questions remain unanswered, we decided to resolve the KKM puzzle in the context of our analysis by testing the remaining five indices for significance. Should the majority of the indices indeed confirm the finding relating to the rule of law index, the reliability of the principal component would be undermined. The results, summarised in Annex Table A3.7, confirm the opposite: none of the KKM indices enter the regressions significantly (though all do so with the expected sign). On this basis, we are able to confidently reject the hypothesis that KKM governance indicators, as a substitute for CPIA, represent a statistically significant measure relevant to the prediction of debt distress episodes. Furthermore, in the absence of any evidence that could support an alternative explanation, we are tempted to interpret the significance of the rule of law index as a spurious regression result, probably caused by a peculiar correlation pattern with the debt distress variable in the sample underlying this analysis.<sup>45</sup>

Finally, as the last step of our probit analysis, we fit a series of models including alternative combinations of governance and vulnerability indicators, in conjunction with average aid inflows and the terms of trade index. We expect aid and the price trend to capture the liquidity effects of different magnitudes of overall loan and grant financing, as well as the implicit income effects from terms of trade shocks, during the years preceding the occurrence of debt distress episodes in low-income countries. In line with our expectations, the results from these last specifications, labelled Probit 14 to Probit 17 in Table 3.5, attest to the statistical relevance of both the moving average of aid and the GT index in predicting distress episodes. That is, countries enjoying relatively higher aid inflows are less likely to experience debt distress during any period covered by our sample, while countries experiencing a relative depression in their terms of trade during the years preceding distress episodes are more likely to run into a situation of distress. Moreover, the regressions confirm our

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<sup>45</sup> Moreover, the fact that our finding confirms the IMF study's with regard to the rule of law index testifies to the close similarity between the databases underlying the two analyses. This should reinforce the crucial bearing of our findings and conclusions on those reached by the IMF.

previous finding: the debt-to-exports ratio and the vulnerability indexes are found to be highly significant, while the CPIA and governance indices fail to enter regressions with an acceptable degree of significance when tested in combination with any of the measures of vulnerability. Furthermore, we find that the LR-test now assigns a slightly lower degree of confidence to the vulnerability indices, which is in line with our expectations relating to their joint assessment with liquidity measures. Finally, it should also be noted that the Rule of Law index ceases to be significant when the liquidity controls are introduced.

In sum, our empirical re-assessment of the BWI analyses underlying the DSF provides overwhelming evidence for questioning the role of the CPIA and governance indicators as reliable and significant predictors of debt distress episodes involving low-income countries. Indeed, on the grounds of similar data and methodology applied by the IMF, we reach the unequivocal conclusion that their finding in relation to the CPIA and other policy indicators results essentially from a misspecification problem. Failing to include vulnerability and liquidity measures among the crises predictors, the IMF study produces the empirical outcome supporting the CPIA's central role within the proposed DSF. However, such evidence is proven spurious when the CPIA and other governance measures are tested in conjunction with the EVI or its single components, as well as simple measures capturing conditions of relative illiquidity. Indeed, we demonstrate that it is exactly these factors of structural vulnerability to exogenous shocks that significantly explain debt distress episodes involving the LICs over time, rather than the World Bank's governance indicators.

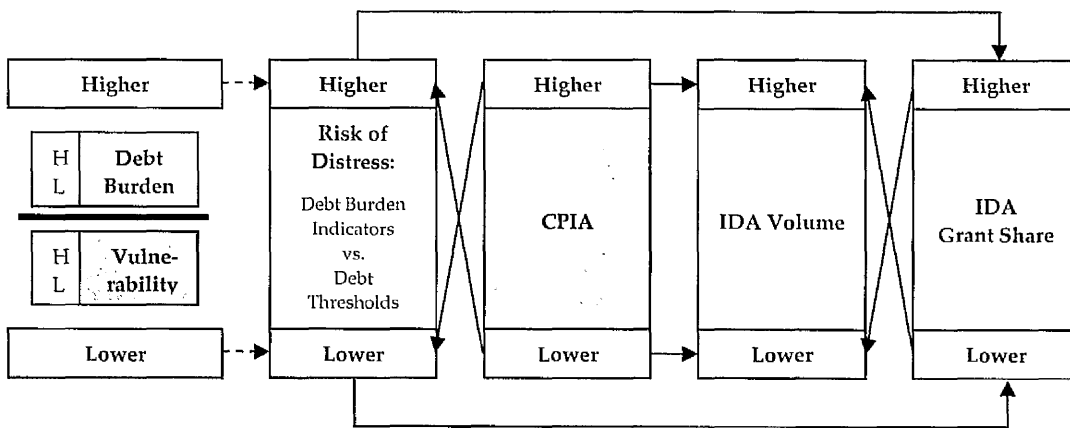
By failing to investigate more thoroughly the robustness of the CPIA and alternative governance indicators to the introduction of more relevant predictors, the IMF study essentially undermines the credibility of its own analysis, and thereby that of the DSF as a whole.

### **3.3.2 The CPIA bias of the DSF and its neglect of vulnerability**

Despite the fact that neither the policy nor the shock measures employed in their empirical analyses would actually be conducive to supporting such a supposition, it should be recalled that the BWI base their proposal for the new DSF on the claim that

CPIA, debt burden and shocks are equally significant predictors of debt distress. However, the framework paper then assigns to the CPIA, rather than to shocks, the central role in determining so-called sustainable thresholds. Although inconsistent with their own conclusions, the BWI thereby relegate vulnerability to a subsidiary, rather than equal, role in guiding the debt sustainability assessment and its lending implications. To better clarify these aspects, Chart 3.2 stylises the asymmetric roles assigned to the key determinants of debt distress – debt burden, CPIA and shocks – within the DSF and the broader implications for IDA allocation. Each box represents a stylised element of the DSF/IDA14 framework, and the arrows indicate the direction of causal relationship between these elements, for convenience assuming

**Chart 3.2: The CPIA-Centred Debt Sustainability Framework – Stylised Implications**



away any multiple feedback effects. Overall, the chart illustrates how a country's CPIA score determines the amount of IDA country allocation, and, together with the country's debt burden indicators, the grant share it is deemed eligible for. For example, the lower a country's CPIA ranking, the lower will be its relative share of aid within the IDA envelope, and the higher its risk classification, everything else being the same. As a consequence, the overall volume of aid flow to that country would be further reduced in proportion to the discount applied to the higher grant share established by the traffic light system. It may thus be argued that by trying to address longer-term debt stock solvency concerns through increased grant financing, the DSF/IDA14 framework introduces a perverse liquidity effect concerning the

immediate and shorter-term problems associated with situations of debt distress. In fact, with a 20 per cent upfront reduction in overall aid allocation, the DSF reduces current net IDA transfers to a country during a period of time equal to the grace period of IDA loans (typically 10 years). Ultimately, to the extent that it is illiquidity, rather than insolvency, that determines a debtor country's debt sustainability<sup>46</sup>, the CPIA focus of the DSF causes sustainability concerns to succumb to the prerogatives of the extant IDA allocation framework, at the cost of losing its effectiveness in dealing with low-income countries' debt crisis.

In contrast to CPIA, vulnerability to external shocks enters the DSF merely via the forecasting exercises constituting its second pillar, while it is left out the core IDA-allocation process. The outer left box of Chart 3.2 illustrates the marginal weight assigned to vulnerability to shocks, shown to enter the DSF exclusively through the assessment of effects from simulated changes to the denominator variables of the debt burden indicators. That is, vulnerability is assessed together with the forecasted evolution of a country's debt burden (the numerator) in terms of its likely impact on debt burden indicators over time. Assume, for example, that a country scoring low in terms of CPIA also has a history of high vulnerability to external shocks affecting its exports and repayment capacity. Then, insofar as the country's volatility is reflected in the denominator of the debt stock-to-exports ratio and in the historical scenario or baseline assumptions regarding future export revenues, the stress tests of the DSF should pick up higher standard deviations and thus signal potential breaches of one or more debt burden indicators against thresholds over time. However, as it is currently operated, the DSF/IDA14 would not take into account such a finding in terms of the decision made regarding the country's volume of IDA allocation. Rather, the DSF proposal suggests, in line with the usual BWI tenet, that "the appropriate policy response [...] would generally involve some combination of policy adjustment to reduce the overall level of borrowing, and – where possible – a higher share of grant financing or increased concessionality on planned borrowing."<sup>47</sup> Therefore, provided that it has not already been placed in the highest category of risk

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<sup>46</sup> On the centrality of illiquidity, as opposed to insolvency, the reader is referred to the discussion in Chapter 2.

<sup>47</sup> IDA and IMF (2004a: 28)



distress, the implication for the low-CPIA-high-vulnerability country is likely to be an upward shift in the risk category. Accordingly, its grant share would further increase and the IDA volume fall, on top of the adjustment-induced reduction in the level of borrowing, should there be any. In sum, the potential risk from a country's vulnerability to exogenous shocks is dealt with on a purely informative ex-ante basis made in accordance with the BWI's judgement of best response, by which potential effects from vulnerability may be translated into a combination of policy adjustment conditionalities, and, possibly, an increase in the grant share (say, from 50 to 100 per cent, minus the implicit up-front reduction of 20 per cent in overall aid disbursements).

Finally, it should be noted that the marginalisation of vulnerability concerns against policy prerogatives is also evident for the case of a country with low CPIA and low vulnerability. In such a case, the dynamic stress tests would show none of the country's debt burden indicators to be in breach of indicative thresholds over time. As should be clear from Chart 3.1, there would be no effect in terms of the volume and grant share of IDA allocation to that country, since this would be determined solely by the static threshold analysis of the DSF's first pillar.

In sum, the CPIA constitutes the common central factor underlying both the decision processes relating to aid allocation and debt sustainability, while vulnerability plays an ancillary role exclusively in the DSA. While a framework centred on the concept of performance-based indicative debt burden thresholds ensures overall compatibility with the prerogatives of the performance-based allocation system of IDA, its failure to assign a more central role to vulnerability in guiding both the aid allocation and debt sustainability process remains largely unjustified. Insofar as vulnerability to shocks represents a key determinant of debt distress, any DSF that fails to effectively translate vulnerability assessments into appropriate policy responses in terms of volume and timing of aid is bound to fail to meet its objective of making debt positions sustainable.

### **3.3.3 The major shortcomings of the new Debt Sustainability Assessment**

The inappropriate and biased treatment of policy against vulnerability is pervasive across all the features of the DSF, including its newly devised Debt Sustainability

Assessment (DSA). While its central function within the DSF has been outlined above, it remains here to examine the crucial shortcomings of the DSA's basic accounting mechanism with regard to the distinction of endogenous factors affecting a debtor country's debt sustainability.

Following World Bank (2005b), we first consider the method by which the DSA's basic accounting framework is derived from the fundamental balance of payment identity, expressed as:

$$CAB + KAB + \Delta R \equiv 0. \quad (4)$$

Where  $CAB$  is the current account balance;  $KAB$  the current and financial account balance; and  $\Delta R$  denotes change in net international reserve assets. The BOP identity can equivalently be expressed to highlight the factors determining the evolution of external debt:

$$D_t \equiv (1 + i_t)D_{t-1} - TB_t - Tr_t - FDI_t + \Delta R_t \quad (5)$$

where  $D_t$  is a country's nominal external debt stock in current U.S. Dollars;  $i_t$  is the nominal interest rate on external debt;  $TB_t$  is the trade balance (net exports of goods and services);  $Tr_t$  are transfers of the current account, including grants and remittances, and other non debt-creating transfers, including debt relief; and  $FDI_t$  is net foreign direct investment and portfolio flows.<sup>48</sup> From (5), it is clear that in order to close a financing gap in period  $t$ , ensuing from an excess of financial requirements (mainly the trade deficit, plus debt service and changes in reserve holdings) over non debt-creating resources (mainly grants, FDI and workers' remittances), the typical low-income country will have to resort to new external loans, thereby putting upward pressure on its external debt stock,  $D_t$ .

Since the DSA chooses the ratio of debt stock to GDP as the key measure of debt burden, the evolution of external debt burden is expressed as the ratio of the external debt stock and its determinants to GDP. Expressing all terms of identity (5) as a ratio to GDP:

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<sup>48</sup> Note that  $CAB = (1 + i_t)D_{t-1} - TB_t - Tr_t$  and  $KAB = D_t + FDI_t$ .

$$\Delta d_t = d_t - d_{t-1} \equiv i_t d_{t-1} \frac{y_{t-1}}{y_t} - tb_t - tr_t - fdi_t + dr_t, \quad (6)$$

where small letters indicate the variables as ratio to GDP;  $y_t$  is GDP in period  $t$ ; and  $\Delta d_t$  is the change in external debt stock in relation to period  $t$ .

Finally, expressing the inverse ratio of change in GDP as:  $\frac{y_{t-1}}{y_t} = 1 + g_t + \rho_t + g_t \rho_t$ ,

that is by splitting GDP growth to its real and price components –  $g_t$  and  $\rho_t$  respectively – and then replacing for GDP change in identity (6), the following expression is derived:<sup>49</sup>

$$\Delta d_t \equiv \frac{i_t d_{t-1}}{1 + g_t + \rho_t + g_t \rho_t} - \frac{g_t d_{t-1}}{1 + g_t + \rho_t + g_t \rho_t} - \frac{\rho_t (1 + g_t) d_{t-1}}{1 + g_t + \rho_t + g_t \rho_t} - tb_t - tr_t - fdi_t + dr_t \quad (7)$$

Identity (7) highlights the determinants of year-to-year changes in the debt stock to GDP ratio, which include the financing gap (as in (6)), plus the factors determining GDP growth, namely the change in interest rate on external debt, the real GDP growth rate, and price and exchange rate changes (the first, second, and third term on the right-hand side, respectively). The signs taking each of the terms on the right-hand side of identity (7) indicate that a rise in the trade deficit, the interest rate, or reserve holdings puts upward pressure on the external debt stock, while higher real GDP growth, domestic exchange rate appreciation, price inflation, net inflows of grants, remittances, FDI and portfolio flows will have the opposite effect.

Based on the accounting framework defined by identity (7), the new DSA explores the future evolution of a LIC's external debt by forecasting its key determinants. In particular, taking GDP as representing a debtor economy's central measure of repayment capacity, the new DSA is based on a GDP-centred concept, which the BWI consider to represent endogenous debt dynamics. Endogeneity is thereby simply assumed to be expressed by the proportion of change in the external debt stock explained by changes in nominal GDP, in turn distinguishing the GDP's real growth from price components. In contrast, all other factors influencing external debt are subsumed into the two categories of net-debt creating flows and a residual, and are

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<sup>49</sup> By simple manipulation, not repeated here (see World Bank, 2005b).

expressed as ratios to GDP to allow for a direct comparison with the so-called endogenous factors.

Of course, to label GDP-related changes to the external debt ratio as 'endogenous' is misleading, to the extent that a debtor country's GDP is determined by a wide array of factors, only some of which the country authorities have the power to influence. In fact, commodity and aid-dependent low-income countries are well known to possess very limited control over the actual development of their stream of income. Variations to the income stream are mostly determined by external or exogenous causes, such as the terms of trade affecting the trade balance, or the inflows of official aid and private remittances. Therefore, it may be argued that the BWI's focus on external debt and its determinants as a ratio to GDP could be described as endogenous only to the extent that it explains changes to GDP, and thereby to all the variables expressed in terms of their ratio to GDP. However, this relates the concept of endogeneity to the assessment process itself, rather than the causal origin of factors explaining LICs' evolution of external debt. To see the point, it is sufficient to consider that any rate of nominal GDP growth exceeding that of nominal external debt causes the debt to GDP indicator to decline, and the same applies to any other variable expressed as a proportion of GDP. However, such decline *per se* neither implies sustainability in the external debt position, nor does it distinguish factors that are endogenous to debtor country policy from those which are not.

The question arises as to why the BWI choose the DSA to address a largely meaningless question of debt stock evolution in terms of GDP, while ignoring the more relevant distinction between exogenous versus endogenous factors affecting external debt sustainability.<sup>50</sup> Arguably, the most plausible answer is that such a distinction is not centrally instrumental to the DSF. This is because the DSF assigns a central role to countries' CPIA rankings in the assessment of both debt sustainability and policy, whether or not enacted in response to external shocks, while policy conformity with IMF/IDA conditionality is assessed and rewarded outside the realm

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<sup>50</sup> If anything, an analysis of external debt stock evolution in terms of GDP is meaningful in terms of cross-country comparisons, including the comparative effect of inflation and exchange rate variations across countries. However, the DSA is in the first place an instrument addressing the sustainability of external debt in the case of country-specific analysis.

of the DSA as such.<sup>51</sup> Though consistent within the broader DSF and IDA allocation context, we argue that by failing to make such a crucial distinction, the DSA is unsuitable for identifying the key causes undermining debt sustainability, and thus for guiding the lending and relief responses of the international community. Indeed, our proposal for an alternative accounting method to that of the DSA, outlined in Chapter 5 below, extensively demonstrates that a suitable distinction between the factors affecting debt sustainability is indeed feasible, and that such an assessment is the precondition for the introduction of state-contingent debt instruments that are conducive to the achievement of debt sustainability.

Besides the inappropriateness of the DSA accounting mechanism, we identify two further shortcomings undermining its central analytical role within the debt sustainability framework: firstly, its reliance on a set of debt burden indicators that are intrinsically sensitive to revisions in parameters and accounting practices, thus failing to provide reliable measures which are directly comparable over the extensive time horizons of simulations; secondly, its central focus on external stock analysis, rather than emphasising the crucial factors of liquidity, i.e. the flow variables relating to financing requirements, available domestic resources and net financial transfers. We now consider each of these issues in turn.

(i) Choice of Debt Burden Indicators:

DSA simulations are essentially focussed on the evolution of three key indicators: the NPV of debt to GDP ratio, as a measure of a country's external debt burden in relation to its overall availability of resources; the NPV of debt to exports ratio, in relation to the earning capacity of foreign exchange; and the debt service ratio, measuring the drain on a country's current resources due to debt service obligations. NPV measures are generally preferred to nominal measures in the context of low-income countries, since they capture the high grant element – or concessionality – of the overall external debt stock outstanding. By representing the discounted value of a country's overall future debt service obligations, its NPV debt stock is supposed to provide an assessment of the actual debt burden, which reflects the lower debt

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<sup>51</sup> Most notably, this occurs through the performance-based allocation system (PBA) adopted in the allocation of IDA, determining the volume of ODA disbursements (see Chart 3.1).

service payments associated with highly concessional – as opposed to non-concessional – debt. Much of the criticism that has been raised regarding the use of NPV indicators as thresholds for LICs' qualification for the HIPC Initiative equally applies to the DSF, and need not be repeated here.<sup>52</sup> However, our crucial concern in the context of debt sustainability analyses relates to NPV indicators' intrinsic susceptibility to variations in parameters and accounting methodology. For, if the effects from changes in parameters or methodology overshadow those resulting from the actual determinants of a country's risk of debt distress, debt burden indicators largely lose their usefulness as an early warning mechanism, particularly when they are assessed against fixed indicative thresholds.

The point is best illustrated by making a comparison between various sustainability analyses actually conducted in relation to a low-income country's external debt over time. Consider, for example, an extract of various DSA projections made between 2000 and 2006, in relation to Uganda's<sup>53</sup> NPV of debt to exports ratio, as reported in IMF progress reviews of Uganda's poverty reduction growth facility and in various earlier debt sustainability analyses. Table 3.6 shows that the estimated NPV debt-to-export ratio exhibits substantial discrepancies, which have arisen mainly from changes to the accounting methodology, and to a lesser extent from the revision of macroeconomic forecasts. Indeed, most of the enormous gap between 2000 and 2002 estimates, exceeding 100 percentage points from 2004/05 onwards, is due to underestimation of future debt stocks and overestimation of export growth rates.<sup>54</sup> While the difference in estimates between the two DSAs conducted in 2005 is less pronounced, it still emphasises the crucial role of a change in methodology in altering the conclusions regarding Uganda's risk of debt distress: without taking into account any change in the actual factors determining the country's debt stock evolution, the DSF would have considered its debt ratio to be in breach of the indicative DSF threshold of 200 per cent according to the June 2005 measure, while it would have come to different conclusions (hence policy effects) according to data

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<sup>52</sup> E.g. Gunter (2002).

<sup>53</sup> While almost every available low-income country's DSA could serve as a representative example, our choice of Uganda is determined by our focus on this country also for the case study in Chapter 6 below.

<sup>54</sup> It should be noted here that IDA and IMF (2002: 14) justify the difference as being the result of an oversight involving incomplete treatment of new financing.

emerging from the August 2005 analysis, which showed Uganda's debt ratio as falling well below the indicative threshold.

**Table 3.6: Uganda, Debt Sustainability Analyses, Comparison 2000, 2002 and June 2005, August 2005**

| NPV Debt / Exports         | 1998/99  | 1999/00 | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 |
|----------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| DSA January 2000*          | 150  | 138     | 128     | 117     | 109     | 102     | 96      | 91      | 84      | 78      | 73      |
| DSA August 2002*           |  |         | 171     | 199     | 209     | 207     | 198     | 188     | 178     | 171     | 165     |
| Difference due to:         | Underestimation of future debt stocks (mostly), plus overestimation of export growth.                  |         |         |         |         |         |         |         |         |         |         |
| Estimation Difference (%): |  |         | 34      | 71      | 92      | 103     | 106     | 108     | 111     | 118     | 127     |
| DSA June 2005              |  |         |         |         | 263     | 242     | 225     | 217     | 220     | 222     | 222     |
| DSA August 2005            |  |         |         |         |         | 193     | 186     | 186     | 186     | 185     | 183     |
| Difference due to:         | Denominator change, from three-year average to current exports (63%); upward revision of exports (17%) |         |         |         |         |         |         |         |         |         |         |
| Estimation Difference (%): |  |         |         |         |         | -20     | -17     | -14     | -15     | -17     | -17     |

Notes: (\*) based on three-year averages of total exports in goods and services

Sources: Various IMF/IDA DSA document. Author's own calculations.

Table 3.7 emphasises even more strongly the degree to which the intrinsic accounting fragility resulting from reliance on NPV data hampers the DSA's reliability. Drawing from an IMF comparison between Uganda's debt sustainability analyses of the years 2002 and 2006, we calculate a detailed breakdown of the factors explaining changes in the NPV of debt to exports ratio in the year 2004/05. The comparison evidences how substantial the effects of changes to parameters alone can be on the NPV debt to exports indicator (65.3 per cent), relative to variations in the key liquidity and macroeconomic determinants, which are the variables with actual bearing on the country's risk of distress. Indeed, the country would appear to have substantially benefited from a combination of higher than anticipated new borrowing (lowering the ratio by 14.3 percentage points), while exports were considerably higher than expected (changing the debt ratio by 27 percentage points). However, changes in the discount rate (increasing the NPV of debt measure) and the exchange rate vis-à-vis other currencies (increasing the ratio by 40 per cent) would actually have amounted to a net increase of the ratio to 229.4 per cent. It is only because of a change of measurement method affecting the denominator, namely by switching from a three-year moving average of exports to current year exports, that the ratio actually decreased by more than 50 per cent, down to 179.1 per cent.

In the particular instance depicted in Table 3.7, the various sources of discrepancy between forecasted and observed measures tend to cancel each other out, thus resulting in a relatively close match (18.9 per cent). Nevertheless, it exemplifies well the grounds for our concern with regard to the DSF's reliance on net present value measures of debt, which are subjected to a host of factors undermining its role as meaningful and reliable assessment of a country's risk of distress. Therefore, in contrast to the BWI's current practice with regard to debt sustainability analysis, in Part III of this study we propose an alternative framework, which effectively circumvents the reliance on debt ratios as a guiding mechanism for aid allocation and debt relief.

**Table 3.7: Uganda, DSA 2002 vs. DSA 2006 - NPV Debt/Exports (%)**

| Year  | 2004/05 |
|---|---------|
| DSA August 2002 - forecasted  | 198.0   |
| DSA February 2006 - observed  | 179.1   |
| Total change in ratio   | -18.9   |
| Change in methodology (denominator now calculated as current exports) | -50.3   |
| Changes in parameters   | 65.3    |
| o/w: changes in discount rates  | 24.8    |
| o/w: changes in exchange rates  | 40.5    |
| Due to unanticipated new borrowing                                    | -14.3   |
| o/w: higher than expected disbursements                               | -16.2   |
| o/w: lower concessionality of loans                                   | 1.9     |
| Unanticipated change in exports                                       | -27.0   |
| Other factors   | 7.4     |

Source: Author's own calculations, based on IMF (2006), Sixth Review, Appendix VI, Table 1.

### (ii) Stock versus flow analysis

Our final concern relates to the fact that the DSF assessment of a debtor's risk of distress focuses mainly on external debt stocks, instead of flows. Much in line with the HIPC Initiative's aim of reducing a country's debt stock to levels that are considered sustainable, the DSF sustainability analysis of external debt is conducted on the basis of two stock measures in NPV terms, plus a single debt service ratio. Although the debt service ratio is said to be "[...] the best indicator for analysing whether a country is likely to face debt-servicing difficulties in the current period"<sup>55</sup>,

<sup>55</sup> World Bank (2005b: 10)



it is also seen to understate the future debt service burden in the presence of highly concessional loans, which are typically increasing over time. According to the World Bank, debt stock indicators are thus to be preferred, since they discount the whole stream of future debt service payments and therefore enable better predictions of future debt servicing problems.

Arguably, the official line of argument underlying the DSF approach to debt sustainability assessment points toward a primarily informative, rather than operational, nature of the DSA exercise, in which the objective of a comprehensive, long-term outlook regarding the likelihood of debt distress prevails over the aim of timely, effective intervention at the onset of distress. Indeed, as will be extensively argued below, the DSF currently does not incorporate any kind of mechanism aimed at aligning financial transfers to a borrower with its current financial requirements. The only bearing of the DSA on official financial transfers to a low-income country results from its qualification of that country's risk of distress, determining the degree of concessionality – not the volume – of new official borrowing. Clearly, 50 or 100 per cent of new borrowing disbursed in grants, rather than loans, will positively affect a debtor's current and future external debt stock position and, *ceteris paribus*, the outlook on its stock indicators. However, official multilateral loans typically concede a grace period of ten years, and there will be no positive effect on official debt flows, including debt service, for the whole period until servicing of the first grant-substituted loans becomes due. Hence, while one can agree with the above argument that debt flow indicators tend to understate the future burden of debt service due to grace periods and long maturity, it is harder to accept that the BWI's favouring of debt stock indicators over flow indicators, motivated on purely analytical grounds, gives rise to a risk assessment methodology that severely downplays the role of current illiquidity as the most crucial factor leading to debt distress.

In sum, debt stock indicators not only fail to provide fully comparable projections of a country's actual debt burden over time, mainly for the accounting reasons outlined in the previous section, but these indicators also divert attention from the flow dimension involving current financial sources and requirements. Thereby, the DSA

fails to provide a key analytical and operational warning tool necessary for effective and timely official intervention in the case of financial distress.

### 3.4 Concluding remarks

The foregoing discussions reveal a broad spectrum of shortcomings in the extant multilateral approach to addressing low-income countries' debt sustainability concerns. By deconstructing the single components of the DSF, and highlighting the complex interrelationships between these components and the broader IDA14 framework, we reach the conclusion that the entire structure of the DSF is affected by a severe flaw arising from its subordination to the prerogatives of the aid allocation framework. Indeed, it would appear that with the new DSF, the BWI have effectively managed to render the debt sustainability assessment and its implications fully conform to the CPIA-centred thrust of the IDA14 framework, particularly with regard to its aim of increasing the grant share of multilateral financing. In order to do so, the BWI had to find and demonstrate but one missing link, which would relate low-income countries' debt sustainability assessment to the CPIA. Resting on dangerously flimsy empirical grounds, the BWI showed that such a link does indeed exist, and has not hesitated to build upon it their entire argument supporting the new sustainability framework. Unfortunately, we find the governance-debt distress link cannot withstand the inclusion of economic vulnerability and liquidity measures, and produce evidence undermining its reliability as the DSF's central building block.

In comparison to the central flaw affecting the role of CPIA in explaining debt distress, the numerous shortcomings of the DSF also unveiled in this chapter may appear to be of relatively minor importance. Nevertheless, the DSF's reliance on an accounting framework that disregards the need for an effective distinction between the causal factors affecting a country's debt sustainability and its reliance on debt measures that tend to further blur, rather than clarify, any such assessment, are certainly a sign that the shortcomings of DSF are pervasive and deeply rooted. In fact, it appears that the new DSF represents a reinforcement of its predecessors, with an additional CPIA twist, rather than introducing a truly 'new' outlook on the multilateral approach to the long-standing debt problem.

The analysis described in this chapter does not address the central question with regard to the deeper motives underlying the BWI's (and their main stakeholders') reluctance to introduce a multilateral instrument that could effectively address the vulnerability factors they themselves acknowledge as having played a crucial role in determining the demise of previous multilateral attempts to make LICs' debt sustainable. For such a discussion, the interested reader is referred to Fine (2001), who distinguishes between the roles played by rhetoric, scholarship and policy in development practice, including the BWI's, and also to Broad (2006), who critically outlines the BWI's 'Art of Paradigm Maintenance'.

What this chapter does show, however, is that the BWI have gone to great lengths to mask their reluctance to break with the CPIA-centred system they have created as the central pillar in dealing with the low-income countries. In this sense, our conclusions are strongly corroborated by the recently published external audit of World Bank analysis between 1998 and 2005, chaired by Angus Deaton (Deaton et al., 2006), which criticises the World Bank's recurrent practice of using questionable evidence in support of its development policies.

## Appendix Tables

**Table A3.1: Probit Estimations – Description of Variables and Data Sources**

| Item                     | Description   |
|--------------------------|---|
| Data Issues and Coverage | <p>Our database includes all the 58 countries classified as low-income according to the World Bank definition, i.e. those countries in which 2005 GNI per capita amounted to U.S. Dollars 875 or less.</p> <p>The database includes time-series spanning from 1970 to 2002. Depending on the availability of time-series for the various predictors employed in the probit regressions, the dataset available for estimations is composed as an unbalanced panel.</p> <p>All distress predictors enter estimation with a lag of one year, to control for endogeneity. The choice of a one-year lag, rather than a more appropriate use of trend deviations, has been made to resemble the method employed by the IMF and World Bank studies, thus allowing for better comparability of results.</p> |
| Debt Distress            | <p>Following the IMF definition, debt distress is defined as a situation in which the ratio of a country's accumulated arrears on official external debt to its total external debt stock exceeds the 5 percent threshold. Non-distress is defined as at least three consecutive years in which the ratio falls below the 5 percent threshold. The binary variable used in the probit regressions takes value one during debt distress episodes, and value zero during non-distress episodes.</p>   |
| CPIA                     | <p>Time series of CPIA scores are still undisclosed to the public domain and thus unavailable to researchers outside the World Bank and IMF. Accordingly, the CPIA series was missing from the dataset underlying the Kraay and Nehru analysis. As a substitute for the actual CPIA scores, the CPIA series was constructed by drawing from the available CPIA country rankings by quintiles, to the extent available for the 'episodes years'. The missing data within adjacent years of CPIA availability were computed by interpolation from the CPIA scores implicit in various World Bank datasets. A higher value of the CPIA index constructed for this study is associated with lower (worse) performance rankings.</p>   |
| NPV Debt                 | <p>Net present value data of external debt is not available in the World Bank and IMF databases. Therefore, the debt ratios were</p>  |

|                      |   |
|----------------------|---|
| Ratios               | extracted from the Kraay-Nehru dataset.   |
| Trade Openness       | Defined as the ratio of the sum of exports and imports to GDP, in accordance with the IMF study. Data source: World Bank - World Development Indicators (online subscription, accessed March 2005).   |
| REER Over-valuation  | Based on Bill Easterly's real exchange rate overvaluation index, available in the Kraay-Nehru dataset.  |
| REER Volatility      | Defined as the deviation of the real exchange rate from the preceding three-year average, in accordance with the IMF study. Data source: World Bank - World Development Indicators (online subscription, accessed March 2005).  |
| Inflation            | Defined as the annual change in the consumer price index, in accordance with the IMF study. Data source: World Bank - World Development Indicators (online subscription, accessed March 2005).  |
| Inflation Volatility | Defined as the deviation from the preceding three-year average of the consumer price index, in accordance with the IMF study. Data source: World Bank - World Development Indicators (online subscription, accessed March 2005).  |
| ICRG                 | The International Country Risk Guide Index on the quality of bureaucracy, available in the Kraay-Nehru dataset.   |
| Rule of Law          | The Kaufmann-Kraay-Mastruzzi Rule of Law Index, available from Kaufmann et al. (2004)   |
| KKM Factor           | Extracted as the principal component of the six available indices in Kaufmann et al. (2004). One principal component was retained, explaining about 70 percent of variation in the six single dimensions of the overall KKM index. Since the indices cover only the years 1996, 1998, 2000, 2002 over the time period of analysis, the missing values between 1996 and 2002 were obtained by linear interpolation, while the value of the principal component in the year 1996 was used for the previous years.   |
| EVI                  | The Economic Vulnerability Index (EVI) was obtained from the United Nations Department of Economic and Social Affairs – Division for Sustainable Development, New York. The EVI employed in this study is an UN-weighted index of the following indicators: the natural logarithm of population; the share of manufacturing and services sectors in the economy; the export concentration index, by UNCTAD; the agricultural instability index, by FAO; the export instability index, by IMF. Several years of the index have been made available by UN for this research project, the remaining years were computed by linear interpolation. Lower values of the EVI are associated with a lower degree of economic vulnerability. |

|                            |   |
|----------------------------|---|
| Export Instability Index   | A component of the EVI, sourced from the IMF.   |
| Export Concentration Index | A component of the EVI, based on UNCTAD's Herfindahl-Hirschmann index, which is a measure of the degree of market concentration, normalized to obtain values ranking from 0 to 1 (maximum concentration).   |
| GT Index                   | A terms of trade index constructed by Gilbert and Tabova (2005), in line with the well-known Deaton-Miller index (Deaton and Miller, 1995). The index expresses the percentage gain or loss in national income resulting from variations in a country's import or export prices, relative to the preceding four-year average. Price variations are weighted by the value share of single commodities in a country's overall export or import flows. The index excludes trade in metals. |
| Aid (MA3)                  | Total aid flows (ODA) are measured as aggregate flows of official loans and grants to a low-income country. In order to capture the average trade flow effect in the years preceding debt distress episodes, aid flows are measured as the three-years moving average.  |

**Table A3.2: IMF Probit Results (Original Title: Determinants of Distress) 1/**

|                                | CPIA     |          |          | Openness |          |          | Real Exchange Rate Deviation |          |          | Overvaluation |          |          |
|--------------------------------|----------|----------|----------|----------|----------|----------|------------------------------|----------|----------|---------------|----------|----------|
|                                | Debt-to- | Debt-to- | Debt-to- | Debt-to- | Debt-to- | Debt-to- | Debt-to-                     | Debt-to- | Debt-to- | Debt-to-      | Debt-to- | Debt-to- |
|                                | GDP      | exports  | revenue  | GDP      | exports  | revenue  | GDP                          | exports  | revenue  | GDP           | exports  | revenue  |
| Debt ratio                     | 0.015**  | 0.002**  | 0.003**  | 0.016**  | 0.003**  | 0.003**  | 0.004**                      | 0.002**  | 0.003**  | 0.003**       | 0.003**  | 0.004**  |
| Policy                         | -0.519** | -0.415** | -0.404** | -0.006** | 0.001    | 0.001    | 0.002*                       | 0.006    | 0.008**  | 0.006**       | 0.001    | 0.002*   |
| P-Value of Test of Controls    | 0.000    | 0.000    | 0.000    | 0.000    | 0.000    | 0.000    | 0.000                        | 0.003    | 0.0000   | 0.000         | 0.000    | 0.000    |
| <b>Implied Thresholds 2/3/</b> |          |          |          |          |          |          |                              |          |          |               |          |          |
| Bad Policy                     | 26       | 83       | 138      | 28       |          |          | 27                           |          | 161      |               |          | 234      |
| Average Policy                 | 43       | 186      | 205      | 37       |          |          | 34                           |          | 189      |               |          | 261      |
| Good Policy                    | 58       | 276      | 264      | 45       |          |          | 38                           |          | 202      |               |          | 296      |

|                                | Exchange Rate Volatility |          |          | Inflation |          |          | ICRG Bureaucracy Index |          |          | ICRG Political Risk Index |          |          |
|--------------------------------|--------------------------|----------|----------|-----------|----------|----------|------------------------|----------|----------|---------------------------|----------|----------|
|                                | Debt-to-                 | Debt-to- | Debt-to- | Debt-to-  | Debt-to- | Debt-to- | Debt-to-               | Debt-to- | Debt-to- | Debt-to-                  | Debt-to- | Debt-to- |
|                                | GDP                      | exports  | revenue  | GDP       | exports  | revenue  | GDP                    | exports  | revenue  | GDP                       | exports  | revenue  |
| Debt ratio                     | 0.014**                  | 0.002**  | 0.003**  | 0.015**   | 0.003**  | 0.003**  | 0.012**                | 0.012**  | 0.012**  | 0.002**                   | 0.002**  | 0.012**  |
| Policy                         | 0.411**                  | 0.429**  | 0.322**  | 0.001**   | 0.001**  | 0.002**  | -0.312**               | -0.233** | -0.272** | -0.016*                   | 0.001    | -0.007   |
| P-Value of Test of Controls    | 0.000                    | 0.000    | 0.000    | 0.000     | 0.000    | 0.000    | 0.000                  | 0.000    | 0.000    | 0.000                     | 0.000    | 0.000    |
| <b>Implied Thresholds 2/3/</b> |                          |          |          |           |          |          |                        |          |          |                           |          |          |
| Bad Policy                     | 15                       | 44       | 127      | 36        | 137      | 206      | 3                      |          |          |                           | 16       |          |
| Average Policy                 | 23                       | 103      | 156      | 39        | 154      | 241      | 7                      |          | 17       | 26                        |          |          |
| Good Policy                    | 33                       | 174      | 191      | 40        | 160      | 252      | 29                     | 48       | 131      | 34                        |          |          |

Source: IMF and IDA (2004b: 60 – Appendix 1, Table 2)

Original table notes: 1 \* and \*\* denotes significance at the 5% and 1% level respectively. 2/ Debt ratios are in present value terms using constant discount rates. 3 Missing value indicates that the relevant policy variable is found to be insignificant. "-" denotes negative thresholds.

Table A3.3: Alternative Definitions of Debt Distress – Comparative List of Episodes

| Country Code | Start Year | Kraay - Nehru  |            | Start Year | Kraay - Nehru  |            | Country Code | Start Year | Kraay - Nehru  |            | Country Code | Start Year | Kraay - Nehru  |            |
|--------------|------------|----------------|------------|------------|----------------|------------|--------------|------------|----------------|------------|--------------|------------|----------------|------------|
|              |            | IMF Definition | Definition |            | IMF Definition | Definition |              |            | IMF Definition | Definition |              |            | IMF Definition | Definition |
| AGO          | 1989       | 0              |            | 1983       | 0              | ZAR        | 1983         | 0          |                | 1979       | 1            | RWA        | 1980           | 0          |
| AGO          | 1991       | 1              |            | 1987       | 1              | ZAR        | 1987         | 1          |                | 1987       | 1            | RWA        | 1985           | 0          |
| BGD          | 1972       | 0              | 0          | 1970       | 0              | COG        | 1970         | 0          | 0              | 1970       | 0            | RWA        | 1993           | 1          |
| BGD          | 1978       | 1              | 1          | 1979       | 0              | COG        | 1979         | 0          | 1              | 1978       | 1            | STP        | 1977           | 0          |
| BGD          | 1987       | 0              | 0          | 1984       | 1              | COG        | 1984         | 1          | 0              | 1991       | 0            | STP        | 1985           | 1          |
| BGD          | 1992       | 0              | 0          | 1987       | 1              | COG        | 1987         | 1          | 0              | 1996       | 0            | SEN        | 1970           | 0          |
| BEN          | 1970       | 1              |            | 1970       | 0              | CIV        | 1970         | 0          | 0              | 1970       | 1            | SEN        | 1975           | 0          |
| BEN          | 1973       | 0              |            | 1975       | 0              | CIV        | 1975         | 0          | 0              | 1981       | 0            | SEN        | 1979           | 1          |
| BEN          | 1982       |                | 1          | 1980       |                | CIV        | 1980         |            | 1              | 1983       | 1            | SEN        | 1992           | 1          |
| BEN          | 1986       | 1              |            | 2000       | 1              | CIV        | 2000         | 1          |                | 1986       | 0            | SEN        | 1995           | 0          |
| BEN          | 1994       | 0              |            | 1970       | 1              | GNQ        | 1970         | 1          |                | 1990       | 1            | SLE        | 1970           | 0          |
| BTN          | 1981       | 0              |            | 1994       | 0              | ERI        | 1994         | 0          |                | 1970       | 0            | SLE        | 1984           | 1          |
| BTN          | 1986       |                | 0          | 1970       | 0              | ETH        | 1970         | 0          |                | 1975       | 0            | SLE        | 1994           | 0          |
| BTN          | 1991       |                | 0          | 1982       |                | ETH        | 1982         |            | 0              | 1983       | 1            | SLE        | 1998           | 1          |
| BTN          | 1996       |                | 0          | 1990       | 1              | ETH        | 1990         | 1          | 1              | 1992       | 0            | SLE        | 2001           | 0          |
| BFA          | 1970       | 0              |            | 1970       | 0              | GMB        | 1970         | 0          | 0              | 1994       | 1            | SLB        | 1978           | 0          |
| BFA          | 1975       | 0              |            | 1975       | 0              | GMB        | 1975         | 0          | 0              | 1996       | 0            | SLB        | 1983           | 0          |
| BFA          | 1980       | 0              |            | 1989       | 0              | GMB        | 1989         | 0          | 0              | 1998       | 1            | SLB        | 1988           | 0          |
| BFA          | 1986       |                | 1          | 1994       |                | GMB        | 1994         |            | 0              | 2000       | 0            | SOM        | 1970           | 0          |
| BFA          | 1988       | 1              |            | 1970       | 1              | GHA        | 1970         | 1          |                | 1992       | 0            | SOM        | 1975           | 0          |
| BFA          | 1991       | 0              |            | 1976       | 0              | GHA        | 1976         | 0          |                | 1970       | 0            | SOM        | 1980           | 0          |
| BDI          | 1970       | 0              |            | 1977       |                | GHA        | 1977         |            | 0              | 1988       | 1            | SOM        | 1982           | 1          |
| BDI          | 1975       | 0              |            | 1988       |                | GHA        | 1988         |            | 0              | 1970       | 0            | SDN        | 1970           | 0          |
| BDI          | 1980       | 0              |            | 1995       |                | GHA        | 1995         |            | 1              | 1975       | 0            | SDN        | 1976           | 1          |
| BDI          | 1985       | 0              |            | 1970       | 1              | GIN        | 1970         | 1          | 1              | 1975       | 0            | SDN        | 1980           | 1          |
| BDI          | 1990       | 0              |            | 1975       | 0              | GNB        | 1975         | 0          | 0              | 1980       | 0            | TJK        | 1996           | 0          |
| BDI          | 1998       | 1              |            | 1980       | 1              | GNB        | 1980         | 1          | 1              | 1990       | 0            | TJK        | 1998           | 1          |
| KHM          | 1982       | 0              |            | 1970       | 0              | HTI        | 1970         | 0          |                | 1995       | 0            | TZA        | 1970           | 1          |
| KHM          | 1988       | 1              | 1          | 1977       |                | HTI        | 1977         |            | 1              | 1970       | 0            | TGO        | 1970           | 0          |
| CMR          | 1970       | 0              |            | 1992       | 1              | HTI        | 1992         | 1          |                | 1971       | 0            | TGO        | 1986           | 1          |

Table A3.3 cont'd

| Country Code | Start Year | Kraay - Nehru  |            | Country Code | Start Year | IMF Definition |            | Country Code | Start Year | Kraay - Nehru  |            | Country Code | Start Year | IMF Definition |            | Country Code | Start Year | Kraay - Nehru  |            |
|--------------|------------|----------------|------------|--------------|------------|----------------|------------|--------------|------------|----------------|------------|--------------|------------|----------------|------------|--------------|------------|----------------|------------|
|              |            | IMF Definition | Definition |              |            | IMF Definition | Definition |              |            | IMF Definition | Definition |              |            | IMF Definition | Definition |              |            | IMF Definition | Definition |
| CMR          | 1975       |                | 0          | HTI          | 1995       | 0              |            | NIC          | 1982       |                | 1          | TGO          | 1988       |                | 0          |              |            |                |            |
| CMR          | 1980       |                | 0          | IND          | 1970       | 0              |            | NIC          | 1983       |                | 1          | TGO          | 1992       |                | 1          |              |            |                |            |
| CMR          | 1986       |                | 1          | IND          | 1975       | 0              |            | NER          | 1970       |                | 0          | TGO          | 1995       |                | 0          |              |            |                |            |
| CMR          | 1990       | 1              |            | IND          | 1980       | 1              |            | NER          | 1975       |                | 0          | TGO          | 1999       | 1              |            |              |            |                |            |
| CMR          | 1997       | 0              |            | IND          | 1984       | 0              |            | NER          | 1982       |                | 1          | UGA          | 1970       | 0              |            |              |            |                |            |
| CAF          | 1970       | 0              | 1          | IND          | 1993       | 0              |            | NER          | 1991       |                | 1          | UGA          | 1978       | 1              |            |              |            |                |            |
| CAF          | 1975       | 1              |            | KEN          | 1970       | 0              |            | NER          | 1970       |                | 0          | UGA          | 1981       | 0              |            |              |            |                |            |
| CAF          | 1984       | 0              |            | KEN          | 1974       | 1              |            | NGA          | 1970       |                | 0          | UGA          | 1981       | 0              |            |              |            |                |            |
| CAF          | 1990       | 1              |            | KEN          | 1991       | 1              |            | NGA          | 1975       |                | 0          | UGA          | 1990       | 1              |            |              |            |                |            |
| CAF          | 1990       | 1              |            | KEN          | 1991       | 1              |            | NGA          | 1980       |                | 0          | UGA          | 1992       | 0              |            |              |            |                |            |
| TCD          | 1970       | 0              |            | KGZ          | 1995       | 0              |            | NGA          | 1985       |                | 1          | UZB          | 1992       | 0              |            |              |            |                |            |
| TCD          | 1979       | 1              |            | LAO          | 1970       | 0              |            | NGA          | 1985       |                | 1          | VNM          | 1981       | 0              |            |              |            |                |            |
| TCD          | 1981       | 0              |            | LAO          | 1970       | 0              |            | NGA          | 1991       |                | 1          | VNM          | 1987       | 1              |            |              |            |                | 1          |
| TCD          | 1984       | 1              |            | LAO          | 1986       | 0              |            | PAK          | 1970       |                | 0          | YEM          | 1979       | 0              |            |              |            |                |            |
| TCD          | 1990       | 1              |            | LSO          | 1970       | 0              |            | PAK          | 1975       |                | 0          | YEM          | 1987       | 1              |            |              |            |                |            |
| TCD          | 1990       | 0              |            | LSO          | 1975       | 0              |            | PAK          | 1979       |                | 1          | ZMB          | 1970       | 0              |            |              |            |                | 0          |
| TCD          | 1992       | 1              |            | LSO          | 1980       | 0              |            | PAK          | 1984       |                | 0          | ZMB          | 1984       | 1              |            |              |            |                |            |
| TCD          | 1996       | 0              |            | LSO          | 1985       | 0              |            | PAK          | 1989       |                | 0          | ZMB          | 1999       | 0              |            |              |            |                |            |
| TCD          | 1998       | 1              |            | LSO          | 1990       | 0              |            | PAK          | 1994       |                | 1          | ZWE          | 1970       | 1              |            |              |            |                |            |
| COM          | 1970       | 0              |            | LSO          | 1995       | 0              |            | PNG          | 1970       |                | 0          | ZWE          | 1973       | 0              |            |              |            |                |            |
| COM          | 1977       | 1              |            | LBR          | 1970       | 0              |            | PNG          | 1975       |                | 0          | ZWE          | 1984       | 0              |            |              |            |                | 0          |
| COM          | 1980       | 0              |            | LBR          | 1975       | 0              |            | PNG          | 1980       |                | 0          | ZWE          | 1989       | 0              |            |              |            |                | 0          |
| COM          | 1986       | 1              | 1          | LBR          | 1979       | 1              |            | PNG          | 1985       |                | 0          | ZWE          | 1994       | 0              |            |              |            |                | 0          |
| ZAR          | 1970       | 0              |            | LBR          | 1985       | 1              |            | PNG          | 1990       |                | 0          | ZWE          | 2000       | 1              |            |              |            |                |            |
| ZAR          | 1976       | 1              |            | MIDG         | 1970       | 0              |            | RWA          | 1970       |                | 0          |              |            |                |            |              |            |                |            |
| ZAR          | 1981       | 1              |            | MIDG         | 1975       | 0              |            | RWA          | 1975       |                | 0          |              |            |                |            |              |            |                |            |

Notes: 1 denotes the start year of debt-distress episode; 0 denotes the start year of non-distress episodes; empty cells indicate the lack of debt distress identification, in contrast to the alternative approach.

Source: Kraay and Nehru dataset, and author's calculations in line with the IMF definition



**Table A3.4: Simple Probit Regression Results**

|                            |           |
|----------------------------|-----------|
| NPV Debt/Export Ratio      | 0.003***  |
| CPIA                       | 0.083**   |
| EVI                        | 0.026***  |
| GT Index (ToT)             | 0.003*    |
| Export Instability Index   | 0.031***  |
| Export Concentration Index | 1.576***  |
| Instability-Concentration  | 0.045***  |
| KKM Factor                 | -0.065**  |
| Rule of Law (KKM)          | -0.535*** |
| Aid (MA3)                  | -0.841*** |

Note: These probit specifications include debt distress as the dependent binary variable, and the debt-exports ratio plus any of the indicators listed, taken each singularly. Also note that among the various specifications, the coefficient of the debt-exports ratio is not the same, but oscillates mainly around the indicated value of 0.003.

Degree of confidence in significance tests: (\*\*\*) 0.1% (\*\*) 1% (\*) 5% ( ) >5%

**Table A3.5: Correlation Matrix of Predictors**

|                      | CPIA   | EVI    | GT Index | Export Instability | Export Conc. | Exp Multip. | Governance | Rule of Law | Aid |
|----------------------|--------|--------|----------|--------------------|--------------|-------------|------------|-------------|-----|
| CPIA                 | 1.000  |        |          |                    |              |             |            |             |     |
| EVI                  | 0.358  | 1.000  |          |                    |              |             |            |             |     |
| GT Index             | -0.054 | 0.014  | 1.000    |                    |              |             |            |             |     |
| Export Instability   | 0.309  | 0.703  | -0.039   | 1.000              |              |             |            |             |     |
| Export Concentration | 0.287  | 0.754  | -0.008   | 0.369              | 1.000        |             |            |             |     |
| Export Multiplier    | 0.341  | 0.825  | -0.029   | 0.793              | 0.806        | 1.000       |            |             |     |
| KKM Factor           | -0.678 | -0.241 | 0.029    | -0.392             | -0.190       | -0.336      | 1.000      |             |     |
| Rule of Law          | -0.537 | -0.278 | 0.059    | -0.384             | -0.322       | -0.434      | 0.683      | 1.000       |     |
| Aid (MA3)            | -0.303 | -0.438 | 0.031    | -0.279             | -0.311       | -0.289      | 0.115      | 0.255       | 1   |

Note: These are pair-wise correlations relating to the entire data sample. Data source described Table A3.1.

