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ECONOMIC ASSISTANCE MODALITIES IN BI- AND MULTILATERAL DEVELOPMENT COOPERATION: ESSAYS IN APPLIED DEVELOPMENT ECONOMICS

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List of Acronyms

AfDB	African Development Bank
AfDF	African Development Fund
ATET	Average Treatment Effect on the Treated
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CIESIN	Center for International Earth Science Information Network
CRS	Creditor Reporting System
EC	European Commission
EFA	Explanatory Factor Analysis
E-HIPCI	Enhanced Heavily Indebted Poor Country Initiative
FE	Fixed Effects
FH	Freedom House
FH CLI	Freedom House Civil Liberties Indicator
FH PRI	Freedom House Political Rights Indicator
GBS	General Budget Support
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GFS	Government Finance Statistics
GII	Global Integrity Initiative
GMM	Generalized Methods of Moments
GNI	Gross National Income
HIPC	Heavily Indebted Poor Country
HIPCI	Heavily Indebted Poor Country Initiative
ICRG	Intra Country Risk Guide
IDA	International Development Association
IDB	Inter-American Development Bank
IDHA	International Development and Humanitarian Assistance
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IMF	International Monetary Fund
LIC	Low Income Country
LMIC	Lower Middle Income Country
MCA	Millennium Challenge Account
MDRI	Multilateral Debt Relief Initiative
NGO	Non-Governmental Organization
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development

OECD/DAC	Development Assistance Committee of the OECD
OLS	Ordinary Least Squares
PAF	Policy Assessment Framework
PFM	Public Financial Management
PPGD	Public and Publically Guaranteed Debt
PRGF	Poverty Reduction and Growth Facility
PRS	Poverty Reduction Strategy
PRSC	Poverty Reduction Support Credit
PRSP	Poverty Reduction Strategy Paper
PV	Present Value
RDB	Regional Development Bank
RE	Random Effects
RMSR	Root Mean Square Residual
SPA BSWG	Budget Support Working Group of the Strategic Partnership with Africa
SSA	sub-Saharan Africa
TFP	Total Factor Productivity
TLI	Tucker-Lewis-Index
UIS	UNESCO Institute for Statistics
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
WDI	World Development Indicator
WGI	World Wide Governance Indicator
WGI CC	World Wide Governance Indicator Control of Corruption
WGI GE	World Wide Governance Indicator Government Effectiveness
WGI RL	World Wide Governance Indicator Rule of Law
WGI RQ	World Wide Governance Indicator Regulatory Quality
WGI VA	World Wide Governance Indicator Voice and Accountability
WHO	World Health Organization
YCLEP	Yale Center for Environmental Law and Policy

1. General Introduction

General Introduction

"Development economists have long known the answers on how to achieve development. The only problem is that those answers have kept changing over time." – Easterly (2012)

During the 1990s, to many observers it became increasingly clear that conventional wisdom in development economics and policy, which was primarily informed by the "Washington Consensus," had been a rather painful and costly experience for many developing countries, and had failed to yield the intended results. As early as 1991, a team of economists tasked with reviewing and evaluating the World Bank's development assistance operations cautiously indicated that structural adjustment lending, which had been adopted in response to the Latin American debt crisis, had thus far been a mixed blessing at best (Thomas et al. 1991).[1] While economists continue to debate the extent to which structural adjustment lending accompanied by a neo-liberal conditionality framework has been a principal cause of poor development outcomes, even the Bretton Woods Institutions were forced to acknowledge that their policy prescriptions had failed to produce the intended results (World Bank, 2005). The most evident failure in this context was the economic and political collapse of sub-Saharan Africa, which by 2000, aside from a few exceptions, had reached calamitous dimensions:

> *Nearly all of sub-Saharan Africa has been transformed from the heady optimism and enormous promise of early independence to almost unspeakable suffering. Many nation-states have descended at least once into chaos: Angola, Burundi, Ethiopia, Liberia, Mozambique, Rwanda, Sierra Leone, Somalia, Sudan, Uganda, and Zaire (now Congo) have all seen periods in which civil order collapsed completely.* (Lindauer et al., 2002)

[1] The Washington Consensus was a set of universal policy and reform measures that developing countries' governments were requested to implement as a condition for aid in order to accelerate economic development. Conditions included: i) establishing macroeconomic stability by controlling inflation and fiscal deficits; ii) opening economies to the rest of the world through trade and unrestricted capital flows; and iii) liberalizing domestic product and factor markets through privatization and deregulation (Gore, 2000, 789). As described by Gore (2000), these reform measures were propagated in the form of conditionality attached to the structural adjustment lending operations of the IMF and World Bank.

With the increasing reluctance of many recipient countries to subject themselves to the policy conditionality of the IMF and World Bank, and in light of a growing recognition that the Washington Consensus had been a failure, the absence of a coherent and broadly supported development strategy became all too apparent (Lindauer et al., 2002; World Bank, 2005; Rodrik, 2006). The only point on which consensus could be achieved was that there was *no unique set of rules* to guide development policy (World Bank, 2005).