**Table A3.6: Principal Components Analysis (KKM)**

| Component | Eigenvalue | Difference | Proportion | Cumulative |
|-----------|------------|------------|------------|------------|
| Comp1     | 4.15923    | 3.50615    | 0.6932     | 0.6932     |
| Comp2     | .65308     | .220642    | 0.1088     | 0.8021     |
| Comp3     | .432438    | .0747382   | 0.0721     | 0.8741     |
| Comp4     | .3577      | .138603    | 0.0596     | 0.9337     |
| Comp5     | .219097    | .0406448   | 0.0365     | 0.9703     |
| Comp6     | .178452    | .          | 0.0297     | 1.0000     |

Source: Author's calculations. Data source described Table A3.1.

**Table A3.7: Probit estimations involving the remaining KKM dimensions**

| KKM Component:       | Voice and Accountability |             | Political Stability   |             | Government Effectiveness |             |
|----------------------|--------------------------|-------------|-----------------------|-------------|--------------------------|-------------|
| Vulnerability Index: | EVI                      | Inst.-Conc. | EVI                   | Inst.-Conc. | EVI                      | Inst.-Conc. |
| Debt/EXP             | 0.002***                 | 0.002***    | 0.002***              | 0.002***    | 0.002***                 | 0.002***    |
| KKM Component        | -0.132                   | -0.181      | -0.216                | -0.217      | -0.491*                  | -0.352      |
| Vulnerability Index  | 0.025**                  | 0.071***    | 0.028**               | 0.068***    | 0.022*                   | 0.065**     |
| Constant             | -0.731**                 | -1.399***   | 2.018***              | -1.352***   | 1.884***                 | -1.431***   |
| KKM Component:       | Regulatory Quality       |             | Control of Corruption |             |                          |             |
| Vulnerability Index: | EVI                      | Inst.-Conc. | EVI                   | Inst.-Conc. |                          |             |
| Debt/EXP             | 0.002***                 | 0.002***    | 0.002***              | 0.002***    |                          |             |
| KKM Component        | -0.259                   | -0.115      | -0.568*               | -0.374      |                          |             |
| Vulnerability Index  | 0.025**                  | 0.071***    | 0.025**               | 0.066**     |                          |             |
| Constant             | -1.846***                | -1.324***   | 2.062***              | -1.467***   |                          |             |

Notes:

Degree of confidence in significance tests: (\*\*\*) 0.1% (\*\*) 1% (\*) 5% ( ) >5%

LR-tests have been omitted.

## 4 An Assessment of IDA Debt Service Modulation Schemes

### 4.1 Introduction

The preceding chapter outlined the World Bank's rationale for envisaging the introduction of debt service modulation schemes as an integrating component of the new DSF (in particular, see the discussion in section 3.2). In an implicit admission of the DSF's failure to effectively protect low-income countries against exogenous shocks, in May 2005, the IDA released a report entitled "Managing the Debt Risk of Exogenous Shock in Low-income Countries" (IDA, 2005b), evaluating a number of financial instruments that creditors could offer to help mitigate the impact of such shocks. However, far from representing a break with the tenets underlying the DSF, the IDA sets out the latest analysis by emphasising its common foundations with the DSF:

"Recent work by the Bank and Fund on an operation framework of debt sustainability in low-income countries identified exogenous shocks as one of three factors strongly affecting the risk of debt distress; the other two being the debt burden and the quality of policies and institutions. While the primary responsibility for dealing with the effects of shocks rests with low-income countries [...] themselves, the international community can also play a constructive and supportive role, provided such support is fully consistent with the country's own development priorities as expressed in the PRSP. Furthermore, better management of shocks is in the interest of official creditors."<sup>1</sup>

Signalling great caution against impinging upon any of the DSF's operational and broader aid implications, the IDA defines the criteria any ex-ante scheme would have to fulfil in order to be given consideration within the existing framework. As the overarching condition the IDA stipulates that creditors would face no losses of re-flows in nominal terms, and that the risk implications for creditors be limited, particularly in view of adverse selection and moral hazard effects.<sup>2</sup> In other words, in order to qualify, any ex-ante scheme would need to ensure that it affects only the

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<sup>1</sup> IDA (2005b: 1)

<sup>2</sup> Ibid. pp.15-16

timing, rather than the overall volume of aid re-flows in nominal terms, and that its overall benefits to borrowers would be matched by those from pooling service risks across donors' debt portfolios, thus offsetting the net costs.

On such a premise, which *de facto* imposes the constraint of creditor loss minimisation over the objective of borrower benefit maximisation, it should be no surprise that the IDA review is mainly focussed on assessing ex-ante instruments' comparative risk-sharing and risk-pooling effects across countries and time. Indeed, in order to guarantee 'fairness' and 'applicability' of any new instrument, its key parameters are assessed and calibrated across a panel of selected LICs in relation to overall cost-benefit implications, rather than being optimised to ensure effectiveness and benefit maximisation at the individual country level. Instead, by placing stringent constraints on the qualifying and evaluative process of ex-ante schemes, the IDA essentially fails to address the central policy objective, which is to maximise the individual country's insulation against exogenous shocks under the aegis of an innovative multilateral financing scheme.

Arguably, the IDA moved towards applying such creditor-centred bias of analysis out of apprehension regarding financial innovation that would necessarily imply substantial ex-ante commitments and potential costs to be borne by donors, additional to those that the current IDA/DSF framework already entails.<sup>3</sup> Indeed, it should be noted that IDA's report is merely a response to a request by its Board of Governors and the Development Committee to further investigate the potential scope of multilateral measures, and thus lacks the donor community's mandate to actually propose any scheme that would have far-reaching implications for existing commitments.

The multilateral agency's methodological bias may thus be largely attributed to institutional constraints affecting its capacity to effectively explore the scope and potential of innovative financial instruments. Free from any such constraints, our own assessment of the IDA ex-ante mechanisms takes an alternative approach, with the main focus on these schemes' potential effects at the single country level.

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<sup>3</sup> This is certainly true for the official IDA report. The background studies to the report apply equally strict constraints, with the exception of Tabova (2004), who examines the option of a trust fund that would finance the additional costs involving her scheme (see Tabova 2004: 11).

Thereby, we place the main emphasis on assessing their potential to achieve the goal of effective protection against shocks, under the operational constraints imposed by the IDA. Moreover, we choose to disregard the comparative implications of creditors' risk-pooling benefits across schemes. For, if the financial instruments should prove ineffective in achieving their primary goal, any cost-benefit assessment relating to creditors would be largely irrelevant.

Our analysis draws directly from and refers to the background papers underlying the IDA report, rather than to the report per se. It proceeds by first deriving a generalised scheme representing the key features of the various mechanisms proposed, and then simulating their performance on the basis of a case study, taking Uganda's historical context as an example. The remainder of this chapter is structured as follows: Section 4.2 describes the essential thrust characterising the schemes underlying the IDA report; Section 4.3 simulates the main implications of each of the schemes for the case of Uganda; Section 4.4 derives the main conclusions from our assessment.

#### **4.2 The basic design and modalities of IDA indexing schemes**

Our assessment specifically relates to the contingency instruments proposed by Gilbert and Tabova (2005), Tabova (2004), and Vostroknutova (2005).<sup>4</sup> Each of these papers essentially proposes some variation on a common basic scheme, which attempts to link sovereign debt service payments to some index capturing a debtor's ability to repay debt. Central to all the instruments is the definition of modalities and terms applied to identifying exogenous shocks and to translating these into a proportional revision of a debtor's scheduled stream of debt service. Each scheme thus consists of three basic elements: (i) an index, to identify the occurrence of shocks; (2) threshold measures, defining the intensity of shocks triggering the scheme's intervention; (3) a formula, or set of rules, specifying the response function to the occurrence of shocks.<sup>5</sup>

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<sup>4</sup> We choose not to present our simulation results in relation to the proposal by Vostroknutova and Yi (2005), who evaluate the possibility of indexing official debt service to borrowers' foreign exchange rate. For, nominal exchange rate protection is also implicit in Vostroknutova's proposal for U.S. Dollar GDP indexing, the results of which are presented below.

<sup>5</sup> As Gilbert and Tabova (2005) have succinctly put it.

Among the proposed schemes, a key distinguishing feature relates to the choice of the indexing variable. Tabova (2004) and Vostroknutova (2005) index debt service payments to countries' GDP growth, taken to represent the broadest measure of economy-wide effects from shocks on repayment capacity. In contrast, Gilbert and Tabova (2005) ask whether concessional debt service could be linked to commodity prices, by accelerating and delaying repayments according to a trade-weighted terms-of-trade index.

With the exception of the instrument proposed by Gilbert and Tabova (2005), the other IDA schemes rely on a similarly structured index and modulating formulae. The index is typically defined as the control variable's deviation from its moving average:

$$I_t = (z_t - \bar{z}_t), \quad (1)$$

where  $z_t$  is the indexing variable in period  $t$ , e.g. the real GDP growth rate, and  $\bar{z}_t$  is a backward-looking moving average,

$$\bar{z}_t = \sum_{i=1}^n \frac{z_{t-i}}{n}. \quad (2)$$

It should be noted that LICs' year-to-year variability in the indexing variable  $z_t$  is typically high, making the choice of lags ( $n$ ) in the computation of moving averages an important matter of judgement. Too narrow a time span ( $n$ ) assigns too high a weight to years of exceptional growth (either positive or negative), while too many lags would fail to capture mid-term changes in the trend of real growth and render the scheme less flexible to adjusting to structural changes in the underlying variable. While the IDA authors' common choice is four lags ( $n=4$ ), our own simulations demonstrate a high sensitivity to the choice of lags, and thus each scheme is assessed by adopting both a shorter ( $n=3$ ) and a longer ( $n=5$ ) lag structure.

Furthermore, the index  $I_t$  is said to fulfil the IDA's requirement that any such financial instrument "minimize the opportunities for moral hazard and adverse selection"<sup>6</sup>. For, its proponents argue that no debtor government would have a

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<sup>6</sup> IDA (2005b: 15)

typical moral hazard incentive to misreport or purposely influence the indexing variable, given that the cumulative effect on the moving average would require that such action be continued over several periods before debt service would actually be lowered. For example, a country could hardly be envisaged as hampering on purpose its GDP growth over a prolonged period of time, just to reap the meagre benefits from a temporarily lower stream of debt service. Furthermore, it is argued that it would be difficult for countries to accurately forecast future deviations from moving averages, particularly with regard to foreseeing the odds of actually benefiting from the scheme. It is therefore likely, its proponents argue, that these difficulties would reduce the risk of adverse selection occurring, which would see exclusively countries with down-side risks signing up to participate.<sup>7</sup>

As extensively discussed in Chapter 5 below, our own assessment shows the BWI's emphasis on the risks of incentive distortions to be largely exaggerated, and argues that they would be best addressed outside the realm of contingency mechanisms per se. Arguably, any IDA- dependent country undergoing the periodical reporting and screening exercises conducted by the BWI would neither have much opportunity to cheat, nor the incentive to do so, as long as the scheme is considered beneficial and the punishment for cheats entails their exclusion from it (even less so if punishment entailed indeterminate exclusion from the soft-loan window). Furthermore, the adverse selection fears appear to be largely misplaced in the context of financial innovation that is supposed to appeal precisely to those countries displaying the highest degree of vulnerability and down-side risks. Adverse selection is thus largely an issue associated with a cost-minimising creditor-centred approach, but should have little bearing on our own assessment.

Contrary to the concern expressed in the IDA papers with regard to moral hazard implications, we note that their simple index may actually have the desirable effect of modulating debt service (or any other financial flow) not only to fluctuations around the moving trend but also to the trend itself. For example, an index formulated according to equation (1) would necessarily include the marginal trend effect of any variable falling below its declining moving average trend (and vice versa for the case

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<sup>7</sup> Assuming, of course, that participation in the scheme could not be forced upon any country.

of an increasing trend). Therefore, the index may actually involve the potential of introducing incentive distortions, to the extent that the underlying indexed variable is at least partially under the control of the debtor country's authorities (e.g. GDP growth, foreign exchange rate variations). While this would make the index largely inconsistent with the IDA's own premise, such a property is desirable if a more sophisticated control system for incentive distortions is put in place (e.g. as outlined in Chapter 5).

To control more accurately for the incentive implications of IDA schemes, Vostroknutova (2005) proposes an alternative variant of the above index, now defined as the ratio of the deviation of  $z_t$  to the moving average of deviations during the previous  $n$  periods. Consequently,  $I_t$  takes a value greater (less) than one if current trend deviation is greater (less) than the average deviation over the previous  $n$  years:

$$I_t = \frac{(z_t - \bar{z}_t)}{\left| \frac{\sum_{i=1}^n z_{t-i} - \bar{z}_{t-i}}{n} \right|} \quad (3)$$

Such an index is suitable for distinguishing exceptionally pronounced deviations from those which fall within the average degree of volatility the country has been facing, but lacks the advantage of trend modulation of the alternative specification.

Having defined the index, the IDA financing schemes establish a formula to translate variations of the index into debt service modulations. The formula generally applied is expressed by:

$$\begin{aligned} DS_t^r &\equiv \min[\mu DS_t^o, DS_t^o(1 + \lambda|z_t - \bar{z}_t|)] && \text{if } I_t > 1 \text{ and} \\ DS_t^r &\equiv \max[0, DS_t^o(1 - \lambda|z_t - \bar{z}_t|)] && \text{if } I_t < -1 \text{ and} \\ DS_t^r &\equiv DS_t^o && \text{if } -1 \leq I_t \leq 1; \end{aligned} \quad (4)$$

where:

$DS_t^r$  is revised debt service in period  $t$ ;

$DS_t^o$  is debt service originally due in period  $t$ ;



$\lambda$  is a parameter regulating the degree of adjustment.

Note that the formula (4) implements a cap-floor approach, so that revised debt service will neither exceed  $\mu$  times the amount originally due, nor fall below zero.<sup>8</sup> If the current period's trend deviation is greater than average, i.e.  $I_t > 1$ , debt service is to be increased by an amount equal to its trend deviation multiplied by a factor  $\lambda$ . However, should such a revision increase debt service by more than a certain multiple of original debt service due, then  $\mu DS_t^o$  will set an upper limit applied to the scheme's actual modulation of debt service in any given year. Similarly, if current period's trend deviation falls below the moving average, i.e.  $I_t < -1$ , debt service is to be reduced by an amount equal to its trend deviation multiplied by a factor  $\lambda$ . Again, the floor of zero debt service will bind if the revised debt service would otherwise become negative. Finally, it should be noted that parameter  $\lambda$  calibrates the impact of the scheme, i.e. the degree to which debt service is modulated by the distance of the indexing variable from its moving average. In the simulation exercises below, we show that the actual calibration of this parameter is central to determining each instrument's potential in terms of the benefits accruing to single borrowers.

### 4.3 Uganda case study simulations

Without any pretence of providing a particularly comprehensive empirical assessment, this section aims at providing a first insight into the IDA instruments' likely implications on a low-income country's debt service schedule. Our simulation framework takes a backward-looking, historical, approach, with particular focus on the case of Uganda during 1986-2003 and various sub-periods.<sup>9</sup> While the time horizon of analysis is constrained by the availability of data, it includes Uganda's experience of a series of pronounced shocks adversely affecting its external balances

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<sup>8</sup> Negative debt service would imply an augmentation of scheduled disbursements on top the rescheduling already granted, and thus sensibly add to the pledges donors would have to make *ex-ante* in order to establish the instrument. As mentioned, such implications are ruled out by the IDA requirements.

<sup>9</sup> Besides Uganda, we tested the main implications of the IDA schemes for Ghana, Mozambique, and Zambia (not reported here). The simulations generally corroborate our findings in relation to the Uganda case study. Our choice to present the detailed results for Uganda, instead of other LICs', rests on our focus on this country for the central case study related to our proposal for a contingency scheme. The reasons underlying our focus on Uganda are extensively described in Chapter 6, Section 6.1.

and economic performance. The underlying data are extracted from the World Bank's Global Development Finance (GDF) and World Development Indicators (WDI) databases.<sup>10</sup> The following sections outline the specific simulation context and our main results in relation to the *ex-ante* schemes underlying by the IDA report.

#### 4.3.1 Real GDP growth indexing

We first implement the indexing scheme outlined in the above equations (3) and (4), whereby  $z_t$  is set equal to Uganda's rate of real GDP growth<sup>11</sup> in period  $t$ . In order to ensure comparability with the results of Vostroknutova (2005), we set the cap applied to maximum total debt service at  $\mu=2$ , and also apply a service floor equal to zero. We then simulate the implementation of the instrument over the period 1995-2003, with particular focus on its implications in terms of debt service revisions in each period.

The four quadrants of Graph 4.1 summarise the main simulation outputs relating to the GDP indexing scheme, with lambda set at unit value. Quadrant I displays Uganda's real GDP growth rate, as well as the current and average deviations of the latter from its moving average growth rate (taking a five-years average, i.e.  $n=5$ ). The series in Quadrant I constitute the elements underlying the instrument's index, in accordance with equation (3) above. The third quadrant of Graph 4.1 shows this index, in the case of Uganda, to exceed the chosen bandwidth of  $\pm 1$  in all but one year (i.e. 2002). Put differently, the country is shown to have suffered from considerable year-to-year variation in its real GDP growth rate, which causes the index to exceed unit value in absolute terms during almost the entire period of observation. As a result, the scheme is simulated to frequently trigger automatic revisions of Uganda's total debt service due<sup>12</sup>, in accordance with formula (4). The

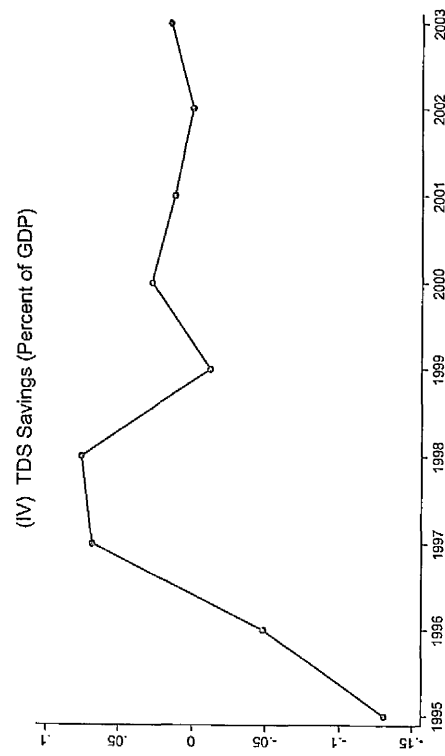
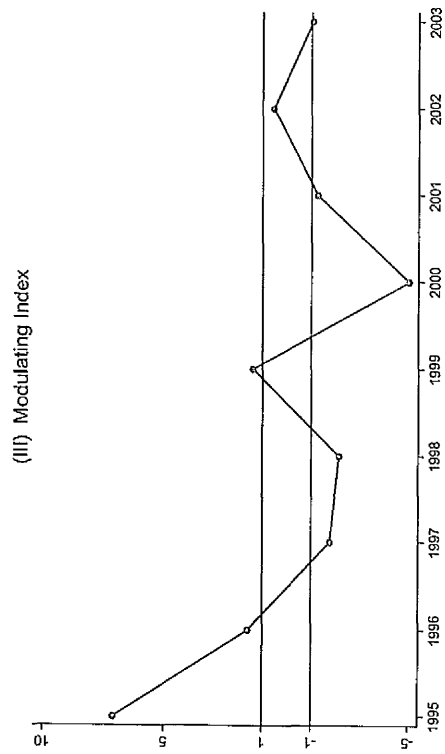
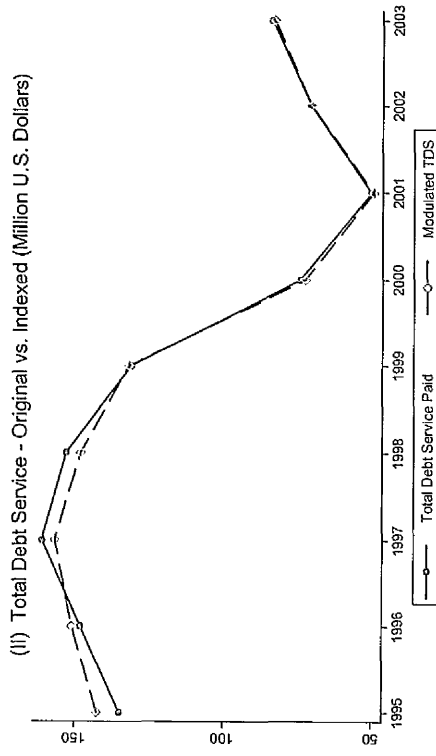
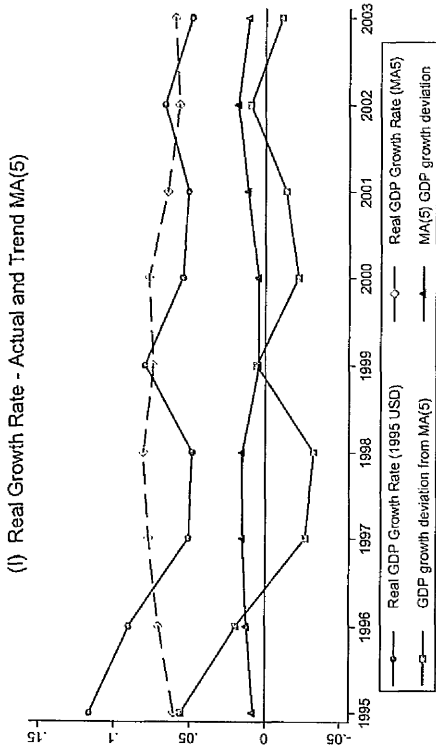
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<sup>10</sup> The data underlying simulations were extracted from the GDF and WDI online databases in February 2005 (institutional subscribers' access). To ensure better consistency across series, all data in real terms have been re-indexed to the base year 1995.

<sup>11</sup> Real GDP growth is measured in terms of constant local currency units (drawn from WDI).

<sup>12</sup> Total debt service includes Uganda's debt service payments on total long-term debt (i.e. public and publicly guaranteed and private non-guaranteed debt), use of IMF credit, and interest on short-term debt. Debt service payments are the sum of principal repayments and interest payments in the year specified. We also used alternative specifications of total debt service, e.g. by including changes in the stock of arrears outstanding, which however did not significantly alter the simulation results.

Graph 4.1: Uganda: Real GDP Growth Indexing Scheme ( $\lambda=1$ )



ensuing debt service revision is plotted in quadrant II of Graph 4.1, against the total debt service originally due. At low values of  $\lambda$ , proportional changes in debt service are of limited effect in modulating the country's overall debt servicing curve. For, even substantial deviations in Uganda's growth rate merely translate to proportional deviations in the level, rather than differences, of the country's debt service flow over time. For example, in the year 1998 the deviation of Uganda's real GDP growth rate fell short of its average by a sizeable 3.2 per cent. As a result, the effects from setting parameter  $\lambda = 1$ , i.e. by translating GDP mean-deviations into changes in debt service on a one-to-one basis, are of limited magnitude when measured in terms of absolute differences between original and modulated debt service. The limited effect is even more strongly emphasised when debt service modulation is expressed as a ratio to GDP. Indeed, quadrant IV shows TDS savings<sup>13</sup> to range only between -0.13 and 0.07 expressed as a percentage of GDP, thus representing negligibly small revisions to the country's debt burden.

Of course, higher values of the modulation parameter  $\lambda$  proportionally increase the scheme's effect on debt service due, and thus on debt service savings. Graph 4.2 and Table 4.1 compare the scheme's effectiveness in adjusting Uganda's debt service during the years of major trend deviations in the real growth index, for increasing levels of  $\lambda$ . Consider, for example, the period 1995-1997, during which Uganda was suffering from a continuously declining real GDP growth rate.<sup>14</sup> By construction, the growth-indexing instrument is not able to suitably capture the effects of such continuing decline over several subsequent periods, as is evident from Panel III of Graph 4.1. Indeed, the latter shows the index to fall below the minus-one intervention mark only in 1997, when debt service reductions would have started to take effect. However, Table 4.1 shows that at  $\lambda = 1$ , debt service would have continued to increase during 1995-1997 despite the revisions, and despite Uganda facing a declining GDP growth rate. Only by increasing the instrument's modulation factor to

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<sup>13</sup> TDS Savings is a term used here to denote differences between original and modulated debt service during the period of observation, independently of whether the scheme would entail TDS differences to be rescheduled or forgiven. Positive (negative) values of TDS Savings are associated with a higher (lower) debt service over the entire simulation period.

<sup>14</sup> Such a decline is mostly related to a plunge in (green) coffee prices, Uganda's main export item, after prices had reached their peak in 1995. See Chapter 6 for a detailed description of Uganda's historical growth and export performance.

$\lambda=2$  would the scheme have been sufficiently effective to actually lower debt service to accommodate the below-average growth rate in 1997, as captured by the index. Moreover, it would have taken  $\lambda=3$  to more than offset the increase in debt service originally due during 1995-1997, in order to accommodate the declining growth rates during that period.

Graph 4.2: Alternative Calibrations of the Real GDP Growth Indexing Scheme

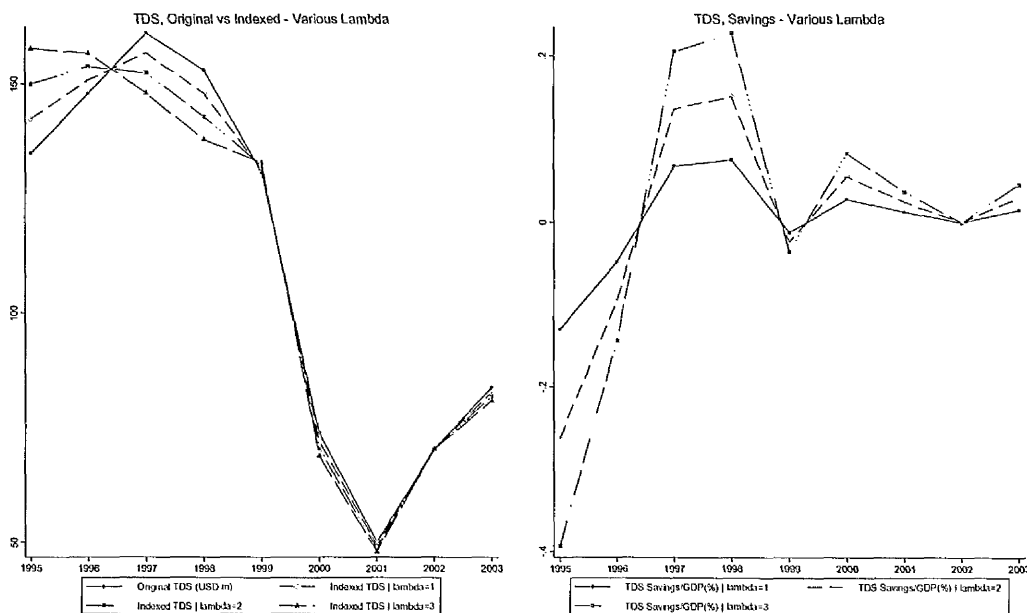


Table 4.1: Total Debt Service Modulation - Alternative Levels of Lambda

| U.S.Dollars<br>(millions) |                 |                  |                     |                  |                     |                  |                     |
|---------------------------|-----------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| Year                      | Original<br>TDS | lambda=1         |                     | lambda=2         |                     | lambda=3         |                     |
|                           |                 | Modulated<br>TDS | TDS diff.<br>(%GDP) | Modulated<br>TDS | TDS diff.<br>(%GDP) | Modulated<br>TDS | TDS diff.<br>(%GDP) |
| 1995                      | 135             | 143              | -0.13               | 150              | -0.26               | 158              | -0.39               |
| 1996                      | 148             | 151              | -0.05               | 154              | -0.09               | 157              | -0.14               |
| 1997                      | 161             | 157              | 0.06                | 152              | 0.13                | 148              | 0.19                |
| 1998                      | 153             | 148              | 0.07                | 143              | 0.14                | 138              | 0.21                |
| 1999                      | 131             | 132              | -0.01               | 132              | -0.02               | 133              | -0.03               |
| 2000                      | 74              | 72               | 0.02                | 71               | 0.04                | 69               | 0.06                |
| 2001                      | 50              | 49               | 0.01                | 49               | 0.02                | 48               | 0.03                |
| 2002                      | 71              | 71               | 0.00                | 71               | 0.00                | 71               | 0.00                |
| 2003                      | 84              | 83               | 0.01                | 82               | 0.02                | 81               | 0.03                |
| TDS savings 1995-2003     |                 | 1                | -0.01               | 3                | -0.02               | 4                | -0.03               |
| TDS savings 1996-2003     |                 | 9                | 0.12                | 18               | 0.24                | 27               | 0.36                |

Note: Author's simulations based on GDF data

Furthermore, we observe that even at  $\lambda=3$ , the instrument's net TDS savings implications are extremely limited, reaching a maximum of -0.39 per cent of GDP in 1995. However, besides negligible year-to-year savings, the bottom rows of Table 4.1

show that the net savings effect of the scheme over the entire simulation horizon is extremely low, as well as being highly sensitive to the exclusion of single years. As a percentage of GDP, net total savings from debt service reductions are close to zero during 1995-2003, while they amount to about one third of a percentage point of GDP when 1995 – a year of substantially higher than average growth – is excluded. A similar conclusion is reached regarding absolute, rather than proportional, effects: TDS savings are close to zero if 1995 is included (Table 4.1).

Finally, it should be noted that the GDP indexing scheme's effect on debt service modulation depends on the level of a country's debt service originally scheduled. That is, the higher (lower) debt service due, the higher (lower) the change in debt service will be. As a consequence, debt service adjustment may well be penalising a country if during the overall duration of the scheme years of higher-than-average growth associated with high debt service due outnumber years of lower-than-average growth combined with low levels of debt service due. For example, consider Graph 4.1: in 1996 Uganda experienced a positive growth deviation of about 19 per cent, which would have triggered an upward TDS revision of about US\$ 3 million; in contrast, a negative growth deviation of approximately 14 per cent in 2001 would have reduced the country's TDS by only US\$ 0.7 million.

In sum, the above simulation results demonstrate the real GDP-indexing mechanism's overall weak potential to tilt debt service in response to Uganda's GDP growth, and thus to significantly align its debt service with broad capacity to pay. In particular, the instrument's index is unsuitable for capturing trend reversals in the growth rate, and its modulation formula is highly sensitive to the actual choice of the bandwidth triggering intervention, as well as the actual setting of the calibration parameter  $\lambda$ . To be effective, the latter would have to be adjusted according to the specific circumstances facing each individual LIC, particularly with regard to the level and moving average variables underlying the growth indexing mechanism and the specific debt service pattern. However, country specificity is incompatible with the IDA's requirement for uniformly applied rules and parameters across countries, which in the context of the IDA instrument considered here implies the application of a uniform parameter  $\lambda$  across all the low-income countries.

In pursuance of a suitable way of determining the optimal value of  $\lambda$  in the context of growth-indexing, the background papers to the World Bank report put forward two alternative calibration methods, which differ in terms of the policy target pursued. With the main focus on the creditor costs implied by alternative calibrations of the GDP-indexing instrument, Vostroknutova (2005) suggests that  $\lambda$  be set either at unit value or, alternatively, to assign  $\lambda$  the median value between the minimum and maximum growth deviations across the entire sample of IDA-countries. While the former approach is chosen on grounds of simplicity, the latter is said to aim at achieving a more equally distributed pattern of debt service modulations across countries. This is because it would minimise the number of times the average country would encounter the binding limits of the scheme and end up paying either the minimum (i.e. zero) or maximum amount (i.e. twice) of debt service due. While this may be true, we would add that nothing in this calibration approach ensures a 'fair' distribution of gains among LICs, and even less so the instrument's potential to effectively cushioning shortfalls of GDP growth in the case of individual countries. Indeed, it is sufficient to consider that Vostroknutova (2005) identifies  $\lambda$  equal to 2.05 as the optimal calibration value, which our simulations have shown to entail negligibly small changes to Uganda's debt servicing schedule, far from effectively aiding the country in times of particular difficulty.

While Vostroknutova (2005) fails to provide compelling evidence in support of her proposal, Tabova (2004) proposes a potentially more promising method of calibration. This takes as prime objective the adjustment of the debt service stream in line with a LIC's real GDP growth, thereby reducing the variability of the TDS to GDP ratio. In pursuance of this goal, Tabova (2004) proposes that the value of  $\lambda$  be determined so as to minimise the volatility of the TDS-GDP ratio, which is measured as the variation of the indexed debt service to GDP ratio against its moving average:

$$\min VAR \left[ \frac{TDS_t^r}{Y_t} - \sum_{i=1}^n \left( \frac{TDS_{t-i}^r}{Y_{t-i}} * \frac{1}{n} \right) \right] \quad \forall \lambda \geq 0 \quad (5)$$

where  $\frac{TDS_t^r}{Y_t}$  is the ratio of indexed debt service to nominal GDP, and

$\sum_{i=1}^n \left( \frac{TDS_{t-i}^r}{Y_{t-i}} * \frac{1}{n} \right)$  is the moving average of this ratio.<sup>15</sup>

The minimisation objective is then simulated by implementing the same scheme as in Vostroknutova (2005) above, but substituting the simple index  $I_t = (z_t - \bar{z}_t)$  for

$$I_t = \frac{(z_t - \bar{z}_t)}{\left| \frac{\sum_{i=1}^n z_{t-i} - \bar{z}_{t-i}}{n} \right|}.$$

To assess Tabova's approach, we first need to solve the minimisation problem. We decide to take a heuristic approach by devising an iterative procedure that converges to the variance minimising parameter in relation to equation (5).<sup>16</sup> Focussing again on the case of Uganda, we now conduct a broader range of simulations, covering the longer period 1986-2003 as well as two shorter sub-periods to control for the scheme's sensitivity to the exclusion of years, and setting the lag structure ( $n$ ) of the index to include alternatively five or three years.

Table 4.2 lists the simulation results from our iterative solutions to equation (5) in relation to the different lag structures and simulation periods contemplated. The upper rows of the table provide the summary statistics of the scheme's index. A positive (negative) average value of the index over the simulation period indicates an overall positive (negative) trend in Uganda's GDP growth, which causes debt service revisions to take a negative (positive) average value over the period (bottom row of Table 4.2). Moreover, the index is shown to take an average close to zero across simulations, which determines the scheme's modulation effects to be generally low, as reflected by the low magnitudes of both absolute and relative TDS savings.

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<sup>15</sup> Tabova (2004) also tests an alternative objective, defined as the volatility of the residual foreign exchange-to-GDP ratio, where residual foreign exchange is computed as the sum of export receipts minus oil imports and debt service outlays. This variant is not included here, since the variance minimisation procedure is identical to the case of the TDS-GDP ratio.

<sup>16</sup> The variance-minimisation procedure was coded in Stata9. Due to space limitations, the lengthy program code, as well as the detailed iteration outputs, are not reported here, but can be made available by the author upon request (in relation to all the LICs).



**Table 4.2: Uganda – Variance Minimising Parameter Calibration in the Case of Real GDP Growth Indexing**

| Lag Structure                     | n=5               |                 |                   |                   |                   | n=3               |                   |                   |
|-----------------------------------|-------------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                   | 1995-2003         | 1996-2003       | 1986-2003         | 1995-2003         | 1996-2003         | 1995-2003         | 1996-2003         | 1986-2003         |
| Index $I_t = (z_t - \bar{z}_t)$ : |                   |                 |                   |                   |                   |                   |                   |                   |
| Mean                              | -0.00             | -0.01           | 0.01              | -0.00             | -0.01             | -0.00             | -0.01             | 0.01              |
| Standard Deviation                | 0.03              | 0.02            | 0.03              | 0.03              | 0.02              | 0.03              | 0.02              | 0.03              |
| Minimum                           | -0.03             | -0.03           | -0.03             | -0.04             | -0.03             | -0.04             | -0.04             | -0.04             |
| Maximum                           | 0.06              | 0.02            | 0.07              | 0.06              | 0.02              | 0.06              | 0.02              | 0.08              |
| Calibration of $\lambda$ (#)      | $\lambda^* = 2.1$ | $\lambda^* = 0$ | $\lambda^* = 0.8$ | $\lambda^* = 2.8$ | $\lambda^* = 0.5$ | $\lambda^* = 2.8$ | $\lambda^* = 0.5$ | $\lambda^* = 1.9$ |
| Var (TDS/GDP) Revised             | 0.20              | 0.16            | 0.57              | 0.37              | 0.28              | 0.40              | 0.28              | 0.59              |
| Var (TDS/GDP) Original            | 0.22              | 0.16            | 0.57              | 0.44              | 0.28              | 0.44              | 0.28              | 0.63              |
| Difference in Variance (%)        | -9.8              | 0.0             | -0.4              | -15.0             | -0.7              | -8.7              | -0.2              | -6.6              |
| Total Sum of TDS Savings (USD m)  | 1.5               | 8.2             | -22.7             | 9.0               | 5.4               | 3.2               | 10.8              | -47.9             |
| Total Sum of TDS (USD m)          | 1006              | 871             | 2104              | 1006              | 871               | 1006              | 871               | 2435              |
| TDS Savings (% of TDS)            | 0.14              | 0.94            | -1.08             | 0.89              | 0.62              | 0.32              | 1.23              | -1.97             |

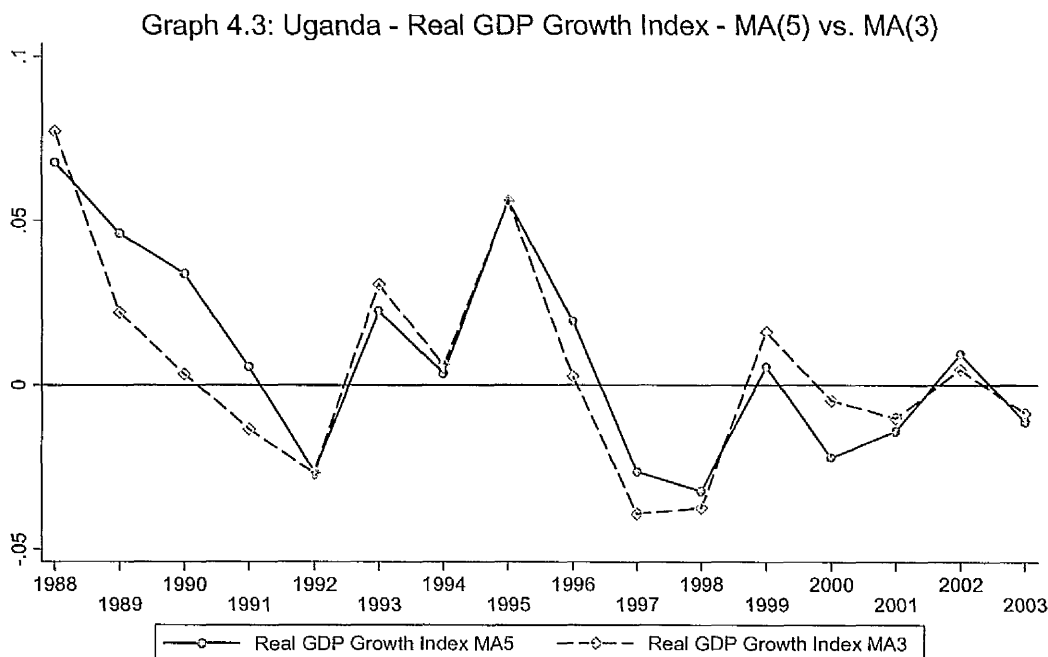
Source: Author's simulations, based on GDF and WDI data.

Notes: (#)  $\lambda^*$  = variance-minimising value of lambda

However, while these results reflect those of Table 4.1 – employing a different index – our key focus here is on the scheme’s effectiveness in reducing the variation in the TDS-GDP ratio. The latter is assessed by the difference in variance before and after the introduction of the modulation scheme. Table 4.2 compares the scheme’s effectiveness in reducing variations between the identified variance-minimising values of parameter  $\lambda$  and the scenarios with  $\lambda$  at unit value. It can be observed that the optimal calibration values, indicated as  $\lambda^*$ , fall within a relatively narrow range, spanning from 0.5 to 2.8. For example, the simulation scenario shown in the first column of Table 4.2 indicates the variance-minimising value of  $\lambda^*$  to converge at the value 2.1. Accordingly, the TDS modulation effect would cause TDS/GDP variability to fall by about 10 per cent during 1995-2003, while debt service would decline by only USD 1.5m, or 0.14 per cent of total debt service paid over the same period. However, the results listed in the second column show that when the simulation period is reduced by one single year, to 1996-2003, it appears that there exists no value for  $\lambda > 0$  that could reduce the variance of the original TDS-GDP ratio, and thus the scheme would not even be activated during the whole period of analysis. In contrast, the third column shows that an extension of the period to include the years 1986-2003, would have variance-minimising  $\lambda$  set at 0.8. This, however, would reduce the variability of the TDS-GDP ratio by less than 0.5 per cent during the same period, while the country would see its debt service revised upwards by almost US\$ 23 million. Arguably, in the face of an accelerated repayment stream it is questionable whether the country authorities would consider the net benefits from a negligibly small reduction in the TDS-GDP ratio to be positive.

The scheme’s intrinsic sensitivity to period selection is further evidenced by comparing its effectiveness using different lag structures. Although the difference between the two differently lagged indexes is not particularly pronounced in the case of Uganda (Graph 4.3), Table 4.2 shows that the simulations adopting a backward-looking moving average of three, as opposed to five, years ( $n=3$ ), yield results that differ considerably in the determination of variance-minimising  $\lambda$ . Since a shorter moving average is more suitable to capturing short-term cyclicalities, we would expect it to constitute a more effective benchmarking method in the presence of Uganda’s high variability around trend. Indeed, our results confirm that for any chosen period,

a comparison of simulations based on MA(5) against MA(3) shows the latter to be associated with a higher calibration parameter  $\lambda$  and a stronger decline in TDS/GDP variability.



In sum, our simulations of the real-GDP indexing scheme under the pursuance of variance minimisation appear to confirm its limited effectiveness in modulating Uganda's debt service to any significant degree. The best results are achieved by indexing to a backward-looking growth benchmark of three lags, and for higher values of  $\lambda$ . However, even then, the variability of the TDS-GDP ratio shows only a limited decline, and may well be associated with an overall acceleration of the debt service stream compared to no intervention. Furthermore, optimal calibration appears to be highly sensitive to period selection.

Against this background, showing severe limitations of this scheme's applicability to the case of a single country, it is evident that such difficulties would be almost insurmountable in the cross-country context contemplated by the IDA. The calibration of the instrument to objectives such as minimisation of debt ratio volatility would be impossible, and the requirement for uniform parameters across countries would lead to severe discrepancies in the instrument's impact across countries. Ultimately, the pursuance of creditor cost limitation would be likely to lead to the application of a low parameter value, similar to Vostroknutova's scenario setting  $\lambda$

at unit value, thus foregoing any potential to effectively address the repayment difficulties across countries and time.

#### 4.3.2 U.S. Dollar GDP growth indexing

A country's total external debt service is typically denominated in current U.S. Dollars. Therefore, to more effectively align debt service with a country's capacity to pay, an insurance scheme could be indexed to GDP growth in current U.S. Dollar terms. While indexing to a country's deviations in the real GDP growth rate captures broad macroeconomic circumstances, the growth rate denominated in current U.S. Dollars encompasses a broader range of factors affecting a country's capacity to pay. Besides real growth, it reflects both changes in a borrower's currency exchange rate to the dollar (or to a basket of creditors' currencies) and domestic inflation (see Annex A4.1 to this chapter for a description of basic relationships between the two growth series). On such a premise, Vostroknutova (2005) contemplates applying the IDA scheme to LICs' GDP growth deviations denominated in U.S. Dollars, instead of constant local currency units.

To assess the IDA scheme's performance with U.S. Dollar GDP indexation, we reiterate here our simulation method in line with Tabova's variance minimisation approach to calibration, in order to provide a direct comparison with the real growth indexing scheme considered above.<sup>17</sup> Table 4.3 summarises our main simulation results. Strikingly, except for the 1995-2003 period (first column), in none of the contemplated scenarios is the scheme suitable for achieving its goal of variance minimisation of the TDS-GDP ratio. Due to the sheer magnitude of the index deviations, there is no value of  $\lambda > 0$  which could translate changes in nominal GDP growth into volatility-reducing revisions of the country's debt service stream.<sup>18</sup> In contrast, the results demonstrate that proportional debt service revisions, i.e. at  $\lambda = 1$  as applied by Vostroknutova (2005), render the revised TDS-GDP ratio extremely

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<sup>17</sup> It should be noted that the IDA review does not directly address U.S. Dollar indexing among the schemes contemplated, and only does so implicitly, with reference to the background paper by Vostroknutova (2005). Furthermore, the IDA includes a scenario indexing to countries' real exchange rates. As already mentioned, we do not include this scheme among our reported simulations, since our results in relation to the latter are partly subsumed in the broader growth indexing scenario reported in this section (in relation to the nominal, rather than real exchange rate).

<sup>18</sup> We reach the same conclusion also by applying alternative measures of volatility, e.g. the growth ratio's standard deviation/mean ratio, or the OLS trend deviation measure (not reported here).

Table 4.3: Uganda - Nominal GDP Growth Indexing Simulations

| Lag Structure<br>Period          | n=5               |           |           | n=3       |           |           |
|----------------------------------|-------------------|-----------|-----------|-----------|-----------|-----------|
|                                  | 1995-2003         | 1996-2003 | 1986-2003 | 1995-2003 | 1996-2003 | 1986-2003 |
| Index Statistics:                |                   |           |           |           |           |           |
| Mean                             | -0.01             | -0.01     | -0.04     | -0.02     | -0.07     | -0.02     |
| Standard Deviation               | 0.21              | 0.21      | 0.26      | 0.18      | 0.12      | 0.24      |
| Minimum                          | -0.25             | -0.25     | -0.46     | -0.22     | -0.22     | -0.44     |
| Maximum                          | 0.48              | 0.48      | 0.48      | 0.37      | 0.08      | 0.37      |
| Calibration of $\lambda$         | $\lambda^* = 0.2$ | 1         | 1(#)      | 1(#)      | 1(#)      | 1(#)      |
| Var (TDS/GDP) Original           | 0.19              | 0.50      | 1.95      | 1.05      | 1.02      | 1.76      |
| Var (TDS/GDP) Revised            | 0.22              | 0.22      | 0.67      | 0.44      | 0.28      | 0.65      |
| Difference in Variance (%)       | -13.2             | 127.9     | 193.2     | 137.7     | 260.2     | 169.4     |
| Total Sum of TDS Savings (USD m) | 2                 | 12        | 126       | 44        | 93        | 86        |
| Total Sum of TDS (USD m)         | 1006              | 1006      | 2435      | 1006      | 871       | 2435      |
| TDS Savings (% of TDS)           | 0.25              | 1.23      | 5.16      | 4.35      | 10.73     | 3.51      |

Source: Author's simulations, based on GDF and WDI data.

Notes: (#) indicates that the variance-minimising lambda equals zero.

**Table 4.4: Uganda – Nominal GDP Growth Indexing Results (1986-2003) in millions of U.S. Dollars (current), unless indicated otherwise**

| Period | GDP  | GDP Growth | GDP Growth Rate | Growth Index | Original TDS | Indexed TDS | TDS Saving | Original TDS/GDP (%) | Indexed TDS/GDP (%) | TDS Saving (% GDP) |
|--------|------|------------|-----------------|--------------|--------------|-------------|------------|----------------------|---------------------|--------------------|
| 1986   | 3920 | 400        | 0.11            | -0.15        | 171          | 145         | 26         | 4.36                 | 3.71                | 0.65               |
| 1987   | 6280 | 2360       | 0.6             | 0.33         | 160          | 213         | -53        | 2.55                 | 3.39                | -0.84              |
| 1988   | 6510 | 230        | 0.04            | -0.23        | 202          | 156         | 46         | 3.1                  | 2.39                | 0.71               |
| 1989   | 5250 | -1260      | -0.19           | -0.46        | 188          | 101         | 87         | 3.58                 | 1.93                | 1.65               |
| 1990   | 4300 | -950       | -0.18           | -0.29        | 145          | 103         | 42         | 3.37                 | 2.4                 | 0.97               |
| 1991   | 3320 | -980       | -0.23           | -0.3         | 147          | 102         | 45         | 4.43                 | 3.08                | 1.35               |
| 1992   | 2860 | -460       | -0.14           | -0.15        | 113          | 97          | 17         | 3.95                 | 3.37                | 0.58               |
| 1993   | 3220 | 360        | 0.13            | 0.27         | 154          | 195         | -41        | 4.78                 | 6.06                | -1.28              |
| 1994   | 3990 | 770        | 0.24            | 0.36         | 149          | 203         | -54        | 3.73                 | 5.09                | -1.36              |
| 1995   | 5760 | 1770       | 0.44            | 0.48         | 135          | 200         | -65        | 2.34                 | 3.47                | -1.13              |
| 1996   | 6040 | 280        | 0.05            | -0.04        | 148          | 142         | 6          | 2.45                 | 2.35                | 0.10               |
| 1997   | 6270 | 230        | 0.04            | -0.11        | 161          | 144         | 17         | 2.57                 | 2.3                 | 0.27               |
| 1998   | 6530 | 260        | 0.04            | -0.14        | 153          | 132         | 21         | 2.34                 | 2.02                | 0.32               |
| 1999   | 5970 | -560       | -0.09           | -0.25        | 131          | 99          | 33         | 2.19                 | 1.65                | 0.54               |
| 2000   | 5890 | -80        | -0.01           | -0.11        | 74           | 66          | 8          | 1.26                 | 1.12                | 0.14               |
| 2001   | 5640 | -250       | -0.04           | -0.05        | 50           | 48          | 2          | 0.89                 | 0.85                | 0.04               |
| 2002   | 5800 | 160        | 0.03            | 0.04         | 71           | 73          | -3         | 1.22                 | 1.27                | -0.05              |
| 2003   | 6200 | 400        | 0.07            | 0.08         | 84           | 91          | -7         | 1.35                 | 1.46                | -0.11              |

Source: Authors' simulations, based on GDF and WDI data.  
 Note: Calibration at lambda = 1.

volatile, and lead to substantial debt service savings particularly during years characterised by a strongly negative index mean (i.e. when positive and negative yearly modulations do not tend to cancel each other out).

Table 4.4 shows more detailed simulation results relating to the scheme's effect during each single year between 1986 and 2003. The years 1989 and 1995 mark, respectively, the peak and dip levels of the growth index. Debt service is reduced by 46 percent, or US\$ 87 million, in 1989, and increases by 48 per cent or US\$ 65 million in 1995, when positive growth deviation is highest. Although the scheme's liquidity effects are of substantial magnitude in absolute terms, they are limited when measured as a percentage of GDP: the yearly TDS savings ratio reaches its peak at 1.65 per cent, in 1989, and subsequently declines along the negative trend of the TDS-GDP ratio. Furthermore, it should be noted that yearly liquidity effects of debt service modulation are distorted by indexing to MA(5) deviations as opposed to yearly fluctuations of GDP growth. For example, in 1989, nominal GDP fell by about 19 per cent compared to its level during the previous year, while its deviation from MA(5) was 46 per cent. This caused the scheme to trigger a debt service revision that was more than twice as high as the amount warranted by the year-to-year variation. However, to the extent that year-to-year variation captures the actual burden of external debt in terms of financial liquidity, or capacity to pay more in general, indexing schemes should employ a smaller number of lags, and thereby assign a proportionally higher weight to current deviation. Finally, Table 4.3 shows the sum of Uganda's simulated debt service savings to be US\$ 126 million over the period 1986-2003. Rather than representing a substantial amount of additional aid to the country, it should be noted that this scheme's financial implications would amount to only about 1.2 per cent of the total amount of official financial development assistance to Uganda over the same period.

In sum, our simulations support the view that nominal GDP indexing, being susceptible to a broader range of factors influencing a country's repayment capacity, could, in principle, offer better risk hedging proprieties to low-income countries. In particular, we find that such a scheme could lead to a substantial degree of yearly debt service revisions, depending on the specific parameter settings applied. However, the scheme's broader potential for protection also increases the

discrepancies among individual countries' actual exposure to GDP fluctuations over time. Therefore, the nominal GDP scheme is bound to present even greater calibration difficulties than those discussed in relation to the real GDP scheme, and is largely unsuitable for uniform application across the group of low-income countries, as mandated by the IDA.

Finally, it should be recalled from our discussions in Chapters 2 and 3, that the greatest weakness of GDP indexing schemes results from their lack of differentiation between exogenous and endogenous determinants. Therefore, these instruments are unsuitable for making the fundamental distinction between a borrower's capacity to pay, and the state of nature affecting the latter. While this problem is already intrinsic in the real GDP measure, serving as an indexing variable to the scheme considered in the previous section, it is greatly exacerbated in the case of current U.S. Dollar growth indexing, involving a broad spectrum of possible causes affecting a country's monetary variables. Ultimately, by introducing the potential for incentive problems (e.g. a country's disincentive to exceed the average growth rate or to meet an inflation target), these schemes fail to correctly interpret the basic tenets underlying the design of incentive-compatible contingency instruments, and thereby could hardly constitute a viable option for application to the broader creditor community. In this sense, the IDA's underlying assumption, i.e. that indexing to trend deviations would largely deter incentive distortions, is clearly inconsistent with its own preconditions on ex-ante instruments.

#### **4.3.3 Terms of trade indexing**

An important variant of the common IDA scheme is introduced by gearing a debtor's debt service to some index capturing its terms of trade (TOT), rather than GDP. To the extent that a country's export commodity prices do not significantly diverge from world prices, and the country lacks the market power to substantially influence these prices, its terms of trade constitute a sound basis for an index reflecting truly exogenous shocks to a country's repayment capacity. By indexing to a variable proxying the state of nature, rather than capacity to pay as such, it largely avoids the



indeterminacy underlying the GDP-based indices, and thus most of the incentive hazards associated with the latter.<sup>19</sup>

However, instead of properly appreciating the advantages from indexing to exogenously determined prices, rather than to GDP, the IDA report ascribes it the following characteristics:

“An instrument that links official debt service to changes in a country-specific commodity price index allows for timely adjustment in resource flows in the event of a terms-of-trade shocks. [...]

The timing risks that the creditor would face are likely to be small. [...] A simulation of a portfolio of conventional concessional credits and a similar portfolio of credits indexed to commodity prices found that the latter resulted in an approximate loss of 0.5 percent of total reflows in net present value terms. [...]

The design of the instrument avoids incentives for misreporting as the calculation of required debt service is based on international commodity prices. [...]

This instrument would only insure against unfavourable international commodity price developments, but would not insure against other commodity-related shocks that affect a country's repayment capacity.” (IDA 2005: 17-18)

Clearly, this characterisation of the scheme reflects both the IDA report's central creditor bias, and the mostly operational concern it exhibits with regard to the incentive effects. Indeed, the incentive effects are reduced to representing mere misreporting concerns, rather than centring attention on the crucial issues relating to the ex-ante scheme's incentive implications. Arguably, by failing to compare alternative schemes on such grounds, the IDA report lacks any relevant bearing on the analysis of their true implications and likely effectiveness in either debtor or creditor countries.

In relation to our assessment of the TOT-indexing scheme in the case of Uganda we choose to follow two different approaches, with the aim of providing a comparison of its performance with those of the GDP schemes considered above. We first restructure the basic scheme outlined in Section 4.2, using a terms of trade index relying on unit value prices. Subsequently, we simulate an alternative instrument, as

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<sup>19</sup> Although it may still be argued that insuring against a low-income country's vulnerability to terms of trade shocks includes a protection bias in favour of countries with greater vulnerability, which, in turn, may introduce a distortion in their incentive to free themselves from the reliance on a narrow and vulnerable basket of export commodities. While it is impossible here to expand on the broader implications from protection against terms of trade shocks, the reader is referred to the discussion in Chapter 5 below.

contemplated by the IDA on the basis of the trade-weighted terms of trade index devised by Gilbert and Tabova (2005).

#### 4.3.3.1 Terms of trade indexing with the standard IDA scheme

The basic IDA scheme is readily adapted to indexing changes in Uganda's terms of trade. The index is now defined as:

$$I_t = \frac{ToT_t}{\overline{ToT}_t}; \quad (6)$$

where the country's (barter) terms of trade are defined as:

$$ToT_t = \left( \frac{XGS_{USD}}{XGS_{1995USD}} \right) / \left( \frac{MGS_{USD}}{MGS_{1995USD}} \right); \quad (7)$$

where  $XGS_{USD}$  and  $MGS_{USD}$  are the unit values<sup>20</sup> of exports and imports, respectively;

and where the backward-looking moving average of the ToT is:

$$\overline{ToT}_t = \frac{1}{n} \sum_{i=1}^n ToT_{t-i}. \quad (8)$$

We then calibrate the scheme so as to minimise the volatility of the TDS/XGS ratio, i.e.:

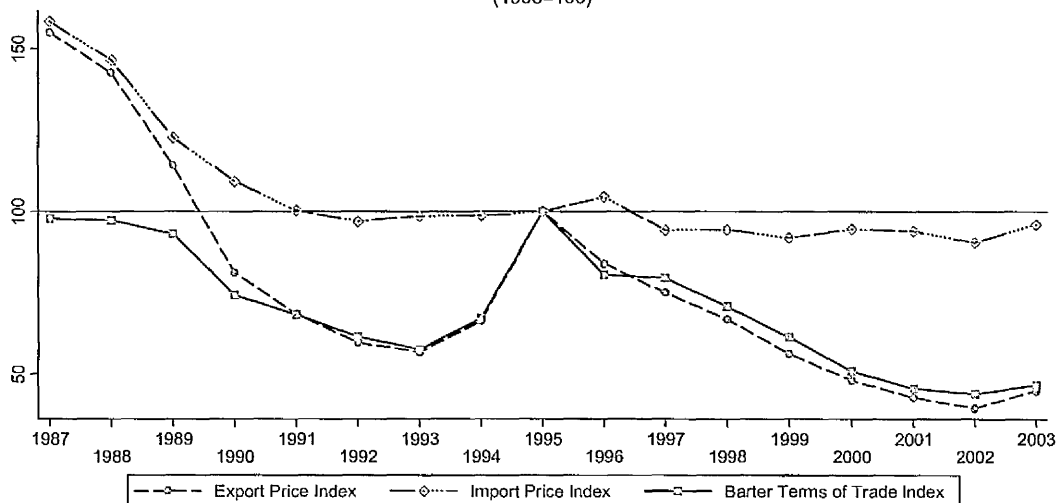
$$\min VAR \left[ \frac{TDS_t^r}{XGS_t} - \sum_{i=1}^n \left( \frac{TDS_{t-i}^r}{XGS_{t-i}} * \frac{1}{n} \right) \right] \quad \forall \lambda \geq 0 \quad (9)$$

Turning to the simulation results, Graph 4.4 displays export and import unit values relating to Uganda during 1986-2003. Over the entire period, export prices show a pronounced downward trend, with the exception of a sharp rise in 1995, while import prices tend to flatten out from the early 1990s onwards. Consequently, the terms of trade closely follow the downward trend in export prices, particularly since the early 1990s.<sup>21</sup>

<sup>20</sup> Unit value is the ratio of export (import) value to export (import) volume. Unit values are calculated from WDI data, and correspond to those published in the UNCTAD Handbook of Statistics CD-ROM (2005) but offering greater availability of observations.

<sup>21</sup> For a detailed description of Uganda's TOT pattern, see Chapter 6 below.

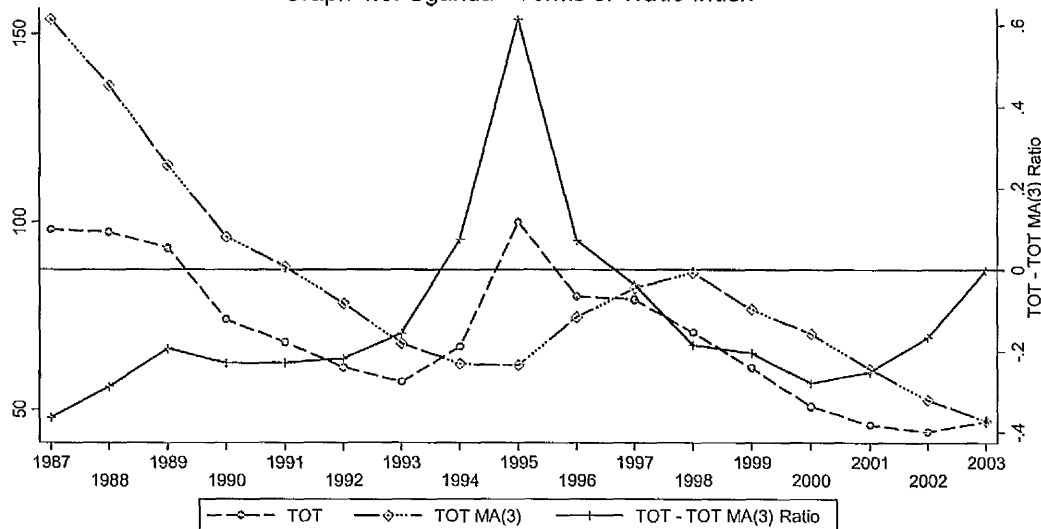
Graph 4.4: Uganda - Export, Import Prices, and the Barter Terms of Trade  
(1995=100)



Source: Author's calculations, based on WDI data

Graph 4.5 plots the index,  $I_t$ , calculated as the ratio of Uganda's terms of trade to its moving average (assuming a three-year lag structure). By indexing the scheme to  $I_t$ , debt service is to adjust to both TOT fluctuations around the trend and to the trend itself. Together, these forces cause the index to fluctuate broadly between -40 and +60 per cent, and the strong downward pressure from worsening terms of trade is shown to restrict the index mostly to the negative area of the graph.

Graph 4.5: Uganda - Terms of Trade Index



Source: Author's calculations, based on WDI data

Table 4.5 lists the results from simulations over alternative periods and lag structures. Contrary to the GDP indexing schemes, calibration of  $\lambda$  to the objective of variance-

minimisation is achieved by all the scenarios, and is highly effective in reducing volatility in the TDS-XGS ratio. The latter is shown to fall by between 8 and 80 per cent, and, overall,  $\lambda$  at unit value would appear to be the optimising calibration value of the scheme's key parameter across the various scenarios. The average value of the index is consistently negative, reflecting a situation of generally worsening terms of trade, and takes more negative values when the peak year of 1995 is excluded. The index triggers substantial debt service adjustments, both on a yearly basis and in terms of total changes to debt service over the various periods of application. For example, depending on the lag structure of the index, the application of the scheme over the period 1986-2003 would have led debt service to fall by between 12 and 16 per cent as ratio to total debt service due, despite the inclusion of the TOT upswing during 1994/95.

**Table 4.5: Uganda – Terms of Trade Indexing Simulations**

| Lag Structure<br>Period    | n=5       |           |           | n=3       |           |           |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                            | 1995-2003 | 1996-2003 | 1986-2003 | 1995-2003 | 1996-2003 | 1986-2003 |
| Index:                     |           |           |           |           |           |           |
| Mean                       | -0.08     | -0.15     | -0.17     | -0.05     | -0.13     | -0.11     |
| Standard Deviation         | 0.28      | 0.19      | 0.23      | 0.28      | 0.13      | 0.22      |
| Min                        | -0.35     | -0.35     | -0.38     | -0.28     | -0.28     | -0.36     |
| Max                        | 0.52      | 0.13      | 0.52      | 0.61      | 0.07      | 0.61      |
| Calibration $\lambda$ (#)  | 0.9       | 1.1       | 1.0       | 1.1       | 0.6       | 1.1       |
| Var (TDS*/XGS) Original    | 19.9      | 21.8      | 97.4      | 62.3      | 65.2      | 113.7     |
| Var (TDS/XGS) Revised      | 100.0     | 59.7      | 180.3     | 135.5     | 71.4      | 182.2     |
| Difference in Variance (%) | -80.1     | -63.5     | -46.0     | -54.0     | -8.6      | -37.6     |
| Total Sum of TDS Savings   | 12        | 92        | 356       | 13        | 57        | 288       |
| Total Sum of TDS           | 1006      | 871       | 2264      | 1006      | 871       | 2435      |
| TDS Savings (% of TDS)     | 1.2       | 10.6      | 15.7      | 1.3       | 6.5       | 11.8      |

Source: Authors' calculations, based on WDI and GDF data.

Notes: (#) Variance-minimising value of lambda.

In sum, the Uganda case study demonstrates that terms of trade indexing clearly outperforms its GDP-anchored variant. Applying our own specification as a hybrid version of the proposals of Vostroknutova (2005) and Tabova (2005), and defining an alternative index optimally capturing trend variations, we show that the scheme has the potential to effectively reduce the volatility of the debt servicing-to-exports ratio. Moreover, the scheme shows itself to be less vulnerable to the type of incentive issues addressed by the IDA, while also fulfilling our own criterion in relation to its ability to link debt service payments to a proxy that is far closer to representing the state of nature, than is GDP.

#### 4.3.3.2 Terms of trade indexing along the Gilbert and Tabova (2005) scheme<sup>22</sup>

In an interesting study underlying the IDA report, Gilbert and Tabova (2005) conduct an investigation into the potential benefits of terms-of-trade insurance schemes. Wary of potential incentive distortions introduced by indexing to unit values, which could induce debtor governments to over-report import prices and under-report export prices, the authors opt for the employment of an alternative terms of trade index, reflecting world prices instead of country-specific unit values. However, by emphasising the benefits of world prices over export and import unit values, Gilbert and Tabova (2005) appear not to fully acknowledge that unit values, such as those underlying the TOT Index used in the previous scheme, have the great benefit of reflecting country-specific attributes of particular primary exports, such as quality characteristics and specific grades. Since these characteristics have a decisive bearing on the price a specific commodity commands in the international markets (e.g. coffee, cocoa, tobacco), an index based on unit values offers broader protection against a country's susceptibility to exogenous shocks affecting prices through altered commodity characteristics (e.g. as a consequence of climatic shocks).

Essentially, the authors compute their index following a method identical to that applied in the seminal contribution by Deaton and Miller (1995), but decide to exclude from the index all those primary commodities for which world prices are not well-defined (e.g. iron ore and oils), as well as metals exports.<sup>23</sup> The index is thus defined as:<sup>24</sup>

$$I_t = \sum_i^m w_{it}^j \ln \left( \frac{p_{it}}{p_{it}} \right); \quad (10)$$

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<sup>22</sup> We thank Alexandra Tabova for having kindly made available their terms of trade index for the purpose of this study.

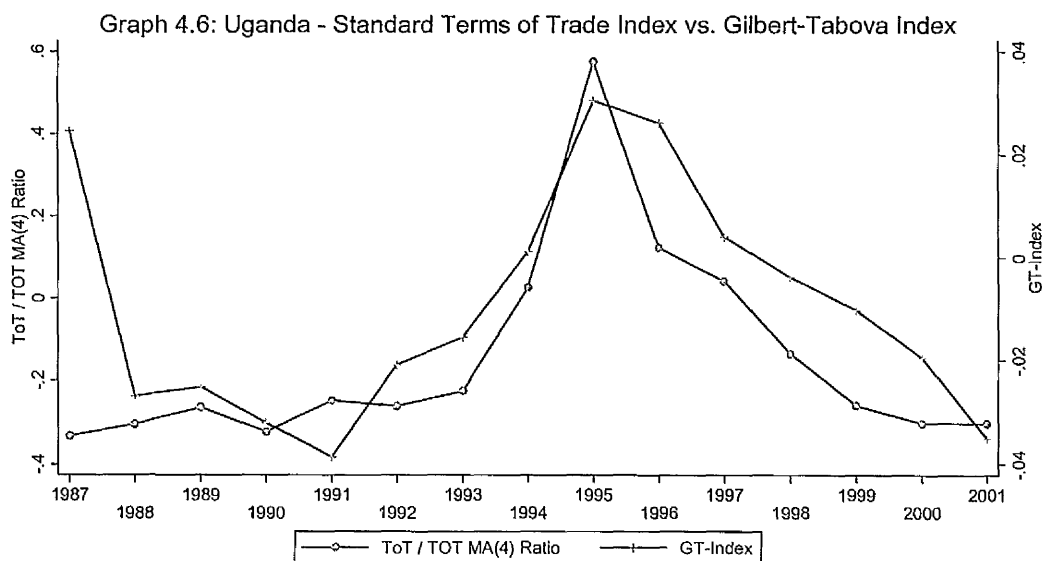
<sup>23</sup> Since metals exports fail to explain growth in the regressions, Gilbert and Tabova perform to estimate the TOT-GDP growth relationship. However, while dropping metals from the index appears to be less of a problem when applied to Uganda, which relies on few other metals exports with the exception of gold (see Chapter 6), the same could not be argued in the case of other mainly metal-exporting LICs, such as Zambia (copper) or Ghana (gold). Furthermore, the exclusion of oil from LICs' import bill is bound to heavily distort the assessment of the balance of payments impacts from fluctuations in the world price of their primary import item.

<sup>24</sup> See Tabova and Gilbert (2005: 5-9) for a detailed description of the index.

where  $m$  is the total number of commodities  $i$  entering the index;  $w_{it}^j$  represents the weights of the relative importance of specific commodities within any country  $j$ 's exports and their value share in that country's national income;  $p_{it}$  denotes the matrix of prices across commodities and time, and  $\overline{p_{it}}$  is the moving average of the matrix of prices, defined as:

$$\overline{p_{it}} = \frac{1}{n} \sum_{i=1}^n p_{i,t-i} \quad (11)$$

The authors choose to have a lag-structure of four years ( $n=4$ ). A comparison between the Gilbert-Tabova Index and the barter terms of trade index for Uganda shows a close similarity between the two series in the observed pattern over time (Graph 4.6).<sup>25</sup> In the case of our country study, this would support the application of either index, whereby the inclusion of lags remains a largely arbitrary matter of judgement. However, the same does not apply for LICs who are predominantly metals exporters, in which case the GT Index is largely inapplicable (e.g. see the table in Annex A4.2, for the case of Zambia).



Relying on the on the above-defined index, Gilbert and Tabova (2005) design their modulation scheme with the objective of limiting the impact of adverse shocks on the borrowing countries, but emphasising that this should be achieved "without

<sup>25</sup> Note that the GT-Index is only available for the period up to 2001.

imposing a substantial cost to the lending institution".<sup>26</sup> Instead of pursuing variance-minimisation as such, the authors calibrate their instrument using a trial-and-error approach, roughly exploring the cost-benefit effects from alternative parameter settings across the 56 low-income countries included in their sample. The authors eventually settle for the parameter values listed in Table 4.6, which at the same time constitute their instrument's modulation formula. Gilbert and Tabova (2005) apply a cap-floor approach to limit maximum and minimum debt service revision, similarly to the general IDA scheme. However, in contrast to the IDA scheme, and in particular to the Vostroknutova (2005) index outlined above, they define asymmetric bands of +1 and -2.5 per cent, as a safeguard to borrowers against too high positive debt service modulation during (very) propitious periods, and also to exclude the possibility of negative debt service modulation, i.e. the automatic disbursements of additional loans, during very adverse periods. In all other respects, the instrument works similarly to the other schemes featured by the IDA report. For example, an index value ranging between +0.5 and -1.25 per cent would leave a country's debt service stream intact, while an index value falling between -1.25 and -2.5 per cent would qualify for a debt service reduction by one half of the amount originally scheduled for the particular year of observation.

**Table 4.6: Gilbert-Tabova Debt Service Indexing Scheme**

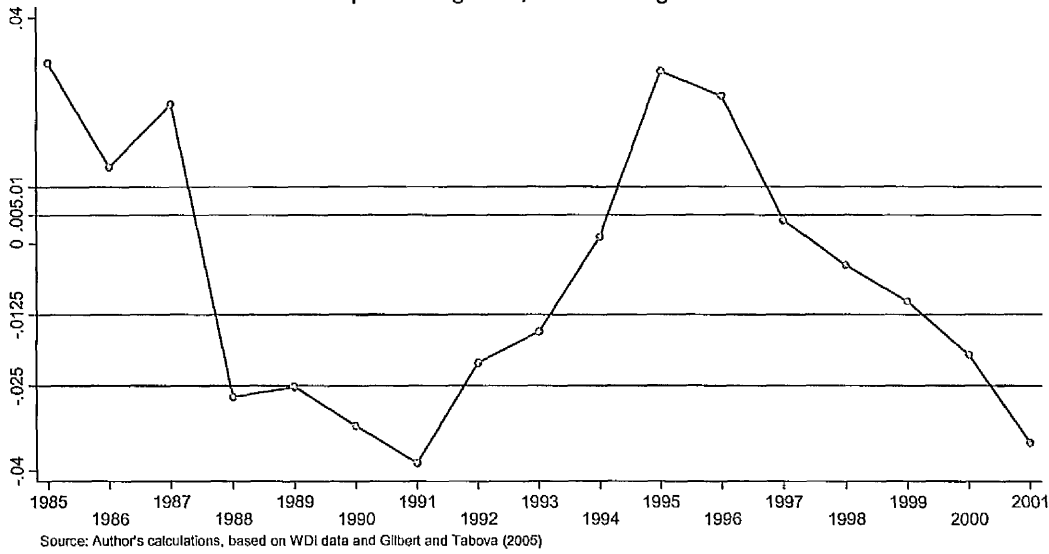
| Period          | Index value                 | Debt Service Multiple |
|-----------------|-----------------------------|-----------------------|
| Very propitious | $I_t > 1\%$                 | 150%                  |
| Propitious      | $1\% \geq I_t > 0.5\%$      | 125%                  |
| Neutral         | $0.5\% \geq I_t > -1.25\%$  | 100%                  |
| Adverse         | $-1.25\% \geq I_t > -2.5\%$ | 50%                   |
| Very adverse    | $-2.5\% > I_t$              | 0%                    |

Source: Gilbert and Tabova (2005), adapted by the author.

Turning now to simulations, we decide to apply the GT-instrument to the case of Uganda over the entire period of availability of the GT-index, i.e. 1985-2001, and by adopting the same calibration underlying the authors' own simulations. Graph 4.7 shows that the GT-scheme applied according to the parameter settings of Table 4.6

<sup>26</sup> Gilbert and Tabova (2005: 12)

Graph 4.7: Uganda, GT-Indexing Scheme



Graph 4.8: Uganda - TDS, Original vs. Indexed  
(Million U.S.Dollars)

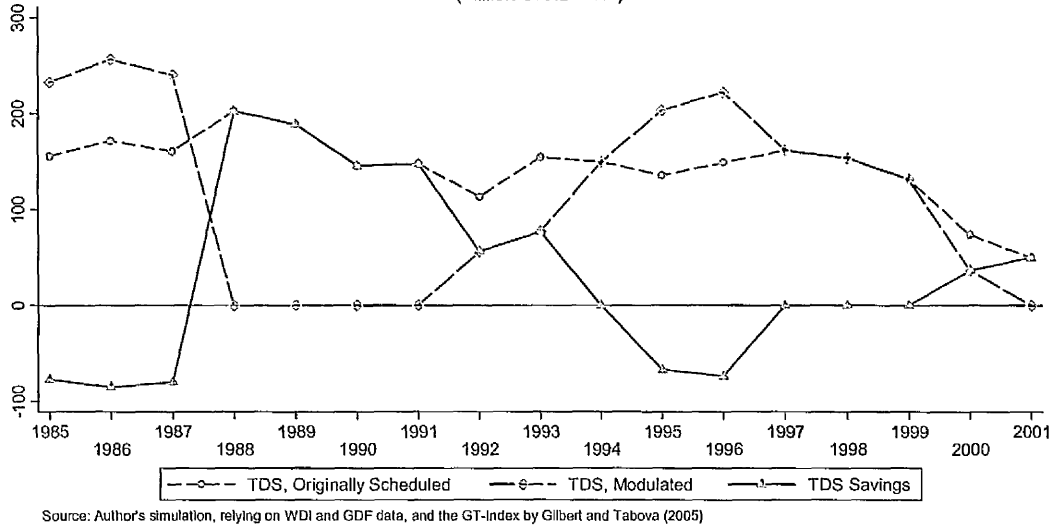


Table 4.7: Gilbert-Tabova Indexing Scheme Simulation Results

| Period                     | 1985-2001 | 1986-2001 | 1995-2001 | 1996-2001 |
|----------------------------|-----------|-----------|-----------|-----------|
| Index                      |           |           |           |           |
| Mean                       | -0.01     | -0.01     | 0.00      | -0.01     |
| Std. Dev.                  | 0.02      | 0.02      | 0.02      | 0.02      |
| Minimum                    | -0.04     | -0.04     | -0.04     | -0.04     |
| Maximum                    | 0.03      | 0.03      | 0.03      | 0.03      |
| Var (TDS/XGS) Original     | 281       | 300       | 34        | 39        |
| Var (TDS/XGS) Revised      | 346       | 321       | 136       | 132       |
| Difference in Variance (%) | 65        | 21        | 102       | 93        |
| Total Sum of TDS Savings   | 518       | 596       | -54       | 13        |
| Total Sum of TDS           | 2436      | 2281      | 852       | 717       |
| TDS Savings (% of TDS)     | 21.3      | 26.1      | -6.4      | 1.8       |

Source: Author's simulations, based on WDI and GDF data, and the terms of trade index devised by Gilbert and Tabova (2005).



would identify 29 per cent of the years as very propitious, 24 per cent as neutral, 18 per cent as adverse, and 24 per cent as very adverse. As a result of Uganda's predominantly adverse terms of trade evolution, Graph 4.8 shows the instrument to result in an overall debt service reduction over the entire period, and to reduce debt service to zero in about one quarter of the years. Moreover, debt service reductions are shown to be substantial, exceeding US\$ 250 million in the year 1988 alone. Between 1988 and 1991, Uganda would have seen its entire debt service rescheduled to the future.

Table 4.7 provides a more detailed summary of all the relevant simulation results across alternative time periods. A comparison across periods shows the instrument's effects to be highly sensitive to the exclusion of single years, both in terms of TDS savings and the volatility of the TDS-XGS ratio. Since the scheme is not calibrated to minimise volatility, the variance of the TDS-XGS ratio is consistently increased by the debt service revisions, and doubles during the shorter periods of application. While variance minimisation is not among the scheme's objectives, and is thus not the most appropriate measure for assessing its performance, it should be noted that it also appears to fail to fulfil its primary objective, i.e. to provide effective protection at minimised cost to creditors. While effective protection is indeed achieved by means of substantial yearly rescheduling, as shown in Graph 4.8, Table 4.7 also shows that such rescheduling tends to rapidly accumulate, particularly over the longer periods of simulations. For example, after the implementation period spanning from 1985 to 2001, Uganda's debt stock would have increased by US\$ 518 million, accruing from the accumulation of rescheduled arrears. As result, the effects of the scheme appear to be largely inconsistent with the IDA prerogatives, and thus with the authors' own target of devising a scheme in line with those requirements.

With regard to this finding, it is worth mentioning that Gilbert and Tabova (2005) reach a conclusion that strongly contrasts with our own simulation results. Indeed, using a different methodology, based on forward-looking Monte Carlo simulations of terms of trade shocks, the authors estimate that after an application period of 25 or 15 years Uganda's accumulated arrears would amount to only 3.6 and 1.8 per cent,

respectively, of the initial debt stock.<sup>27</sup> Unfortunately, the difference in methodological approach makes it impossible to directly compare these results with those derived from the deterministic, historical simulations we conduct here. However, the magnitude of the discrepancy with our results is striking: we calculate that over the same period of 15 years, spanning between 1987 and 2001, Uganda's TDS arrears would actually have increased by a sizeable 35.4 per cent in relation to its initial debt stock, compared to the 1.8 per cent found by Gilbert and Tabova (2005). When comparing results, it should be noted that a strong argument in favour of our approach is its focus on assessing the scheme's potential effects in relation to the terms of trade shocks Uganda is actually known to have experienced. In contrast, the bootstrapping method applied by Gilbert and Tabova (2005) creates a fictitious simulation scenario, representing an environment the average IDA-only country is assumed to be experiencing over some chosen time horizon spanning into the future. While either methodology may be said to have its specific advantages and drawbacks, the general experience has demonstrated that forecasting scenarios involving low-income countries are usually far off any reasonable margin of error.<sup>28</sup>

It could still be argued that the cost-minimising objective of the GT-scheme would be achieved if its overall reflows implications to the lending institutions were to average out among participating low-income countries. While this would crucially depend on the specific correlation structure of shock events actually experienced across countries and time, it would still remain necessary to optimise the scheme for the individual participating country, in order to avoid the creation of severe incentive distortions. For example, the substantial accumulation of arrears over prolonged periods by some countries, e.g. Uganda, would entail a wide array of typical disincentive problems similar to those associated with a situation of debt overhang. In contrast, in the case of other countries, the prospects of prolonged periods of debt service accelerations could lead to an excessive liquidity squeeze, and thus accentuate adverse selection problems.

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<sup>27</sup> See Gilbert and Tabova (2005: 27 – Table 5).

<sup>28</sup> The simulations underlying the BWI debt sustainability assessment (DSA) being perhaps the most suitable example in this context (see Chapter 3).

In sum, we fail to find the GT-scheme to be particularly compelling on the basis of its comparative performance against the alternative TOT-instrument analysed above. On the basis of our Uganda country study, we find the instrument's rigid parameter calibration to undermine its capacity to adequately adjust to a specific pattern of terms of trade evolution. Thereby, the GT-scheme lacks the desirable flexibility of the alternative TOT-instrument, including its potential for achieving the desirable variance-minimising effect. Furthermore, as the central feature of the Gilbert and Tabova (2004) approach, the trade weighted terms of trade index exhibits the severe shortcoming of excluding metals and oil prices, which makes it unsuitable for application across LICs, thus foregoing its potential as a useful world-price-based alternative to the simple barter terms of trade index.

#### **4.4 Concluding remarks**

Against the background of a long-standing reluctance to even contemplate the potential role of contingency schemes in addressing low-income countries' vulnerability to exogenous shocks, the ex-ante instruments envisaged by the recent IDA report mark an important step forward in the multilateral approach. The general scheme we have analysed in this section, as a surrogate for those proposed by the background papers underlying the report, offers a simple instrument that can be tailored to include a variety of alternative indexing variables.

Among the instruments considered in the context of our Uganda country study simulations, the terms of trade indexing schemes seem to be best suited to adjusting a country's debt service to capacity to pay. The basic TOT-instrument also appears to have a greater potential to reduce TDS-XGS volatility, provided that the IDA's requirement of creditor-cost minimisation is not made binding. In contrast, GDP schemes seem to perform less well, and are also bound to present greater calibration difficulties due to the disparate factors affecting GDP growth across countries. However, while parameter calibration in the case of one country has been shown to be problematic, the IDA requirement of uniform parameter setting across low-income countries appears to be largely impractical. For, there is no possible way of determining an optimal parameter setting that would ensure the instruments' suitability for beneficial application across all the LICs. Instead, the IDA's prerogative

of minimising creditor costs would probably lead to a weak calibration of any instrument envisaged, with focus on risk-pooling characteristics across creditors' portfolios, and negligible liquidity effects for individual debtor countries.

More fundamentally, the proponents of these instruments seem to disregard the conceptual difference between a country's repayment capacity and the state of nature that influences it. The importance of such a distinction being made in order to ensure an insurance scheme's incentive compatibility has long been in the domain of our understanding in relation to these issues, as was extensively discussed in Chapter 2 of this study. However, rather than addressing these instruments' more profound incentive implications, the IDA's emphasis seems to be placed on the more superficial, and arguably less decisive, aspects of distortions, such as a borrower's scope for misreporting or even tilting its exports to reap some short-sighted benefits. While failing to even appropriately address the latter, e.g. by wrongly assuming the incentive compatibility of indices based on moving averages, the IDA fails to realise the broader shortcomings of its approach in relation to contingency schemes.

Ultimately, none of the schemes analysed in this section is fully appropriate for assessing the various sources of vulnerability affecting a country's capacity to pay, nor to address the actual financial needs arising from shocks. For, indexing faces a trade-off between capturing the shocks from a limited, well-defined source (e.g. the terms of trade), thus ignoring all other important sources of shocks to an economy, and the insurmountable complications from disentangling exogenous from endogenously determined shocks when indexing to broader proxies of repayment capacity (e.g. nominal GDP growth). Also, debt service adjustment constitutes but one of the items constituting overall net official financial transfers to a debtor economy, which, as a whole, would have to represent the modulating variable. Put differently, in order to modulate effectively a country's liquidity, a financing scheme would need to adjust financial flows beyond debt service scheduled, with a broader objective of modulating flows in response to financial requirements and involving at least some degree of new financing and/or relief of existing debt.

We conclude our analysis with a final reflection in relation to the IDA ex-ante scheme's proposed allocation within the overall Debt Sustainability Framework (i.e.

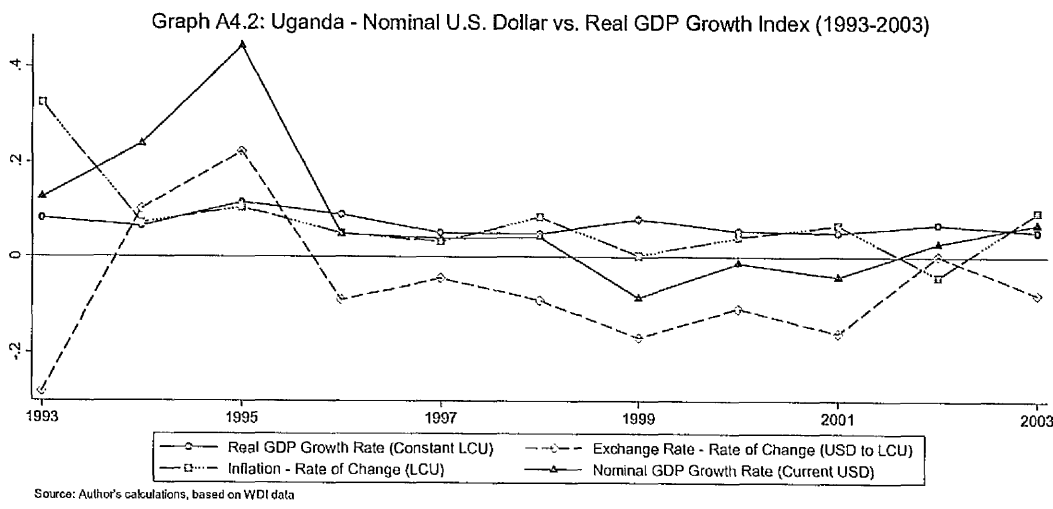
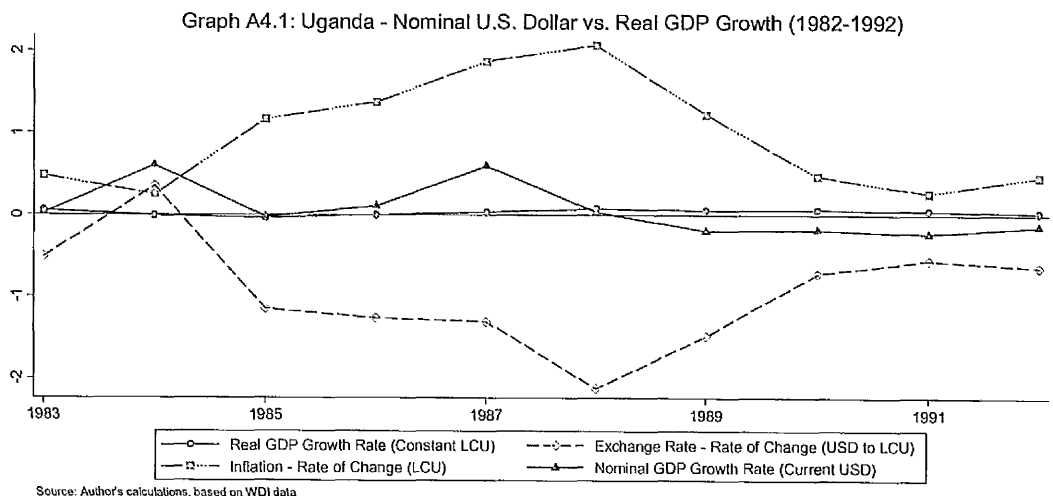
the third pillar in Chart 3.1 of the preceding chapter). It will be recalled from the discussions in Chapter 3 that the DSF's debt sustainability assessment is crucially focussed on the evolution of external debt in relation to debtor's GDP. Moreover, it has been pointed out that the rationale for the integration of IDA ex-ante schemes into the DSF arises out of its failure to protect countries against the large, unforeseeable shocks occurring with relatively low frequency. In light of these considerations, it would appear that for reasons of internal consistency, the DSF would have to be integrated with an ex-ante scheme indexing to countries' nominal GDP growth, mirroring the accounting method underlying the DSA. As a result, the DSF's extant shortcomings would be likely to be further exacerbated by adding those identified in relation to the GDP-indexing scheme. Besides, as already mentioned in Chapter 3, even if we were to assume away the flaws affecting the indexing scheme, the overall constellation of the DSF would still represent an inconsistent patchwork of interrelated modules. For, the central thrust of the CPIA-centred IDA14/DSF regime would continue to determine the fundamental aspects relating to LICs' debt sustainability, namely volume and type of aid allocation, while the contingency scheme would have no bearing other than on debt service rescheduling. However, to the extent that debt service streams are of mostly trivial magnitude compared to the bulk of financial flows involving a LIC's aid-dependency on donors, the potential benefits from indexing would be proportionally small.

In sum, we confirm our assessment of the extant DSF as leading to particularly negative and worrisome conclusions, also with regard to the outlook of its implications after the inclusion of a contingent facility along the lines of the IDA schemes considered in this chapter. As we will extensively demonstrate in the third and final part of this study, a more positive outlook for low-income countries' debt sustainability over time will only be achieved by entirely rethinking the current aid allocation and debt sustainability frameworks, on the basis of a more central role assigned to contingency schemes informing the donors' response to those countries' vulnerability to exogenous shocks.

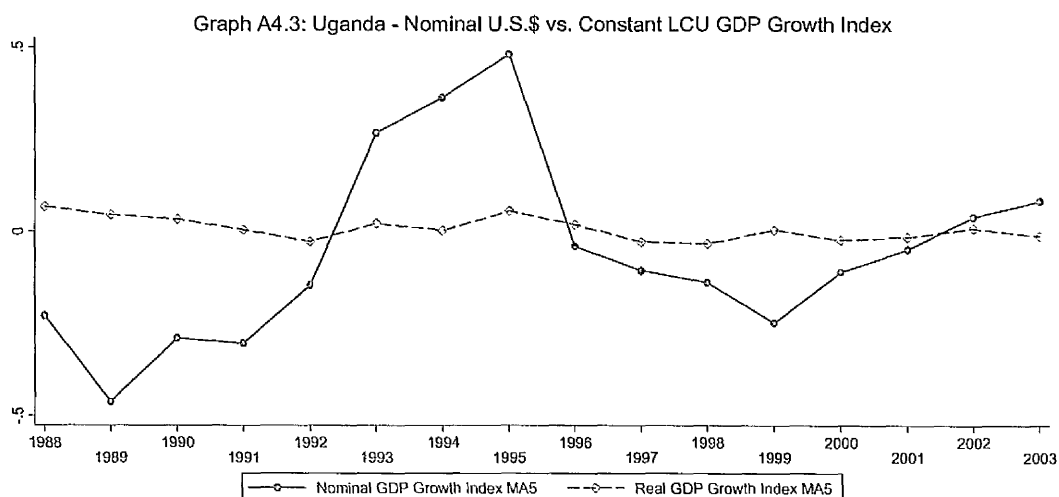
# Appendices

## Appendix A4.1: GDP growth – U.S. Dollar vs. LCU Series

The two GDP growth series underlying simulations in Section 4.3 are drawn from the World Development Indicator database, which derives these data as follows. Consider Graphs A4.1 and A4.2, illustrating the relation between Uganda's real GDP growth, in constant local currency units (LCU), the yearly rate of change of its exchange rate expressed as Shillings to the U.S. Dollar, domestic inflation as measured by GDP deflator, and its GDP growth rate expressed in current U.S. Dollar



terms. Since all series are expressed in terms of their yearly rate of change, U.S. Dollar GDP growth is the net sum of the real measure in constant LCU terms, plus inflation and the exchange rate. Uganda liberalised its exchange rate in 1993; previous to this, it was heavily administered and subject to extreme fluctuations. Graph A4.1 shows the typically offsetting effect between inflation and the (official) nominal exchange rate during 1983-1992, which however causes the U.S. Dollar denominated growth rate to fluctuate around the more stable LCU growth rate. Graph A4.2 shows the same relationships with reference to more tranquil times, and during which exchange rate determination was mostly left to the markets.<sup>29</sup> To better see the relationships among the WDI data, consider for example the year 1999: the real LCU growth rate is shown to be positive, which would possibly have caused the indexing scheme to revise Uganda's debt service upward. However, that period's marked depreciation of the exchange rate of the Shilling to the Dollar against the background of low domestic inflation caused Uganda's U.S. Dollar-denominated growth rate to turn negative. As a result, the IDA scheme indexed to nominal GDP growth would have had the opposite effects on Uganda's debt service revision. To the extent that repayment capacity depends on a country's current disposal of U.S. Dollars to service its debts, the nominal scheme would have offered more comprehensive protection against the exchange rate factor undermining Uganda's payment capacity in 1999.<sup>30</sup>



<sup>29</sup> See Chapter 6 for a detailed background on Uganda's historical vicissitudes.

<sup>30</sup> Whereby it should be recalled from the discussion in Chapter 3 that we reject IDA's presumption that GDP growth could represent a suitable measure of repayment capacity.

**Table A4.1: Main Statistics Relating to the Nominal and Real Indices (1988-2003)**

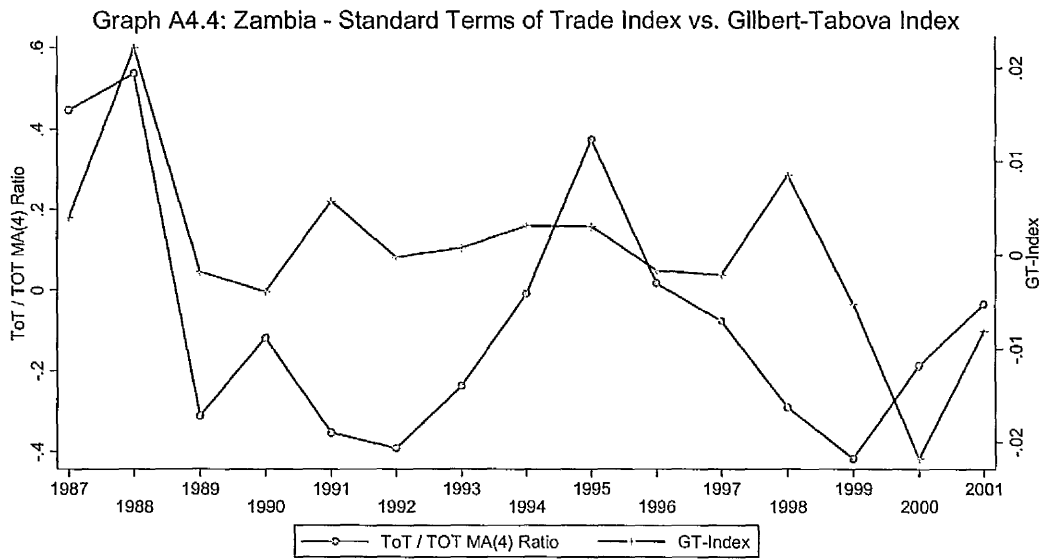
|                 | Mean  | Std.Dev. | Min   | Max  | Correlation |
|-----------------|-------|----------|-------|------|-------------|
| U.S. GDP Growth | -0.06 | 0.25     | -0.46 | 0.48 | 0.04        |
| LCU GDP Growth  | 0.01  | 0.03     | -0.03 | 0.07 |             |

Source: Author's calculations, based on WDI data.

Finally, consider the different magnitude of fluctuations relating to the two alternative trend deviation indexes underlying the IDA scheme. As is to be expected, Graph A4.3 and Table A4.1 show that the deviations from average nominal growth outstrip the constant LCU series both in terms of greater magnitude and volatility over time. As a result, the U.S. Dollar index would lead to more frequent and substantial debt service revisions over time. Furthermore, the low correlation between the two indexes shows that deviations in terms of constant LCU GDP growth are dominated by the largely unrelated monetary effects on Uganda's debt-carrying capacity.



Appendix A4.2: Gilbert-Tabova Index vs. Standard TOT Index in the case of Zambia



## Part III

## 5 Proposal for a State-Contingent Debt Sustainability Framework

### 5.1 Introduction

Our evaluations in Part II show the new BWI Debt Sustainability Framework (BWI-DSF) and the World Bank approach to debt service modulation schemes to be largely detached from the central tenets of the theoretical debt literature with regard to the optimal definition of ex-ante state-contingent debt contracts. Indeed, Part I of this study has laid out the rationale for the introduction of contingent financial instruments to assist low-income countries on an ex-ante basis in coping with exogenous shocks to their balance of payments and external debt sustainability. In line with the established insights of the substantial body of sovereign debt and contract theory literature, we concluded that the orderly solution to LICs' debt overhang would have to involve a combination of state-contingent mechanisms, capturing a debtor country's repayment capacity according to observable and verifiable states of nature, and also to allow for periodical contract renegotiation in relation to the residual factors influencing the debt contract's outcome.

Clearly, these requirements on state-contingent financing are broader than those envisaged by the BWI in relation to their own concept of ex-ante instruments, which merely establishes a contractual basis of the rules for a pre-determined response regarding the amount and terms of assistance before the contingency occurs.<sup>1</sup> This definition of ex-ante instruments significantly downplays their posited supremacy over ex-post responses, by essentially reducing it to the avoidance of delays and uncertainty with regard to the response by the donor community. Based on such a premise, the key policy issue in relation to ex-ante instruments becomes merely the shortening of the time-lag between the occurrence of a shock and the provision of foreign assistance<sup>2</sup>, which is not necessarily seen as a sufficient justification for the

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<sup>1</sup> For a comparative classification of the characteristics distinguishing ex-ante from ex-post mechanisms according to the BWI interpretation, see IDA (2005b: 9).

<sup>2</sup> As well as the provision of a risk-sharing mechanism to creditors, as outlined in Chapter 4.

introduction of ex-ante financing, as the problem could also be addressed by more efficient decision-making processes in relation to ex-post approaches.

In light of all the shortcomings of the BWI approach, this chapter moves on to defining the basic elements of an encompassing proposal for a so-called Contingency Debt Sustainability Framework (CDSF), representing an attempt to tackle the major challenges posed by the actual implementation of state-contingent debt contracts according to the theoretical discussion in Chapter 2. We begin by noting that, from an operational perspective, any debt sustainability framework faces a trade-off between its suitability for standardisation across countries and its capacity to capture country-specific circumstances determining debt sustainability. To be operationally viable on an ex-ante basis, a DSF has to inform the borrowing and lending process on the basis of a parsimonious set of observable indicators, applicable across debtor countries. To be effective, a DSF must ensure equitable and fair treatment across countries, while also taking into account those country-specific factors that significantly affect debt sustainability in an individual country, but not in others. In an attempt to strike a balance between these overarching requirements, our proposal for a CDSF is based on an analytical framework that distinguishes exogenous from endogenous factors determining a country's need for financial assistance and its debt stock development over time. We define as mixed-endogenous all those factors affecting a debtor country's balance of payments (BOP) that are attributable, at least in part, to policy measures under the direct control of its authorities, and which are enacted during the period under consideration. In contrast, we define as exogenous effects on the balance of payments all factors outside the realm of government control. However, with the exception of a number of well-defined shocks, it is usually not possible to clearly distinguish, ex-post, between the exogenous and endogenous variables determining a country's balance of payments. Therefore, any ex-ante scheme is bound to introduce some degree of distortion in a debtor country's incentive with regard to the endogenous factors maximising the BOP outcome. To minimise negative incentive effects, the proposed CDSF thus introduces a performance assessment mechanism, classifying a debtor country's actual policy actions according to its compliance with policy programmes set out in agreement with the lenders.

After controlling for contractual policy compliance, the CDSF accounting method allows for a useful identification of exogenous shock and trend factors, determining the sign and amounts of automatic adjustments to the volume and grant share of official development finance. It will be shown that by adjusting aid flows to a debtor's exposure to external shocks, and by alleviating the debt burden in light of unfavourable trend factors, the proposed debt sustainability framework constitutes an effective tool for defining the donor communities' ex-ante policy response to the key factors undermining sustainability of low-income countries' external debt flows and stocks.

The remainder of this chapter is organised as follows: section 5.2 outlines the overall features and specific instruments of the state-contingent debt sustainability framework; section 5.3 derives an accounting methodology suitable for distinguishing between the exogenous and endogenous factors affecting a debtor country's balance of payments; section 5.4 draws the conclusions.

## **5.2 Proposal for a Contingency Debt Sustainability Framework**

Chapter 3 has extensively discussed the shortcomings of the World Bank and IMF's debt sustainability framework and debt service modulation schemes, particularly with regard to their inability to deal comprehensively with low-income countries' pronounced vulnerability to exogenous shocks. Against the background of the foregoing discussion, and in contrast to the CPIA bias characterising the existing framework, the outline of our proposal for a Contingency Debt Sustainability Framework is centred on the concepts of external vulnerability and exogenous shocks.

Chart 5.1 stylises the main functions of and relationships between the elements constituting the CDSF. The key operational features of the scheme are divided into two areas, in abstract relation to their reference to two distinct time periods. Period *t* should be thought of as referring to a time span long enough to allow for the collection and analysis of the relevant information of factors affecting a debtor country's balance of payments during its course. Conditional upon sufficient information becoming available by the time it ends, the exact duration of the reference period will be established in relation to the specific circumstances faced by

a debtor country. For example, it will correspond to the yearly auditing of the country balance of payment statistics, or to the periodic conclusion of broader economic review assessments, such as those that low-income countries undergo every six months by virtue of their involvement in three-year arrangements with the IMF Poverty Reduction Growth Facility (PRGF). Whatever its length, period  $t$  constitutes the time frame within which the CDSF operates as an ex-ante contingency mechanism, i.e. as a contractual arrangement for compensation in the event that pre-defined criteria are met. In contrast, period  $t+1$  refers to the CDSF implications relating to subsequent periods, which are not based on an ex-ante arrangement, and thus require either negotiations between the donor and the recipient, or are discretionary to the donor community alone.

The focus of the CDSF is on low-income countries' external aspects of debt sustainability, as resulting from their balance of payments. Other factors affecting a borrowing country's debt sustainability, most notably the fiscal aspects relating to foreign aid dependency, are not directly addressed by the scheme, and remain in the background of the analysis. However, similarly to the IMF and World Bank debt sustainability analyses, a more encompassing CDSF should be thought of as comprising two complementary and interrelated assessment processes, addressing both a borrower's external and fiscal sustainability.

The CDSF envisages a typical sovereign borrower–sovereign lender relationship, in relation to official financial assistance. If the relationship is assumed to involve only one multilateral lender, the main implications of the CDSF are suitable for direct comparison with the IDA aid allocation framework outlined above. However, the sovereign lender party to the contract would more appropriately be viewed as representing the entire donor community, so as to confer on the scheme the potential to effectively address LICs' broader debt sustainability concerns, relating to their entire outstanding official debt. Similarly to the HIPC Initiative, the donor community can thus be thought of as involving mainly the multilateral and bilateral entities, to whom the bulk of LIC debt stock is owed. In that case, the scheme conveniently presupposes that the donor community manages to overcome all coordination problems, and that a representative body (e.g. the IDA, Paris Club or an

entity constituted *ad-hoc*) be invested with the power to act on behalf of all its members.

Finally, the CDSF is envisaged to represent a special regime, applicable to those LICs deemed eligible for qualification and which are willing to participate. Although not further specified here, the criteria for eligibility could involve a pre-qualification period, involving both structural and policy benchmarks along the lines of the performance assessment outlined below. For example, eligibility could be made dependent on LICs matching a defined set of structural characteristics, such as their exposure to exogenous shock and trend factors deriving from the particular composition of exports and imports baskets. However specified, any restriction on eligibility presupposes the existence of an alternative regime, applicable to all the countries that are excluded, whether willingly or not. For convenience of exposition, we make the simplifying assumption that the alternative regime is represented by the current aid allocation and debt sustainability mechanisms, although the broader implications of the CDSF proposal would have the effect of replacing, rather than complementing, the existing regime, since the two are broadly incompatible.

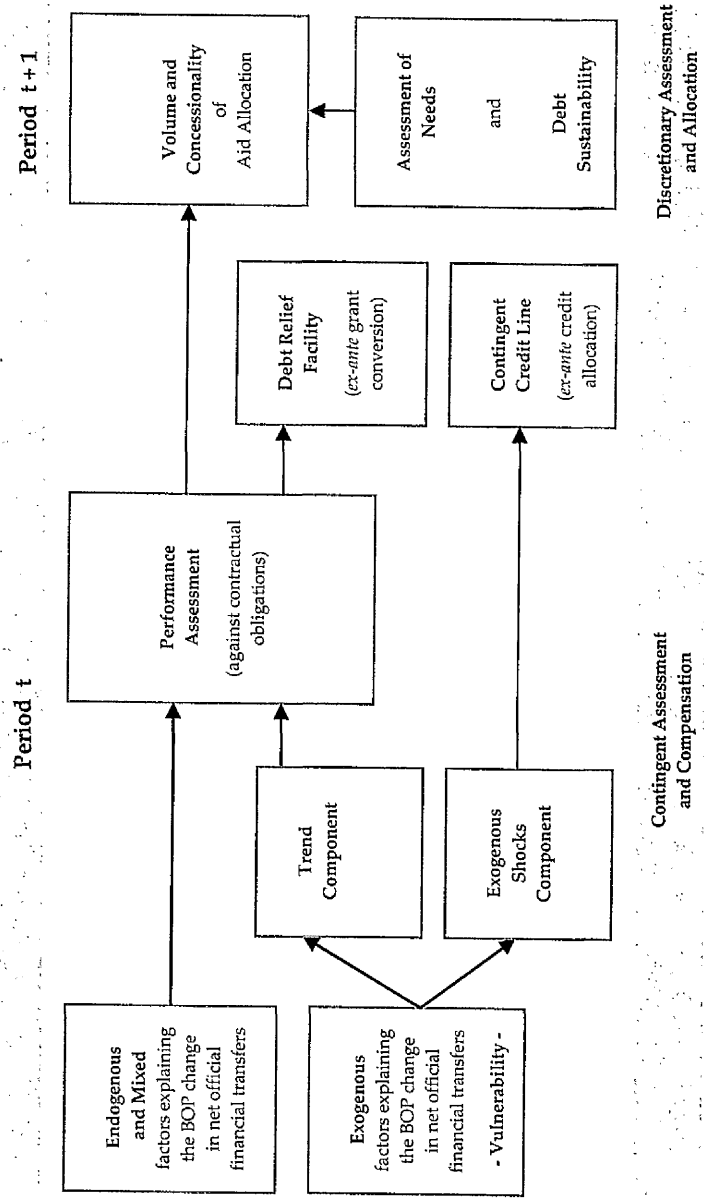
With these qualifications in mind, the key components of the proposal are now discussed in turn.

### **5.2.1 Endogenous vs. exogenous balance of payments determinants**

The central building block of the CDSF is constructed on the bases of the distinction between the factors affecting a debtor country's balance of payments. By applying the accounting methodology outlined below, on the basis of consolidated BOP data at the end of each period  $t$ , a crucial distinction is drawn between factors of exogenous and endogenous nature: exogenous factors are defined as being beyond the influence of the debtor country, such as the world demand and prices facing a small country, while endogenous factors are at least in part, or potentially, subject to the country's control.

The lower left-side of Chart 5.1 shows the CDSF to further disaggregate exogenous factors into trend and shock components. While both components are externally determined variables, insofar as they lie outside the country's sphere of influence, trend effects are assumed to be internalised in the country's expectations

**Chart 5.1: Basic Scheme of the Contingency Debt Sustainability Framework**





regarding future BOP realisations, while shocks are not. That is, the country is assumed to formulate its economic policies according to trend expectations, thereby internalising historical trends of exogenous BOP effects in its policy decisions. For example, the amounts of a particular crop produced and exported may be adjusted as a deliberate policy choice in the face of an observable price trend. Therefore, export earnings from that particular crop are exogenous only with regard to the actual price trend and the effects of natural factors on yields, but not with regard to volume adjustments made in response to those external forces. Exogenous shocks, in contrast, are defined as random realisations around trend and are, as such, unforeseeable. It will be argued below, in relation to the CDSF performance assessment, that it is crucial for such a distinction to be made in the context of a contingency scheme, for it not to distort a LIC's incentives towards emancipation from a condition of vulnerability to exogenous shocks.

The upper left-side box of chart 5.1 represents all non-exogenous determinants of the balance of payments. These include fully endogenous factors, which are entirely under government control, as well as all the BOP effects resulting from the complex interrelations between external shocks and policy reactions to the latter. We call the latter mixed, or indeterminate, effects. The multitude of back and forward linkages between external factors and internal policy measures makes it difficult to identify clear-cut causal relationships, or to disentangle and measure the single forces constituting mixed effects. Despite the difficulties implicit in any such identification exercise, the accounting methodology underlying the CDSF allows for a sufficiently accurate ex-post extrapolation<sup>3</sup> of all the balance of payments determinants that can be clearly qualified as exogenous price shock or trend factors, on the basis of consolidated data observable by both the borrower and the lenders at the end of period  $t$ . By contrast, all the other BOP effects, whether endogenous or mixed, are dealt with as a residual.

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<sup>3</sup> The ex-post nature of the CDSF assessment is not to be confused with the ex-ante nature of its compensatory function.

### 5.2.2 The contingent credit line

The contingent credit line constitutes the CDSF instrument to adjust a LIC's BOP cash-flow to the occurrence of exogenous shocks, by modulating net official transfers. Upon identification and measurement of the realised effects of shocks on a debtor country's balance of payments, the contingency mechanism involves the automatic disbursement or amortisation of interest-free top-up funds in proportion to their net overall direction and magnitude. In order to be effective in filling the liquidity gap ensuing from negative shocks, such disbursements are to occur periodically, at the end of period  $t$ , or with higher frequency, depending on the feasibility of conducting an immediate impact assessment. By definition, shocks are identified as random realisations around trend and should, as such, be mean-reverting. Hence, there is no particular justification for the contingency mechanism to disburse grants, instead of credits. Nevertheless, the scheme should be made flexible to include periodic grant-conversions of debts accumulated by the credit line, to the extent that the cumulative effects of these events over the longer term should not revert to trend, or should have resulted from large real shocks, such as natural disasters.<sup>4</sup>

It should be noted that the CDSF compensation mechanism contrasts with the debt service modulation schemes envisaged by the World Bank. For, in terms of insulation against external factors, the CDSF offers comprehensive protection against all identifiable exogenous factors affecting a debtor's balance of payments, in contrast to the World Bank's reliance on a narrow set of single indices, such as real GDP growth, exchange rate or export prices. However, with the exception of world prices, such indices are not suitable for distinguishing exogenous from endogenous factors. As has been argued above, it is essentially these schemes' failure to solve the central identification problem which undermines their own potential to operate as ex-ante contingency mechanisms, as well as underlying the World Bank's misplaced scepticism concerning their desirability on the grounds of moral hazard implications.

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<sup>4</sup> It is unlikely that the occurrence of real volume shocks due to natural disasters would be offset by the occurrence of positive real shocks. Of course, the events referred to in the text relate to the exceptional occurrence of disasters with significant impact, and not to the experience of more or less favourable climatic conditions, which should, at least in principle, average out.

A second point of contrast with the World Bank schemes relates to the CDSF's operation of a contingent credit line, rather than the modulation of debt service alone. To the extent that LICs' present and future debt service ratios have been significantly reduced by a combination of HIPC debt relief and the higher degree of concessionality of new debt, a yearly contingency window limited to the magnitude of debt service is unlikely to offer sufficient coverage in the face of sustained vulnerability. This strategy only achieves a temporary closure of the gap relating to the liquidity needs resulting from debt service due, while neglecting the typically broader BOP gap caused by the exogenous factors. Of course, only after the closure of the BOP gap can a debtor's actual debt sustainability be established, and a focus on debt service alone is thus widely meaningless and bound to be ineffective. Put differently, in contrast to the CDSF, the World Bank debt service schemes appear to be hampered by a narrow focus on the debt dynamics *per se*, rather than effectively addressing the broader BOP implications of shocks determining a debtor's overall sustainability. Clearly, if such sustainability is to be achieved, modulation of net official transfers needs to occur through a flexible disbursement facility involving fresh credits, rather than debt service modulation alone, and to amounts suitable for filling the ensuing BOP liquidity gap.<sup>5</sup>

### **5.2.3 Performance assessment against contractual obligations**

The upper central box of Chart 5.1 represents the central mechanism of the CDSF in relation to the treatment of non-shock factors determining a country's balance of payments during *t*. According to the above definition, both exogenous trend and mixed endogenous components are to some degree under the control of the debtor country, or are at least in principle amenable to the effect of deliberate policy choices. Therefore, a compensatory mechanism that extended also to these factors the treatment accorded to fully exogenous shocks would introduce the potential for

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<sup>5</sup> Assuming, of course, that debt service cannot be negative, as is done in the World Bank proposals. Otherwise, a distinction between disbursements and service would be spurious. Clearly, any contingency scheme's ultimate focus would have to be on net transfers, and the World Bank's restriction to positive debt service modulation can only be explained by its stated reluctance to consider any proposal that would have ex-ante implications on donors' commitments for additional financial disbursements.

incentive distortions affecting a recipient's efforts aimed at reinforcing its balance of payments position over time.<sup>6</sup>

It remains debatable under what conditions such moral hazard implications would be severe enough to undermine the broader development efforts of a low-income country authority with a genuine interest in overcoming a situation of degradation and poverty. Without formally stating the assumptions under which negative incentive factors would actually dominate a debtor's broader development objectives, the BWI simply take the moral hazard implications of ex-ante instruments as a given.<sup>7</sup> They thus point to moral hazard issues on the grounds of outright incompatibility between the ex-ante effects of a contingency mechanism and the CPIA-centred incentive structure of the IDA allocation mechanism, whereby the introduction of state-contingency is thought to be lowering the positive incentive effects of selectivity-based aid allocation. Quite to the contrary, we argue that in order to be compatible with LICs' broader development incentives, a contingency framework will first have to remove the severe distortions intrinsic to the CPIA-based debt sustainability and aid allocation frameworks themselves. As discussed in Chapter 3, these distortions mainly result from the CPIA's reliance on a set of assessment criteria that are indiscriminately applied to all the developing countries, and which fail to distinguish between the causal nature of the factors affecting the assessment. To the extent that LICs feel unduly punished by the allocation and relief effects of the CPIA-centred framework, their incentive distortions from the latter will be higher than the CDSF's.

We envisage the CDSF to include a domestic policy performance assessment against pre-defined country-specific benchmarks. The latter should be set in relation to each period  $t$  and define a detailed country policy agenda, in lieu of an underlying contract between the country authorities and the donor community. Ideally, the

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<sup>6</sup> It should be noted that, as is implicit in any insurance mechanism, the contingent credit line may also reduce a country's incentive to improve its vulnerability to exogenous shocks over time. However, in the case of trend and other BOP factors, the risk factor of moral hazard mainly relates to the debtor's attempt to increase the actual amount of compensation in any period  $t$  at the cost of its longer-term development plans. For example, it cannot be excluded that the country authorities would have an incentive to cheat and reap higher compensation in period  $t$ , if, for some reason, they were to place a higher value on the maximisation of short-term benefits than on the discounted value of the long-term benefits resulting from alternative policy actions leading to emancipation from vulnerability.

<sup>7</sup> See, for example, IDA (2004b, 2005b) and IMF and IDA (2004b, 2005a).

contract will be the expression of a genuinely cooperative approach between the parties to the contract, rather than the imposition of a particular set of policies by donors. At the end of each period  $t$ , the CDSF assesses a country's compliance with regard to the actual enactment of planned policies during the period under analysis, but not on the basis of their outcomes. To the extent that domestic policy implementation relates to observable actions, such as decrees and laws, the CDSF thereby avoids the problem of identifying policy effects and sets the pre-condition for the scheme to operate on an ex-ante basis, i.e. regulated by the terms set out in the underlying contract. In practice, such an assessment could be conducted in a similar way to the periodic reviews of LICs' IMF PRGF arrangements, which already include close monitoring of governments' compliance with IMF policy conditionality.<sup>8</sup> However, in contrast to the PRGF review, which makes the periodic disbursement of IMF credit-tranches conditional upon a recipient country's meeting quantitative performance criteria and benchmarks relating to policy results, we propose the CDSF to assert a country's qualification for continued support on the basis of policy-enactment alone. Therefore, the CDSF avoids both a performance assessment being distorted by exogenous factors affecting outcomes, and borrowers being unduly held accountable for either exogenous factors or the actual development effectiveness of agreed-upon policies. At the same time, however, the CDSF performance assessment controls for recipient's moral hazard implications, by effectively providing the donor community with the enforcement instrument necessary to hold countries accountable for their policy commitments.

The performance assessment has different implications with regard to the various components of the CDSF. In relation to a country's overall qualification for the CDSF, including the contingent credit line, a severe breach of policy commitments, or incompatible actions such as fraudulent reporting, would necessarily have to lead to a country's suspension or indefinite exclusion from the scheme's benefits. The exact procedure and criteria underlying such a decision would have to be anchored in the terms of the contractual agreement, and optimally involve a body including members of both the lending and borrowing communities. Furthermore, the potential for

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<sup>8</sup> For a detailed description of the IMF PRGF, see <http://www.imf.org/external/np/exr/facts/prgf.htm> and related pages.

exclusion from the CDSF would necessarily presuppose the existence of a fall-back solution, which would naturally be the regime applied to all the LICs that are either not eligible or are unwilling to participate. As mentioned above, we make the simplifying assumption that the current aid allocation and DSF regimes would remain in place after the introduction of the CDSF, and apply to all the LICs not involved in the scheme.<sup>9</sup>

In relation to both the category of mixed-endogenous and trend BOP factors, the performance assessment ascertains a LIC's fulfilment of policy conditions during period  $t$ , as one input informing the lenders' decision concerning the volume of aid allocation in period  $t+1$ . Similarly to the current IDA allocation process, such a decision would ultimately have to rely on a broad assessment of any LIC's specific needs for official development assistance, with particular focus on the requirements resulting from the fiscal accounts and from ongoing and planned development projects supported by foreign aid. However, in contrast to the CPIA-based allocation process determining the distribution of aid mainly according to countries' CPIA performance, qualification for continued aid disbursements would depend on actual policy compliance, with balance of payments volatility being one of the criteria informing aid allocation among eligible countries. Since the implications of the CDSF for future aid allocations cannot be fully established ex-ante, it will essentially have to rely on the donor community's assessment concerning a country's future need for aid and the debt sustainability implications. Such judgement would ideally be the result of a cooperative exercise with the authorities of the recipient country, particular with regard to the specification of scenarios underlying macroeconomic, fiscal and balance of payments forecasting exercises.

#### **5.2.4 The debt relief mechanism**

Only with regard to the category of BOP trend factors has the CDSF performance assessment ex-ante implications on the grant share of aid allocation in period  $t$ . It will be recalled from the above discussion, that BOP trend factors are identified as originating from causes exogenous to the country, but that their magnitude is

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<sup>9</sup> Of course, by making such assumption we implicitly disregard the broad incompatibility between the two alternative regimes, particularly with regard to the net distributional effects of aid allocation, as well as the adverse selection implications that would derive from the two regimes combined.

susceptible to the effects of deliberate policy reactions. By classifying policy actions according to their contractual legitimacy, the performance assessment validates the component of trend factors that is (potentially) under government control. Hence, to the extent that a LIC is found to be in compliance with policy obligations, the CDSF provides distinct treatment for the category of trend effects, and yet avoids introducing incentive distortions. More specifically, we envisage the CDSF as converting official credit flows automatically into grants, i.e. to relieve debt in proportion to the unfavourable trend factors faced by the country during period  $t$ . The rationale for such a debt relief operation is that LICs typically face negative trend factors – most notably in the form of deteriorating terms of trade – as a reflection of underlying structural deficiencies, which cannot be overcome in the short- and medium-term by domestic policy alone. To the extent that such trend factors strongly influence LICs' need for official development assistance, the achievement of debt sustainability requires official financing not to be contributing toward the increased build-up of external debt, and to relieve it instead.

By providing ex-ante debt relief according to a country's observed degree of exposure to exogenous trend factors, the CDSF is in stark contrast to the BWI-DSF. For, the BWI-DSF predetermines a country's grant share according to the perceived risk of debt distress, and thus lacks the necessary flexibility to adjust the grant share of ODA to the actual circumstances affecting a debtor's balance of payments. However, to the extent that the debt distress forecasts within the BWI-DSF only poorly reflect the actual BOP implications of unfavourable trends, and given the significant bearing trend factors have been demonstrated to have had on a debtor's overall risk of distress, the CDSF approach to ex-ante debt relief should constitute an essential component of plans for averting the occurrence of debt distress situations.

#### **5.2.5 Debt sustainability analysis**

To the extent that lenders' willingness to roll over existing debt and to supply fresh credits is informed by their own perceptions regarding a debtor's capacity to carry debt, debt sustainability may be considered a function of lenders' perceptions, rather than a characteristic intrinsic to a debtor country at any point in time. Put differently, a country's debt will be sustainable as long as lenders consider it to be so in their own

assessment and correspondingly take the necessary lending decisions.<sup>10</sup> It follows that a debt sustainability framework postulating vulnerability to exogenous factors as the central determinant of financial distress will adopt vulnerability as the key measure against which to assess a country's debt sustainability, as much as the BWI-DSF concerns itself mainly with the CPIA and indicative policy-dependent indicators. It should thus be obvious that CDSF debt sustainability analysis would have to depart on several grounds from the DSA as currently conducted within the BWI-DSF.

In the contingent context of country-specific compensation of shock and trend effects the assessment of country debt ratios against indicative cross-country averages would be largely meaningless. The reason is that the BWI-DSF crucially relies on average CPIA-based debt indicators to predetermine the relative country aid allocation and grant share in any period  $t$ , as well as to assess the country's debt sustainability prospects in the face of changing circumstances during subsequent periods. Lacking any contingency mechanism, a LIC's debt sustainability assessment thus results from the estimated changes in future debt ratios against benchmarks, which stay unchanged except for occasional shifts of a country from one CPIA category to another. In contrast, the CDSF operates a country-specific contingent adjustment to the amount and composition of aid flows in any period  $t$ , which not only rules out the significance of any cross-country benchmark assessment, but also reduces the debt sustainability concerns to a projection of the future debt effects from those factors not dealt with by the contingency mechanisms.<sup>11</sup> Consequently, Chart 5.1 shows the debt sustainability assessment exercise to be allocated outside the narrow context of the contingency assessment and compensation mechanism of the CDSF. Instead, debt sustainability concerns will be internalised in the lending decisions relating to future periods  $t+1$ , in relation to the estimated debt flow and stock effects resulting from endogenous and mixed BOP effects under the CDSF

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<sup>10</sup> Of course, this will only be the case if we assume that lenders fully coordinate through the CDSF contract. The self-fulfilling characteristic of lenders' attitude toward borrower's sustainability has been thoroughly discussed in our review of sovereign debt theory (Chapter 2).

<sup>11</sup> We abstract here from any time-limits that may be attached to the application of the contingency mechanisms, including termination as a result of non-compliance. Otherwise, debt sustainability beyond the expiration of the contingency regime would also have to be assessed with regard to the country's capacity to cope with shock and trend factors.



regime. The pre-determined volume and grant mix of aid allocation relating to period  $t+1$  will therefore be the result of the lender community's discretionary decision process involving the combined assessment of needs, sustainability and policy performance relating to a specific country.

It may well be the case that the debt sustainability assessment exercise highlights a particular need for specific amendments to the terms of coverage of the CDSF contract during future periods of application and as an outcome of negotiations between the donor community and the borrowing country. For example, it may be agreed that the ex-ante debt relief facility be temporarily expanded to include a specific number of mixed factors, if there were sufficient reasons for expecting such factors to substantially reduce a country's future debt sustainability, and provided that the beneficiary's policy actions affecting these particular policy outcomes could be effectively monitored.

Finally, it should be noted that the inapplicability of cross-country benchmark indicators does not completely contraindicate the reliance on debt ratios as useful indicators of the evolution of the debt burden over time. We thus envisage the sustainability analysis to compute also debt service and stock indicators as ratios of exports, GDP and other broad measures of a country's capacity to pay, and to track their evolution over time in relation to country-specific averages. As a result of the effect of CDSF compensation on debt flows and stocks in every period  $t$ , these ratios reflect the proportion of shocks and trend factors shaping a country's debt profile over time. In contrast to the strongly distorting effects implied by the net present value ratios adopted by the BWI, the contingent debt ratios should represent a set of indicators that more accurately relate to a country's sustainability and notional creditworthiness under the CDSF regime.<sup>12</sup>

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<sup>12</sup> The details relating to the calculation of these debt indicators are exemplified by the Uganda country study in Chapter 6 below.

### 5.3 An accounting methodology to distinguish exogenous from mixed-endogenous balance of payments effects

The separation of endogenous from exogenous determinants of illiquidity constitutes the central analytical building block of the proposed CDSF, on which all its assessment and compensatory functions depend. To derive an accounting methodology suitable to the CDSF, we start with an external liquidity needs-based approach to development finance, which is modelled according to a balance of payments framework of the supply and demand for foreign financial assistance. Consider that, in any period  $t$ , a country's external demand for new concessional loans is reflected in its balance of payments, which can be expressed in the following terms:

$$L_t^D \equiv i_t D_{t-1} + p_t D_{t-1} + IMP_t - EXP_t - GR_t - WR_t - FDI_t + \Delta R_t + Z_t \quad (1)$$

In identity (1), the demand for loans ( $L_t^D$ , with inverted sign) is shown to derive from the sum of the trade balance ( $IMP_t - EXP_t$ ), the payments of interest ( $i_t D_{t-1}$ ) and principal ( $p_t D_{t-1}$ ) on existing debt, and net changes in the country's international reserves ( $\Delta R_t$ ); minus the sum of non-debt creating financial inflows, i.e. official grants ( $GR_t$ ), net foreign direct investment inflows ( $FDI_t$ ) and workers' remittances ( $WR_t$ ); plus a residual factor ( $Z_t$ ), aggregating all other BOP flows including errors and omissions. The net sum of all these flows ( $L_t^D$ ) represents a low-income country's financial gap before concessional lending, which is typically negative, reflecting such a country's heavy dependence on aid to finance external deficits.

The supply of concessional loans is a function of the development lenders' multifaceted assessment relating to a country's performance and needs relative to the other recipient countries. Beyond the determinants concerning the official lender-borrower relationship with regard to a recipient's socio-economic development as such, loan supply is also a function of political economy considerations, such as aid support on strategic grounds, and of random factors relating to lenders' vagaries, misjudgements, or coordination failures.

$$L_t^S = f(\text{Performance, Need, Political, Random}) \quad (2)$$

Therefore, the supply of loans is largely unsuitable for deterministic modelling. Assuming that demand for new loans is insatiable, at least to the extent that it always outstrips supply, i.e.

$$L_t^S \leq L_t^D, \quad (3)$$

the supply-constrained demand identity for ex-post observed loan disbursements in any period  $t$  is given by:

$$L_t^S \equiv i_t D_{t-1} + p_t D_{t-1} + IMP_t - EXP_t - GR_t - WR_t - FDI_t + \Delta R_t + Z_t. \quad (4)$$

This identity must always hold on an ex-post basis, in relation to the observed flows at the end of any period  $t$ . However, although the actual realisation of individual BOP items is observable ex-post, the interdependency and multitude of back-and-forward linkages between these items makes it impossible to disentangle clear-cut causal relationships. Neither is it possible to precisely identify and measure the single causal factors determining the overall balance of payments. This indeterminacy mainly originates from the difficulty in distinguishing exogenous from endogenous determinants of the balance of payments. Consider, for example, the effects of an external shock causing the world price of a country's key export item to suddenly plunge. Everything else being the same, the lower price will reduce the country's export earnings and increase its trade deficit. Although the price effect could in principle be measured in terms of foregone export earnings, it will not be possible to isolate its direct effect from the effects of specific actions or policies enacted in response to the shock. The country may decide either to increase or decrease the export volume of the item the price of which has fallen, or take alternative actions to compensate for the loss in revenue, say by adjusting buffer stocks and the composition of its exports and imports baskets. Also, the donors' perception of the effects of the shock and the appropriateness of the debtor country's policy response may affect their disbursement of loans and grants, which, in turn, may trigger further domestic policy adjustments affecting the balance of payments. Ultimately, to the extent that it is impossible to know what the debtor's and the lenders' actions would be in the absence of the price shock without having complete information with regard to their objective functions, it will be equally impossible to fully isolate the shock's net effect on BOP.

Despite the intrinsic difficulty in exactly distinguishing between the various causes of variation in the BOP items of identity (4), a suitable accounting methodology can nevertheless be devised to allow for a useful distinction of exogenous factors to be made, to the extent that such factors can be clearly identified. Essentially, the methodology consists in postulating a counter-factual situation relating to a country's balance of payments as would have prevailed in the absence of certain exogenous events, and thus to deduce the effects of such events. This methodology was first introduced by Balassa (1982, 1984), in his studies analysing the difference in policy responses to external shock by outward- versus inward-oriented developing countries during the 1970s. Later, Solis and Zedillo (1985) applied a similar framework in their analysis of the causes underlying Mexico's debt build-up and subsequent crisis during the early 1980s.

In order to derive the specification most suitable to the purpose of the CDSF, we further break down the terms of identity (4) relating to the trade balance and debt flows, and derive trend deviations. Consider that net official transfers ( $NTR_t$ ) can be expressed as the difference between disbursements of new loans ( $L_t^S$ ) and the service of existing debt  $(i_t + p_t)D_{t-1}$  in period  $t$ :

$$NTR_t = L_t^S - (i_t + p_t)D_{t-1}. \quad (5)$$

Splitting the values of exports and imports into their price and volume components, the balance of payments identity of period  $t$  can be expressed as:

$$NTR_t = p_t^m M_t - p_t^x X_t - GR_t - WR_t - FDI_t + \Delta R_t + Z_t; \quad (6)$$

where  $p_t^m$  and  $p_t^x$  denotes the average price of imports and exports, and  $M_t$  and  $X_t$  the volume, or real value, of imports and exports of goods and services. The same identity can be expressed in terms of trend values, signed by over-bars:

$$\overline{NTR}_t = \overline{p}_t^m \overline{M}_t - \overline{p}_t^x \overline{X}_t - \overline{GR}_t - \overline{WR}_t - \overline{FDI}_t + \overline{\Delta R}_t + \overline{Z}_t \quad (7)$$

Trend values serve as benchmarks against which actual realisations of BOP items are measured, and are calculated as moving averages in period  $t$ . For example, the export price trend during the period  $t-k$  is computed as:

$$\bar{p}_t^x = \frac{1}{k} \sum_{i=1}^k p_{t-k+i}^x \quad (8)$$

The deviations of BOP items from trend levels are readily found by subtracting identity (7) from (6). For example, exports price trend deviations are computed as  $(p_t^x - \bar{p}_t^x)$ , and real exports deviations as  $(X_t - \bar{X}_t)$ . In the case of prices, deviations of actual values from trend can be clearly classified as exogenous factors, to the extent that LICs are typically not in a position to influence world prices. In contrast, for the case of trade volumes, the identification of the exogenous component requires the introduction of so-called 'hypothetical' values.<sup>13</sup> The latter simulate the scenario of unchanged external circumstances affecting a country's real trade balance, and are derived by filtering out the BOP effects resulting from real changes in the debtor country's exports due to fluctuations in world demand, and from variations in import volume explained by changes in GDP growth. More specifically, trend and hypothetical exports volume are defined as:<sup>14</sup>

$$\bar{X}_t^j = X_o^j (1 + \bar{g}_X^j)^t \quad \text{trend export volume} \quad (9)$$

$$\hat{X}_t^j = X_o^j \prod_1^t (1 + g_X^j) \quad \text{hypothetical export volume } t=1,2,..T \quad (10)$$

Index  $j$  denotes a specific commodity or category of commodities,  $g_X^j$  is the growth rate in period  $t$  of world demand for the country's export item  $j$ , and  $\bar{g}_X^j$  is the trend of world demand. Assuming that a country's share in the world market of item  $j$  remains unchanged between periods, the difference between hypothetical and trend export values measures the real effects of exogenous changes in world demand conditions. In conjunction with observed changes in export prices, it will thus be possible to gauge the degree to which exogenous shocks to export volume and prices have affected a country's actual export receipts over the chosen period of observation.

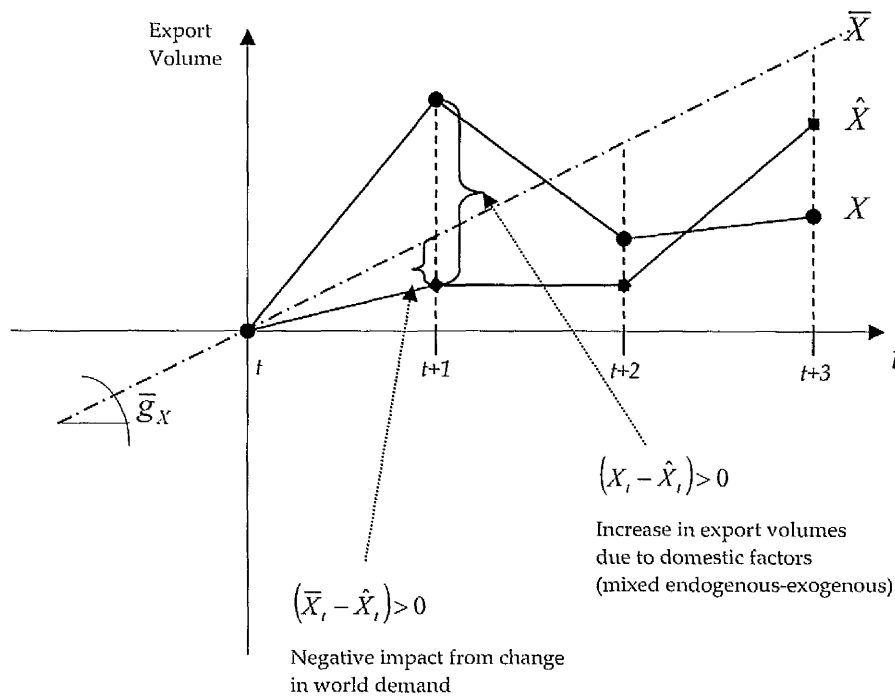
Figure 5.1 further clarifies the conceptual distinction between actual, trend and hypothetical export volume in relation to the CDSF. The trend volume of exports

<sup>13</sup> Adopting the terminology introduced by Belassa (1984).

<sup>14</sup> Following Solis and Zedillo (1985).

during the three periods of observation is established on the basis of average growth in world demand over the three years prior to  $t$ . The hypothetical volume reflects the country's potential export quantity, given by the world demand for its exports, observed in each period. The difference between trend and hypothetical exports measures the real impact of trend deviations in the growth rate of world demand. For instance, in period  $t+1$  the growth of world demand is shown to fall short of average growth. The vertical distance between trend and hypothetical volume measures the shortfall of export quantity due to this negative exogenous shock. In the same period, however, actual export volume was substantially higher than would have been expected on the basis of developments in world demand alone. Therefore, the difference between actual and hypothetical volume is only explainable by internally

Figure 5.1 – Actual, Trend and Hypothetical Export Volumes



determined factors affecting real exports, which, for example, could include a policy-induced increase in productivity, particularly favourable climatic conditions, or a combination of both. Usually, it will not be possible to clearly distinguish between the forces driving mixed effects. Only to the extent that the exogenous nature and the exact amount by which a single factor has contributed to determining an internal

change in volume can be clearly identified, can the corresponding proportion be disentangled from the mixed effects and added to the external shock factors, eligible for compensation by the CDSF contingent credit line. For example, suppose that a large proportion of the observed shortfall between actual and hypothetical volume in period  $t+3$  of Figure 5.1 is the result of a clearly defined event, such as a natural disaster wiping out most of a country's seasonal harvest of its major agricultural export crop. In such case, the extent of damage can be estimated as a proportion of the distance  $(X_t - \hat{X}_t)$ , which together with the observed fall in world demand growth  $(\bar{X}_t - \hat{X}_t)$  will add up to an overall estimate of the exogenous shock factors affecting real exports in  $t+3$ . However, with the exception of particularly severe disasters, it is not usually feasible to distinguish the effects of natural shocks to export volumes from all the other factors affecting internally determined deviations, including those that are purely policy-induced. To the extent that this is the case, their combined effect is to be allocated to the mixed-endogenous category of the CDSF. On the other hand, insofar as it is possible to identify a measurable factor that systematically determines a country's export volume, besides change in world demand, it should be accounted for in the right-hand side of equations (9) and (10), and thus automatically qualify as an exogenous shock.

Turning now to the imports side of the trade balance, trend and hypothetical import series are calculated as follows:<sup>15</sup>

$$\bar{M}_t^j = M_o^j (1 + \varepsilon_M^j \bar{g}_{GDP})^t \quad \text{trend imports} \quad (11)$$

$$\hat{M}_t^j = M_o^j \prod_1^t (1 + \varepsilon_M^j g_{GDP}) \quad \text{hypothetical imports} \quad t=1,2,\dots,T \quad (12)$$

Where  $\varepsilon_M^j$  is the trend income elasticity of import item  $j$ ,  $g_{GDP}$  is the debtor country's actual GDP growth rate between period  $t-1$  and  $t$ , and  $\bar{g}_{GDP}$  is the trend rate of the GDP growth. Assuming that import elasticity remains constant over the period of analysis, the difference between trend and hypothetical imports measures the volume effects of the deviation of GDP growth from its trend value. Of course, these

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<sup>15</sup> *ibid.*

effects cannot be qualified as exogenous per se, GDP growth being the expression of mixed-endogenous factors affecting a debtor's economy as a whole. Indeed, the full accounting framework outlined below classifies the differences between actual, trend and hypothetical flows of real imports as mixed trade balance effects. Furthermore, similarly to the case of exports, any measurable factor that should be observed to be systematically affecting a specific country's import volume over time, e.g. official grant disbursements in support of imports, ought to be included in the right-hand side of equations (11) and (12). Finally, it should be noted that to the extent that it should be possible to estimate the price elasticities of specific import commodity items, these should be used to complement income elasticities in the calculation of overall import elasticity.

The degree of agglomeration by export sectors in equations (9) and (10), and by import sectors in equations (11) and (12), is reflected in the number of subcategories included in index  $j$ . Ideally, the categories would range from the largest aggregate of the country's total exports of goods and services, down to its single most important export sectors and items. In practice, the informational requirement for a comprehensive and detailed breakdown of trade items is usually too large for low-income countries' limited institutional and operational capacity to cope with in a timely manner. Data collection and elaboration requires coordination between various line ministries, the country's central bank and its central statistics agency, leading to delays in the availability of consolidated data. To the extent that the timely availability of high-quality information, say by the end of period  $t$ , is required for an effective decision-making process underlying the contingency framework, there will be a trade-off between the quality and the degree of detail of information on the one hand, and the timing of its availability on the other. In the medium and longer term, such a trade-off can be narrowed by effective international support aimed at increasing low-income countries' statistical and information management capabilities. In the shorter term, however, the operational features of the CDSF could be adjusted to include a provisional assessment of volume and price effects, to the extent that these could be estimated at the time of its activation. Crucially, such early assessment would allow for a sufficiently rapid intervention by the contingency mechanism, so as to effectively counter the observed BOP trend and shock effects.



Later, once consolidated data becomes available, a follow-up assessment would correct or fine-tune the disbursement and relief operations of the CDSF. However, the CDSF would have to control for the potential moral hazard problem arising from the reliance on information provided by the beneficiary of the CDSF itself. With regard to trade volumes, this would require the cross-checking of customs data against those provided by the country's main trade partners, e.g. the European Union. With regard to prices, these would have to rely on a comparison between world prices and the actual prices applied to the country's export and imports. However, as Gilbert and Tabova (2004) note, because of transport costs and grade differentials, there may only be a moderate degree of correlation between the two sets of prices. Therefore, although it would in principle be preferable to index the CDSF to world prices, which a small country has no power to influence and which are also known without any time lag, the scheme's primary aim of effectiveness may ultimately require its reliance on the country's actual terms of trade.

Finally, similarly to the trade balance, a distinction between trend and hypothetical values could also be made for each of the other BOP items on the right-hand side of identity (6). For example, it would be possible to assess changes to the net flow of FDI against hypothetical FDI ( $FDI_t^H$ ), defined as the flow consistent with the country's share of FDI inflows in relation to its own specific FDI determinants and those of neighbouring countries at a certain point in time:<sup>16</sup>

$$FDI_t^H = \frac{1}{S} \sum_{s=t-T-1}^T \frac{FDI_s^i}{FDI_s^r}; \quad (13)$$

where  $FDI_s^i$  is net flows to country  $i$  and  $FDI_s^r$  is net FDI inflows to the reference group of countries. Similarly, discrepancies between donor commitments and actual disbursements of official grants could enter the identity in the form of hypothetical grants, defined as the proportion of the overall shortfall that is not attributable to debtor's policy actions or its compliance with policy conditionality more generally.

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<sup>16</sup> The data and forecasts necessary to derive country-specific and regional FDI series could be drawn from the annual World Investment Report and related publications (e.g. see UNCTAD, 2005).

### Box 5.1: Balance of Payments Effects

$$NTR_t - \overline{NTR}_t \equiv \quad (14)$$

(I) Exogenous shock effects to the trade balance:

$$\equiv I(\overline{X}_t - \hat{X}_t) \quad \text{Volume change in exports demand (a)}$$

$$+ (p_t^x - I)(\overline{X}_t - \hat{X}_t) \quad \text{Value effect of (a) (b)}$$

$$+ (p_t^m - \overline{p}_t^m)\overline{M}_t - (p_t^x - \overline{p}_t^x)\overline{X}_t \quad \text{Terms of trade effect (c)}$$

$$- (p_t^x - \overline{p}_t^x)(X_t - \hat{X}_t) \quad \text{Price trend deviation of (g) (d)}$$

$$- (p_t^m - \overline{p}_t^m)(\hat{M}_t - M_t) \quad \text{Price trend deviation of (i) (e)}$$

$$- (p_t^m - \overline{p}_t^m)(\overline{M}_t - \hat{M}_t) \quad \text{Price trend deviation of (k) (f)}$$

(II) Volume and price trend effects to the trade balance (mixed effects):

$$- I(X_t - \hat{X}_t) \quad \text{Internal change in export volume (g)}$$

$$- (\overline{p}_t^x - I)(X_t - \hat{X}_t) \quad \text{Price trend effect of (g) (h)}$$

$$- I(\hat{M}_t - M_t) \quad \text{Internal change in import volume (i)}$$

$$- (\overline{p}_t^m - I)(\hat{M}_t - M_t) \quad \text{Price trend effect of (i) (j)}$$

$$- I(\overline{M}_t - \hat{M}_t) \quad \text{Import volume effect of GDP (k)}$$

$$- (\overline{p}_t^m - I)(\overline{M}_t - \hat{M}_t) \quad \text{Price trend effect of (k) (l)}$$

(III) Deviations in financial flows (mixed effects):

$$- I(GR_t - \overline{GR}_t) \quad \text{Deviation in grants (m)}$$

$$- I(WR_t - \overline{WR}_t) \quad \text{Deviation in workers' remittances (n)}$$

$$- I(FDI_t - \overline{FDI}_t) \quad \text{Deviation in FDI inflows (o)}$$

$$- I(\Delta R_t - \overline{\Delta R}_t) \quad \text{Deviation in reserves accumulation (p)}$$

$$+ I(Z_t - \overline{Z}_t) \quad \text{Other net debt-creating flows (q)}$$

**Note:**

The symbol  $I$  represents a sum vector across the total number of export and import agglomerates,  $j$ .  
The sum of all exports effects is equal to the simple trend deviation: (a)+(b)+(d)+(g)+(h)+[(c)-(p<sup>m</sup> - p̄<sup>m</sup>)M̄<sub>t</sub>] = (p̄<sup>x</sup> X̄<sub>t</sub> - p<sup>x</sup> X<sub>t</sub>);

Similarly, with regard to import items: (e)+(f)+(i)+(j)+(k)+(l)+ [(c)+(p<sup>x</sup> - p̄<sup>x</sup>)X̄<sub>t</sub>] = (p<sup>m</sup> M<sub>t</sub> - p̄<sup>m</sup> M̄<sub>t</sub>).

The basic structure of identity (14) is borrowed from Solis and Zedillo (1985), and has been substantially modified by the author.

However, the actual setup of the CDSF accounting mechanism will depend on the specific characteristics of the debtor country involved, as well as the availability of a sufficiently comprehensive and reliable set of information relating to the main factors affecting its balance of payments. Limiting the distinction of hypothetical values to the trade balance alone, the full specification of balance of payments effects is obtained by subtracting identity (7) from (6), after substituting for trend and hypothetical imports and exports. By disaggregating value terms to reflect price and trend components, we obtain the set of expressions constituting the central accounting framework underlying the CDSF, which is outlined in Box 5.1. The balance of payment effects are grouped into three categories. The positive or negative sign with which the individual items enter identity (14) determine their effect on the country's demand for additional net transfers. Put differently, from an ex-post perspective, those items entering the equations with a positive value are to be considered debt-inducing, to the extent that they explain a proportion of the positive deviation in net official transfers to the country. Conversely, all items taking a negative value are accounted for as having had a debt-deducing effect during the period of observation, since they lower the BOP gap to be filled by net official transfers. The first category of items contains all the debt-inducing trade balance effects, which are of purely exogenous nature. With the exception of item (a), measuring the effect from volume changes in world demand as outlined in Figure 5.1 above, these are all price effects. Item (b) measures the price impact of item (a), which together sum up to the value effect of the deviation of actual from hypothetical export volume on the overall trade balance. Item (c) represents the terms of trade shock effect measured as price variations with respect to their trend value, against trend imports and exports volume. In contrast to a measure of the terms of trade in current terms, which is typically calculated on the basis of period  $t$  prices and volumes, item (c) captures the purely exogenous shock element of the terms of trade factor affecting the country's BOP in period  $t$ . Items (d), (e) and (f) represent the price trend deviation of exports volume, imports volume, and GDP growth, respectively. Only the price variation components of these three effects represent true shocks to the country's BOP management, while their overall effects are mixed and thus belong to category (II). The overall sum of items (a) to (f) constitutes the exogenously

determined proportion of the overall trend deviation in the country's balance of payments during period  $t$ , excluding net official transfers. Depending on whether it takes a positive or a negative sign, the overall shock component in  $t$  will be classified as unfavourable or favourable to the country, respectively. As has been discussed above (Chart 5.1), the contingent credit line of the CDSF triggers automatic credit adjustments at the end of period  $t$ , to compensate for the overall BOP shock component.

The second category of items in identity (14) contains all the trade balance effects, which cannot be classified as exogenous shocks. Item (g) measures the difference between actual and hypothetical exports, as visualised in Figure 5.1. Similarly to the other items in category (II), this effect enters identity (14) with a negative sign, because a positive difference between actual and hypothetical export volume reduces the country's need for net official transfers from the perspective of the overall deviations in its balance of payments. Item (h) represents the price trend effect of the deviation in export volume. Together with the corresponding shock component (d), effects (h) and (g) capture the value effect of the discrepancy between actual and hypothetical exports:

$$-(\bar{p}_t^x - I)(X_t - \hat{X}_t) \quad + \quad (14.h)$$

$$-(p_t^x - \bar{p}_t^x)(X_t - \hat{X}_t) \quad + \quad (14.d)$$

$$-I(X_t - \hat{X}_t) \quad = \quad (14.g)$$

$$-p_t^x(X_t - \hat{X}_t) \quad = \quad \text{Value effect}$$

In contrast to item (d), neither (g) nor (h) qualify as purely exogenous effects, since change in export volume is deemed to be at least in part determined by factors under the control of the debtor country.

All remaining items of category (II) are import effects. Items (i) and (j) compute the volume and price trend effects of  $(\hat{M}_t - M_t)$ , which is the deviation of actual imports volume from the amount of imports explained by the country's rate of growth of GDP and the income elasticity of imports. Items (k) and (l) compute the volume and price trend effects of  $(\bar{M}_t - \hat{M}_t)$ , thus quantifying the imports effect of deviations in the GDP growth rate from its own trend. In contrast to the import price

shock component measured by item *(f)*, neither the import volume nor the price trend effect can be considered as entirely exogenous to the country. For, according to the specification of equations (11) and (12), the difference in actual, trend and hypothetical imports is attributable to changes in import elasticity and/or GDP growth, which are both factors that are, at least in principle, susceptible to influence by the country authorities.

All items of category *(II)* typically pose difficulties in trying to fully distinguish their exogenous and endogenous origins. Nevertheless, as outlined above, the CDSF entails that conditional upon a country's policy performance, the price trend components of category *(II)* – i.e. items *(h)*, *(j)* and *(l)* – qualify for an equivalent grant conversion of debt disbursed in period *t*. In contrast, the volume effects *(g)*, *(i)* and *(k)* do not qualify for grant conversion. Rather, since real deviations are a prime indicator of the country's need for official assistance in the medium to longer term, the signs and magnitudes of real effects inform the CDSF in relation to the volume of future aid allocation.

Finally, the third category of effects includes the trend deviations of the various non-debt financial flows of the balance of payments. They take a negative sign in identity (14), because positive trend deviations have a debt-deducing effect on the balance of payments. Item *(m)* measures variation in official grant disbursements; item *(n)* in workers' remittances, or private current account transfers more generally<sup>17</sup>; item *(o)* in net FDI inflows to the country; item *(p)* in changes to the country's international reserve holdings. It should be noted that the reason for including disbursements of official grants (item *m*) in this category is that from the perspective of an ex-post assessment, the CDSF's emphasis is mainly placed on analysing and comparing of the debt-inducing effect of single BOP items. Since a positive trend deviation of official grant transfers has a lowering effect on the period's balance of payment gap, it explains part of the net deviation in official net transfers, as do the other effects. However, from the perspective of the CDSF's role in determining the optimal volume of overall aid disbursements in line with expectations relating to BOP trend

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<sup>17</sup> Workers' remittances is typically the most important item of private unrequited transfers to LICs, and explains the choice of labelling. Of course, the inclusion of specific items and exclusion of others will vary from country to country.

developments during period  $t+1$ , the grants item would be more correctly moved to the left-hand side of identities (6) and (7) and (14), so as to reflect the total net official development assistance planned for period  $t+1$ , together with net transfers.

It should be noted that identity (14) includes category-III items as simple trend deviations. Alternatively, their hypothetical expressions could have been introduced, for example by equation (13) in the case of FDI. Although the separation of shocks and trends from real components would lead to a more detailed assessment with regard to these effects, as is done with the trade balance, it is not the purpose of the CDSF to directly compensate for their effects on the balance of payments. In contrast, the CDSF, as envisaged here, has the exclusive aim of rendering official debt flows supportive of a LIC's repayment capacity, as resulting from the structure of its foreign trade sector and the occurrence of exogenous shocks affecting its overall trade performance. The CDSF thus limits the inclusion of category III effects to an assessment of the conformity of underlying policy factors with contractual obligations. Typically, the contract would relate to long-term programmes with the aim of fostering a low-income country's business environment, exchange rate, capital account and international reserves management, in order to keep in check the main endogenous factors influencing deviations in FDI and private transfer inflows, as well as international reserves. Ascertained compliance with contractual terms, together with the signs and magnitudes of single financial effects, will then serve as an input to the CDSF's assessment of overall BOP sustainability, and, together with a more comprehensive needs and sustainability assessment, guide the lending decisions relating to period  $t+1$ .

#### **5.4 Potential costs and benefits of the CDSF**

Any conjecture relating to the potential costs and benefits of the CDSF over a certain time horizon would necessarily have to rely on the estimation of trends and the likelihood of contingent events occurring across eligible countries, as well as the scheme's potential to effectively increase beneficiaries' balance of payments sustainability. While benefits are difficult to measure, the historical assessment of balance of payments determinants across a large number of LICs, and in line with the methodology outlined in the previous section, would at least offer a rough indication

of the likely range of costs involved. Although we deem it feasible on the basis of the comprehensive database underlying this study, such broad analysis would go beyond its limited scope of outlining the basic principles guiding a CDSF, and is thus left for further research. Instead, the country study presented in the next chapter simulates the CDSF implications in the representative case of Uganda. The results from such an analysis, in terms of estimated costs and benefits, are highly encouraging. For, at similar cost to those involve in the actual HIPC and Paris Club Initiatives over a 15-year period up to 2002, the CDSF is clearly shown to achieve an effective reversal in Uganda's accumulation of external debt together with substantial compensatory cash-flow effects, while the opposite holds true for the actual regimes. Although the results from a single country study cannot be generalised to the case of all LICs, they would support some degree of optimism with regard to the overall cost-benefit implications of the CDSF compared to those involved in the current BWI regime.

From a qualitative perspective, a few tentative conclusions can be reached in relation to the main implications for borrowers' prospects of balance of payment sustainability on the one hand, and the scheme's implications for lenders' overall aid disbursements on the other. With regard to LICs' benefits in terms of balance of payments sustainability, consider that the fundamental balance of payments identity underlying the CDSF accounting framework, identity (6), can be expressed in terms of expected values, where superscript  $e$  denotes country authorities' expectations with regard to the balance of payments in period  $t$ :

$$NTR^e_t \equiv p_t^m M^e_t - p_t^x X^e_t - GR^e_t - WR^e_t - FDI^e_t + \Delta R^e_t + Z^e_t \quad (15)$$

Assume that the country holds rational expectations with regard to both the exogenous and endogenous factors affecting its balance of payments. That is, rather than formulating expectations statically around simple trend values of the BOP items in identity (15), the country planners also internalise the expected effects from the CDSF, in accordance with the terms set out in the underlying contract. Clearly then, the CDSF will not only have a stabilising effect through the adjustment of net transfers to exogenous shocks affecting the trade balance in period  $t$ , but the anticipation of its effects will also considerably facilitate the planning of policies in

relation to external balances. It follows that the CDSF's benefits are increased by the extent to which the highly volatile and uncertain context characterising low-income income countries' balance of payments constitutes a major disruptive factor in their capacity to enact long-term development plans. Conversely, the largely discretionary, ex-post, character of the current BWI-DSF regime fails to create a foreseeable link between the left- and right-hand sides of identity (15). For, aid disbursements are driven by country-rankings according to the CPIA criteria, which have little or no correlation to the actual balance of payments situation. In fact, rather than facilitating LICs' struggle against the disruptive effects of exogenously determined volatility and uncertainty, the BWI-DSF and aid allocation regimes can be thought of as exacerbating the potential for disruptions, by introducing an additional factor of uncertainty in relation to a country's expectations of aid allocation in any period  $t$ .

Finally, turning to a brief consideration of the costs to lenders, which the CDSF would potentially entail, it should be noted that the framework proposed here does not have the primary aim of minimising such costs. Thus, it contrasts with the World Bank proposals for debt service modulation schemes, the effects of which were shown to be largely undermined by the requirement not to cause losses in terms of creditors' overall reflows. Nevertheless, there is no reason to expect the cost implications of the CDSF's two central instruments to be of any significant magnitude in terms of overall aid flows to LICs over the longer term. For, the contingent credit line mainly applies to both unfavourable and favourable price shocks, and, if not mean-reverting, should be expected to be accumulating deficits at a moderate pace. Moreover, the facility would offer lenders the opportunity to effectively pool price risks across countries, and thus would represent a relatively cost-effective solution.<sup>18</sup> Of course, the contingency mechanism would become significantly more expensive if it were to compensate also for the multitude of real shocks facing LICs. In that case, however, its costs would have to be viewed in

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<sup>18</sup> This is the central argument of IDA (2005b) in relation to the benefits of ex-ante mechanisms.



relation to those of the existing international facilities for dealing with low-income countries' natural disasters and real output shocks.<sup>19</sup>

With regard to the CDSF's debt relief according to trend factors, it is difficult to reach any conclusion as to its net effects on the overall grant share involving aid to low-income countries. For, the BWI-DSF already entails a grant share of 50 or 100 per cent of IDA disbursements, according to a LIC's likelihood of debt distress, and applies a discount factor lowering the overall volume of aid to countries qualifying for grant financing. Whether or not the CDSF would increase the overall grant share of aid allocation would thus depend on a comparison between the average incidence of trend factors across LICs, and the net grant implications of the BWI-DSF. Without the outcome of such an analysis, it can be reasonably expected that the CDSF would have only moderate effects on the overall grant share of aid allocation across LICs, which is already very high, while it is likely to have relatively stronger implications for the grant share of those individual LICs facing trend factors markedly different to the average. Furthermore, it should be noted that there would be no substantial change in the allocation of bilateral ODA flows to LICs, which already account for almost 100 per cent of grants.

## 5.5 Concluding remarks

This chapter's approach to defining a state-contingent debt sustainability framework stands out strongly against the ongoing attempts to rendering the current debt sustainability framework more responsive to the occurrence of exogenous shocks. It argues that only a bold attempt to overcome the apparent shortcomings of the current aid allocation and debt sustainability paradigm has the necessary potential to achieve the overarching aim of putting an end to low-income countries' continuing debt crises.

Without any presumption of comprehensiveness, this chapter's schematic presentation of a contingency framework indicates the key elements of a new approach to contingent financing and debt relief, on the basis of which it is hoped that a more thorough discussion and elaboration of the analytical and operational

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<sup>19</sup> This facilities include, among others, the Humanitarian Assistance Programs of the United Nations and the European Commission, and the World Bank's Emergency Recovery Loans Program.

challenges will ensue. Similarly, the accounting framework presented in this chapter serves as an indication, or example, illustrating the essential feasibility of developing a more comprehensive tool for assessment of low-income countries' balance of payment vulnerabilities, as a useful underpinning to the proposed contingency framework. Of course, much refinement would be needed to ensure its operational viability, which would presume the solution of a number of caveats and technicalities that are insufficiently envisaged at this stage of abstraction.

Despite its relatively early stage of elaboration, the basic features and elements of the CDSF already provide a sufficiently defined analytical framework to be tested for its main implications against the historical experience of low-income countries. A whole range of empirical analyses involving individual case studies, as well as the category of low-income countries as whole, are currently being undertaken and will be the subject of subsequent endeavours in this line of research. However, the key insights from the empirical analysis are already apparent from the representative country study relating to Uganda, which is the focus of the subsequent chapter.

## 6 Uganda Country Study

### 6.1 Introduction

The choice of Uganda for our representative case study of the proposed CDSF was mainly based on it representing a low-income country:

- whose development prospects have long been hampered by a severe and persistent external debt problem relating to official development financing;
- whose economic structure well reflects LICs' typical structural weakness, particularly with regard to vulnerability to exogenous shocks;
- with a long-standing track record of excellence in the IMF and World Bank structural adjustment and policy reforms, hence earning the highest ratings in the Country Policy and Institutional Assessment (CPIA);
- which, as a result of compliance, has benefited from substantial flows of official financial assistance, and been a frontrunner in the implementation of the two HIPC Initiatives, receiving significant amounts of debt relief since 1996.

While the first two characteristics are common to most HIPCs, Uganda crucially outperforms other sub-Saharan LICs on the basis of its track record with the BWI. Indeed, the country has long been featured among the highest ranking group of countries (first quintile) of the CPIA, as well as having successfully completed a number of IMF programmes – most recently the poverty reduction growth facility – the reviews of which generally awarded Uganda the highest performance and compliance ratings.<sup>1</sup> More generally, Uganda has long been considered a darling of the international financial institutions, having a performance record which was

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<sup>1</sup> For a list of recently published CPIA rankings of LICs, see <http://siteresources.worldbank.org/IDA/Resources/2004CPIAweb1.pdf> (accessed in June 2006). For the 2005 and 2006 reviews of Uganda's PRGF, see IMF (2005b) and IMF (2006).

championed as a role model for other sub-Saharan HIPC's. As a result, bilateral and multilateral aid has been particularly forthcoming for Uganda.

In the narrow context of this case study, Uganda's record of conformity with BWI policy conditionality is particularly convenient, for two main reasons. First, Uganda's high performance ratings over the entire period of analysis is well suited to the simulation context of the contingency scheme, which establishes that in order for it to be implemented continuously over a period of time, the debtor country must be in compliance with the policy obligations set out in the underlying contract. While Uganda suits this scenario well, any simulations involving a country with a more ambiguous performance record would require the potentially awkward task of simulating the CDSF effects of non-compliance.<sup>2</sup> Secondly, it allows ruling out *a priori* the hypothesis that the country's persistent debt crisis has primarily been the result of its failure to comply with BWI's policy advice, and thus could have been avoided or alleviated by improving compliance. Therefore, it will be possible to compare the simulated effects of the CDSF with those historically observed during the same period of analysis, and reach meaningful conclusions with regard to the comparative performance of each scheme under conditions of full compliance. Furthermore, since this scenario does not touch upon the fundamental question of the degree to which Uganda's debt crisis is the outcome of flawed policy conditionality imposed by the BWI and closely adhered to by the country authorities, it suits the context of the following simulations, which will be shown to have no bearing on answering this question.

The analysis of this chapter is organised as follows: Section 6.2 outlines the main characteristics of Uganda's balance of payments vulnerability and external debt problems over time. Section 6.3 applies the CDSF accounting methodology to Uganda during the period 1988-2002, and discusses the main results from alternative simulation scenarios implementing the scheme's contingency mechanisms. Section 6.4 concludes.

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<sup>2</sup> This would involve the definition of compliance indices other than the CPIA, and of a set of actions to be performed in the face of different degrees of non-compliance.

## 6.2 Uganda's balance of payments and external debt evolution

### 6.2.1 Historical overview

For most of the time between 1962, the year it gained its independence, and the late 1980s, Uganda suffered from political turmoil and civil war, which plunged the country into a status of social, economic and institutional disarray. Idi Amin's military regime of 1971-1979 was followed by a short-lived successor government that attempted recovery and stabilisation with the support of IMF and World Bank loans. However, all efforts were soon to be undermined by further instability and war. Only in 1986 did Uganda progress towards a situation of relative social and political stability, when the National Resistance Movement took power and installed its leader, Yoweri Museveni, as the country's president.<sup>3</sup>

By 1986, Uganda's per capita GDP had fallen by nearly 40 per cent from its level in 1970, its exports base had virtually vanished, while much of the British colonial legacy of basic infrastructure had been left to deteriorate.<sup>4</sup> The new government inherited an agricultural subsistence economy absorbing over 80 per cent of the workforce; cash crops represented only five per cent of GDP.<sup>5</sup> In 1986, the external debt stock stood at US\$ 1.4 billion (36 per cent of GDP), most of which had been contracted at unfavourable terms from private creditors to finance war expenses. As a result, debt service obligations exceeded an average 12 per cent per annum of outstanding debt (US\$ 172 million in 1986).<sup>6</sup>

Lacking the domestic revenue base to finance economic recovery, the government had to rely on donor assistance. This was forthcoming from the World Bank and IMF, as Uganda subscribed to their package of prescriptions involving economic recovery, stabilisation and reform programmes. During 1986-1992, implementation of reforms progressed swiftly, and per capita GDP growth averaged about five per cent.

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<sup>3</sup> At the time of writing, Mr. Museveni is still holding on to the country's presidency.

<sup>4</sup> Collier (1997) and Gautam and Marcos (2002)

<sup>5</sup> Collier (1997: 651)

<sup>6</sup> Gautam and Marcos (2002: 4)

Recovery and growth, however, were mostly the result of restoration of domestic consumption and fiscal expenditure financed by foreign aid, rather than of reforms.<sup>7</sup>

ODA was increasingly replacing external private financial transfers, and the build-up of multilateral debt rapidly gained momentum. By 1991, the external debt stock had risen to US\$ 2.6 billion (84 per cent of GDP), while higher concessionality had lowered debt service to a nominal US\$ 147 million, or half the service rate compared to 1986. Nevertheless, the country's ability to stay current on debt obligations was severely undermined by a sharp deterioration in its terms of trade. During 1986-1991, the world price of coffee, Uganda's predominant export commodity, collapsed, causing total export revenues to plunge by 65 per cent and the ratio of debt service to exports to increase from 41 to 75 per cent. As a result, by the early 1990s, the country found itself increasingly unable to service its debt. Despite substantial official net resource transfers, foreign exchange had to be rationed to repay priority creditors, while arrears on the remaining debt were left accumulating.<sup>8</sup>

In 1992, Uganda embarked on a second tier of structural adjustment programmes, including the liberalisation of the trade and foreign exchange regimes; the privatisation of public enterprises; and reforms of the financial sector, tax administration and the civil service. By continuing to fulfil closely the conditions attached to the financial support from the IMF and World Bank, Uganda managed to build up a solid reputation with regard to its policy performance and also what the BWI considered as falling under the realm of 'good governance'. As a result, the BWI continued to finance Uganda's reform efforts and balance of payments deficits with ever-increasing concessional loans. The sheer magnitude of external financial support not only allowed Uganda to roll over and service existing debt, but also fuelled its economic expansion: during 1992-2002, Uganda's GDP growth averaged 6.7 per cent in real terms<sup>9</sup>. The extent to which economic expansion is to be ascribed to the effects of the reforms and policies implemented, rather than to reflect aid inflows *per se*, remains a matter of debate.<sup>10</sup> However, less controversial is the country's

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<sup>7</sup> Collier (1997)

<sup>8</sup> Ibid (p.6), as well as drawing from the Global Development Finance CD-ROM (2005).

<sup>9</sup> Data from the World Development Indicators CD-ROM (2005).

<sup>10</sup> For two differing accounts, see Collier (1997) and Morrissey and Rudaheranwa (1998).

achievement in channelling a large share of resources to the social sector, and in putting into existence effective poverty alleviation plans. Between 1992 and 2000, the incidence of poverty in Uganda fell remarkably, from 56 to 35 per cent."

Despite its achievements in translating official development assistance into sustained rates of economic growth, as well as social and institutional progress, Uganda never managed to resolve the official external debt crisis it had been facing since the early 1990s. For, the debt service obligations ensuing from the mounting debt stock owed to the official creditors represented an increasing drain on Uganda's economy, while the BWI's reform programmes failed to overcome the economy's structural deficiencies. Instead, Uganda's repayment capacity continued to be hampered by its reliance on an extremely fragile and narrow export basket of cash crops. Vulnerability to external shocks, particularly in the form of pronounced fluctuations in the world prices of export commodities, made repayment crises and arrears accumulation the recurrent symptoms of a deepening crisis.

As the key bastion of BWI's paradigm of aid-driven reform in Africa, it has long been clear that Uganda's failure to succeed would have had wide-ranging implications for the perceptions of the current approach to conditionality-tied aid. Arguably, the BWI thus had a strong incentive to preserve their proclaimed trust in an eventual realisation of the benefits from the implementation of Uganda's reform packages, and a future improvement in the country's external debt position. Hence, until the mid 1990s, the IMF and World Bank continued to support positive net resource flows, high enough to roll over multilateral debt, as well as financing the country's current account and fiscal gaps after imports and social spending. While the multilateral debt problem was thereby relegated to the future, Uganda's bilateral lenders started holding back disbursements of new loans, and existing debt was increasingly dealt with by Paris Club relief operations. Only in 1996, did the BWI move away from defensive lending, towards dealing with Uganda's stock problem. As a frontrunner to the HIPC Initiative, the country saw its external debt stock restructured and

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<sup>11</sup> Ibid. However, a contentious issue among policy practitioners and scholars alike remains with regard to the relative long-term poverty effects from Uganda's high social sector spending, to the disadvantage of increased investment in physical capital and infrastructure more generally.

reduced, with the proclaimed aim of rendering the ensuing debt service schedule sustainable over time.

As an inevitable result of the HIPC Initiative's lack of mechanisms to counter effectively the debt effects of exogenous shocks, recent history has unfortunately confirmed that it would not provide Uganda a permanent escape from crisis. Rather, the plunge in export prices during 1995-2000 proved, once again, Uganda's debt position to be unsustainable despite substantial relief. As a result of the increased requirement for external loans to fill the widening trade deficit, the country's external debt stock started soaring again, making it all too evident that the current approach would not suffice to resolve Uganda's continuing debt crises.

Uganda's history of commodity and aid dependence, combined with a marked vulnerability to exogenous shocks, well exemplifies the key factors explaining low-income countries' debt crisis, as well as the intrinsic inaptitude of extant and past approaches to effectively address the debt problem. Against this background, it is to be expected that the contingency instruments of the sustainability framework proposed in Chapter 5 would have a strong potential for ameliorating the country's external debt position. However, in order to be able to evaluate the simulated effects of the CDSF in the specific historical context of Uganda, it is first essential to examine more closely the relevant factors affecting the country's balance of payments and debt sustainability.

## **6.2.2 The balance of payments**

Table 6.1 summarises Uganda's balance of payments (BOP) flows during 1980-2003, and Graph 6.1 displays the main BOP aggregates.<sup>12</sup> Noting that outflows enter the BOP with a negative sign, while inflows are recorded positively, the zero line in the graph below can be seen to roughly separate the supply and demand factors of Uganda's external financial flows. On the demand side, a steeply declining trend balance in goods and services from 1986 onwards reflects grant-supported import growth that more than outstripped the rather sluggish expansion of Uganda's exports (Table 6.1). On the supply side, a persistently high level of official

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<sup>12</sup> Note that Uganda gained its independence from Britain in 1962, but economic data on Uganda prior to 1980 is scarce, and absent from the IMF BOPS database.



**Table 6.1: Uganda – Balance of Payments, Selected Aggregates, Millions of U.S. Dollars, 1980-2003**

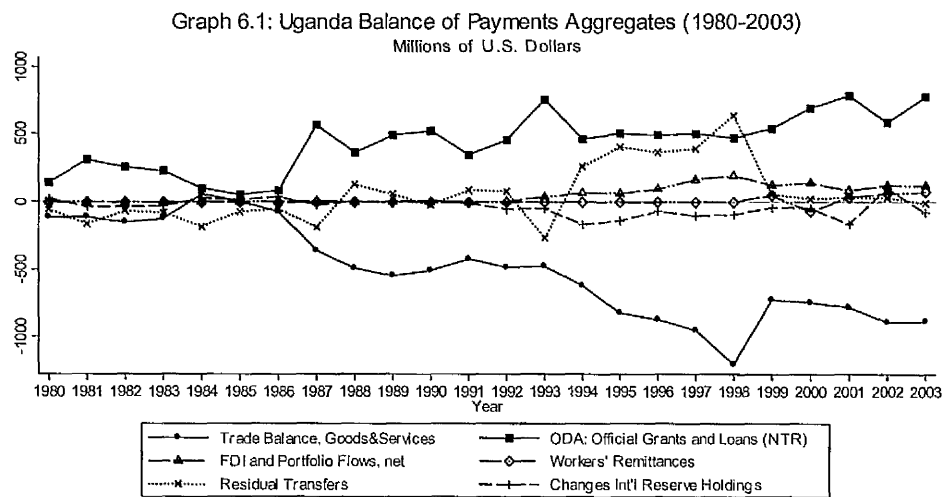
|   | 1980 | 1985 | 1990 | 1991 | 1992 | 1993 | 1994  | 1995  | 1996  | 1997  | 1998  | 1999  | 2000  | 2001  | 2002  | 2003  |
|---|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total Trade Balance                         | -112 | 3    | -509 | -425 | -484 | -478 | -623  | -825  | -877  | -954  | -1208 | -729  | -745  | -781  | -896  | -889  |
| Goods Balance                               | 2    | 110  | -313 | -204 | -271 | -278 | -251  | -367  | -348  | -450  | -656  | -506  | -500  | -500  | -574  | -678  |
| Goods Exports (f.o.b.)                      | 319  | 348  | 178  | 173  | 151  | 200  | 463   | 560   | 639   | 593   | 510   | 484   | 450   | 476   | 481   | 563   |
| Goods Imports (f.o.b.)                      | -318 | -238 | -491 | -377 | -422 | -478 | -714  | -927  | -987  | -1043 | -1166 | -989  | -950  | -975  | -1055 | -1241 |
| Services Balance                            | -114 | -107 | -195 | -221 | -213 | -199 | -372  | -459  | -530  | -504  | -552  | -223  | -246  | -281  | -310  | -229  |
| Services Exports                            | 10   | 23   | n/a  | 21   | 35   | 94   | 64    | 104   | 145   | 165   | 176   | 196   | 213   | 223   | 233   | 294   |
| Services Imports                            | -123 | -130 | -195 | -242 | -248 | -293 | -436  | -563  | -675  | -669  | -728  | -419  | -459  | -504  | -543  | -524  |
| Memo: Exports of Goods and Services         | 329  | 371  | 178  | 194  | 186  | 294  | 527   | 664   | 784   | 757   | 686   | 680   | 663   | 698   | 712   | 860   |
| Memo: Imports of Goods and Services         | -441 | -368 | -686 | -619 | -670 | -771 | -1151 | -1490 | -1662 | -1711 | -1894 | -1408 | -1409 | -1479 | -1608 | -1748 |
| Net FDI and Portfolio Flows (#1)            | 0    | 1    | 0    | 1    | 3    | 37   | 68    | 62    | 95    | 165   | 194   | 124   | 142   | 86    | 122   | 119   |
| Other Sectors' Current Transfers (#2)       | -2   | 0    | 0    | 103  | 207  | 84   | 255   | 340   | 429   | 376   | 504   | 146   | 32    | 153   | 236   | 209   |
| o/w: Workers' Remittances                   | -4   | n/a  | n/a  | n/a  | n/a  | n/a  | n/a   | n/a   | n/a   | n/a   | 48    | -70   | 34    | 50    | 93    | 132   |
| Change in Int'l Reserves Holdings           | 27   | 17   | 12   | -10  | -52  | -49  | -167  | -140  | -69   | -101  | -92   | -40   | -44   | -162  | 101   | -76   |
| Off.Grants (Project Grants and BOP support) | 38   | 22   | 293  | 226  | 261  | 501  | 292   | 348   | 348   | 309   | 399   | 463   | 536   | 481   | 488   | 532   |
| ODA Loans: Net Transfers (#3)               | 104  | 30   | 227  | 120  | 195  | 255  | 171   | 155   | 140   | 190   | 71    | 78    | 156   | 305   | 94    | 255   |
| Disbursement                                | 161  | 184  | 372  | 267  | 308  | 409  | 320   | 290   | 288   | 351   | 224   | 209   | 230   | 355   | 164   | 331   |
| Amortisation                                | -45  | -105 | -109 | -102 | -79  | -119 | -111  | -97   | -105  | -117  | -121  | -97   | -48   | -33   | -45   | -57   |
| Interest Payment                            | -12  | -50  | -36  | -45  | -34  | -35  | -38   | -38   | -43   | -44   | -32   | -34   | -26   | -18   | -25   | -27   |
| Debt Forgiveness (Flow Operations)          | .    | .    | .    | .    | .    | 220  | 40    | 48    | 61    | 32    | 50    | 46    | 70    | 55    | 64    | 61    |
| Other Flows, Incl. Net Errors and Omissions | -55  | -72  | -23  | -16  | -131 | -130 | 45    | 110   | -4    | 46    | 183   | 5     | -7    | -27   | -81   | -81   |
| Memo: Gross Domestic Product                | 1240 | 3520 | 4300 | 3320 | 2860 | 3220 | 3990  | 5760  | 6040  | 6270  | 6530  | 5970  | 5890  | 5640  | 5800  | 6200  |

Notes: (#1) Net of FDI profit remittances (#2) Unrequited private transfers (#3) Total long-term loans, plus net IMF purchases

Signs: (+) sign denotes BOP inflows (-) sign denotes BOP outflows

Data Sources: ODA Loans Series from the World Bank, Global Development Finance (2005). All other series from the IMF BOTS database (2005). Aggregates, including "other flows" are the author's own calculations.

development assistance (ODA) flows reflect the country's close adherence to donor reform and stabilisation programmes since 1986. Hence, as noted above, Uganda was able to benefit from substantial aid inflows, whereby the share of grants persistently



exceeded that of loans in the country's overall ODA envelope (Table 6.1). From the early 1990s onwards, growing confidence in the country's economic performance triggered modest inflows of private capital to Uganda, mainly in the form of foreign direct investment (FDI).<sup>13</sup> Although after the liberalisation of the capital account, in 1997, workers' remittances further added to Uganda's overall private financial flows, they continued to be dwarfed by the sheer magnitude of official development assistance flowing into the country.

Graph 6.1 displays an episode of exceptionally high residual BOP transfers during 1994-1998. Apart from moderate amounts of private current transfers,<sup>14</sup> these transfers merely reflect a change in accounting within the underlying IFS BOPS dataset. While this leaves the overall BOP pattern of Uganda largely unchanged, it should be noted that the downward acceleration in the trade deficit evident in Graph

<sup>13</sup> Direct investors mostly avoided the country during 1971-1986, when net FDI flows actually turned negative. The crucial steps to restore investor confidence, against the background of increasing social, political and macroeconomic stability, included the introduction of the Investment Code in 1991 and a number of incentive measures to promote Uganda as an investment location (e.g. see Obwona, 1996).

<sup>14</sup> Private current transfers have mainly been project-related transfers from non-governmental organisations (NGOs) (see Bank of Uganda: Annual Report, various issues).

6.1, as well as the marked kink in the trade deficit line between 1998 and 1999, are in part exacerbated by this accounting effect.<sup>15</sup>

In sum, Uganda's imports and growth expansion since 1986 has been almost exclusively reliant on foreign development assistance, thus representing the typical characteristics of a heavily aid-driven economy. To gauge the causal relationships driving Uganda's BOP gaps, aid financing and official external debt, we first analyse the evolution of its exports-imports structure over time, and then turn to a closer assessment of the foreign aid composition.

### 6.2.3 The trade balance and the terms of trade

Since independence, Uganda's trade structure has been geared towards the export of agricultural products and the import of manufactured and capital goods. The country inherited an export structure from colonial dependence, which was based on a few traditional agricultural commodities. This became further concentrated during the 1970s as the result of the military regime's trade policy. Prohibitively high taxes, both through direct levies and a highly overvalued exchange rate, caused production and exports of traditional crops to collapse. Between the early 1970s and the 1980s, tea production plunged from 20,000 to 2,000 metric tonnes (mt), and cotton production fell from 87,000 to 2,000 mt. Among the traditional export crops, only coffee production survived relatively unscathed, due to a favourable combination of production characteristics (low annual depreciation of coffee trees and input requirements) and the access to market outlets through substantial smuggling.<sup>16</sup> As a result, Ugandan exports came to rely almost exclusively on coffee, which accounted for 87 per cent of export revenue in 1985.<sup>17</sup> The dependence on coffee rendered Uganda's export earnings highly vulnerable to fluctuations both in the world price for coffee and in climatic conditions determining coffee yields.

In 1987, the government adopted the Economic Recovery Program (ERP) under the aegis of the IMF and World Bank. With regard to the trade regime, the ambitious

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<sup>15</sup> The data issue relates to the ex-post reconciliation of the IFS data with a change in the valuation practise of Uganda BOPS imports (services) data. For a more detailed discussion of the implications of that revision, see Appendix A6.1.

<sup>16</sup> Collier (1997: 650)

<sup>17</sup> According to the data drawn from the World Trade Analyzer CD-ROM (2005).

reform agenda was mainly centred on the privatisation of previously nationalised enterprises and marketing boards, the liberalisation of foreign exchange, and the reduction of trade barriers. Between 1986 and 1998, average nominal tariffs declined from 30 to 10 per cent, non-tariff barriers were removed, and export taxation was abolished.<sup>18</sup> According to the BWI's expectations, Uganda's orthodox trade reform was well-suited to bringing about an eventual reversal of Uganda's trade deficit by a combination of higher export receipts and a dampening effect on imports demand. Furthermore, a liberal exchange rate policy, combined with an overall market-friendly production environment, was thought to create the right incentives to encourage export-oriented expansion by both the traditional and non-traditional agricultural sectors.<sup>19</sup>

In retrospect, this was mostly wishful thinking on the part of the BWI. Uganda's reforms failed to diversify the country's export base effectively, and deteriorating terms of trade exacerbated the trade deficits ensuing from export revenues falling consistently short of growing import bills. That trade reforms had only limited effects on Uganda's export diversification and overall trade performance is clearly borne out by the data. Table 6.2 lists Uganda's ten key export items during 1985-2002, and shows export concentration to have decreased only slightly during that period. Although coffee's share of overall merchandise export value was drastically reduced over this period, from 87 to 22 per cent, the country's dependence on coffee exports remains high. For, most of the reduction in coffee's share of export value is accounted for by the sharp decline in the world coffee prices, rather than export volumes: by 2002 the coffee price had plummeted to one quarter of its level in 1985 (Graph 6.2). Between 1985 and 1990 alone, while Ugandan exports were reliant on coffee to more than 80 per cent, its price fell by 55 per cent, thereby reducing the overall export revenue from US\$ 410 to 215 million (Table 6.2).

Despite its rapid price decline, no other agricultural commodity has yet managed to take over from coffee as Uganda's predominant export crop. Among the traditional production sectors, cotton, tea and tobacco did increase over time in terms of export

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<sup>18</sup> von Uexküll (2006: 9). Also see Collier (1997) and WTO (1995, 2001).

<sup>19</sup> See Morrissey and Rudaheeranwa (1998) and WTO (1995).

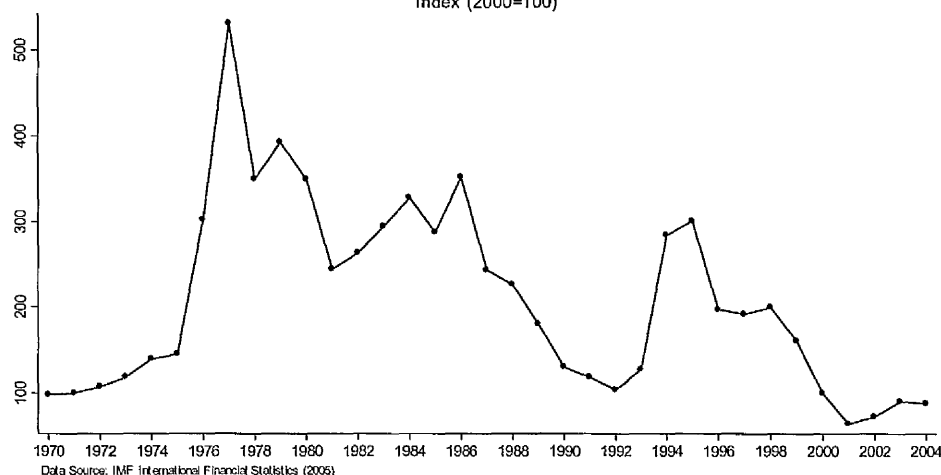
**Table 6.2: Uganda – Key Commodities Exported, Value Terms, Millions of U.S. Dollars, 1985-2002**

| Export Item (SITC code)/Period      | 1985 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | Average(1996-2002) | Average(1985-2002) |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|--------------------|--------------------|
| All Export Commodities (SITC4) (#1) | 410  | 215  | 629  | 625  | 680  | 510  | 489  | 388  | 451  | 488  | 519                | 407                |
| 1. Coffee(0711)                     | 351  | 173  | 478  | 478  | 460  | 291  | 284  | 124  | 95   | 107  | 263                | 270                |
| 2. Fish, Crustaceans (03)           | 0    | 1    | 29   | 60   | 49   | 68   | 27   | 32   | 85   | 94   | 59                 | 27                 |
| 3. Gold, non-monetary (9710)        | 1    | 0    | 18   | 25   | 15   | 8    | 34   | 43   | 51   | 61   | 34                 | 14                 |
| 4. Tobacco, unmanufactured (121)    | 0    | 2    | 12   | 11   | 12   | 19   | 13   | 28   | 35   | 48   | 24                 | 11                 |
| 5. Tea (0741)                       | 5    | 1    | 2    | 1    | 1    | 26   | 21   | 33   | 32   | 24   | 20                 | 9                  |
| 6. Hides, skins (21)                | 20   | 15   | 11   | 10   | 9    | 6    | 4    | 14   | 26   | 10   | 11                 | 12                 |
| 7. Electric current (3510)          | 0    | 0    | 0    | 0    | 6    | 12   | 0    | 19   | 11   | 16   | 9                  | 4                  |
| 8. Cut flowers and foliage (2927)   | 0    | 0    | 3    | 5    | 8    | 5    | 11   | 11   | 11   | 11   | 9                  | 4                  |
| 9. Crude animal materials (291)     | 14   | 0    | 1    | 1    | 1    | 4    | 36   | 2    | 3    | 2    | 7                  | 4                  |
| 10. Cotton (263)                    | 13   | 6    | 8    | 12   | 20   | 3    | 19   | 8    | 3    | 12   | 11                 | 9                  |
| All Other Export Items              | 6    | 16   | 69   | 22   | 100  | 69   | 40   | 75   | 98   | 103  | 72                 | 44                 |
| Coffee (%Total Merch. Exports)      | 86%  | 81%  | 76%  | 76%  | 68%  | 57%  | 58%  | 32%  | 21%  | 22%  | 51%                | 67%                |
| Five Top Export Items (%Total)      | 87%  | 83%  | 86%  | 92%  | 79%  | 81%  | 78%  | 67%  | 66%  | 68%  | 77%                | 81%                |
| Number of Export Items (#2)         | n/a  | n/a  | 83   | 78   | 85   | 68   | 66   | 76   | 89   | 89   | 79                 | n/a                |

Source: World Trade Analyzer, STATCAN, CD-ROM (2005); UNCTAD Handbook of Statistics CD-ROM (2005); author's own calculations

Notes: (#1) Commodities are classified according to the Standard International Trade Classification (SITC), Revision 2, at up to 4-digit level of detail.  
 (#2) According to the SITC classification at three digits, including only products with export value greater than USD 100,000, or amounting to more than 0.3 per cent of the country's total exports value.

Graph 6.2: Uganda Coffee Export Price (1970-2004)  
Index (2000=100)



value share, but not even their combined value has ever reached that of coffee alone (Table 6.2). Despite the improvements in productivity of some of Uganda's traditional agricultural sectors, their overall expansion and the investment efforts to foster agricultural output have been undermined by the frequent occurrence of climatic shocks, particularly in the form of droughts.<sup>20</sup> For example, between 1997 and 1998 alone, total merchandise export earnings declined by 33 per cent due to torrential rains – known as the *El Niño* phenomenon – as the combined result of a 34 and a 38 per cent fall in export volume of the non-coffee traditional sectors and coffee, respectively (Table 6.2).<sup>21</sup>

Uganda has been more successful in developing substantial export capacity in a few single non-traditional crops, most notably through commercial fishing of Nile perch fish in Lake Victoria. Indeed, in 2001 and 2002, the export value of fish was close to overtaking coffee as the prime export item. Other major non-traditional export sectors which Uganda has managed to develop include cut flowers, sold to the European market, and electric current, exported to the neighbouring African countries. Furthermore, increased investment in the extraction industry has increased exports of non-monetary gold, mainly to Europe. Although combined earnings from non-traditional exports did grow over the years, these have not been sufficient to compensate for Uganda's price-induced loss of coffee revenue. Furthermore, the non-

<sup>20</sup> Particularly significant productivity increases occurred in the tobacco sector. On the role of FDI in Uganda's increase in tobacco production, see Ferrarini (2005).

<sup>21</sup> Also see Gautam and Marcos (2002: 14).

traditional sectors have suffered from pronounced fluctuations in production yields, as well as high price volatility, similar to those experienced by the traditional sectors. As a result, Uganda's diversification efforts had little effect on its overall vulnerability to exogenous shocks.

Table 6.3 assesses Uganda's exposure to export volatility on the basis of two volatility measures calculated for the country's total exports, agricultural exports, and a number of selected export items for which consistent data are available. The coefficient of variation (CoV) is computed as the percentage ratio of the standard deviation to the 1988-2002 period average. Since the presence of pronounced trend factors risks largely invalidating the significance of CoV measures over an extended time period, we de-trend the series to calculate an alternative volatility index for the longer period 1970-2004.<sup>22</sup>

The two indices yield a broadly similar picture of extremely high variations in Uganda's export earnings. Moreover, fluctuations in yearly earnings seem to be caused by variations in both volume and price. While all commodities display pronounced real volatility, in the case of cotton, tobacco and tea, volume shocks appear to have been the primary cause of fluctuations in export earnings. Coffee and fish, on the other hand, show a slightly more stable export volume, with a relatively higher incidence of prices on earnings fluctuations. Among single export items, a generally highly positive volume-price correlation points towards a reinforcing effect of price and quantity volatility combined. In contrast, at the aggregate level, exports display a highly negative correlation between volume and price, and thus lower fluctuations in earnings. Finally, the volatility index is lowest for overall exports of goods and services, reflecting the relatively more stable nature of Uganda's services exports. In this respect, the CoV overestimates the volatility of overall exports, which, however, merely reflects its shortcomings to account for the strongly growing real trend in services during the period 1988-2002 (Table 6.1).

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<sup>22</sup> Roughly following the methodology applied in Osei, Morrissey and Lensink (2002), the index is computed by fitting a quadratic trend to each export item's time series. The index is then calculated by the following formula, relating the residuals ( $\epsilon^2$ ) to the dependent's variable mean ( $\bar{y}$ ):

$$\sqrt{\frac{\sum_{t=1}^n \epsilon_t^2}{n-3} \cdot \frac{100}{\bar{y}}}$$

**Table 6.3: Export Volatility – Selected Items**

| Export Item:                        | Coefficient of Variation (1988-2002) % |               |              |                          | Volatility Index (1970-2004) |               |              |                          |
|-------------------------------------|--|---------------|--------------|--------------------------|------------------------------|---------------|--------------|--------------------------|
|                                     | Export Value                           | Export Volume | Export Price | Volume-Price Correlation | Export Value                 | Export Volume | Export Price | Volume-Price Correlation |
| Total Exports of Goods and Services | 47                                     | 65            | 38           | -0.67                    | 33                           | 32            | 37           | -0.61                    |
| Total Agricultural Exports          | 44                                     | 31            | 39           | -0.21                    | 38                           | 42            | 58           | -0.66                    |
| Coffee                              | 55                                     | 29            | 43           | 0.31                     | 49                           | 29            | 54           | -0.25                    |
| Fish (#1)                           | 84                                     | 49            | 58           | 0.75                     | 50                           | 28            | 38           | 0.75                     |
| Tobacco                             | 102                                    | 103           | 27           | 0.16                     | 111                          | 123           | 26           | 0.13                     |
| Tea                                 | 76                                     | 67            | 18           | 0.59                     | 99                           | 93            | 22           | 0.33                     |
| Cotton                              | 60                                     | 59            | 27           | -0.12                    | 77                           | 112           | 32           | -0.06                    |

Notes: (#1) Computed over the period 1990-2002.

Data Source: FAOSTAT (2005); STATCAN World Trade Analyzer (2005); World Development Indicators (2005); Author's own calculations.

**Table 6.4: Uganda – Merchandise Imports, Value Terms, Millions of U.S. Dollars, 1985-2002**

| Import Item (SITC code)\Period               | 1985 | 1990 | 1995 | 1996 | 1997 | 1998  | 1999 | 2000 | 2001 | 2002  | Average (1996-2002) | Average (1985-2002) |
|--|------|------|------|------|------|-------|------|------|------|-------|---------------------|---------------------|
| TOYL-Total - All commodities                 | 263  | 517  | 499  | 761  | 763  | 1,055 | 964  | 851  | 935  | 1,052 | 910                 | 588                 |
| 0-Food and live animals chiefly for food     | 11   | 17   | 29   | 70   | 87   | 96    | 79   | 81   | 71   | 89    | 82                  | 43                  |
| 1-Beverages and tobacco                      | 4    | 2    | 3    | 4    | 3    | 5     | 3    | 6    | 3    | 4     | 4                   | 3                   |
| 2-Crude materials, inedible, except fuels    | 1    | 12   | 22   | 31   | 27   | 42    | 38   | 27   | 32   | 33    | 33                  | 19                  |
| 3-Mineral fuels, lubricants and related mate | 43   | 33   | 1    | 68   | 69   | 93    | 113  | 84   | 162  | 209   | 114                 | 60                  |
| 4-Animal and vegetable oils, fats and waxes  | 1    | 19   | 6    | 12   | 12   | 26    | 6    | 17   | 6    | 24    | 15                  | 12                  |
| 5-Chemicals and related products, n.e.s.     | 27   | 38   | 55   | 101  | 99   | 137   | 126  | 111  | 124  | 125   | 118                 | 67                  |
| 6-Manufactured goods classified chiefly      | 50   | 85   | 84   | 174  | 162  | 190   | 185  | 163  | 168  | 182   | 175                 | 112                 |
| 7-Machinery and transport equipment          | 92   | 253  | 228  | 198  | 187  | 322   | 273  | 239  | 273  | 276   | 253                 | 198                 |
| 8-Miscellaneous manufactured articles        | 30   | 53   | 65   | 94   | 91   | 126   | 128  | 107  | 84   | 93    | 104                 | 67                  |
| 9-Commodities & trans. not classified        | 4    | 4    | 7    | 8    | 14   | 17    | 14   | 14   | 12   | 17    | 14                  | 8                   |

Data Source: World Trade Analyzer, STATCAN, CD-ROM (2005).



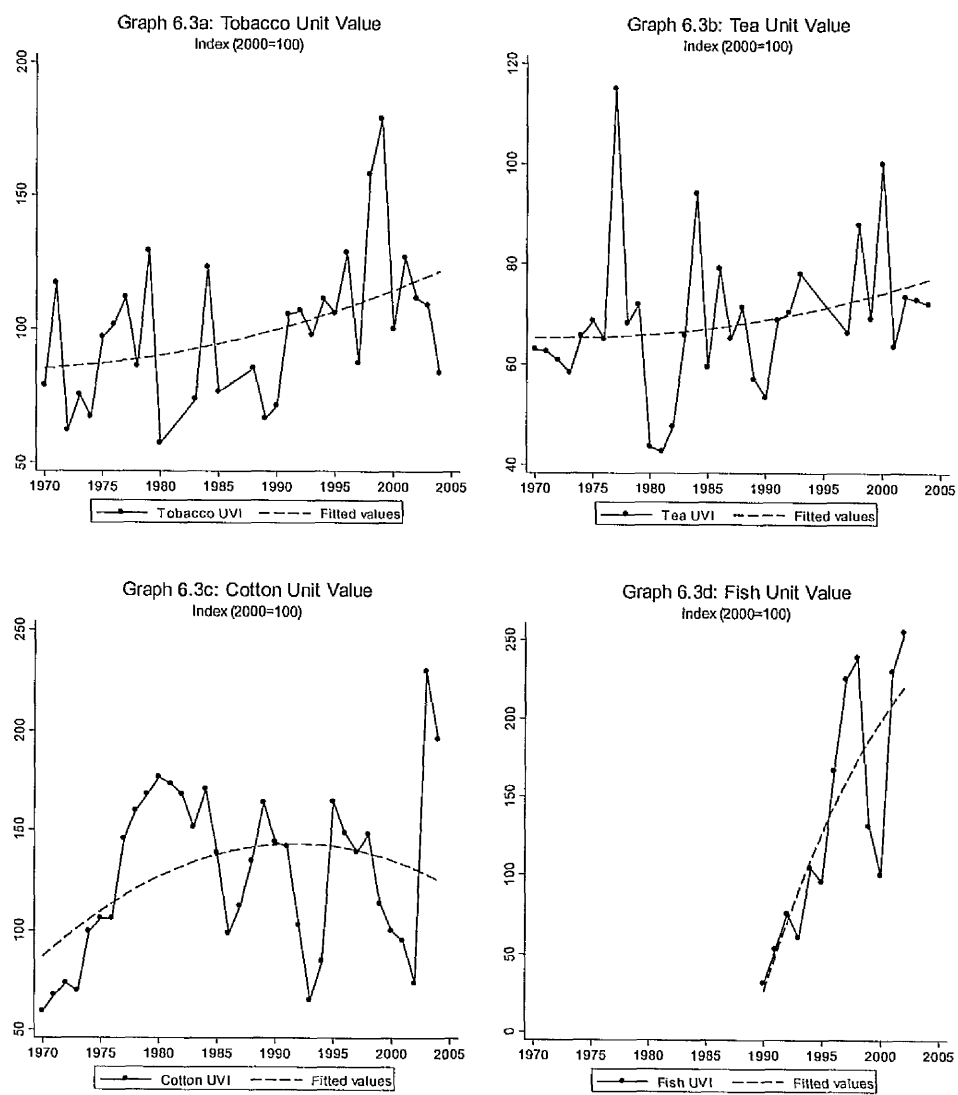
Of course, no causal relationships between the factors of variation can be inferred on the basis of simple correlation analysis. Nevertheless, this approach lends itself to two more observations relevant to the context of the CDSF simulations below. First, Uganda's high degree of volatility in real exports (or export volume) is not accounted for as exogenous shock by the CDSF, since it reflects mixed-endogenous factors, as outlined in Chapter 5. Therefore, the CDSF compensatory instruments will provide only partial coverage of Uganda's export fluctuations, while real shocks are subsumed in the mixed-endogenous category of effects. To the extent that information conform to the CDSF requirements with regard to the measurement of export effects of real shocks would be available, these effects would have to be imputed to the exogenous category.<sup>23</sup> Second, the offsetting effect of volatility across Uganda's total exports of goods and services suggests that CDSF compensation would best be indexed to this broad category of exports. In other words, although the accounting of single trade balance items remains important in relation to a more detailed identification of causal factors affecting BOP sustainability, such detailed accounting is not essential for the operation of CDSF compensatory mechanisms, which necessarily have to focus on the most aggregate level of net effects instead. Therefore, the requirement for informational content necessary to the implementation of the CDSF instruments is minimal, and can be met by the consolidated data represented by Uganda's balance of payments statistics.

In contrast to volumes, the observed volatility in Uganda's export prices is fully exogenous to the country and thus an expression of genuine shocks, which will be fully accounted for by the CDSF. Graphs 6.3(a) to 6.3(d) display the price pattern of four of Uganda's main non-coffee crops over time, measured as export unit values. It is evident that, in contrast to green coffee, some of Uganda's key export items show fairly steep upward sloping trends in unit values. However, the potential BOP benefits from increasing price trends were strongly undermined by the sheer degree of price volatility around trend. For example, the unit value of fish exports increased by a factor of seven between 1990 and 2002, but almost halved between 1998 and 1999 alone. A similar degree of extreme price variability can be observed for tobacco,

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<sup>23</sup> No such information is available supplying the necessary level of detail from the data sources underlying this analysis.

tea, cotton, as well as most of the other agricultural commodities Uganda exports (not reported here).



Data Source: FAOSTAT (2005) and World Trade Analyzer (2005). Author's own calculations.

Against the background of falling coffee prices, such marked price volatility in Uganda's main export crops has had deleterious effects on the sustainability of agricultural reform policies in the affected sectors, thereby significantly undermining the country's longer-term diversification efforts.<sup>24</sup> At the same time, however, export price fluctuations have severely curtailed Uganda's capacity to rely on export

<sup>24</sup> See the Bank of Uganda Quarterly Economic Report (various issues) for a description of several instances when agricultural sectors most severely hit by price shocks found it difficult to finance their production inputs in subsequent years.

earnings for narrowing its current account deficits, as well as financing the cash-flow requirements from outstanding debt obligations.

In sum, Uganda's post-reform export performance since the mid-1980s has not been impressive. The value of overall merchandise exports still depends to a disproportional extent on world coffee prices. Uganda's five top export commodities together still account for 68 per cent of total commodity exports, down from 86 per cent in 1985, and the overall number of large export items has increased only marginally (Table 6.2). The efforts to expand traditional commodity production and to diversify into non-coffee commodity exports were only partially successful in countering the declining trend in coffee prices since 1986. As a result, the value of total merchandise exports was stagnating, from US\$ 410 million in 1985, to US\$ 388 in 2001, and to US\$ 488 in 2002 (Table 6.2). Only on the services front did Uganda manage to establish a growing export industry – mainly tourism – which during the early 2000s grew to represent almost half the value of total goods exports.<sup>25</sup>

With regard to the imports side of the trade balance, Uganda displays the characteristic import composition of a low-income country with little or no domestic manufacturing capacity. Indeed, Table 6.4 shows that Uganda has been predominantly reliant on imports of manufactured goods, equipment, machinery, chemicals and fuels (petrol). While there has been no substantial change in the composition of imports between 1985 and 2002, reflecting the country's failure to significantly improve its domestic manufacturing capacity, increasing amounts of imported inputs and capital goods were required over time to sustain domestic recovery and output growth. As a result, the nominal value of merchandise imports increased fourfold during the observed period, from US\$ 263 to US\$ 1,052, against stagnating exports.

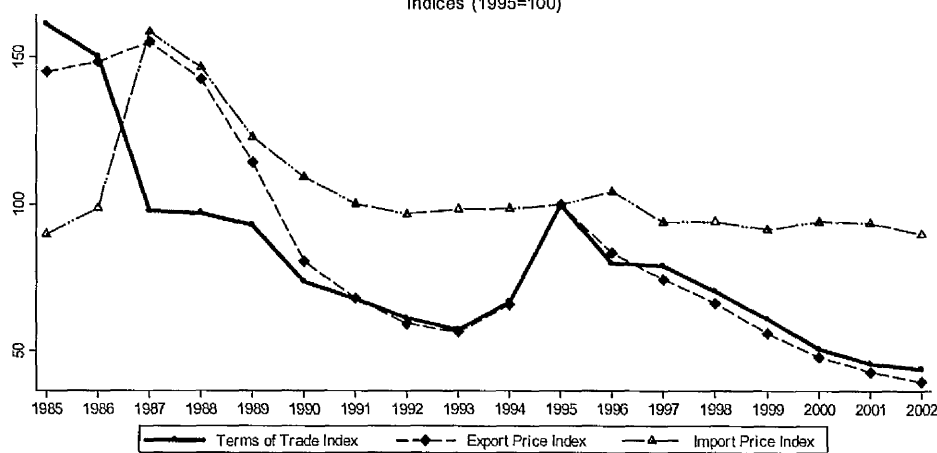
In contrast to export prices, which continued their decline, Uganda's import prices remained fairly stable during the 1990s. The ensuing fall in Uganda's (barter) terms of trade is depicted in Graph 6.4, for total goods and services. Essentially, the country's deteriorating terms of trade reflects the different composition of its export

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<sup>25</sup> In 2000, 88 per cent of services exports came from tourism (Bank of Uganda – Annual Report 2000).

and import baskets, which, in turn, has mainly been the result of the country's inability to free itself from its dependency on a narrow range of agricultural export crops. The terms of trade effect has thus been a crucial factor underlying Uganda's stagnating export earnings, against rapidly growing imports. The cumulative effect of the terms of trade has been enormous: during 1985-2002 it deteriorated by more than 100 per cent. Hence, Uganda's trade deficit has more than doubled because of relative price changes alone, which the country had no influence upon.

Graph 6.4: Uganda - Terms of Trade in Goods and Services  
Indices (1995=100)



Data Source: World Development Indicators (2006); author's own calculations

In sum, the terms of trade factor is both the result and the manifestation of Uganda's failed export diversification. It thus represents the ultimate synthesis of the causal determinants underlying the country's worsening trade deficits, which in turn has been identified as the prime cause of its growing demand for official development financing (Graph 6.1). The evolution of debt financing over time, in particular with regard to the build-up of excessive external debt stocks, is the next and last step of analysis preparing the ground for the CDSF simulations.

#### 6.2.4 The evolution of Uganda's external debt stock

Table 6.5 summarises the relevant data describing Uganda's external debt evolution during 1970-2003. In the years following its independence, Uganda borrowed mainly from the United Kingdom and the World Bank to finance its investments. During the 1970s military regime, as resources were mostly being diverted to finance defence expenditure, Uganda lost access to external finance from the international

Table 6.5: Uganda – External Debt, Millions of U.S. Dollars, 1970-2003

|                          | 1970 | 1975 | 1980 | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total Loan Disbursements | 26   | 33   | 161  | 184  | 372  | 267  | 308  | 409  | 319  | 290  | 289  | 350  | 224  | 209  | 231  | 356  | 164  | 331  |
| PPG, bilateral           | 6    | 3    | 7    | 139  | 219  | 166  | 216  | 202  | 248  | 213  | 179  | 280  | 169  | 168  | 219  | 338  | 136  | 318  |
| PPG, multilateral        | 14   | 11   | 11   | 14   | 36   | 16   | 31   | 189  | 19   | 21   | 46   | 10   | 5    | 6    | 0    | 2    | 21   | 0    |
| PPG, private             | 7    | 2    | 65   | 31   | 38   | 5    | 6    | 18   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 4    | 5    | 8    |
| PNG, total               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| IMF purchases            | 0    | 17   | 78   | 0    | 79   | 79   | 56   | 0    | 52   | 56   | 64   | 60   | 50   | 35   | 12   | 11   | 2    | 6    |
| Total Debt Service       | 9    | 17   | 52   | 153  | 140  | 142  | 108  | 151  | 146  | 133  | 146  | 157  | 149  | 126  | 70   | 47   | 69   | 83   |
| PPG, bilateral           | 1    | 1    | 3    | 17   | 31   | 39   | 40   | 57   | 75   | 72   | 51   | 52   | 65   | 44   | 19   | 24   | 41   | 49   |
| PPG, multilateral        | 6    | 3    | 11   | 9    | 29   | 24   | 18   | 47   | 29   | 21   | 35   | 44   | 24   | 43   | 26   | 4    | 7    | 7    |
| PPG, private             | 3    | 6    | 22   | 30   | 23   | 37   | 19   | 35   | 16   | 11   | 7    | 2    | 4    | 2    | 2    | 3    | 1    | 1    |
| PNG, total               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| IMF repurch. and charges | 0    | 6    | 16   | 97   | 56   | 42   | 32   | 12   | 26   | 30   | 52   | 60   | 56   | 38   | 23   | 16   | 20   | 26   |
| Total Net Transfers      | 17   | 17   | 109  | 32   | 232  | 125  | 200  | 258  | 173  | 156  | 143  | 193  | 75   | 82   | 160  | 309  | 94   | 249  |
| PPG, bilateral           | 5    | 2    | 4    | 123  | 188  | 127  | 176  | 145  | 173  | 141  | 128  | 228  | 104  | 124  | 199  | 314  | 94   | 269  |
| PPG, multilateral        | 8    | 8    | 1    | 5    | 6    | -8   | 14   | 142  | -9   | 1    | 11   | -34  | -19  | -37  | -26  | -2   | 14   | -7   |
| PPG, private             | 5    | -4   | 43   | 1    | 15   | -32  | -13  | -17  | -16  | -11  | -7   | -2   | -4   | -2   | -2   | 1    | 4    | 7    |
| PNG, total               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| IMF net transfers        | 0    | 11   | 62   | -97  | 23   | 37   | 24   | -12  | 26   | 25   | 12   | 0    | -6   | -3   | -11  | -5   | -18  | -20  |

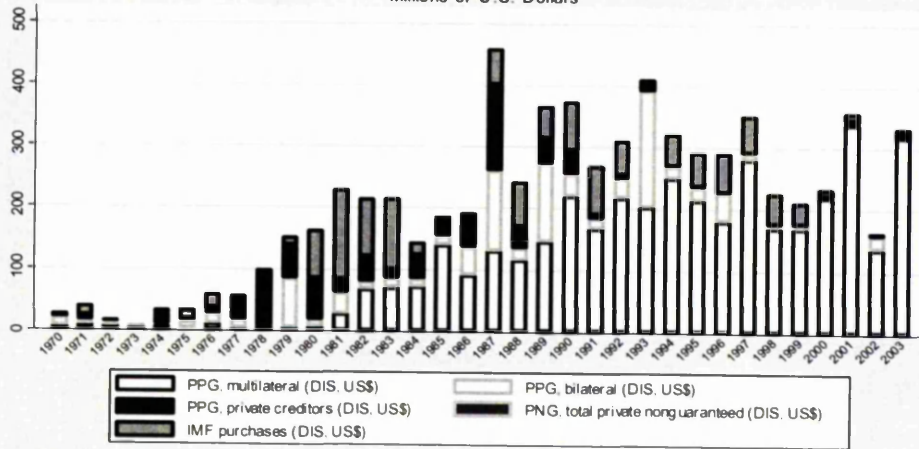
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Table 6.5 (cont'd): Uganda – External Debt, Millions of U.S. Dollars, 1970-2003

|                                | 1970 | 1975 | 1980 | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total Debt Stock               | 152  | 210  | 687  | 1231 | 2583 | 2782 | 2926 | 3033 | 3369 | 3577 | 3684 | 3885 | 3921 | 3494 | 3493 | 3728 | 3992 | 4551 |
| PPG, bilateral                 | 19   | 52   | 79   | 491  | 1270 | 1430 | 1560 | 1730 | 2010 | 2210 | 2290 | 2410 | 2440 | 2550 | 2630 | 2820 | 3170 | 3780 |
| PPG, multilateral              | 108  | 105  | 212  | 191  | 556  | 557  | 612  | 758  | 764  | 770  | 790  | 887  | 883  | 414  | 393  | 449  | 376  | 370  |
| PPG, private                   | 25   | 24   | 244  | 204  | 335  | 301  | 260  | 115  | 93   | 87   | 81   | 80   | 66   | 26   | 24   | 33   | 30   | 17   |
| PNG, total                     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Use of IMF credit              | 0    | 28   | 89   | 305  | 282  | 330  | 344  | 334  | 383  | 417  | 417  | 394  | 398  | 372  | 316  | 275  | 257  | 236  |
| Short-term debt                | 0    | 1    | 63   | 40   | 140  | 164  | 150  | 96   | 119  | 93   | 106  | 114  | 134  | 132  | 130  | 151  | 159  | 148  |
| Accumulation of Arrears        | 0    | 4    | 100  | 60   | 298  | 401  | 347  | 268  | 288  | 270  | 255  | 261  | 277  | 164  | 182  | 265  | 282  | 271  |
| Principal arrears              | 0    | 3    | 82   | 41   | 215  | 299  | 267  | 197  | 207  | 211  | 206  | 215  | 215  | 110  | 124  | 187  | 207  | 198  |
| Interest Arrears               | 0    | 1    | 19   | 18   | 83   | 102  | 80   | 71   | 81   | 59   | 49   | 46   | 62   | 54   | 58   | 78   | 75   | 73   |
| Debt Restructuring             | .    | .    | .    | .    | 67   | 10   | 114  | 212  | 7    | 213  | 0    | 0    | 861  | 30   | 224  | 33   | 129  | 63   |
| Total debt rescheduled         | .    | .    | .    | .    | 16   | 9    | 99   | 38   | 0    | 172  | 0    | 0    | 149  | 19   | 35   | 0    | 0    | 24   |
| Total debt forgiven            | .    | .    | .    | .    | 51   | 1    | 14   | 35   | 7    | 1    | 0    | 0    | 527  | 11   | 24   | 33   | 21   | 30   |
| Total debt stock reduction     | .    | .    | .    | .    | 0    | 0    | 0    | 139  | 0    | 40   | 0    | 0    | 185  | 0    | 165  | 0    | 108  | 9    |
| Debt Stock/Flow Reconciliation |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Total change in debt stock     | .    | .    | .    | .    | 406  | 194  | 150  | 102  | 343  | 210  | 103  | 199  | 33   | -419 | -1   | 234  | 260  | 562  |
| Net flows on debt              | 22   | 19   | 130  | 75   | 269  | 169  | 236  | 244  | 223  | 189  | 206  | 244  | 106  | 119  | 177  | 324  | 129  | 266  |
| Net change in int. arrears     | .    | .    | .    | .    | 28   | 19   | -21  | -9   | 9    | -22  | -9   | -3   | 16   | -8   | 3    | 20   | -4   | -1   |
| Interest capitalised           | .    | .    | .    | .    | 1    | 3    | 38   | 10   | 0    | 30   | 0    | 0    | 15   | 0    | 0    | 0    | 0    | 1    |
| Debt forgiven or reduced       | .    | .    | .    | .    | -51  | -1   | -13  | -138 | -7   | -40  | 0    | 0    | -103 | -7   | -179 | -24  | -125 | -35  |
| Cross-currency valuation       | .    | .    | .    | .    | 201  | 26   | -64  | -1   | 129  | 49   | -91  | -111 | -187 | -65  | -150 | -122 | 224  | 291  |
| Residual                       | .    | .    | .    | .    | -43  | -22  | -26  | -5   | -12  | 4    | -4   | 69   | 186  | -458 | 148  | 36   | 35   | 41   |
| Debt Ratios                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Total Debt Stock/GDP (%)       | 12   | 9    | 55   | 35   | 60   | 84   | 102  | 94   | 84   | 62   | 61   | 62   | 60   | 59   | 59   | 66   | 69   | 73   |
| Total Debt Stock/Exports (%)   | .    | .    | 209  | 332  | 1451 | 1433 | 1578 | 1032 | 639  | 539  | 469  | 512  | 571  | 515  | 528  | 534  | 561  | 529  |
| Debt Service/Exports (%)       | .    | .    | 17   | 42   | 81   | 76   | 61   | 52   | 28   | 20   | 19   | 21   | 22   | 19   | 11   | 7    | 10   | 10   |

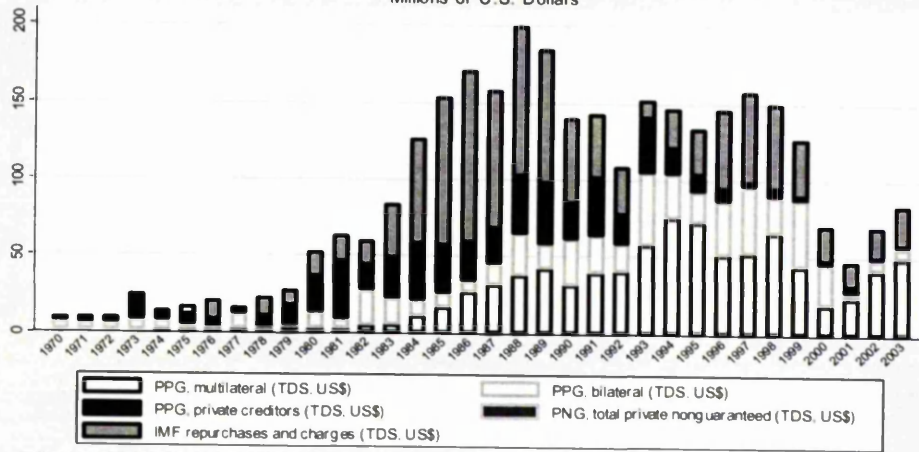
Data Source: Global Development Finance (2005)

Graph 6.5: Total Loan Disbursements (1970-2003)  
Millions of U.S. Dollars



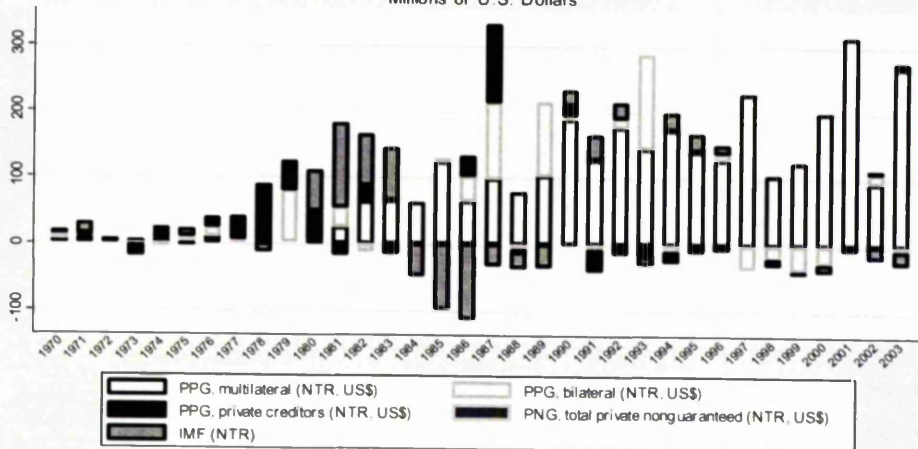
Source: Global Development Finance (2006)

Graph 6.6: Total Debt Service Paid (1970-2003)  
Millions of U.S. Dollars



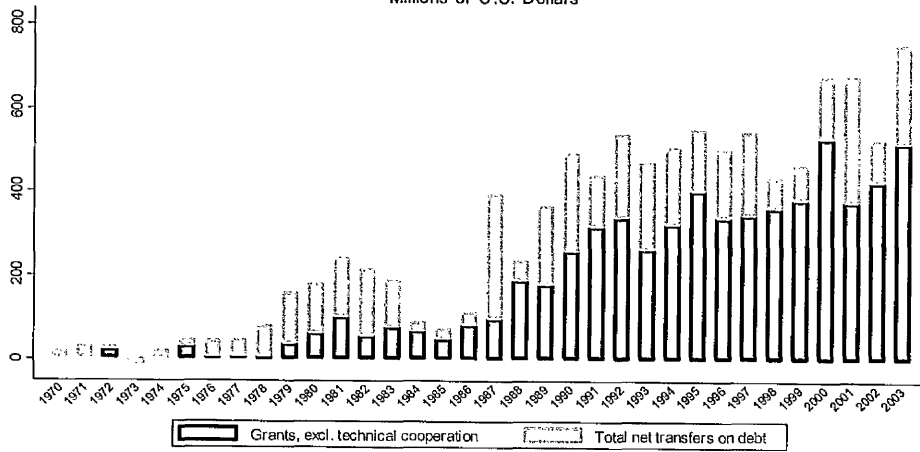
Data Source: Global Development Finance (2006)

Graph 6.7: Net Transfers (1970-2003)  
Millions of U.S. Dollars



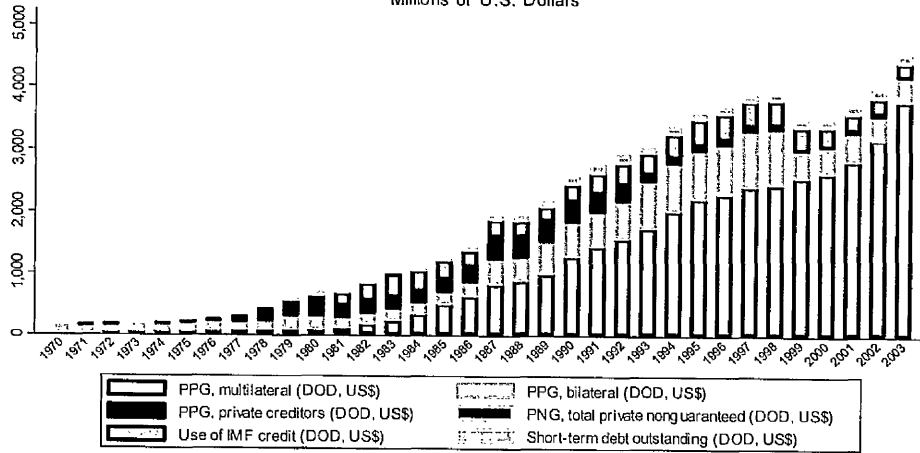
Source: Global Development Finance (2006) - IMF (NTR) derived from other series

Graph 6.8: Official Net Resource Transfers (1970-2003)  
Millions of U.S. Dollars



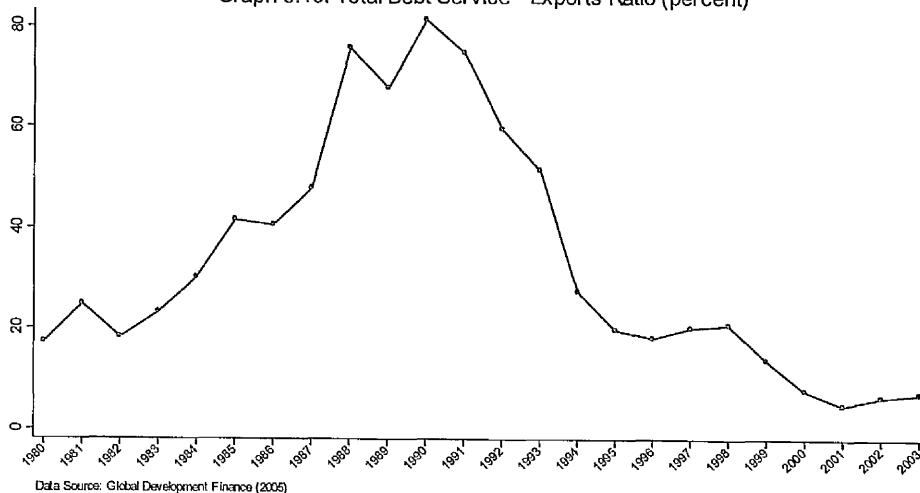
Source: Global Development Finance (2005)

Graph 6.9: Total Debt Stock (1970-2003)  
Millions of U.S. Dollars



Source: Global Development Finance (2005)

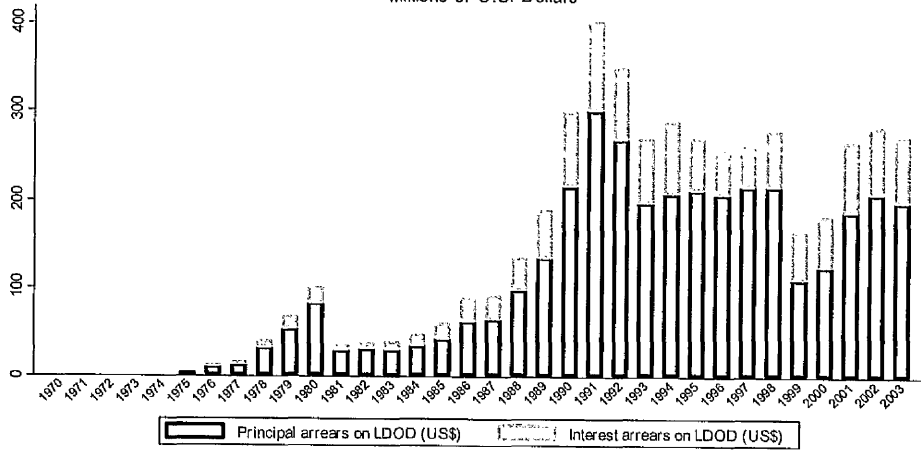
Graph 6.10: Total Debt Service - Exports Ratio (percent)



Data Source: Global Development Finance (2005)

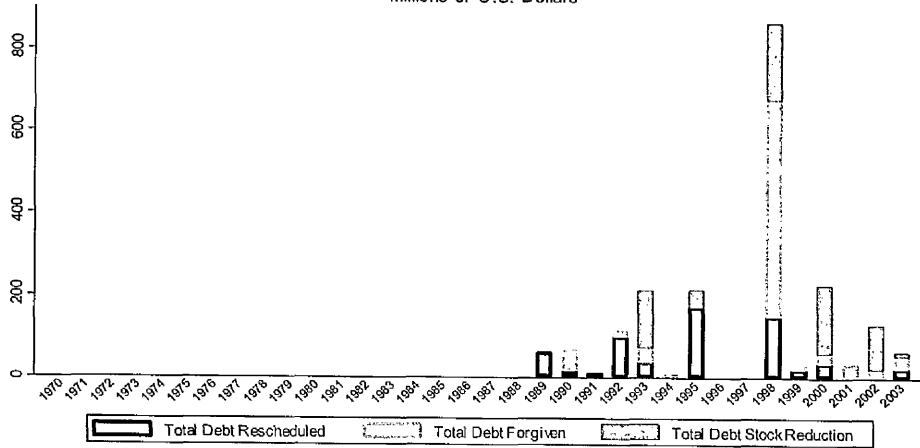


Graph 6.11: Accumulation of Arrears (1970-2003)  
Millions of U.S. Dollars



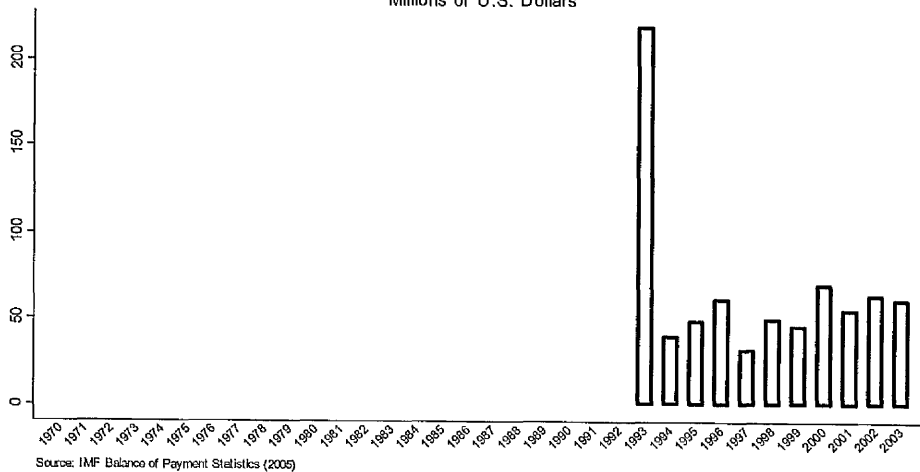
Source: Global Development Finance (2005)

Graph 6.12: Debt Restructuring (1970-2003)  
Millions of U.S. Dollars



Source: Global Development Finance (2005)

Graph 6.13: Debt Relief - Capital Account Inflows (1970-2003)  
Millions of U.S. Dollars



Source: IMF Balance of Payment Statistics (2005)

community and the multilateral institutions, and had to rely on domestic borrowing and a few single bilateral creditors, with high risk premiums attached.

Access to multilateral finance was restored in 1980, as a new government engaged in a recovery programme supported by the IMF and the World Bank. As shown in Graphs 6.5, 6.6 and 6.7, between 1980 and 1986, loan disbursements from these institutions were substantial. However, the IMF soon had its funds repurchased, as political instability and civil unrest were exacerbated, and the government continued to borrow from private creditors. Due to the high country risk perceived, single private market loans were obtainable only on highly unfavourable terms and then only with public guarantees (PPG loans). Uganda was in fact excluded from accessing the international commercial loan markets, and it remained so over the whole period of observation (note that Graph 6.5 shows private non-guaranteed loan disbursements –PNG – to have been virtually non-existent). By the mid 1980s, Uganda debt stock had risen to US\$ 1.4 billion, with an increasing share of debt owed to the multilateral donors (Graph 6.9). However, given the high servicing costs arising from Uganda's non-concessional debt stock, total debt service started to soar, causing net transfers on debt to drop to almost zero in 1985.

In 1986, the National Resistance Movement took power and signed up, a year later, to the Economic Recovery Program under the BWI's guidance. The period until the late 1980s was thus characterised by growing multilateral disbursements, mainly from the International Development Association (IDA) and the African Development Bank (ADB). In addition, Uganda was receiving sporadic disbursements of bilateral official loans and a fairly stable supply of private publicly guaranteed debt (Graph 6.5). Despite accelerating debt service payments, mainly in form of repurchases and charges by the IMF, increasing disbursements by the IDA and ADB kept net transfers positive and rising. As a result, by the late 1980s, Uganda's debt stock already exceeded US\$ 2 billion.

Concurrently with the loan transfers, Uganda benefited from increasing grant disbursements by the official donors, mainly to finance its growing import requirements. Graph 6.8 shows that after 1986, growth in official net transfers was mainly driven by increasing shares of grant financing. Nevertheless, loan

disbursements continued to be substantial, while both the official donors and the Ugandan government failed to impose any kind of debt management strategy linking the amount and terms of lending (borrowing) to the economy's capacity to pay (World Bank, 2002). As Uganda's export prices dropped by 54 per cent between 1986 and 1991 (Graph 6.4), the debt service to exports ratio jumped from 41 to 76 per cent (Graph 6.10). Unable to stay current on its debt obligations, despite the continuing massive inflows of official disbursements, Uganda was facing its first outright debt crisis and defaults. Scarce foreign exchange had to be rationed to service debts owed to the priority multilateral and bilateral official creditors<sup>26</sup>, for them to continue to maintain positive net transfers while the crisis was unfolding. By 1991, total debt service paid had already shrunk, reflecting the country's absolute inability to pay (Graph 6.6), while arrears had accumulated to US\$ 400 million, more than four times the amount in 1986 (Graph 6.11).<sup>27</sup>

The debt crisis led the government, pressured by its concessional creditors, to embrace a broad reform package involving debt reduction and management strategies, first in 1991 and later in 1995, with the aim of reducing the external debt to levels compatible with the country's ability to pay. Existing commercial debt was to be eliminated, accumulated arrears cleared, and future debt contracted exclusively at highly concessional terms. Furthermore, Uganda was to put in place the necessary domestic capacity to effectively monitor and manage the country's external debt.<sup>28</sup> Although these initiatives were successful on many fronts, they ultimately failed to tackle Uganda's longer term debt problem.

Among the key achievements of the 1990s debt reforms is the government's success in achieving the institutional capacity and coordination necessary to comprehensively record and monitor the multitude of external debt obligations, as well as to effectively enforce borrowing discipline on line ministries. Besides representing a drastic qualitative improvement in Uganda's overall accountability, these measures prepared the necessary environment for a successful implementation

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<sup>26</sup> In the early 1990s, the central bank's foreign exchange reserves were as low as 0.5 per cent of monthly imports (Gautam and Marcos, 2002: 6).

<sup>27</sup> Arrears were mostly accumulated on non-Paris Club official debt, as well as private debt.

<sup>28</sup> See Gautam and Marcos (2002) for a more detailed account of Uganda's post-1991 debt strategy.

of the so-called 'new debt policy', which restricted new borrowing to concessional loans. Furthermore, debt service payments remained fairly stable during most of the 1990s, as the combined result of substantial Paris Club debt relief operations (Table 6.5 and Graph 6.12), longer grace periods conceded on newly contracted debt, and increasing shares of grant financing (Graph 6.8). By 1995, the debt service to exports ratio had dropped to 20 per cent (Graph 6.10), favoured by an exceptional rebound in the terms of trade following a boom in the world coffee price. Although coffee prices soon resumed their downward trend, the debt service ratio increased only slightly in the subsequent years, due to the offsetting effect of higher services exports (tourism). Finally, arrears with Paris Club and multilateral creditors were totally cleared, and those in relation to the remaining debt remained fairly stable (Graph 6.11).

Although Uganda managed to overcome the full-blown debt crisis of the early 1990s and to significantly lower its debt burden both in terms of stock and flows, the debt reforms and Paris Club relief operations largely failed to resolve Uganda's longer-term debt stock problem. Fuelled by large capital inflows, including official development grants, the GDP growth rate more than outstripped that of the external debt stock, which was lowered by the debt relief operations. Therefore, the ratio of debt stock to GDP dropped from a high of 102 per cent in 1992 to around 60 per cent during the late 1990s, and a similar plunge could be observed for the debt-to-exports ratio (Table 6.5). However, as has been noted above, the broader economic reforms had no bearing on resolving the causes of Uganda's broadening trade deficits. The latter continued to require massive financing by increasing amounts of new borrowing, which caused Uganda's nominal external debt stock to soar unabated. By the mid-1990s, it was thus becoming increasingly evident that the rising trend in Uganda's debt stock would have required further interventions by the international community in order to avoid an inevitable return to a situation of outright distress and possible defaults.

In 1996, virtually all of Uganda's external debt was owed to the multilateral institutions (IDA, ADB, IMF) and, to a lesser extent, to bilateral creditors. Against the background of the country's increasing share of indebtedness to the multilateral donors and its strong record of compliance with BWI policy prescriptions, Uganda was the first country to qualify for comprehensive debt relief under both the original

(1996) and enhanced (1999) HIPC Initiatives. Despite the BWI's optimism<sup>29</sup>, the Initiatives' aim to bring about Uganda's full debt sustainability and to provide a definitive exit from repeated rescheduling and piecemeal Paris Club relief operations has failed to materialise. Upon reaching the Initiatives' completion points, Uganda was granted debt relief amounting to US\$ 650 million in 1998 and a further US\$ 1.3 billion in 2000, to be delivered over a period of 30 and 20 years, respectively.<sup>30</sup> More than 80 per cent of overall relief was to be provided by the main multilateral creditors, i.e. the IDA, ADB and the IMF.

Graph 6.12 shows the amounts of debt relief actually delivered up to 2003, as a combination of debt rescheduling<sup>31</sup>, forgiveness<sup>32</sup> and reduction.<sup>33</sup> The data show a surge of debt relief in 1998, and to a lesser extent in 2000, upon Uganda reaching its first and second completion points, and relatively little relief in between or since. The considerable amount of debt forgiveness during the year 1998 resulted in both a temporary reduction in arrears outstanding and debt service paid during the subsequent years (Graph 6.6 and Graph 6.11). By the year 2000, the debt service-exports ratio had dropped to 11 per cent, or half its level in 1998. As a result, Uganda's debt repayment capacity remained fairly stable, despite stagnating or falling export revenues. However, by 2002, Uganda's debt sustainability again started to be increasingly undermined by further terms of trade erosion, causing a reversal in the ratio of debt service to exports. Unable to service its debts, Uganda was again left with no choice but to accumulate further arrears (Graph 6.11).

The insufficiency of HIPC relief in the face of Uganda's terms of trade deterioration is most clearly borne out by the balance of payments data. Graph 6.13 shows the actual cash-flow benefits from debt relief operations, as recorded in Uganda's balance of

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<sup>29</sup> The optimistic expectations about Uganda's prospects after HIPC relief were expressed by the IDA and IMF in Uganda's decision and completion point documents. See, for instance, IMF and IDA (1998: 11).

<sup>30</sup> In nominal terms. IMF and IDA (2006b: 10, Table 1).

<sup>31</sup> Total debt forgiven is the amount of principal and interest due or in arrears that was written off or forgiven in any given year.

<sup>32</sup> Total debt rescheduled includes restructurings in the context of the Paris Club, commercial banks, debt-equity swaps, buybacks, and bond exchanges.

<sup>33</sup> Debt stock reductions show the amount that has been netted out of the stock of debt using debt conversion schemes such as buybacks and equity swaps or the discounted value of long-term bonds that were issued in exchange for outstanding debt.

payments. Between 1998 and 2002, yearly BOP relief inflows averaged US\$ 57 million. During the same period, however, Uganda's terms of trade deteriorated by 34 per cent, curtailing Uganda's trade balance by an average of US\$ 131 million each year. Since the negative terms of trade factor was not offset by otherwise favourable developments in Uganda's overall balance of payments, the inadequacy of the HIPC mechanism to provide contingent relief forced the country to rely on additional external finance to cover the BOP gaps. As a result, the accumulation of Uganda's debt stock accelerated again, and by 2002 the HIPC debt stock reductions had already been wiped out by the debt stock increases due to new borrowing.<sup>34</sup> In 2003, the external debt stock exceeded US\$ 4.5 billion, the highest level ever in Uganda's history.

#### **6.2.5 Uganda's balance of payments and external debt – summary conclusions**

From the above exposition of Uganda's recent balance of payments and external debt history, the following conclusions may be drawn:

- Unfavourable terms of trade and an extreme degree of exports volatility have repeatedly undermined Uganda's debt carrying capacity.
- Repeated debt relief initiatives have not solved Uganda's external debt problem, because they have failed to address the country's sources of vulnerability and merely focussed on lowering the repayment schedule instead.
- Substantial amounts of official financial capital inflows, legitimised by Uganda's high performance rankings under the currently applied CPIA-based aid allocation framework, have at times provided the appearance of debt sustainability in terms of debt flows. At the same time, however, the lack of indexation of aid and debt relief provisions to the country's actual debt sustainability determinants have inevitably led to the worsening of debt stocks and the longer-term sustainability prospects.

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<sup>34</sup> It should be noted however, that besides increasing net flows on debt, it was also stock/flow revaluation issues, and in particular changes in cross-currency valuations, that contributed to the rapid hike in Uganda's debt stock evidenced by Graph 6.9.

In light of these considerations, there appears to be considerable scope for improvement in the international donor community's approach to dealing with Uganda's unresolved debt crisis. To what extent such improvement could have ensued from the implementation of the CDSF to the historical context of Uganda during 1988-2002 is analysed next.

### 6.3 Application of the Contingency Debt Sustainability Framework

Building upon the background laid out in the previous sections, we now apply the proposed CDSF accounting methodology and compensatory instruments to the case of Uganda during the period 1988-2002. Our choice of a historical, backward-looking approach allows for a direct comparison between the actual and simulated debt sustainability implications, against the background of Uganda's actual exogenous shock and trend factors. In contrast, forward-looking stochastic simulation exercises would render such comparison less reliable and largely detached from the actual circumstances faced by the country. For, they would necessarily have to rely on assumptions with regard to the simulated frequency and magnitude of future shocks, and also involve conjectures in relation to the likely aid allocation and debt relief implications under the extant framework.

Furthermore, simulation of future balance of payments shocks would require the definition of a suitable model to generate a consistent set of variables explaining Uganda's BOP evolution over time. Since any attempt to define a suitable specification explaining the country-specific direct and indirect effects of the various balance of payments determinants is inevitably fraught with a significant degree of indeterminacy, any such exercise would typically have a wide scope for forecasting errors.<sup>35</sup> However, while the deterministic approach followed here has the advantages of both simplicity and anchorage to Uganda's historically observed vulnerability, it comes at the cost of excluding *a priori* any possibility of assessing the feedback mechanism of the scheme's effects on the country's BOP determinants.<sup>36</sup> With the exception of official development assistance flows, the balance of payments

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<sup>35</sup> For example, see the simple model deployed in Gilbert and Tabova (2005).

<sup>36</sup> For future research, we propose to model these effects in a structuralist CGE framework (see our discussion in Chapter 7).

– and the trade balance in particular – is thus assumed to be entirely unaffected by the effects of the CDSF contingency and debt relief instruments on its key determinants, such as the country's economic growth, export and import flows, FDI, etc.<sup>37</sup>

Nevertheless, the static approach applied in this section is well-suited to the CDSF's emphasis on exogenous factors as the main causation of low-income countries' balance of payments trend deviations, and also offers an ideal evaluation background for the application of the CDSF accounting methodology to Uganda's historical context. With these caveats in mind, the following sections discuss the simulation method in more detail and evaluate the main results.

### 6.3.1 Data sources and computations

The CDSF accounting methodology is implemented in the form of identity (14), Box 5.1 of Chapter 5. All effects are calculated over the time period 1988-2002, for which a consistent and complete set of data is available. The data underlying the computation of the trade balance effects appertaining to categories (I) and (II) are drawn from the online versions<sup>38</sup> of the Balance of Payments Statistics (BOPS) and the International Financial Statistics (IFS) of the IMF, the World Development Indicators (WDI) of the World Bank, the Statistical Database of the Food and Agriculture Organization (FAOSTAT), the Handbook of Statistics (HOS) of UNCTAD, and the World Trade Analyzer (WTA) of Statistics Canada on CD-ROM (STATCAN, 2005 issue). Data for BOP effects belonging to category (III) are drawn from the BOPS, and data on official net transfers are from the World Bank Global Development Finance online database (GDF).

With regard to specific effects, computations involved the following steps:

#### a) Exports of Goods and Services:

Nominal export values are the sum of the BOPS series of goods and services exports. The latter are split into real ( $X_t$ ) and price ( $p_t^x$ ) components on the basis of export price deflators calculated as the ratio of nominal to real export value series of the

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<sup>37</sup> This applies both in terms of the scheme's actual implication in period  $t$  and the expectations relating to its broader BOP implications during future periods  $t+i$ .

<sup>38</sup> Institutional subscribers' subscription, accessed between January and March 2005.



national statistics, drawing from WDI data. Prices are the unit values of overall exports of goods and services, and have been positively checked for correspondence with the unit values available from the HOS database.<sup>39</sup> Trend ( $\bar{X}_t$ ) and hypothetical ( $\hat{X}_t$ ) export volumes are calculated in line with equations (9) and (10) of Chapter 5. The annual growth rate of world demand for Uganda's total exports in any period  $t$ , ( $g_X$ ), is computed as the weighted growth rate of those markets absorbing the bulk of the country's exports. These markets are identified on the basis of WTA data over alternative period averages, depending on the reference periods as applied by the alternative implementation variants described below. For example, Table 6.6 identifies the principal export destinations during the period 1996-2002. It shows that the bulk of Uganda's exports of goods, in nominal value terms, were absorbed by Europe (mainly agricultural exports) and Africa (some agricultural exports for first processing, such as tea and cotton, and virtually all manufactures) and to a lesser extent Asia (mainly frozen fish and animal hides).

**Table 6.6: Uganda Export Destinations 1996-2002**  
(Average Percentage of Total Goods Exports Value)

| Export Item (SITC code)        | Europe | Africa | Asia/Oceania | Total |
|--------------------------------|--------|--------|--------------|-------|
| All Export Commodities (SITC0) | 58     | 24     | 11           | 93    |
| Coffee(0711)                   | 74     | 14     | 7            | 96    |
| Fish (03)                      | 61     | 2      | 30           | 93    |
| Gold, non-monetary (9710)      | 63     | 34     | 1            | 97    |
| Tobacco,unmanufactured (121)   | 81     | 12     | 6            | 99    |
| Tea (0741)                     | 18     | 67     | 14           | 98    |
| Hides, skins (21)              | 18     | 2      | 80           | 99    |
| Electric current (3510)        | 0      | 100    | 0            | 100   |
| Cut flowers and foliage (2927) | 99     | 0      | 0            | 100   |
| Crude animal materials (291)   | 29     | 0      | 70           | 99    |
| Cotton (263)                   | 37     | 40     | 18           | 96    |

Source: World Trade Analyzer, STATCAN, CD-ROM (2005); author's own calculations.

Together, these three regions absorbed more than 90 per cent of Uganda's exports, while exports to any other single region were mostly irrelevant. Having identified the relevant markets for Uganda's exports, total growth in world demand for Ugandan exports is proxied by the weighted average of European, African and Asian demand

<sup>39</sup> In contrast to the series derived from WDI data, the HOS data for Uganda are not available for the entire period of analysis.

for agricultural commodities, and African demand for manufactured goods. More specifically, the real import growth rates in the agricultural and manufactured goods markets are calculated on the basis of available volume data, and weighted for relative importance to Uganda's overall exports value. Among the public sources available, FAOSTAT contains the most comprehensive data on real imports (metric tonnes) relating to European, African and Asian demand for green coffee, tobacco leaves, tea, hides and skins, and fish. In addition, growth in African demand for manufactures is computed as the ratio of merchandise imports to total imports to the region, drawing from WDI data. Appendix A6.2 describes the basic computation results.

b) Imports of Goods and Services:

Similarly to the case of exports, nominal data on import values are drawn from Uganda's annual IMF-BOPS, and divided into price ( $p_i^m$ ) and real ( $M_i$ ) components on the basis of the implicit import price deflator calculated from WDI data. Trend ( $\bar{M}_i$ ) and hypothetical ( $\hat{M}_i$ ) import volumes are calculated in line with equations (11) and (12) of chapter 5, assuming real GDP growth and income elasticity as the determinants of import growth. The real GDP growth rate is calculated from WDI data, while income elasticity is estimated by simple OLS regression of the natural logarithm of imports on the natural logarithm of GDP. Alternative specifications, e.g. by including official grants as an additional regressor, are reported in Appendix A6.3. Overall, the regression results lead to the adoption of Uganda's import elasticity at unit value as our best estimate for CDSF import growth computations.<sup>40</sup>

c) Other effects

Category (III) items of identity (14) are calculated as deviations from moving average. Effect ( $m$ ) includes official grants and debt forgiveness, as recorded in the BOPS. Effect ( $n$ ) includes workers' remittances and non-governmental current transfers of the current account. Effect ( $o$ ) is calculated as net FDI and portfolio inflows to Uganda, net of profit remittances on FDI. Effect ( $p$ ) is based on yearly changes in net

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<sup>40</sup> Our unit value estimate of import elasticity is broadly in line with the IMF's. Indeed, in its final Uganda DSA analysis underlying the HIPC Initiative, the IMF assumes the country's import elasticity to be of unit value between 1997 and 1998, and to take a value of 0.95 thereafter (IMF and IDA 1997: 4).

international reserve holdings. Effect (o) is computed as a residual, after accounting for all the other balance of payments flows, and also includes the BOP net errors and omissions.

### 6.3.2 On the choice between alternative implementation variants

The simulation analysis underlying this study has involved a number of alternative specifications of the CDSF accounting mechanism, which mainly differed in the definition of reference periods underlying trend calculations. Among the two variants reported here<sup>41</sup>, the first involves the definition of ad-hoc base years for the calculation of trend and hypothetical values over several subsequent periods. It is presented here mainly for the purpose of demonstrating the accounting methodology's sensitivity to the choice of specific base years. The second, more favoured, possibility for implementing the CDSF relies instead on trend values calculated as moving averages for all the effects in each single period, thus avoiding the inertia associated with relating balance of payments trends to a specific base year over a longer time.

To see the complications involved in the first approach, we refer back to the illustration of actual, trend and hypothetical export volumes in Graph 5.1, Chapter 5. Similarly to the exemplification of Graph 5.1, it could be envisaged that CDSF accounting be anchored onto a specific set of reference values observed at the base period, and then applied over a certain number of subsequent periods in relation to the same base.<sup>42</sup> For example, a LIC's contingent balance of payments effects and policy performance during subsequent periods  $t+1+i$  could be monitored against the specific benchmarks set in period  $t$ , such as the average export volume observed during the period  $t-i$  (where  $i=0,1,2,\dots,n$ ). However, in order to be feasible within the CDSF context, the shared perception of such a simple approach by the parties involved would have to be that the trend reference values typify some sort of

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<sup>41</sup> Only two out of the six simulations are discussed in this chapter. A full set of simulation results and generating codes in Stata 9 format can be made available upon request.

<sup>42</sup> In this respect, the time-frame of the CDSF would be similar to that underlying the current practice of assessing country performance with reference to indicator variables. For example, the HIPC Initiative's country performance assessment observes the evolution of CPIA and debt indicators between the decision and completion points, and the IMF PRGF conducts detailed assessments based on implementation and outcome indicators during the three-year arrangements.

equilibrium values of a LIC's balance of payment flows. These reference values, in turn, would need to be considered as the expression of a broader concept of equilibrium relating to the debtor's economy, including GDP growth, inflation, real exchange rate and the other BOP determinants. Of course, an accurate identification of such equilibrium benchmarks on the basis of historical BOP observations at any point in time would have to rely on a set of assumptions derived from largely subjective forecasts and trend conjectures in relation to the equilibrium values of an LIC's key BOP determinants over the whole period relevant to analysis. However, in contrast to the simple deterministic approach, this would require the inclusion of benchmark revision clauses in the underlying CDSF contract, in order to avoid disagreements among the parties in relation to disputed benchmarks undermining the determination for automatic compensation of contingent effects. Ultimately, the negotiation complexities of any benchmark adjustment mechanism would be likely to hold up compensation and undermine the ex-ante nature of the CDSF, hence the effectiveness of the entire scheme.

In sum, if a simple deterministic definition of BOP benchmark trend values is to be preferred over benchmark negotiations in the context of the CDSF, then it follows that such trend values need to be defined as self-adjusting measures of a country's BOP trend variation in each period. In contrast, the assessment of BOP effects over several subsequent periods on the grounds of non-negotiable benchmarks relating to a specific base year is bound to introduce a cumulative bias in the estimates of the scheme, with the potential for undermining its feasibility. Indeed, the limits of such an approach are evident from our application to the case of Uganda.

### **6.3.3 Indexing to ad-hoc base year benchmarks**

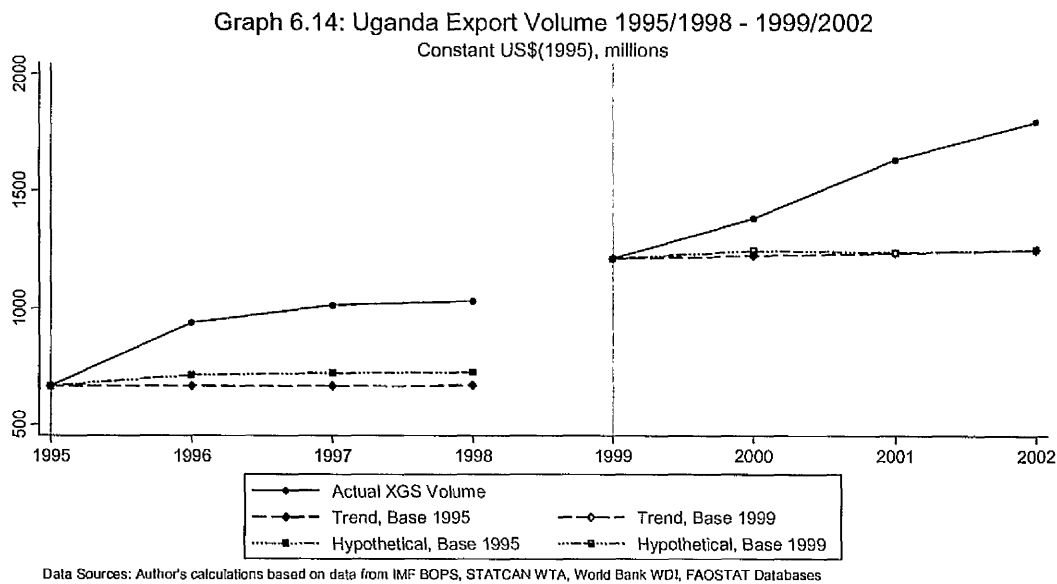
Consider, for example, 1995 as the base year arbitrarily chosen to gauge the BOP and external debt situation of Uganda prior the introduction of the HIPC Initiative, and 1999 as the base year corresponding to the country's qualification for increased debt relief under the enhanced HIPC Initiative.<sup>43</sup> The CDSF accounting method is

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<sup>43</sup> For the sake of consistency with setting 1995 as the base year in relation to the original HIPC Initiative, we would have preferred the year 1998, instead of 1999, as the base year relating to Uganda's qualification for enhanced HIPC relief. However, since the BOPS data underlying computations are inconsistent during the period before and after 1998 (see Appendix A6.1), this led to the choice of 1999 as

implemented over the three periods subsequent to base years 1995 and 1999, with trend values of effects (i.e. the benchmarks) computed as three-year averages observed in the base year. With regard to exports, for example, the benchmark volume in the base year 1995 reflects average real export flows during 1993-1995, against which actual and hypothetical export volumes during 1996-1998 are assessed, according to identities (9) and (10) of Chapter 5.

Graph 6.14 illustrates the simulation results relating to Uganda's aggregated exports of goods and services, in real terms. In both simulation periods, actual export volume is shown to widely outperform trend exports. For, the latter are based on average growth in world demand for Ugandan exports, which amounted to only 0.7 and 1.0 per cent in the three years up to 1995 and 1999, respectively.<sup>44</sup> The vertical distance between actual and trend exports expresses the proportion of Uganda's real exports that was not expected on the basis of past trend growth rates in world demand. In contrast, hypothetical export volumes are calculated as cumulative growth rates of world demand in the periods 1996-1998 and 2000-2002. In either case, the difference



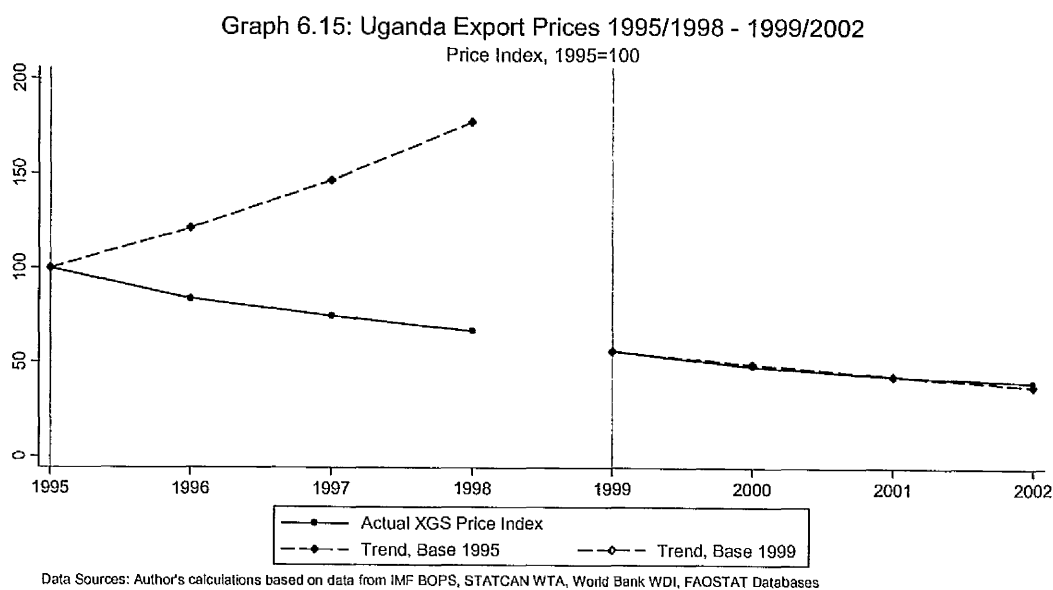
between trend and hypothetical exports is small; the largest difference is accounted for by a 7.1 per cent increase of world demand in 1996 (see Appendix A6.2). The

the second base period for reasons of better data consistency. For the purpose of the subsequent discussions, the change of base year is of minor importance.

<sup>44</sup> Detailed data on yearly growth rates in world demand are listed in Appendix A6.2.

vertical distance between actual and hypothetical exports represents the proportion of real exports that is not explained by changes in the actual growth rates of world demand over the periods of observation. In terms of the CDSF accounting framework, this difference is ascribed to volume effects ensuing from factors internal to Uganda's economy, be they the result of deliberate policy measures or positive output shocks. However, it should be noted that the widening gap between actual, trend and hypothetical volume measures in Graph 6.14 mainly reflects the shortcomings from applying the same benchmark years to a number of subsequent periods. Thereby, a significant departure from trend values during earlier periods, for example in 1996, leads to a cumulative gap which over-estimates the trend deviations during subsequent periods. While such accounting flaws would clearly undermine the effectiveness of CDSF compensation, it will be demonstrated below that the CDSF method is accurate when deviations from trend and hypothetical values are calculated on the basis of moving averages.<sup>45</sup>

The sensitivity of simulation results to the choice of base year is particularly striking when seen in terms of Uganda's export price evolution, displayed in Graph 6.15.



<sup>45</sup> However, it should be noted that in contrast to trend deviations per se, the CDSF estimations of price shock effects are only indirectly affected by the price components of trend deviations (e.g. effect (d) of identity (14) in relation to exports). Therefore, the bias would mostly affect the debt relief mechanism of the CDSF, and only marginally increase the aid allocation effects through the contingent credit line.

Since it overlaps with the peak of the commodity price cycle, the benchmark set in 1995 remains in stark contrast to the actual trend reversal during 1996-1998. The assessment of BOP effects on the basis of trend values prevailing in 1995 would thus lead to a severe overestimation of price shock effects as the result of a cumulative bias in the assessment benchmarks. In contrast, the simulation period 1999-2002 displays a remarkable correspondence between trend expectations and actual prices. However, such correspondence is coincidental, due to the relatively constant rate of decline in Uganda's export price index during 1995-2002 and thus including the base year 1999.<sup>46</sup>

As expected, a CDSF centred on *ad hoc* reference periods appears to be largely unsuitable for a country characterised by sudden trend reversals and a pronounced volatility of trade prices and volumes. Nevertheless, the first results from this analysis provide a valuable insight into the basic working and operational limits of the accounting mechanism underlying the CDSF.

#### 6.3.4 Continuous indexing to moving averages of BOP flows

The most relevant application variant of the CDSF accounting method is reflected in the set of simulations based on 'continuous indexing' of BOP items. Similarly to the above approach, this involves the calculation of BOP effects along identity (14) of Chapter (5), but in relation to moving average trend values updated in each period  $t$ . More precisely, we implement the CDSF over the entire period 1988-2002, by computing the BOP effects as each period's trend deviations from the moving average, and then simulating the implications of the contingency instruments. Moving averages were initially chosen to alternatively range from six years (MA6) to one year (MA1) prior to the period of observation. While preliminary simulation results have shown quantitative differences between alternative lengths of moving averages, we observed them to be relatively small and generally not to affect the qualitative conclusions from the analysis. However, the exact duration of moving averages in the context of the CDSF remains largely a matter of judgement, mainly in relation to the duration of economic cycles, including of world demand and

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<sup>46</sup> As much as the discrepancy introduced by the choice of base year 1995 is a coincidence relating to its overlap with the peak year of the export price cycle.

commodity prices.<sup>47</sup> In the context of the present discussion, we opt to present and evaluate in detail only the results relating to the adoption of year-to-year (MA1) deviations in the calculation of BOP flows deviations, and of three-year moving averages in the computation of world demand, GDP and price factors underlying the calculation of trade balance effects. The main advantage of this approach lies in its affinity with the simplest conception of the CDSF, where each assessment period  $t$  can be viewed as overlapping with the annual consolidation of the country's balance of data accounts. Furthermore, it facilitates the interpretation of results, which yield the percentage contribution of single effects to yearly changes in Uganda's balance of payments and net official transfers.<sup>48</sup> Finally, the choice of three-year averages for world demand and GDP in the calculations of trend and hypothetical import and export values allows for uniformity with the MA3 averages applied to price deviations, and is acceptably close to the average half-life duration of world business cycles.<sup>49</sup>

Tables 6.7 shows all the relevant balance of payment effects calculated under the assumptions specified in the previous paragraph. Table 6.8 summarises the same results as a percentage of overall BOP effects, instead of nominal US dollars. The results are ordered along the three CDSF categories of effects, which are now discussed in turn.

#### Export Volume and Price Effects

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<sup>47</sup> An estimation of the average duration of commodity price cycles in the case of Uganda during the period of observation is beyond the scope of this study. A relevant indication regarding the average duration of price cycles involving sub-Saharan African countries is derived from a series of studies conducted by Paul Cashin and his IMF co-authors (see Cashin et al. 2000, 2001, 2002, 2004). According to these studies, the average duration of price booms is 3.6 years, and that of price slumps is 4.2 years. However, they also find that, similarly to a number of other countries in the region, Uganda's price shocks tend to be of permanent nature.

<sup>48</sup> Alternatively, the percentage changes would have to be thought of in terms of deviations from longer-term trends, for example MA3.

<sup>49</sup> The IMF and NBER generally estimate average duration to be less than four years. See, for example, the discussion in chapter III of the World Economic Outlook (IMF, 2002). Further, note that the World Bank adopts four-year moving averages in its simulations of indexed debt mechanisms, discussed in Chapter 4 above, but without specifying the rationale underlying this choice. However, the differences in CDSF simulation results between MA4 and MA3 averages was of insignificant magnitude (the report of MA4 results is available upon request).



**Table 6.7: Uganda – Balance of Payments Effects, Millions of U.S. Dollars, 1988-2002**

| Year                                     | 1988-2002 |       |        |        |        |        |        |        |        |       |        |        |        |        |        |       |       |
|--|-----------|-------|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|-------|-------|
|  | 1988      | 1989  | 1990   | 1991   | 1992   | 1993   | 1994   | 1995   | 1996   | 1997  | 1998   | 1999   | 2000   | 2001   | 2002   | Mean  | S.D.  |
| Deviation in Net Transfers               | -257.2    | 137.3 | 50.2   | -107.0 | 74.7   | 60.2   | -84.0  | -16.3  | -14.7  | 50.2  | -119.6 | 7.5    | 77.9   | 148.9  | -211.4 | -13.6 | 120.3 |
| <b>Total Exogenous Effects</b>           | 181.7     | 0.2   | -87.1  | -22.6  | -16.9  | 49.4   | -63.0  | -193.3 | -39.1  | -21.3 | 103.9  | 151.8  | 247.7  | 250.8  | 116.0  | 43.9  | 128.1 |
| (a) Volume Change in Exports Demand      | 6.5       | -2.6  | -1.2   | 10.3   | -11.0  | 14.6   | -44.8  | 63.6   | -46.5  | 20.6  | 8.2    | 16.1   | -21.1  | 27.6   | 4.9    | 3.0   | 27.5  |
| (b) Price Effect of (a)                  | 2.8       | -0.4  | 0.2    | -3.3   | 4.5    | -6.3   | 15.2   | 0.0    | 7.5    | -5.2  | -2.7   | -7.1   | 10.9   | -15.8  | -2.9   | -0.2  | 7.7   |
| (c) Terms of Trade Effect                | 150.2     | 1.3   | -97.6  | -75.2  | -9.6   | 15.0   | -22.8  | -299.2 | 22.8   | -36.5 | 97.7   | 103.4  | 235.0  | 202.9  | 103.2  | 26.0  | 132.8 |
| (d) Price Trend Deviation of (g)         | -1.9      | 17.6  | -17.1  | 31.5   | 4.1    | 28.2   | -10.9  | 37.4   | -21.4  | 5.4   | 2.5    | 31.9   | 24.2   | 36.1   | 14.1   | 12.1  | 19.5  |
| (e) Price Trend Deviation of (i)         | 13.8      | -14.4 | 29.4   | 11.9   | -7.2   | -1.3   | 0.4    | 3.7    | -1.7   | -9.9  | -5.3   | 9.4    | -1.3   | 0.0    | -3.0   | 1.6   | 10.9  |
| (f) Price Trend Deviation of (k)         | 10.4      | -1.4  | -0.8   | 2.2    | 2.3    | -0.8   | 0.0    | 1.3    | 0.2    | 4.3   | 3.5    | -1.9   | -0.1   | -0.1   | -0.2   | 1.3   | 3.1   |
| <b>Total Mixed Effects</b>               | 132.3     | 103.1 | -80.9  | -148.7 | 26.6   | -93.6  | 187.5  | 306.5  | -195.1 | 29.4  | 23.4   | -250.1 | -215.9 | -151.5 | 26.0   | -20.1 | 160.7 |
| (g) Internal Change in Exports Volume    | 27.5      | -51.2 | 30.4   | -71.1  | -14.6  | -216.6 | -236.5 | 95.3   | -224.5 | -64.1 | -13.1  | -167.9 | -135.8 | -256.1 | -150.5 | -96.6 | 110.6 |
| (h) Price Trend Effect of (g)            | 13.6      | -24.9 | 11.3   | -8.9   | 1.8    | 65.8   | 91.1   | -37.4  | 57.9   | 10.7  | 1.8    | 41.8   | 46.3   | 110.3  | 76.8   | 30.5  | 43.5  |
| (i) Internal Change in Imports Volume    | 45.0      | 121.6 | -88.4  | -45.9  | 52.2   | 34.8   | 332.8  | 188.4  | -32.7  | 144.4 | 102.7  | -159.6 | -128.0 | 9.2    | 99.4   | 45.1  | 128.4 |
| (j) Price Trend Effect of (i)            | 7.1       | 42.1  | -37.6  | -12.0  | 5.6    | 0.8    | -4.7   | -3.7   | 0.3    | 1.5   | -0.5   | 3.7    | 8.4    | -0.6   | -6.6   | 0.3   | 16.0  |
| (k) Import Volume Effect of GDP          | 33.8      | 11.5  | 2.3    | -8.5   | -16.6  | 21.2   | 4.8    | 65.2   | 4.0    | -62.4 | -67.9  | 32.6   | -7.3   | -15.2  | 7.4    | 0.3   | 34.1  |
| (l) Price Trend Effect of (k)            | 5.3       | 4.0   | 1.0    | -2.2   | -1.8   | 0.5    | -0.1   | -1.3   | 0.0    | -0.6  | 0.3    | -0.8   | 0.5    | 1.0    | -0.5   | 0.4   | 2.0   |
| <b>Total Non-Debt Financial Effects</b>  | -571.2    | 34.0  | 218.2  | 64.3   | 65.0   | 104.4  | -208.5 | -129.5 | 219.5  | 42.1  | -246.9 | 105.8  | 46.1   | 49.5   | -353.4 | -37.4 | 221.2 |
| (m) Deviation in Grants                  | -56.2     | 10.8  | 18.6   | 67.4   | -35.6  | -239.9 | 209.4  | -56.4  | 0.1    | 38.7  | -89.6  | -64.1  | -73.3  | 55.4   | -7.1   | -14.8 | 97.4  |
| (n) Deviation in Remittances             | 0.0       | 0.0   | 0.0    | -103.4 | -103.9 | 123.2  | -170.6 | -84.8  | -89.4  | 52.6  | -127.8 | 358.6  | 113.1  | -120.4 | -82.7  | -15.7 | 136.0 |
| (o) Deviation in FDI                     | 4.5       | 0.0   | 0.0    | -1.0   | -2.0   | -33.7  | -31.0  | 6.1    | -33.2  | -70.0 | -28.8  | 70.1   | -18.1  | 55.8   | -36.2  | -7.8  | 35.6  |
| (p) Deviation in Reserves Holdings       | -22.6     | 0.0   | -9.3   | 21.1   | 42.3   | -2.5   | 117.6  | -26.8  | -71.2  | 31.9  | -8.5   | -51.9  | 3.3    | 117.9  | -262.8 | -8.1  | 87.9  |
| (q) Deviation in Other Flows             | -496.9    | 23.2  | 208.9  | 80.2   | 164.2  | 257.3  | -333.9 | 32.4   | 413.1  | -11.1 | 7.8    | -206.9 | 21.1   | -59.2  | 35.3   | 9.0   | 226.9 |
| <b>Memo: Total Trade Balance Effects</b> | 314.0     | 103.3 | -168.0 | -171.3 | 9.7    | -44.2  | 124.5  | 113.2  | -234.2 | 8.1   | 127.3  | -98.3  | 31.8   | 99.4   | 142.0  | 23.8  | 146.5 |
| Total Exports Effects (Goods & Serv.)    | 64.0      | 3.8   | 163.5  | 57.2   | 65.8   | -73.2  | -209.7 | -164.3 | -290.5 | 49.5  | 196.5  | 116.0  | 142.8  | 99.7   | 96.3   | 21.2  | 143.1 |
| Total Imports Effects (Goods & Serv.)    | 250.0     | 99.4  | -331.5 | -228.5 | -56.2  | 29.0   | 334.3  | 277.5  | 56.3   | -41.4 | -69.1  | -214.3 | -111.0 | -0.3   | 45.7   | 2.7   | 188.4 |

Note: (-) sign denotes a net debt detracting effect, (+) sign indicates an increasing effect on Net Transfers

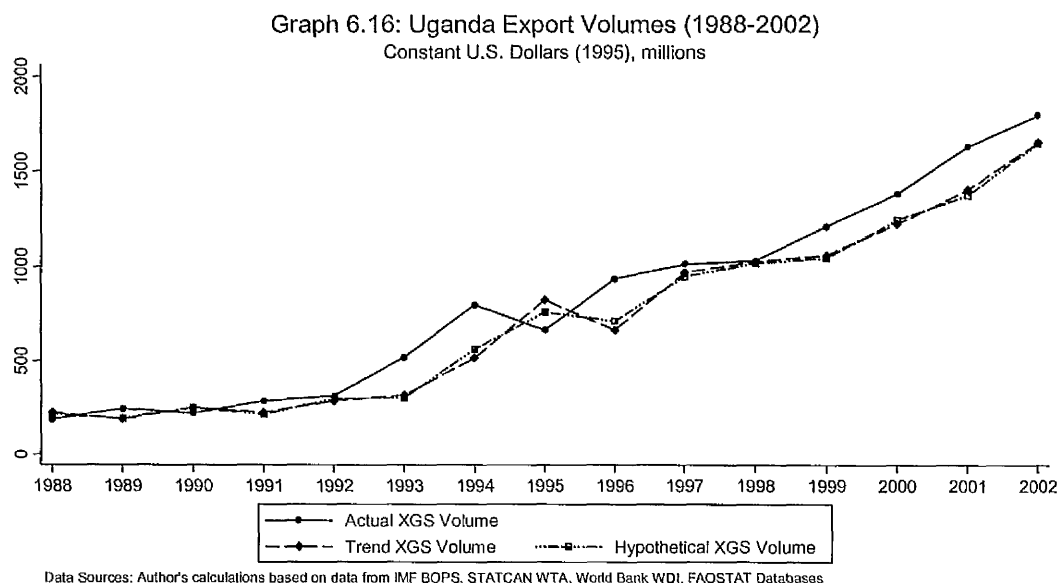
Data sources and calculation method: see Section 6.3.1

**Table 6.8: Uganda – Balance of Payments Effects, As Percentage of Total Effects, 1988-2002**

|   | 1988-2002 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |
|---|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Year  | 1988      | 1989  | 1990  | 1991  | 1992  | 1993  | 1994  | 1995  | 1996  | 1997  | 1998  | 1999  | 2000  | 2001  | 2002  | Mean  | S.D. |
| <b>Deviation in Net Transfers</b>             | -28.6     | 42.0  | 9.1   | -19.2 | 15.6  | 5.7   | -5.2  | -1.6  | -1.4  | 8.8   | -21.0 | 0.6   | 9.2   | 13.7  | -23.7 | 0.3   | 18.3 |
| <b>(I) Total Exogenous Effects</b>            | 20.2      | 0.0   | -15.7 | -4.1  | -3.5  | 4.6   | -3.9  | -19.3 | -3.8  | -3.7  | 18.3  | 11.4  | 29.2  | 23.2  | 13.0  | 4.4   | 14.3 |
| (a) Volume Change in Exports Demand           | 0.7       | -0.8  | -0.2  | 1.8   | -2.3  | 1.4   | -2.8  | 6.3   | -4.5  | 3.6   | 1.4   | 1.2   | -2.5  | 2.6   | 0.5   | 0.4   | 2.8  |
| (b) Price Effect of (a)                       | 0.3       | -0.1  | 0.0   | -0.6  | 0.9   | -0.6  | 0.9   | 0.0   | 0.7   | -0.9  | -0.5  | -0.5  | 1.3   | -1.5  | -0.3  | -0.1  | 0.8  |
| (c) Terms of Trade Effect                     | 16.7      | 0.4   | -17.6 | -13.5 | -2.0  | 1.4   | -1.4  | -29.8 | 2.2   | -6.4  | 17.2  | 7.8   | 27.7  | 18.7  | 11.6  | 2.2   | 15.2 |
| (d) Price Trend Deviation of (g)              | -0.2      | 5.4   | -3.1  | 5.7   | 0.9   | 2.7   | -0.7  | 3.7   | -2.1  | 1.0   | 0.4   | 2.4   | 2.9   | 3.3   | 1.6   | 1.6   | 2.5  |
| (e) Price Trend Deviation of (f)              | 1.5       | -4.4  | 5.3   | 2.1   | -1.5  | -0.1  | 0.0   | 0.4   | -0.2  | -1.7  | -0.9  | 0.7   | -0.2  | 0.0   | -0.3  | 0.0   | 2.1  |
| (f) Price Trend Deviation of (k)              | 1.2       | -0.4  | -0.1  | 0.4   | 0.5   | -0.1  | 0.0   | 0.1   | 0.0   | 0.7   | 0.6   | -0.1  | 0.0   | 0.0   | 0.0   | 0.2   | 0.4  |
| <b>(II) Total Mixed Effects</b>               | 14.7      | 31.5  | -14.6 | -26.7 | 5.6   | -8.8  | 11.5  | 30.6  | -19.0 | 5.2   | 4.1   | -18.8 | -25.5 | -14.0 | 2.9   | -1.4  | 18.7 |
| (g) Internal Change in Exports Volume         | 3.1       | -15.7 | 5.5   | -12.8 | -3.1  | -20.4 | -14.5 | 9.5   | -21.9 | -11.2 | -2.3  | -12.6 | -16.0 | -23.6 | -16.8 | -10.2 | 10.3 |
| (h) Price Trend Effect of (g)                 | 1.5       | -7.6  | 2.0   | -1.6  | 0.4   | 6.2   | 5.6   | -3.7  | 5.6   | 1.9   | 0.3   | 3.1   | 5.5   | 10.2  | 8.6   | 2.5   | 4.7  |
| (i) Internal Change in Imports Volume         | 5.0       | 37.2  | -15.9 | -8.3  | 10.9  | 3.3   | 20.5  | 18.8  | -3.2  | 25.3  | 18.1  | -12.0 | -15.1 | 0.8   | 11.1  | 6.4   | 15.8 |
| (j) Price Trend Effect of (i)                 | 0.8       | 12.9  | -6.8  | -2.2  | 1.2   | 0.1   | -0.3  | -0.4  | 0.0   | 0.3   | -0.1  | 0.3   | 1.0   | -0.1  | -0.7  | 0.4   | 4.0  |
| (k) Import Volume Effect of GDP               | 3.8       | 3.5   | 0.4   | -1.5  | -3.5  | 2.0   | 0.3   | 6.5   | 0.4   | -10.9 | -11.9 | 2.5   | -0.9  | -1.4  | 0.8   | -0.7  | 5.0  |
| (l) Price Trend Effect of (k)                 | 0.6       | 1.2   | 0.2   | -0.4  | -0.4  | 0.0   | 0.0   | -0.1  | 0.0   | -0.1  | 0.1   | -0.1  | 0.1   | 0.1   | -0.1  | 0.1   | 0.4  |
| <b>(III) Total Non-Debt Financial Effects</b> | -63.6     | 10.4  | 39.4  | 11.6  | 13.6  | 9.8   | -12.8 | -12.9 | 21.4  | 7.4   | -43.4 | 8.0   | 5.4   | 4.6   | -39.5 | -2.7  | 27.3 |
| (m) Deviation in Grants                       | -6.3      | 3.3   | 3.4   | 12.1  | -7.4  | -22.6 | 12.9  | -5.6  | 0.0   | 6.8   | -15.8 | -4.8  | -8.6  | 5.1   | -0.8  | -1.9  | 9.8  |
| (n) Deviation in Remittances                  | 0.0       | 0.0   | 0.0   | -18.6 | -21.7 | 11.6  | -10.5 | -8.5  | -8.7  | 9.2   | -22.5 | 27.0  | 13.3  | -11.1 | -9.3  | -3.3  | 14.0 |
| (o) Deviation in FDI                          | 0.5       | 0.0   | 0.0   | -0.2  | -0.4  | -3.2  | -1.9  | 0.6   | -3.2  | -12.3 | -5.1  | 5.3   | -2.1  | 5.2   | -4.0  | -1.4  | 4.2  |
| (p) Deviation in Reserves Holdings            | -2.5      | 0.0   | -1.7  | 3.8   | 8.8   | -0.2  | 7.2   | -2.7  | -6.9  | 5.6   | -1.5  | -3.9  | 0.4   | 10.9  | -29.4 | -0.8  | 9.4  |
| (q) Deviation in Other Flows                  | -55.3     | 7.1   | 37.7  | 14.4  | 34.3  | 24.2  | -20.5 | 3.2   | 40.2  | -1.9  | 1.4   | -15.6 | 2.5   | -5.5  | 4.0   | 4.7   | 24.7 |
| <b>Memo: Total Trade Balance Effects</b>      | 35.0      | 31.6  | -30.3 | -30.8 | 2.0   | -4.2  | 7.7   | 11.3  | -22.8 | 1.4   | 22.4  | -7.4  | 3.8   | 9.2   | 15.9  | 3.0   | 20.0 |
| Total Exports Effects (Goods & Serv.)         | 7.1       | 1.2   | 29.5  | 10.3  | 13.7  | -6.9  | -12.9 | -16.4 | -28.3 | 8.7   | 34.5  | 8.7   | 16.8  | 9.2   | 10.8  | 5.7   | 16.5 |
| Total Imports Effects (Goods & Serv.)         | 27.8      | 30.4  | -59.8 | -41.1 | -11.7 | 2.7   | 20.5  | 27.7  | 5.5   | -7.3  | -12.2 | -16.1 | -13.1 | 0.0   | 5.1   | -2.8  | 25.2 |

Note: (-) sign denotes a net debt detracting effect, (+) sign indicates an increasing effect on Net Transfers  
Data sources and calculation method: see Section 6.3.1

Graph 6.16 shows actual exports to generally outstrip hypothetical and trend values, with all series in differences following a steep upward sloping trend since the early 1990s. The apparently close correspondence between trend and hypothetical values is



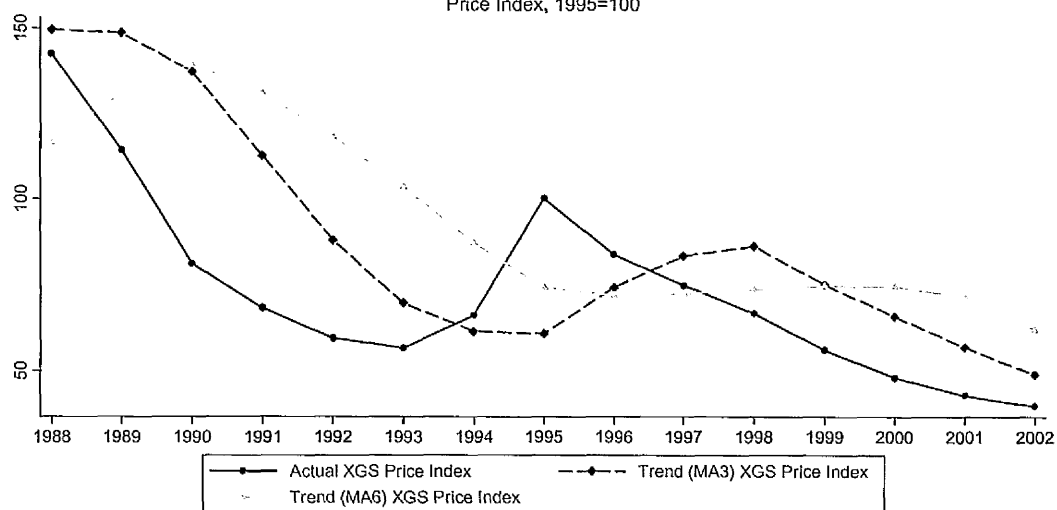
explained by the relatively low scale factor of differences between actual growth rates in world demand for Ugandan exports against three-year averages. However, in terms of CDSF accounting, Table 6.8 shows this difference – item (a) – to count as a highly volatile and relevant exogenous BOP effect, ranging from -4.5 to 6.3 per cent in terms of overall BOP deviations during 1988-2002. Nevertheless, on average, volume changes in export demand over the whole period of observation are shown to have added only US\$ 3 million to Uganda's yearly ex-post demand for official financing, which explains only 0.4 per cent of the demand for official finance.

More significant, in both absolute and relative terms, would appear to have been the difference between Uganda's actual and hypothetical exports. For, with the exception of the years 1990 and 1995, actual exports consistently outstripped export growth explained by changes in world demand, thus reflecting Uganda's increasing export capacity of traditional crops, combined with the introduction of non-traditional agricultural exports since the mid-1990s.<sup>50</sup> In line with the CDSF categorisation of effects, this so-called 'internal change in exports volume' is grouped under the mixed

<sup>50</sup> For a brief outline of Uganda's export diversification performance over time, see section 6.2.2 of this chapter.

endogenous-exogenous effects, category (II), and is shown to have accounted for a sizeable 10.2 per cent detraction in Uganda's average yearly requirement for concessional loans (item (g), table 6.8). The standard deviation of 10.3 per cent during 1988-2002 also shows a significant variability in yearly export differentials, reflecting a high incidence of policy effects and/or real shocks to Uganda's export sectors.<sup>51</sup> However, by treating real output deviations as mixed effects that do not qualify for compensatory measures by any of the CDSF instruments, the accounting methodology avoids the burden of assessing the information necessary to further disentangle the internal exports volume effects. Instead, item (d) of the BOP effects extrapolates the price trend deviation component of changes in exports volumes, as part of the total exogenous effects. As a measure of the debt-inducing effect of price shocks around trend in relation to export volumes, tables 6.7 and 6.8 show effect (d) to have mostly taken a positive sign during 1988-2002, reaching high peaks in single years around an average 1.6 per cent increase in net transfers. It can be seen, for example, that in 1991 alone the price shock effect neutralised almost half of the debt-deducting effect of Uganda's efforts to increase export volumes.

Graph 6.17: Uganda Export Prices (1988-2002)  
Price Index, 1995=100

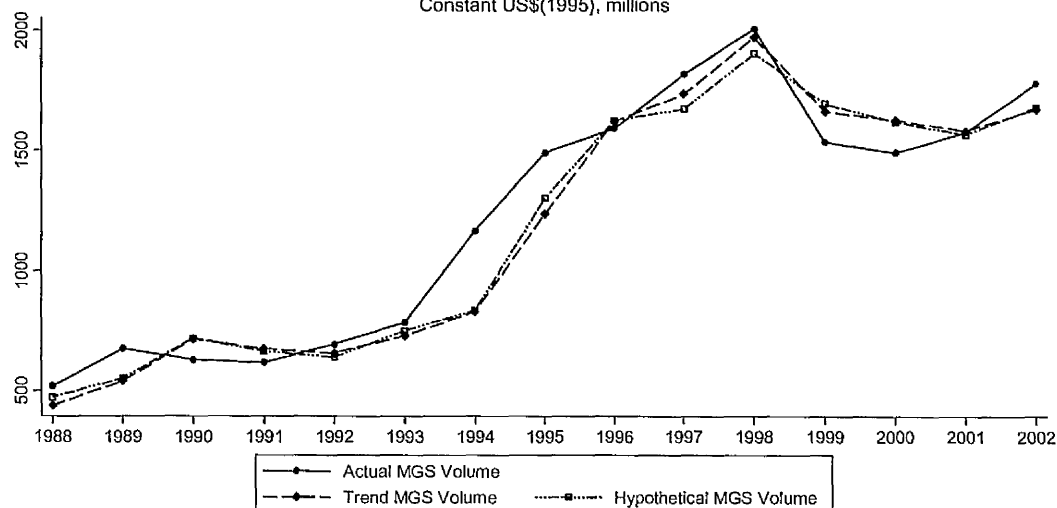


Data Sources: Author's calculations based World Bank WDI Database

<sup>51</sup> For example, the 1995 kink in real exports is likely to have been determined by both changes in stock-management under the expectation of further price increases, and by the onset of the output effects of the severe droughts during 1995-1997. Similarly, the relative decline in export growth against trend values in 1998 at least in part reflects the output effects of the torrential rainfalls associated with the *El Niño* phenomenon during 1997-1998. On the effects of these climatic disasters, see Ndikumana et al. (2002).

Graph 6.17 shows the time pattern of export prices against moving average trends. In addition to the three-year moving average underlying the results presented here, the graph shows the sensitivity of the moving average to alternative choices of range. For example, the indexation to six-year moving averages would lead to a sharp increase in price deviations relating to the early 1990s and 2000s. More generally, longer-term moving averages better reflect the price trend over the entire period of observation, but also have an increasing effect on price deviations in the years between relative peak levels. Or, in other words, longer averages tend to have an increasing effect on single years' shock measures, and a lowering effect on single years' trend measures.<sup>52</sup> However, regardless of the choice of moving average, it can be observed that Uganda's declining export price trend has led to a persistent shortfall of actual prices against trend, with the exception of the temporary price hump around 1995. Therefore, Uganda's export price trend effect – item (h) in tables 6.7 and 6.8 – mostly takes a positive sign over the years, and also takes on large magnitudes indicating a generally strongly debt-inducing effect (as high as 10 per cent in 2001).

Graph 6.18: Uganda Import Volumes (1988-2002)  
Constant US\$(1995), millions



Data Sources: Author's calculations based on data from IMF BOPS, STATCAN WTA, World Bank WDI, FAOSTAT Databases

### Imports Volume and Price Effects

Similarly to the case of exports, items (e) and (f) capture the exogenous effects – while items (i), (j), (k) and (l) measure the mixed effects – relating to Uganda's imports.

<sup>52</sup> In the context of the CDSF, this will affect the relative incidence of the continent credit line and debt relief instruments.

Graph 6.18 displays Ugandan import series, which are shown to have been following a steeply increasing trend during most of the 1990s, and then again from 2000 onwards. It should be noted that the apparent downward kink in actual imports between 1998 and 1999 partly reflects the above mentioned change in the accounting method underlying the BOPS data, which however has been duly taken into account in the computation of effects.

Interestingly, Uganda's actual real imports clearly fell short of both trend and hypothetical values during 1999-2000, pointing towards strong internal forces curtailing the country's imports. Again, it should be emphasised that the CDSF accounting framework treats such deviations as mixed effects, to avoid the risk that the intrinsic indeterminacy underlying the exact cause of variation in import volume could unduly affect the compensation operated by the CDSF instruments. Nevertheless, from a purely analytical perspective, the sheer magnitudes of item (i) during 1999 and 2000 – between 12 and 15 per cent of overall BOP effects (see Table 6.8) – seems to provide some evidence of a strong import crunch determined by a significant deterioration in Uganda's balance of payments, caused by declining terms of trade (item c) and sharp shortfalls in private remittances (item n), as corroborated by the events reported in the Bank of Uganda quarterly and annual reports. Considering the relatively stable supply of official grants and loans during 1999 and 2000, these years would thus appear to offer a striking case exemplifying the main shortcomings of the extant aid allocation mechanism in the case of Uganda, particularly with regard to its unresponsiveness to the occurrence of adverse exogenous shocks. Tables 6.7 and 6.8 show that, instead of countering the shock, a decline in net transfers (positive sign) wiped out most of the increase in official grants (negative sign). The burden of BOP adjustment thus fell mostly on real exports, which expanded by about 12 per cent between 1999 and 2000, while real import contracted by about 15 per cent.<sup>53</sup> In contrast, the simulation results presented below demonstrate that the existence of the CDSF would have brought a significant cash

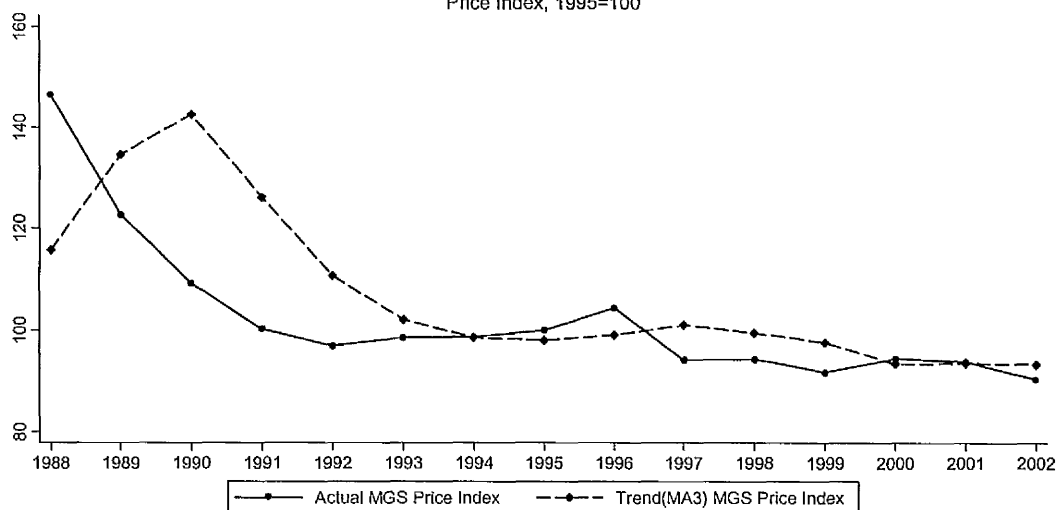
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<sup>53</sup> The unresponsiveness of official loans is explained by Uganda's qualification for enhanced HIPC relief in 1999 and subsequent years, and its emphasis on the development of debt burden indicators and debt relief associated with a restraint on additional loan financing. Furthermore, the front-loading of debt relief to the years immediately following the country's qualification has evidently led to a substitution of debt relief for new financing, at least in the short term.

flow relief to Uganda's balance of payments, thereby effectively countering the real effects of the unfavourable contingencies the country was facing during the late 1990s and early 2000s.

The import volume effect of GDP (item *k*) is based on the differential between trend and actual GDP growth rates, and had a predominantly positive effect on Uganda's balance of payments development. During 1988-2002, the country has enjoyed solid GDP growth rates, averaging 6.7 per cent yearly in real terms. However, significant year-to-year fluctuations, particularly around the coffee price boom raising Uganda's GDP growth rate to almost 12 per cent in 1995<sup>54</sup>, are reflected in the MA3-deviations underlying the import volume effect. Table 6.7 shows the import volume effect to have translated into a moderate 0.7 per cent debt-deducing effect relative to overall BOP deviations, albeit with significant year-to-year variations. For example, in 1997-1998, as Uganda's GDP growth rate returned to its average level after the price boom, hypothetical imports fell below trends, and the import volume effect of GDP favourably accounted for more than 10 per cent in overall BOP deviations. During these years, GDP variation in itself offset almost half of the strongly debt increasing effect of internal changes in imports volume (item *i*), calculated as the vertical

Graph 6.19: Uganda Import Prices (1988-2002)  
Price Index, 1995=100



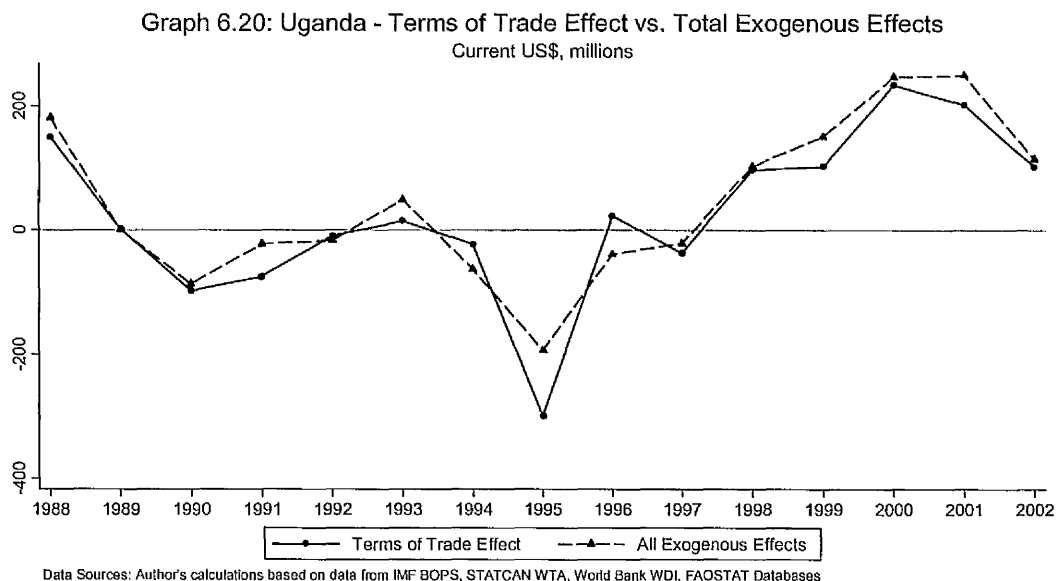
<sup>54</sup> See Appendix A6.3 for GDP growth data.

distance between actual and hypothetical imports.<sup>55</sup>

All the remaining trade balance items of categories (I) and (II) are price effects, based on Ugandan import prices. Graph 6.19 displays actual and three-year moving price averages. Uganda's import price index appears to follow a slowly falling trend, after a temporary spike around the year 1990. With the exception of this period, both the price trend for imports and deviations from trend were significantly less pronounced than those relating to Uganda's exports. The magnitudes of the price shock components of import effects – that is, items (e) and (f) – are thus correspondingly low, adding little to Uganda's total exogenous BOP effects. Similarly, the mild trend component of import prices causes items (j) and (l) to measure only minor shares of the overall import value effects.

### The Terms of Trade Effect

Representing the CDSF's central price effect, item (c) is calculated on the basis of export and import price trend deviations and measures the effects of Uganda's terms of trade on the overall balance of payments and net official financial flows. Tables 6.7 and 6.8, together with Graph 6.20, emphasise the weight of the terms of trade



<sup>55</sup> Indeed, Graph 6.18 shows trend imports to lie between actual and hypothetical values. The distance between the two series measures the internal change, which also includes the difference between trend and hypothetical values, accounting for GDP growth deviations.



effect in the case of Uganda.<sup>56</sup> As the driving factor behind the overall shocks element within Uganda's balance of payment deviations, the favourable terms of trade shock in 1995 accounted for almost US\$ 300 million, or about a third of overall BOP deviations. In contrast, the sharp decline in the terms of trade since 1996 explains more than US\$ 700 million of Uganda's cumulative demand for net official transfers up to 2002, equivalent to more than 11 per cent of yearly net transfers per annum. In the year 2000 alone, which marks the deepest point of the export price cycle, the terms of trade effect added US\$ 235 million to Uganda's need for official BOP credit support, and explained more than a quarter of the overall BOP deviations registered that year. Thereby, the debt-inducing terms of trade effect more than offset the strong debt-restraining effect of the internally determined forces on exports and imports flows.

#### Non-Debt Creating Financial Effects

The remaining items of tables 6.7 and 6.8 belong to category (*III*), including the non-debt financial effects plus a residual. On average, the results show total trend deviations of these items to have had a debt-deducing effect on Uganda's balance of payments, reflecting the overall increasing trend in financial inflows to the country over time. However, year-to-year fluctuations in this category appear to be extremely pronounced, pointing to a particularly frequent incidence of sudden variations in the yearly inflows of remittances (item *n*), official grants (item *m*), and to a lesser extent FDI (item *o*). Furthermore, item (*q*) appears to pick up a considerable amount of residual BOP volatility, left unaccounted for by the other BOP effects.<sup>57</sup> In contrast, deviations in reserve holdings (item *p*) reflect the active role played by the central bank's management of Uganda's international reserve assets, in terms of foreign exchange interventions countering the effects of substantial foreign capital inflows, as well as a buffer mechanism to yearly BOP fluctuations. For example, in the year 2002,

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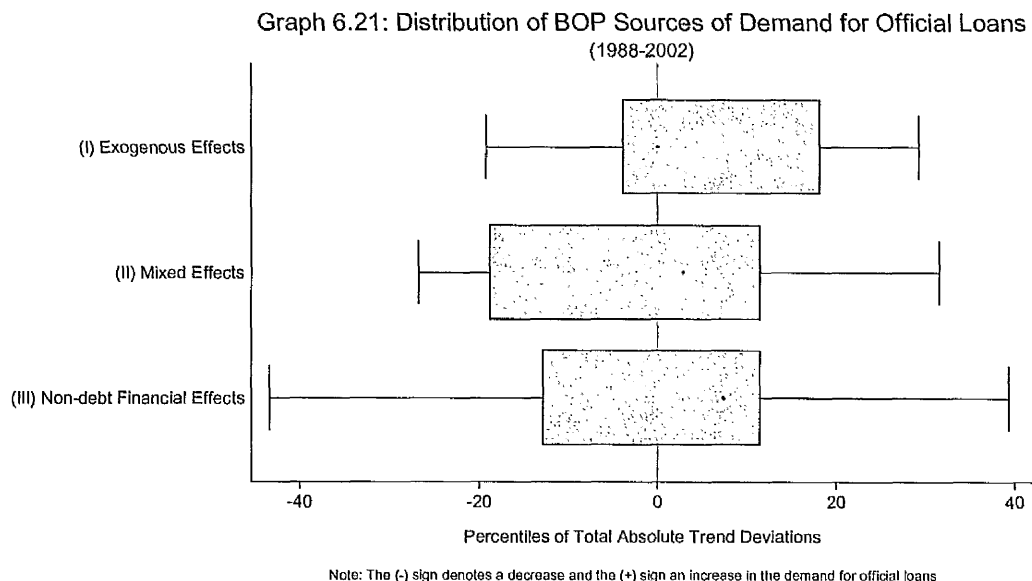
<sup>56</sup> It should be noted that the terms of trade, similarly to all the other BOP listed or graphed, is expressed in terms of its debt-inducing or -deducing effect on Uganda's balance of payments. For example, Graph 6.20 displays the sharp rise in coffee prices around 1995 as a substantial debt-deducing effect on Uganda's balance of payments, causing the terms of trade *effect* to kink downward.

<sup>57</sup> To a large extent, the residual measure reflects the sporadic presence of exceptional BOP flows, large net errors and omissions, as well as the BOP accounting adjustment described above.

a disinvestment in net foreign exchange holdings offset almost a third of the country's overall debt-inducing BOP effects.

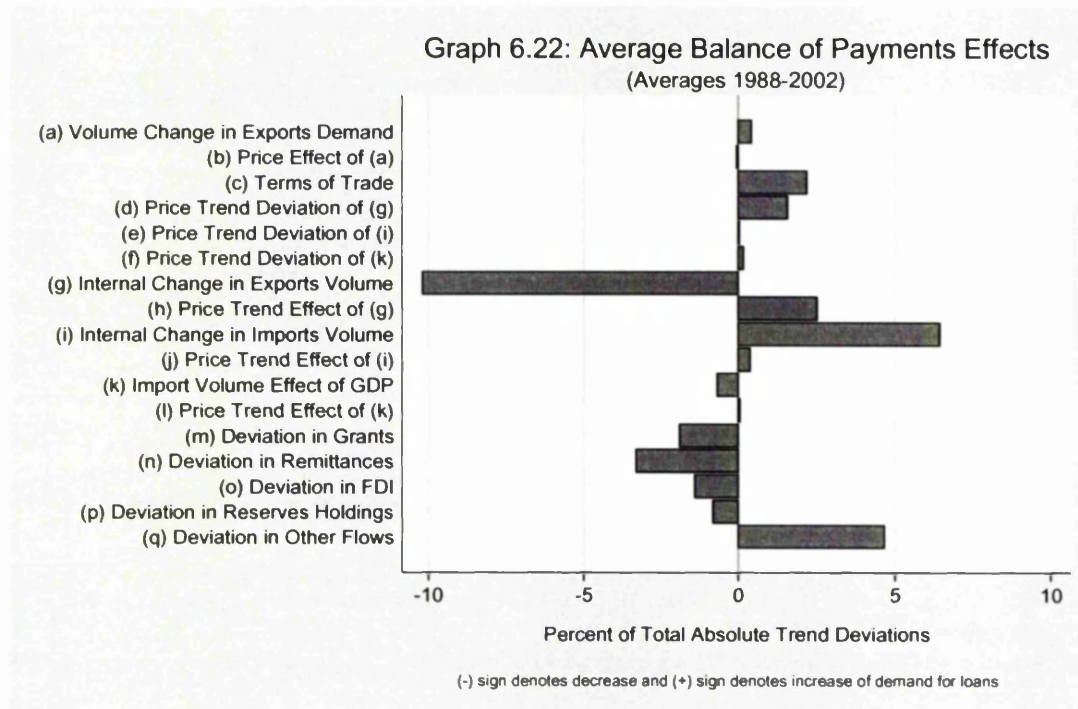
#### Total Exogenous, Mixed and Non-Debt Financial Effects

Overall, the outcomes of the CDSF accounting mechanism reveal a clear pattern with regard to the various categories of BOP determinants. Graph 6.21 summarises the distributional features of each of the three categories during 1988-2002. The shaded boxes display the percentage distributions within the 25<sup>th</sup> and 75<sup>th</sup> percentile



of observations, and the whiskers extend over the adjacent values in each category. The position of the boxes relative to the zero mean line indicates a strongly debt-inducing (positive sign) effect of exogenous effects, while the mixed effects are shown to have had a predominantly debt-deducing (negative sign) effect, reflecting the strong incidence of increasing export volumes over time. In contrast, the percentile distribution of non-debt financial effects appears to be fairly balanced, while displaying the widest spread of observations outside the 50 per cent core around the median. Although relatively less marked, the extension of whisker boundaries in Graph 6.21 evidences the significant volatility of total exogenous and mixed effects. In sum, the percentile distributions show Uganda to have experienced predominantly unfavourable price shock effects, which tended to be offset by mixed effects, while financial and residual effects had a strong influence in adding to the country's overall balance of payments volatility.

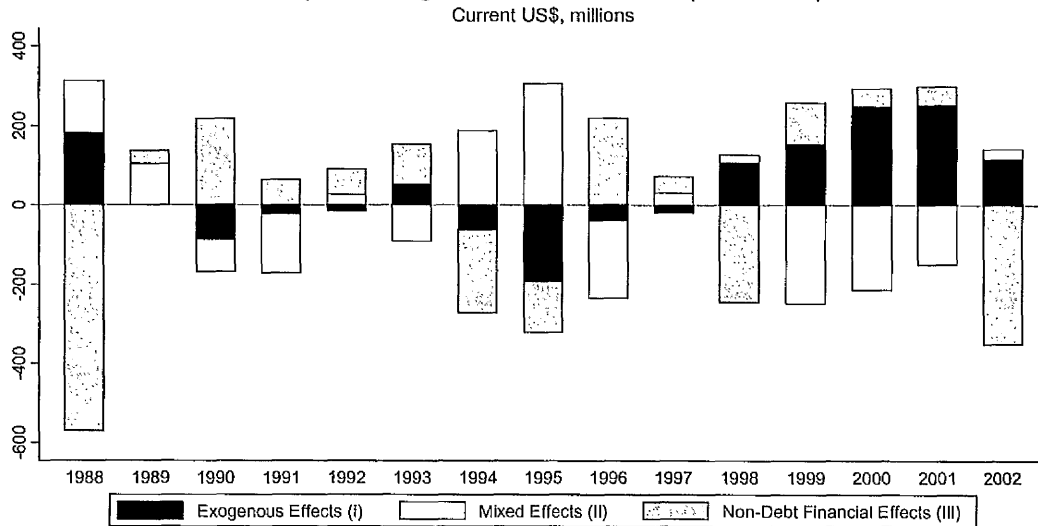
Graph 6.22 displays 1988-2002 averages of the single BOP effects listed in Table 6.8. It highlights the general pattern of debt-inducing effects of price shocks and trend factors, and the debt-deducing effect of strong increases in export volume that more than outweighed those in imports. It can also be seen that the net average effect from non-debt financial flows ensued from a generally favourable pattern of official grants and private capital flows, which however is offset by the residual measure of BOP flows.



Finally, Graph 6.23 offers a visualisation of the yearly composition of balance of payments effects broken down into the three main categories, from which further two interesting observations would appear to emerge. Firstly, the mixed effects tend to take opposite sign with respect to the exogenous and non-debt financial factors, particularly since the early-mid 1990s. As was mentioned above with regard to real exports and imports, variations in prices and financial flows would thus appear to have strongly affected Uganda's real trade balance. To the extent that official financial flows did not respond, or responded insufficiently, to the contingencies affecting the country's balance of payments as a whole, the BOP effects had necessarily to be offset by higher real exports in the face of declining prices, sporadically in combination with a drain on imports. Secondly, Graph 6.23 emphasises the significant magnitude of exogenous effects relative to the other

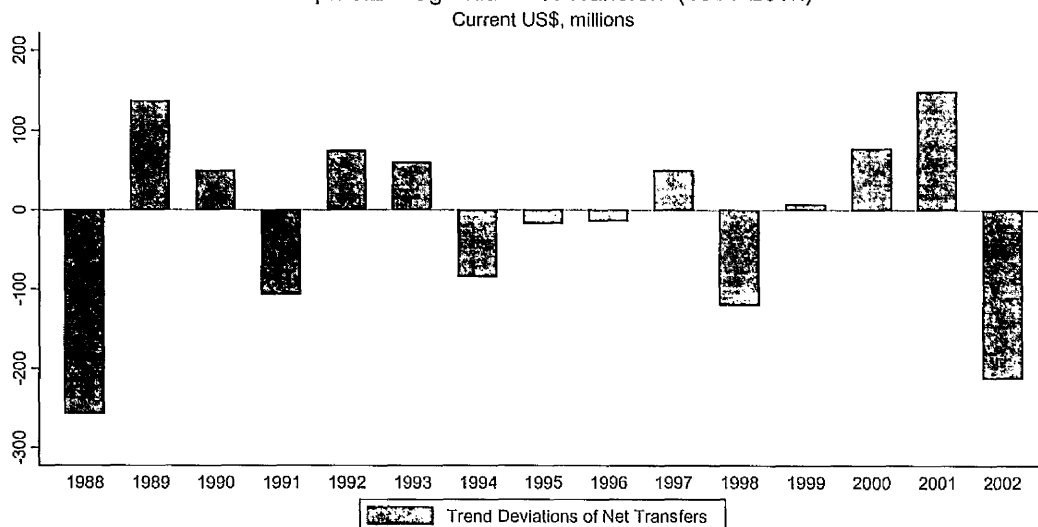
balance of payment effects. Indeed, during the entire period of analysis, factors outside the control of the country authorities are shown to have played a key role in shaping Uganda's balance of payments, thus testifying to the country authorities' difficulties in carrying out effective BOP planning. Such a lack of control is reflected

Graph 6.23: Uganda - All BOP Effects (1988-2002)



in the highly erratic pattern in the yearly net variations of the balance of payments, which is equal to Uganda's net demand for concessional credits (Graph 6.24). As a reflection of the latter, Uganda's external debt stock evolution is thus largely a function of variables outside the country's control.

Graph 6.24: Uganda - Net Transfers (1988-2002)



### 6.3.5 Simulations of the effects of CDSF on Uganda's debt flows and stock

The CDSF envisages two basic financial instruments to assist low-income countries in their task of achieving lasting debt sustainability in the face of adverse external factors: a contingent credit line, providing full compensation for the temporary losses or gains ensuing from exogenous factors; and an ex-ante debt relief mechanism, converting a share of outstanding credits into grants, proportional to the impact of adverse trend factors during any period  $t$ .

On the basis of the results of the CDSF accounting framework applied to Uganda, the basic implications on the country's debt flows and stocks from implementing the two financial instruments can be simulated. Again focussing on the historical period spanning from 1988 to 2002, we calculate the cumulative effects from adjusting Uganda's net official credit flows by the amount of yearly total exogenous shocks. Similarly, we modulate Uganda's external debt stock by the negative trend deviations ensuing from the relevant BOP effects, to derive a set of alternative debt stock series. Finally, we calculate debt stock and flow ratios, as well as roughly estimating the order of magnitude of the overall costs to donors involved in implementing the CDSF. The simulation results are summarised in Table 6.9, and are now discussed in turn.

#### Debt Flow Adjustments

The upper section of Table 6.9, together with Graph 6.25, compares Uganda's actual and adjusted disbursements, amortisation, and net flows of official concessional loans. Disbursements are modulated by the sign and amount of total exogenous shocks faced by Uganda each year, listed in Table 6.7. For ease of analysis, Table 6.9 accounts for the net outcome in terms of overall disbursements to Uganda, rather than separately indicating the credit line balance. For example, the occurrence of a hugely favourable price shocks in 1995 would have had the effect of automatically debiting a corresponding amount to Uganda's contingent credit line, while the sequence of unfavourable price shocks during 1998-2002 would have validated the disbursement of compensatory cash flows from the facility. On average, the contingency mechanism would have provided BOP support to Uganda of about

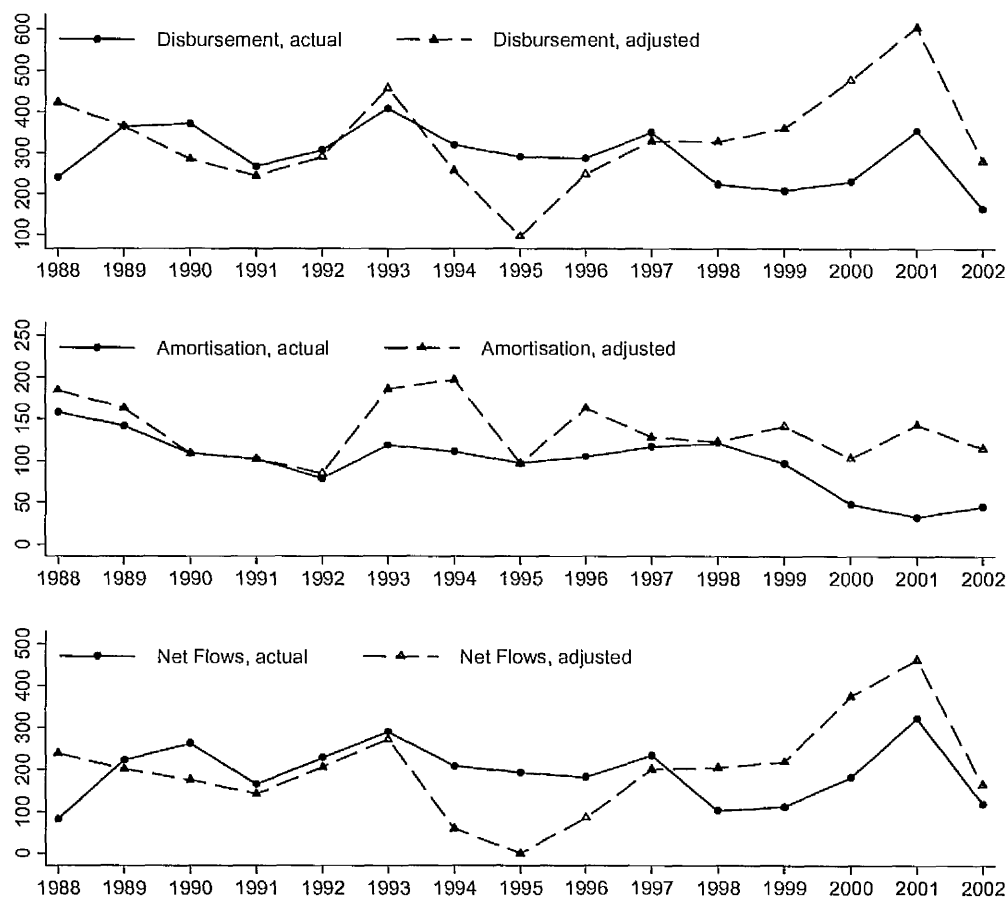
**Table 6.9: Uganda – Contingency Debt Sustainability Framework: Adjustment of Net Flows and External Debt Stock**

| Series/Year  | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Net Flows Adjustment (U.S. Dollar, millions):</b>                           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Disbursements (DIS) - Actual   | 241  | 365  | 372  | 267  | 308  | 409  | 320  | 290  | 288  | 351  | 224  | 209  | 230  | 355  | 164  |
| Adjusted for exogenous shocks (Table 6.7, effects <i>a</i> to <i>f</i> )       | 423  | 365  | 285  | 244  | 291  | 458  | 257  | 97   | 249  | 330  | 328  | 361  | 478  | 606  | 280  |
| Amortisation (AMT) - Actual  | 158  | 142  | 109  | 102  | 79   | 119  | 111  | 97   | 105  | 117  | 121  | 97   | 48   | 33   | 45   |
| Adjusted for price trends (Table 6.7, effects <i>h</i> , <i>i</i> , <i>j</i> ) | 184  | 163  | 109  | 102  | 85   | 186  | 197  | 97   | 163  | 129  | 123  | 142  | 103  | 143  | 115  |
| Net Flows (NFL) - Actual   | 83   | 223  | 263  | 165  | 229  | 290  | 209  | 193  | 183  | 234  | 103  | 112  | 182  | 323  | 119  |
| Notional (Adjusted DIS-AMT)  | 239  | 202  | 176  | 142  | 206  | 272  | 60   | 0    | 86   | 201  | 205  | 219  | 375  | 463  | 165  |
| <b>External Debt Stock (EDT) Adjustment (U.S. Dollar, millions):</b>           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Actual EDT   | 1920 | 2180 | 2580 | 2780 | 2930 | 3030 | 3370 | 3580 | 3680 | 3880 | 3920 | 3500 | 3500 | 3730 | 3990 |
| Net EDT (actual EDT net of stock/flow reconciliation)                          | 2003 | 2226 | 2489 | 2654 | 2883 | 3173 | 3382 | 3575 | 3758 | 3992 | 4095 | 4207 | 4389 | 4712 | 4830 |
| HIPC EDT (net EDT after HIPC and Paris Club Relief) (1988-2002)                | 2003 | 2226 | 2438 | 2603 | 2819 | 2971 | 3173 | 3326 | 3509 | 3743 | 3743 | 3390 | 3393 | 3692 | 3686 |
| CDSF EDT (net EDT after CDSF Relief) (1988-2002)                               | 1795 | 1997 | 2347 | 2535 | 2775 | 2948 | 3134 | 3369 | 3494 | 3716 | 3817 | 3841 | 3720 | 3681 | 3614 |
| HIPC EDT (net EDT after HIPC and Paris Club Relief) (1996-2002)                |      |      |      |      |      |      |      |      | 3758 | 3992 | 3992 | 3639 | 3642 | 3941 | 3935 |
| CDSF EDT (net EDT after CDSF Relief) (1996-2002)                               |      |      |      |      |      |      |      |      | 3705 | 3922 | 3980 | 3896 | 3775 | 3736 | 3669 |
| Memo: Stock-Flow Reconciliation  | n/a  | 21   | 136  | 25   | -87  | -143 | 120  | 22   | -104 | -45  | -73  | -538 | -178 | -90  | 131  |
| Memo: Total Paris Club and HIPC Stock Operations                               | 0    | 0    | -51  | -1   | -13  | -138 | -7   | -40  | 0    | 0    | -103 | -465 | -179 | -24  | -125 |
| <b>Debt Stock/Flow Ratios (Percentages):</b>                                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| EDT/GDP  | 31   | 42   | 57   | 78   | 99   | 92   | 80   | 58   | 58   | 60   | 57   | 57   | 58   | 65   | 64   |
| HIPC (1988-2002)   | 28   | 38   | 55   | 76   | 97   | 92   | 79   | 61   | 61   | 63   | 60   | 64   | 63   | 65   | 62   |
| CDSF (1988-2002)   | 752  | 802  | 1371 | 1342 | 1518 | 1012 | 602  | 501  | 448  | 494  | 545  | 499  | 512  | 529  | 518  |
| EDT/XGS  | 674  | 719  | 1320 | 1306 | 1494 | 1004 | 595  | 530  | 470  | 519  | 572  | 565  | 561  | 527  | 508  |
| CDSF (1988-2002)   | 76   | 68   | 81   | 76   | 61   | 52   | 28   | 20   | 19   | 21   | 22   | 19   | 11   | 7    | 10   |
| TDS/XGS  | 85   | 75   | 81   | 76   | 64   | 75   | 45   | 20   | 26   | 23   | 23   | 26   | 19   | 23   | 20   |
| CDSF (1988-2002), notional   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <b>Total Cost to Creditors (U.S. Dollar, millions):</b>                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1988-2002  | 658  |      | 810  |      | n/a  |      |      |      |      |      |      |      |      |      |      |
| 1996-2002  | 558  |      | 352  |      | n/a  |      |      |      |      |      |      |      |      |      |      |
| Total sum of exogenous effects (assuming ex-post relief of final balance)      | 1216 |      | 1161 |      | 1145 |      |      |      |      |      |      |      |      |      |      |
| Total sum of unfavourable price trends (ex-ante CDSF debt relief)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Total cost of scheme (total relief)  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

Data Sources: Author's calculations, based on data from the IMF BOPS, STATA/CAN WTA, World Bank WDI/GDF, and FAOSTAT Databases.

US\$ 44 million each year during 1988-2002 (Table 6.7). While this corresponds to an increase of about 15 per cent above actual loan disbursements to Uganda over the entire period, the crucial function of the credit line is to provide large-scale adjustments in single years of special need. For example, in the year 2000 Uganda would have benefited from an additional cash flow that would have more than doubled the amount of actual disbursements, and which would have been sufficient to replace almost entirely the balancing effect operated through internal changes to import and export volumes (compare Table 6.7, items *g* and *i*). The overall strong modulation effect of the CDSF over the entire period of analysis is best seen in the upper section of Graph 6.25.

Graph 6.25: DIS, AMT, and NFL: Actual vs. Adjusted (1988-2002)  
Current U.S. Dollars, millions



To provide an estimate of the ex-ante relief implications of the CDSF, Uganda's official loans amortisation series is modulated by the observed incidence of unfavourable price trend effects, while it remains unaffected during the few years

when trends were favourable to the country.<sup>58</sup> As a reflection of the generally deteriorating price trends facing Uganda during 1988-2002, the simulated amortisation data show considerably accelerated debt repayments over time (Table 6.9 and Graph 6.25), exceeding US\$ 30 million per year on average (Table 6.7). Of course, the difference between actual and adjusted amortisation would not imply any further deduction of funds from Uganda's accounts, and are instead reflected in the grant conversion of outstanding debts by the donor community. Therefore, the adjusted net flows series indicated in Table 6.9 should be considered a notional measure, incorporating the accounting equivalent of adjusted disbursements net of amortisation.

### Debt Stock Adjustments

Uganda's debt stock simulation assesses the benefits from the adoption of the CDSF on the country's external debt evolution. Before turning to the simulated series, it should be noted that the total external debt stock over time is determined not only by the cumulative effects of changes in yearly net transfers of loans, but also by a number of other factors. As a category, these factors are conventionally termed stock-flow reconciliation, and include all changes to the external debt stock other than those explained by debt flows in any period. Most notably, they include debt forgiveness or reduction, the accumulation or capitalisation of interest arrears, and changes in the cross-currency valuation of foreign-exchange denominated external debt. Table 6.5 lists the composition of Uganda's stock-flow reconciliation, showing that changes in the country's debt stock partly accounted for debt relief and changes in cross-currency valuation, besides net flows on debt. For example, in the year 2000, a favourable change in currency debt-valuation, together with substantial amount of debt relief, more than offset the debt stock addition from net flows on debt. In contrast, a total change in Uganda's debt stock outpaced by far the net effect from new debt flows and relief in the year 2002, caused by an unfavourable shift in the U.S. dollar exchange rate against the other major currencies in which Uganda's external debt is denominated. As a result, in 2002 Uganda's debt stock increased by

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<sup>58</sup> Note that accelerated amortisation implies a grant conversion of outstanding loans, with the specific purpose of lowering the outstanding debt stock.



US\$ 224 million on the sole basis of valuation changes, leading to an overall US\$ 260 million increase in the country's external debt stock.

It follows, that in the context of our simulation exercise a meaningful comparison of the debt stock effects associated with the implementation of the CDSF with those observed in its absence requires the preliminary extrapolation of cumulated stock-flow reconciliation factors from Uganda's debt stock series. The ensuing net stock series thus serves as an approximation of Uganda's external debt burden in the absence of valuation changes exogenous to the country, as well as the stock effects of both the Paris Club and HIPC debt relief initiatives over time. Besides offering a more meaningful expression of a debtor country's debt stock evolution based on actual borrowing and repayment performance, the net external debt stock provides the basis for computing the comparative debt stock implications of the CDSF against the extant regime.

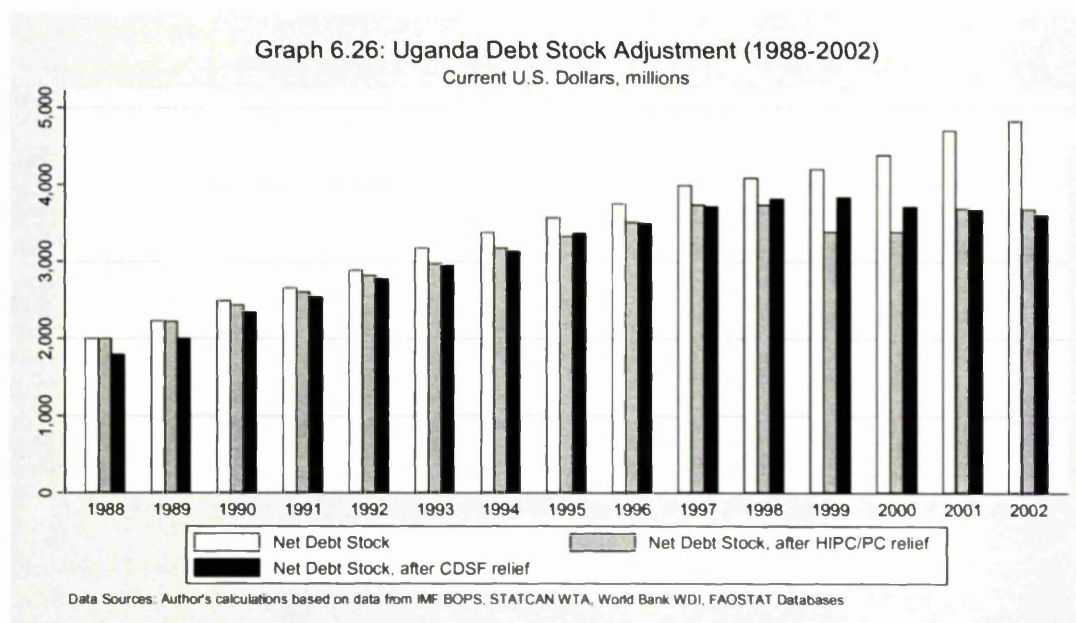
The debt stock simulations are summarised in Table 6.9. The actual external debt stock (EDT) is first purged of the cumulative effects of stock-flow reconciliation over time, starting in 1988. The ensuing net EDT series is thus the result of cumulated net flows alone. On the basis of the latter, we compute two sets of debt stock series, one including the cumulative debt stock effects of HIPC and Paris Club Relief (HIPC EDT), and the other simulating the debt stock implications of the CDSF (CDSF EDT). Both series are computed over the whole period of analysis (1988-2002), as well as a shorter period of time (1996-2002).<sup>59</sup> In line with the CDSF proposal in Chapter 5, we assume that any positive balance on the contingent credit line would eventually have to be relieved. To arrive at a meaningful debt stock measure for comparison with the HIPC EDT series at any point in time during the period of observation, we derive a notional debt stock measure, which is net of both the shock and trend factors dealt with by the contingency instruments, provided that the contingent credit relief carries a positive balance in any given year. The simulated series is thus suitable for direct comparison between the stock benefits associated with the CDSF and those

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<sup>59</sup> The start year of the shorter simulation period is set to correspond with the initiation of the original HIPC Initiative.

resulting from the extant debt allocation and relief framework, which also provides a measure of the relative costs involved in either scheme.

The stock simulations shown in Table 6.9, as well as in Graph 6.26, lead to number of relevant observations. During the decade up to 1997, the upward trend in Uganda's debt stock was fuelled by substantial amounts of net flows, which dwarfed the mostly moderate relief provided by the Paris Club during the early and mid-1990s. Neither would the CDSF have been effective in countering the massive build-up of debt. For, its contingency credit line would have been mainly balanced, as a result of its curbing effect of the cash-flow surge during the coffee price boom around 1995, while its debt relief mechanism would have accelerated amortisation to yield a noticeable stock effect only in three years of unfavourable trends (1993, 1994, and 1996). Notwithstanding the CDSF's significant buffer effects, in contrast to the HIPC/Paris Club regime's sporadic *ad-hoc* interventions, by 1998 Uganda's external debt stock would have been similar under either regime.



The benefits from the CDSF over those of the HIPC regime mainly emerge from 1999 onwards, when the contingency measures would have led to a reversal in Uganda's debt stock and to a steady decline thereafter. In contrast, Uganda's debt stock under the HIPC regime is shown to have rapidly declined between 1998 and 1999 as the result of a massive relief operation, but quickly returned on a growing trend in the subsequent years. This finding relates to the simulation over the entire period, but it

is confirmed also by the outcome relating to the period 1996-2002. Furthermore, the difference in debt stocks between the two regimes appears to be larger in the shorter simulation period. By the year 2002, the CDSF would have reduced Uganda's debt stock by about US\$ 266 million below the HIPC/Paris Club Initiatives after a period of implementation of seven years, while this difference shrinks to US\$ 72 million over the implementation period of 15 years. Of course, the reason is the persistent deterioration of Uganda's terms of trade after 1995, which would have led to a relatively higher debt relief component in the CDSF's overall compensatory functions.

However, more important than differences in levels, it is crucial to appreciate fully the benefits from the trend inversion brought about by the operations of the CDSF. For, the simulation results seem to demonstrate the scheme's suitability to effectively modulate Uganda's debt stock in the face of deteriorating trend factors by means of an ex-ante debt relief facility, besides its key role of providing beneficial flow effects through the contingent credit line (Graph 6.25). Put differently, the implementation of the CDSF would have led to a substantial compensatory or smoothing effect in Uganda's yearly balance of payments flows, and at the same time outperform the extant debt relief mechanisms in terms of debt stock implications. It may thus be argued that the Uganda case study lends strong support to an ex-ante approach in terms of its effectiveness in countering both liquidity and debt stock implications from adverse exogenous circumstances.

Finally, to complete the assessment of the simulation outcomes, it remains to be addressed whether the proposed contingency scheme would have actually contributed toward rendering Uganda's debt position sustainable, compared to HIPC/Paris Club, and at what comparative costs. These two questions are now addressed in turn.

#### The Cost of CDSF vs. HIPC/Paris Club

The bottom row of Table 6.9 reports the estimated costs relating to the two periods of simulation. The total cost of the CDSF relates to the cumulated shock and trend factors compensated by this scheme, and thus appears as the difference between Net and CDSF EDT in 2002. Equivalently, the total cost results from the sum of

exogenous and unfavourable price trends over the period of simulation (Table 6.7).<sup>60</sup> Interestingly, our estimates indicate total costs of the CDSF at around US\$ 1.2 billion for both periods of application. This is explained by an increase in the relative cost of the contingent credit line from more pronounced price trend deviations after 1995, compared to the entire period spanning from 1988 to 2002. At the same time, however, the latter period involved higher costs through the ex-ante debt relief mechanism, for compensating the country for a deeper overall deterioration in its terms of trade since 1988.<sup>61</sup>

The CDSF's cost of US\$ 1,216 million over the 15-year period would represent a significant amount of additional aid flows to Uganda, equivalent to 28 per cent of total loan disbursements during 1988-2002, or about 30 per cent of the country's actual external debt stock in 2002. However, the estimated donors' burden involving the CDSF compares favourably to HIPC and Paris Club interventions. The total nominal debt relief committed by the original and enhanced Initiative to Uganda over a window of 30 years amounts to US\$ 1,950 million.<sup>62</sup> Thus, in terms of average commitments over 15 years, those implied by the CDSF simulations would exceed the HIPC's by roughly a quarter. However, a more relevant comparison is made in terms of debt relief actually delivered to Uganda, including the bilateral donor-borrower Paris Club operations. Table 6.9 shows Uganda's overall relief operations to sum up to US\$ 1,145 million, pointing towards a negligibly small difference in nominal costs between the two alternative schemes.<sup>63</sup> In relation to the period 1996-2002, the observed costs fall to US\$ 896 million, mainly involving HIPC relief (including the US\$ 465 million in 1999 alone).<sup>64</sup>

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<sup>60</sup> This applies with the exception of years characterised by positive trend factors.

<sup>61</sup> Of course, this applies to the case study of Uganda and not in general. For example, if shock and trend factors had developed favourably during, say 2000-2002, the shorter-term cost simulations would have been considerably lower. Nevertheless, to the extent that there is some degree of reversal of price deviations towards a long-term trend, costs associated with the CDSF should be relatively lower in the long term.

<sup>62</sup> Of which US\$ 983 million were committed by the International Development Association, and US\$ 210 million by the IMF (see the HIPC Statistical Update: IMF and IDA, 2003: 10).

<sup>63</sup> A large share of HIPC relief to Uganda involved the BWI, rather than the Paris Club creditors. Between 1997 and 2002, the actual HIPC relief to Uganda by IDA and IMF together amounted to a combined total of US\$ 510 million (see IMF and IDA, 2003).

<sup>64</sup> Of course, the higher costs of the CDSF involving the shorter period reflect the above mentioned difference in debt stocks between CDSF and HIPC in the year 2002.

In sum, the CDSF is estimated to involve similar magnitudes of costs, particularly over the entire period of simulation. The conclusion is thus twofold. First, the contingency scheme would involve costs comparable to those actually supported by the donors during 1988-2002, which invalidates – at least in the case of Uganda – any argument typically put forward in relation to the costliness of ex-ante schemes.<sup>65</sup> Second, if the costs involved are roughly the same, the demonstrated effectiveness of the CDSF in substantially modulating Uganda's debt flows and stocks (at least in the face of severe trend deterioration) can only appear favourable in comparison to the HIPC's inherent failure to provide any kind of contingent relief.

#### Debt Ratios and Sustainability

The simulation results should leave little doubt about the potential supremacy of the CDSF over past regimes, by effectively dealing with Uganda's debt problem. With regard to the debt flow implications, the contingent credit line of the CDSF was shown to exert substantial modulating effects on Uganda's liquidity in the face of exogenous shocks. Despite its analytical crudeness, the CDSF accounting framework appears to be suitable to capture an important share of exogenous factors affecting the country's overall balance of payments flows during a historical period characterised by particularly pronounced shocks and adverse trend effects.

With regard to the debt stock implications of the contingency mechanisms, it will be recalled from Chapter 5 (Chart 5.1) that the CDSF has the crucial function of adjusting a country's debt stock in compensation for adverse trend factors contingent on any period  $t$ . In contrast, the debt stock evolution over the longer term is addressed by a more comprehensive debt sustainability analysis which, together with the CDSF performance assessment, will inform future aid allocation and grant share. These decisions fall into the realm of the overall aid allocation system, rather than the CDSF as such, and cannot be addressed within the simulation framework of this chapter. Nevertheless, the introduction of the CDSF compensation mechanism has been shown to be effective in reversing the further build up of debt under the persistent presence of highly adverse circumstances. Everything else being the same,

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<sup>65</sup> Chapter 4 discusses at length the restrictions imposed on debt service modulation schemes on the grounds of their cost implications and 'additionality' to existing aid commitments.

the CDSF simulations thus demonstrate an increase in Uganda's capacity to carry higher levels of debt in comparison to the extant framework, which is equivalent to attesting increased debt sustainability during the historical period under analysis.

Finally, it has already been mentioned that conventional debt burden ratios widely lose their significance in the context of the CDSF. To illustrate the point, Table 6.9 lists the ratios of external debt stock to GDP or exports of goods and services, together with the debt service ratio. A comparison of these ratios in relation to the CDSF and HIPC regimes simply reflects the effect of either scheme on Uganda's debt stock and service over time. However, without a set of estimated debt sustainability benchmarks for each of these ratios, their absolute level is mostly meaningless, and their trend merely provides some vague indication with regard to Uganda's debt evolution over time. Of course, in line with our benchmark estimates in Chapter 3, it would, in principle, be possible to derive indicative benchmarks similar to those applied by the BWI-DSF, with low-income countries' debt ratios ordered along EVI rankings, rather than CPIA. However, as should be clear from the discussions in Chapter 5, an assessment against average benchmark indicators would be misleading in the context of the CDSF, since it would fail to appropriately reflect the scheme's country-specific effects by modulating debt flows and stock. As a result, the central feature of the CDSF, tailoring official assistance to the BOP factors facing any specific country, would force the donor community to depart from its current practice of assessing LICs' debt sustainability according to policy-dependent benchmarks, and to start reasoning in terms of a country's unique vicissitudes and financial requirements instead.

#### **6.4 Concluding remarks**

Chapter 5 has outlined the basic features of a contingency debt sustainability framework, and postulated that its compensatory financial instruments could represent a breakthrough in the donor-community's approach to the unresolved debt crisis involving low-income countries. This chapter's simulations of the CDSF's application to the case of Uganda have delivered encouraging results, which largely confirm the scheme's potential benefits. Indeed, in the face of Uganda's exposure to extreme price fluctuations and deteriorating trend factors during 1988-2002, the application of the CDSF would have been effective in delivering substantial flow and

stock support to the country, rendering its external debt profile more sustainable. In contrast, despite implying similar costs to the donors, the multitude of bilateral and multilateral support efforts implemented during this period failed to achieve their central aim of putting Uganda on a sustainable path.

## Appendices

### Appendix A6.1: Data issues relating to Uganda's balance of payments

In common with all the publicly available BOP data on Uganda available for this study, the IMF BOPS data on Uganda shows some apparent inconsistencies during the mid-to-late nineties. In particular, the BOPS trade balance data display a structural break between 1998/99, resulting from a change in the reporting method. This is manifested by a significant value drop in the goods and services import-export series, which is neither supported by the country authorities' own reports on trade performance during the period concerned, nor by the national statistics data of the World Bank's World Development Indicators.<sup>66</sup> While the IMF BOPS does not provide any particular indication with regard to the specific causes and effects of such a shift in accounting, these can be evinced from carefully cross-checking the BOP data from the alternative sources available. From a thorough analysis of alternative datasets and on the basis of information gathered from the Bank of Uganda<sup>67</sup>, a combination of explanatory factors could be identified:

- A switch in the classification of merchandise imports from CIF (cost, insurance and freight) to FOB (free on board) in 1998/99, explaining a large share of the disproportional plunge in the trade balance.
- There have been significant changes in the method applied to estimate government project imports, ensuing in a 15 per cent downward revision in 1998/99.<sup>68</sup>
- "Other sectors' transfers" comprises workers' remittances and other transfers, mainly those from NGOs and international aid agencies to non-

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<sup>66</sup> See, in particular, the statistics published by the Bank of Uganda in its Annual Reports and Quarterly Economic Reports (BOU, various issues), and the World Bank's World Development Indicators CD-ROM (2005).

<sup>67</sup> The author conducted several telephone interviews with BOU officials of the research department during 2006.

<sup>68</sup> See Bank of Uganda (undated), "Uganda: Balance of Payments Concepts, Sources and Methods", <http://www.bou.or.ug/indexstat.htm>



governmental domestic entities. This BOP item is currently derived as the residual after deducting all identified BOP inflows from total purchases of foreign exchange by authorised dealers.<sup>69</sup> Therefore, at least part of the CIF-FOB difference has to be reflected in the “other sectors’ transfers” BOP item. This appears to be evident in the case of Uganda during 1993-1998.

For the purpose of the analysis presented in this chapter, it was crucial to keep intact the internal consistency of the BOPS series in any given year. Therefore, it was decided not to revise the data for time-inconsistency in light of the above insights (e.g. by estimating the amount of CIF on imports during 1993/98 and revising all BOP series concerned accordingly). Instead, the shift in accounting has been dealt with *ad-hoc*, depending on the specific simulation exercise at hand. In the MA(3) forward-looking effects simulations over three years, these have been set to cover 1995-1998 and 1999-2002, so as to reconcile the marking of Uganda’s pre-and post completion point HIPC debt relief episodes with the break year 1998. In the MA(1) and MA(3) simulations based on yearly accounting, the structural break has been accounted for by offsetting the moving average of the trade balance series between 1998/99 by the equivalent of their differences in levels. This avoided moving averages being unduly affected and carrying forward the break in the data. At the same time, however, the true information on the actual volume and price effects between 1998/99 is foregone.

On the basis of commonly accessible data for research, there appears to be a lack of an optimal alternative to the use of IMF BOPS data, given the specific purpose of analysis. For, BOP data of the Bank of Uganda are available only for the periods 1993-1999 and 1997-2004, imports enter the two datasets as CIF and FOB, respectively, making the two sets scarcely reconcilable with the limited information available.<sup>70</sup> An interesting path for future refinement of the accounting technology presented in this chapter would be made possible by gaining greater access to the detailed datasets of the Trade and External Debt Department (TEDD) of the Bank of Uganda, the country’s key ministerial departments (including the custom’s department), and

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<sup>69</sup> Ibid. Also see IMF (2003).

<sup>70</sup> BOU officials referred the author to the central bank’s Quarterly Economic Reports as their most reliable source of data. Unfortunately, the BOU would not make available a consistent dataset over a longer period of time.

various other domestic authorities, such as the Uganda Coffee Development Authority (UCDA).

Finally, as a third alternative source of balance of payments data, we analysed the series drawn from World Bank's World Development Indicators (WDI). These are sourced from both national authorities and the IMF BOPS, thus overlapping with the original sources already considered. However, the WDI contains longer series of trade flows data from national sources, which appear to be most coherent with respect to the recording of import flows and do not display any apparent accounting shift during the 1990s. Unfortunately, other than basic aggregates, the WDI does not offer a sufficiently detailed and comprehensive set of BOP data, necessary to this analysis.

## Appendix A6.2: Growth of world demand for Uganda's exports

The table below lists the estimated weights relating to the demand for Ugandan exports. Growth in total demand is mainly determined by European, African and Asian demand for food and agricultural goods, which are the major components in Uganda's overall export basket.

**Table A6.1 Total Growth Of World Demand For Uganda's Exports**

| Year | Total Weighted Demand Growth (%) | African Growth for Manufactures (%) | European, African, and Asian Growth in Demand for Food and Agricultural Goods (%) |
|------|----------------------------------|-------------------------------------|---|
| 1988 | -0.3                             | 11.3                                | -0.6  |
| 1989 | 2.7                              | 4.2                                 | 2.7   |
| 1990 | 2.8                              | 7.5                                 | 2.7   |
| 1991 | -3.0                             | 1.9                                 | -3.2  |
| 1992 | 4.7                              | 13.8                                | 4.3   |
| 1993 | -3.2                             | -12.1                               | -3.0  |
| 1994 | 8.2                              | 4.3                                 | 8.2   |
| 1995 | -4.7                             | 38.4                                | -5.2  |
| 1996 | 7.1                              | -8.2                                | 7.5   |
| 1997 | 1.3                              | 2.1                                 | 1.5   |
| 1998 | 0.4                              | -6.4                                | 0.8   |
| 1999 | 1.4                              | -2.4                                | 1.6   |
| 2000 | 2.8                              | 0.7                                 | 3.8   |
| 2001 | -0.5                             | -2.0                                | -0.5  |
| 2002 | 0.9                              | 2.6                                 | 1.0   |

Source: Author's own calculations on the basis of WTA, WDI, and FAOSTAT data.

African demand for manufactures is highly volatile, reflecting the region's overall economic instability, particularly in terms of annual purchasing power. For example, at its peak, the commodity price boom caused a rise in African imports of manufactures of more than 38 per cent. Unfortunately, this upswing has not much benefited Uganda's exports in their share of manufactures, the latter being negligibly small in comparison to food and agricultural exports. Overall, the impact of change in world demand on Ugandan exports is relatively contained, yet significant: during 1988-2002, the average annual growth in total demand was 1.4 per cent, with a standard deviation of 3.6 per cent.

### Appendix A6.3: Estimation of import elasticity

Combined data on Uganda's GDP, imports of goods and services and official grants in real terms are available for the period 1982-2002 (U.S. Dollars millions):

| Year | Imports | GDP  | Grants |
|------|---------|------|--------|
| 1988 | 792     | 3620 | 187    |
| 1989 | 774     | 3850 | 177    |
| 1990 | 763     | 4100 | 257    |
| 1991 | 727     | 4330 | 314    |
| 1992 | 716     | 4480 | 336    |
| 1993 | 692     | 4850 | 260    |
| 1994 | 772     | 5160 | 319    |
| 1995 | 1200    | 5760 | 400    |
| 1996 | 1360    | 6280 | 336    |
| 1997 | 1380    | 6600 | 342    |
| 1998 | 1420    | 6920 | 358    |
| 1999 | 1580    | 7470 | 379    |
| 2000 | 1450    | 7880 | 527    |
| 2001 | 1470    | 8280 | 373    |
| 2002 | 1760    | 8830 | 421    |

As is to be expected for the case of a highly aid-dependant country, pair-wise correlation between grants, imports and GDP over the entire period of data availability is extremely high.

Pairwise correlations between imports, GDP and official grants (natural logarithms, 1982-2002):

|       | lnmgs  | lngdp  | lngrt  |
|-------|--------|--------|--------|
| lnmgs | 1.0000 |        |        |
| lngdp | 0.9529 | 1.0000 |        |
| lngrt | 0.7879 | 0.8586 | 1.0000 |

All variables are transformed into natural logarithms, whereby *lnmgs* denotes imports of goods and services, *lngdp* is GDP, and *lngrt* is official grants. Since the contemporaneous estimation of import elasticities of GDP and grants by OLS regression presents a severe problem of multicollinearity, we estimate elasticity as a simple regression of imports on GDP. Insofar as official grant disbursements are partially reflected in GDP, the estimated elasticity also reflects the effects on grants on imports. The table below lists selected results, showing estimated coefficients and the other basic OLS statistics. Over the entire period 1982-2002, the GDP elasticity of imports is estimated at slightly above unit value, and increases a little when estimated over the shorter period 1988-2002 (the latter reflecting the chosen simulation period of the CDSF). The value of the coefficient on *lngdp* falls when estimation is limited to 1982-1995, probably reflecting a relatively smaller aid impact on imports and GDP. Grants elasticity of imports is estimated as being generally

lower than GDP's, particularly during the earlier years of observation. As expected, the multiple regressions on both GDP and grants are problematic, and the coefficient on grants is statistically insignificant. A final series of regressions included the natural logarithm of Uganda's exchange rate to the U.S. Dollar, to test for its relative effect on imports. The two specifications in the above table show coefficients on *lngdp* to increase by approximately 30 per cent, while R-squared (adjusted) is maximised.

**Selected OLS-Regression Results:**  
**Dependant variable: *lnmgs***

| Regressor(s) | Coefficient(s) | t-statistic(s) | and ( $R^2$ ) | Period    |
|--------------|----------------|----------------|---------------|-----------|
| <i>lngdp</i> | 1.05           | 13.70          | (0.90)        | 1982-2002 |
| <i>lngdp</i> | 1.10           | 8.69           | (0.85)        | 1988-2002 |
| <i>lngdp</i> | 0.75           | 4.40           | (0.62)        | 1982-1995 |
| <i>lngrt</i> | 0.40           | 5.58           | (0.62)        | 1982-2002 |
| <i>lngrt</i> | 0.84           | 3.52           | (0.49)        | 1988-2002 |
| <i>lngrt</i> | 0.46           | 4.19           | (0.59)        | 1982-1995 |
| <i>lngdp</i> | 1.16           | 7.69           | (0.91)        | 1982-2002 |
| <i>lngrt</i> | -0.06          | -0.84          |               |           |
| <i>lngdp</i> | 1.34           | 4.96           | (0.87)        | 1988-2002 |
| <i>lngrt</i> | -0.29          | -1.27          |               |           |
| <i>lngdp</i> | 1.36           | 14.83          | (0.95)        | 1982-2002 |
| <i>lnfex</i> | 0.34           | 4.28           |               |           |
| <i>lngdp</i> | 1.36           | 12.11          | (0.93)        | 1988-2002 |
| <i>lnfex</i> | 0.41           | 3.80           |               |           |

On the basis of the above results, and without further digressions into more sophisticated specification attempts, we decided to adopt GDP elasticity of imports at unit value. This measure is derived from the rounded value of the estimation results involving the full set of observations available, which best represent the long-term elasticity underlying the specification of hypothetical and trend values of imports within the CDSF. Although alternative specifications point towards a certain underestimation of unit elasticity, we find this to represent a more cautious approach in calculating the hypothetical values within the CDSF framework. Such caution appears to be desirable particularly in light of the BWI's adoption of elasticity at unit value or slightly below in their DSA relating to Uganda<sup>71</sup>.

Finally, the computations underlying trend and hypothetical imports in the above simulations are based on real GDP growth data from the WDI database (*rgdp\_d*), which are listed below:

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<sup>71</sup> Further on this point, see footnote no. 40 in this chapter.

| year | rgdp_d    |
|------|-----------|
| 1985 | -.0331325 |
| 1986 | .0031153  |
| 1987 | .0403727  |
| 1988 | .080597   |
| 1989 | .0635359  |
| 1990 | .0649351  |
| 1991 | .0560976  |
| 1992 | .034642   |
| 1993 | .0825893  |
| 1994 | .0639175  |
| 1995 | .1162791  |
| 1996 | .0902778  |
| 1997 | .0509554  |
| 1998 | .0484848  |
| 1999 | .0794798  |
| 2000 | .0548862  |
| 2001 | .0507614  |
| 2002 | .0664251  |
| 2003 | .0486976  |

## 7 Summary Conclusions and Agenda for Further Research

Part I of this study laid the theoretical grounds in support of state-contingent debt contracts. It found that there is a strong consensus within and between the relevant strands of sovereign debt and contract theory literature with regard to the benefits from state-contingent debt contracts. Such financial instruments should allow creditors' lending and relief operations to be optimally tailored to a debtor's repayment and debt carrying capacity, on the basis of a distinction between policy-induced and state-contingent factors. The desired contract outcome by either party to the contract is thereby achieved by locking in ex-ante lenders' optimal response functions to the states of nature contemplated by the (incomplete) contract, and by providing an enabling environment for contract renegotiation in relation to all the factors falling outside the realm of ex-ante regulation.

Part II of this study identified the shortcomings of the current IDA aid allocation and debt sustainability frameworks against the basic tenets of the theoretical literature, and in relation to their implications for a successful solution to low-income countries' long-standing debt crisis. It was pointed out that instead of addressing the vulnerability concerns of LICs in relation to exogenous causes, BWI lending and debt relief is centred on the CPIA, which fails to identify the sources of vulnerability. Instead, the CPIA embodies the multilateral agencies' optimism about the benefits of tying aid to their own model of the development process, and presents the essential vehicle for enforcing the BWI doctrine across the developing countries. However, as a result of its detachment from the central tenets of optimal debt contracting, the outcome of the BWI approach to aid and debt relief has been to consistently distort borrower's incentives to adhere to contractually defined conditionality, leading instead to a vicious cycle of exasperating reciprocal mistrust by both sides to the contract. Without downplaying low-income countries' own share of responsibility, the historical record of severe vulnerability to shocks and terms of trade deterioration against the background of inappropriate multilateral support should leave no

reasonable doubt about the BWI's responsibility for the failure of these countries to overcome their long-standing debt crises and to move on to a sustainable path of economic development.

Considerable emphasis within our assessment of the BWI approach was devoted to re-estimating the empirical grounds on which the new CPIA-centred DSF is built. Following a methodology similar to that adopted by Kraay and Nehru (2004) and related IMF analysis to identify the factors underlying debt distress episodes in low-income countries over the last few decades, we find that measures of economic vulnerability are highly significant predictors of crisis episodes, while the CPIA or KKM governance indices are not. We conclude that the empirical studies underlying the indicative CPIA-debt thresholds of the BWI-DSF do not represent a sufficiently robust basis on which to build the central thrust of the new DSF. Moreover, we note that without the crucial link provided by the CPIA, between selectivity-based aid allocation and debt sustainability analysis, the entire argument in support of the BWI approach collapses, and in its stead emerges its true aim of reinforcing *a priori* the role of the CPIA in determining the gradual shift from multilateral loan to grant financing.

Against the background of the continuing failure of the BWI to address the low-income countries debt and development crisis at its roots – namely shock vulnerability and long-term terms of trade deterioration – we argued that the stage is set for low-income countries' lasting debt sustainability to be further undermined by inappropriate multilateral policy, despite recurring debt relief initiatives. Against this background, Part III of the study advocated the introduction of a compensatory debt allocation and relief mechanism that would closely fulfil the requirements of an optimal debt contract, as suggested by the theory discussions of Part I. Our central aim was thus to define the basic elements of a so-called Contingency Debt Sustainability Framework, which would be able to identify and deal *ex-ante* with the key exogenous factors affecting repayment capacity, and to allow for renegotiation in relation to all the other factors affecting the donor-borrower relationship. The proposed solution lies in a scheme, which centrally rests on an accounting method suitable for distinguishing exogenous shock and trend factors from BOP variations that are under the partial control of country authorities, and which devises a set of



compensation and assessment facilities to deal comprehensively with the multifaceted causes of balance of payments vulnerability and the ensuing demand for development finance.

The simulated implementation of the CDSF to the representative case study of Uganda produced encouraging results, demonstrating the potential benefits of our proposal: the country would have been effectively insulated from the severe price shocks experienced during 1988-2002, and would also have received adequate compensation in the face of terms of trade deterioration. However, while emphasising its great potential, it should be highlighted that we presume neither that the basic scheme outlined in the preceding chapters could serve as an operational framework in its current form, nor that the empirical evidence produced provides a fully exhaustive demonstration of its suitability to achieve lasting sustainability in the case of all the LICs. Far from any such ambition, the present study hopes instead to represent a relevant contribution towards a more concrete definition of a debt sustainability framework based on the key insights from the relevant theory, but which was still outstanding in the extant literature. In order for this initial effort to eventually lead to the definition of a fully-fledged CDSF, we identify the following non-exhaustive list of analytical and empirical improvements as the central subject for future research:

1. By focussing exclusively on the balance of payments, the CDSF only looks at the external balance effects of debt financing. It is thus crucial that the accounting framework be integrated with a fiscal sheet, to capture the dimension of LICs' debt sustainability resulting from the fiscal accounts. In the above approach, the fiscal aspects of vulnerability have been conveniently assumed away, and with them all the complications relating to the definition of ex-ante instruments able to deal with fiscal and BOP shocks in combination.
2. The CDSF accounting method is to be refined with regard to its inclusiveness of factors affecting a LIC's key economic sectors and industries reflected in the aggregated balance of payments. It should be recalled from identities (9) to (12) of Chapter 5 that the measurement of actual against trend and hypothetical values is envisaged to include all of a country's main export and import sectors and

industries, in order to allow for a more detailed specification of the sources of BOP shocks. Unfortunately, from the publicly available datasets used for the current study it has not been possible to create a consistent dataset that would allow for a detailed breakdown of Uganda's key sectors and commodities over the entire period of simulation.<sup>1</sup> Future research will have to source the data from LICs' central authorities and agencies, and further explore the need for upgraded information processing and auditing systems by the BWI in order to guarantee the availability of timely data for the proposed accounting method to be fully practical. Probably, the contingency scheme will thereby have to be made sufficiently flexible to allow for interim compensations on the basis of provisional data, and to subsequently implement corrective measures as soon as consolidated data become available.

3. Contingency accounting is also to be revised in relation to its specification of the variables affecting hypothetical series. For example, with regard to trade balance volumes, simple indexing to world demand and GDP, as the CDSF does, is not fully suitable to capture the key factors determining change in real exports and imports flows. Furthermore, the methodology identifying exogenous shocks ought to be expanded to the non-debt creating financial flows of the balance of payments, as suggested in Chapter 5.
4. The question of equity and fairness of any country-specific compensatory scheme, among LICs and between LICs and the rest of the aid-recipient community, needs to be further addressed before it could possibly be implemented. In particular, questions arise in relation to the definition of countries' qualification and graduation procedures from the contingency scheme, and the related implications in terms of adverse selection problems. Similar concerns apply to the coordination problems affecting the donor community, particularly with regard to the CDSF's performance assessment in view of the likely incompatibility

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<sup>1</sup> The Bank of Uganda (BOU) collects all the data relating to the trade balance from the various line ministries (the Customs Office, in particular) and the Central Office of Statistics. However, the author's request to BOU for a detailed dataset for the purpose of the current study has not been granted, and instead reference was made to the annual and quarterly BOU reports for all the data available.

between the specific conditions on policy and assessment methodology requested by single donors or group of donors.<sup>2</sup>

5. Following the above revisions, more research needs to be devoted to modelling and simulating the contingency mechanism's performance and cost implications across countries and time. In order to fully gauge the likely benefits from the CDSF in terms of broader balance of payments and macroeconomic sustainability, rather than sustainability of external debt alone, a fully-fledged simulation framework would draw from the more advanced versions of World Bank's Revised Minimum Standard Model (RMSM XX) and structuralist CGE models. Closing these models in line with the three-gaps approach to the role of external development finance – thus including a fiscal gap – would appear to be the most promising line for future research in this direction, in conjunction with the application of bootstrapping methodologies to emulate LICs' historical BOP vulnerability in the assessment of the CDSF under the occurrence of a range of likely shock scenarios.

Finally, we believe that the relevance of this thesis and the future research that will build on it goes beyond the narrower focus of debt sustainability, particularly with regard to its implications on the aid allocation debate and the broader literature on development financing. For example, recent contributions within the aid effectiveness literature have shown the benefits from aid to be highest when funds are disbursed in response to (or concomitant with) negative exogenous shocks (e.g. Collier and Dehn, 2001; Guillaumont and Chauvet, 2001). However, the empirical assessment of the growth impact of shocks-targeted aid has been lacking a suitable method to identify the broader range of BOP shocks affecting aid recipients. Therefore, estimations had to rely mainly on simple shock indices (e.g. Dehn, 2000b), which entered the aid-allocation models applied to longitudinal datasets (Collier and Dehn, 2001; Alesina and Dollar, 2000; Guillaumont and Chauvet, 2001). As a result, the growth-enhancing role of vulnerability-targeted aid is likely to have suffered from a relatively severe underestimation bias. By providing a more comprehensive

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<sup>2</sup> A point brought to our attention by Dr Jane Harrigan, at the presentation of excerpts from this thesis at a workshop held at SOAS in November 2006.

method to identify BOP shocks and to quantify the ensuing liquidity implications, a fully-fledged CDSF accounting mechanism could provide a fundamental element to re-estimate aid-effectiveness in view of LICs' BOP vulnerability. The possible applications could include a panel approach capturing historical BOP vulnerability across developing countries, to test the findings of the critical literature that has countered the aid-policies-growth link advocated by Burnside and Dollar (2000) and subsequent research in that line. Furthermore, the CDSF simulation framework modelled along the lines of a structuralist CGE could lead to interesting results highlighting the potential benefits of targeting aid according to shocks and vulnerability criteria, in comparison to the CPIA and the Country Performance Rating more generally.

A further point of broader relevance of this thesis, beyond the main focus of debt sustainability, can be identified in its role of having highlighted the lack of robustness of BWI empirical analysis, as mentioned above. Similarly to Hansen and Tarp (2001) and related studies, which forcefully challenged the empirical grounds underlying the aid-policy link identified by Burnside and Dollar (2000), our empirical work in this thesis corroborates the critical view about IMF and World Bank research practices, which all too often appear to be tailored to favourably support *a priori* the policy conclusions set by the BWI's Boards of Governors. However, against the practice of weeding out findings that contradict BWI orthodoxy, and to use favourable research instead – as an independent evaluation report of World Bank research recently attested (Deaton et al., 2006) – it is crucial that critical findings be produced and disseminated through the appropriate channels. In this regard, it is unfortunate that the research community seems not to be devoting sufficient efforts to examining more thoroughly the empirical analyses produced by the BWI in support of their central policy frameworks, thus failing to more effectively counter the unchallenged proliferation of largely unsubstantiated orthodoxy. From this perspective, it is hoped that the empirical part of this thesis will raise the necessary interest to stimulate further contributions from other researchers, to ensure that the fundamental criticism of the BWI empirics will not go unnoticed.

A final area of influence of the present study has been identified in the field of multilateral trade regulation. Particularly within the World Trade Organization, there

has been much debate recently about the way in which the international regulatory trade framework could be modified in order to optimally capture developing countries' need for special and differential treatment (SDT). While proposals for a progressive approach to WTO regulation according to the specific economic vulnerabilities faced by single member countries have recently been advanced (e.g. Cottier, 2006), the discussions in the trade-related literature about suitable methods for classifying and dealing with country vulnerability are still at an early stage. It would thus appear that there exists some scope for a method similar to the CDSF accounting framework to be applied to the trade-regulatory framework, particularly with regard to a sector and/or product-specific analysis of vulnerability.

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