As early as the second half of the 1990s, conventional wisdom began to change, particularly in the following three areas:

First, during the 1990s it became evident that a substantive reduction in the external public debt held by Highly Indebted Poor Countries (HIPCs) was a necessary precondition for macroeconomic growth and social stabilization. Repeated rounds of structural adjustment lending in increasingly difficult macroeconomic and fiscal environments had substantively contributed to the accumulation of public debt. As early as the second half of the 1980s external debt stocks in many HIPCs had become excessive, with many debtor countries undergoing the serial rescheduling of their debt. Under growing pressure, in 1995 the World Bank and the IMF agreed to participate in the implementation of the HIPC Initiative, a comprehensive and once-and-for-all debt reduction program that would encompass multilateral, bilateral, and private debt (Callaghy, 2004). The core objective of the HIPC Initiative and, later, the Enhanced HIPC Initiative was to return the external debt stocks of highly indebted poor countries to sustainable levels (World Bank and IMF, 1996). Following demands by OECD and Paris Club members who had made the greatest contribution to financing the HIPC, in 2006 the HIPC Initiative was followed by the Multilateral Debt Relief Initiative, which was to focus solely on the comprehensive reduction of HIPCs' remaining multilateral debt.

Second, while it was acknowledged that the conditionality applied in the context of the IMF's and the World Bank's structural adjustment lending operations were to narrow and had on many occasions been counterproductive, a growing strand in the literature, both from inside development institutions and from academia, suggested that the stagnation or even reversal in socio-economic development experienced in sub-Saharan Africa during the 1980s and 1990s was to large extent caused by a lack of effective government institutions and bad policies. Consequently, while matters of institutional development, democratic legitimacy, and accountability had been of ancillary importance to geo-political and geo-strategic considerations for aid allocation during the Cold War era, in the second half of the 1990s, *good governance* emerged as the new *sine qua non* of development cooperation (for example Dornboos, 2001; Hermes and Lensink, 2001; Chhotray and Hulme, 2009). A seminal paper by Burnside and Dollar (2000), which identified a strong relationship between sound policies and economic growth, as well as an abundant subsequent research provided the empirical grounds for a realignment of aid allocation mechanisms towards

explicit or implicit conditionality on *good governance* (for example, Berthélemy and Tichit, 2004; Burnside and Dollar, 2004; Arndt and Oman, 2006).

Third, as consensus was now limited to the insight that there was no single set of rules for the design of effective development assistance, recipient countries were requested to take more initiative and to develop national so-called Poverty Reduction Strategies that would reflect their individual developmental needs and priorities. At a series of high-level forums in Monterrey, Rome, and Paris a new consensus emerged on how bi- and multilateral development assistance could be provided effectively and more coherently. The 2002 Monterrey Conference on Financing for Development placed *ownership* and *good governance* at the core of the new development strategy. Furthermore, it was considered necessary to harmonize donor activities, which were often highly fragmented and uncoordinated, in order to reduce transaction costs for recipient countries and align aid efforts with nationally owned development strategies. At the Rome High Level Forum on Aid Harmonization, held in spring 2003, the heads of the major bi- and multilateral donor agencies declared:

> *We in the donor community have been concerned with the growing evidence that, over time, the totality and wide variety of donor requirements and processes for preparing, delivering, and monitoring development assistance are generating unproductive transaction costs for, and drawing down the limited capacity of, partner countries. We are also aware of partner country concerns that donors' practices do not always fit well with national development priorities and systems, including their budget, program, and project planning cycles and public expenditure and financial management systems. We recognize that these issues require urgent, coordinated, and sustained action to improve our effectiveness on the ground.* (OECD, 2003b)

Based on this insight, in 2005 a new development agenda was developed at the Paris High Level Form on Aid Effectiveness, based on four core principles for improving development assistance:

i) Ownership, i.e. developing countries must *set their own strategies for poverty reduction, improving institutions, and tackling corruption;*
ii) *Alignment, i.e. donors must commit themselves to align behind nationally owned development objectives and strategies, as well as make use of domestic institutions*, particularly national budgets, to provide assistance;
iii) Harmonization, i.e. donors must coordinate their activities and where possible develop joint programs and simplify their procedures, particularly their implementation requirements; and
iv) Results, i.e. a stronger emphasis on outcomes, with clear evaluation procedures on the impact of donor interventions.

At least pro forma, this meant a fundamental shift in the way development assistance was to be provided. Instead of imposing conditionality and demanding policy alignment in recipient countries, donors were now expected to draw their conditionality from a comprehensive domestic strategy for development and poverty reduction, elaborated by the national government and civil society. Furthermore, as previous forms of aid delivery – which included a wide variety of donor requirements and processes for preparing, delivering, and monitoring development assistance – were considered to generate unnecessary transaction costs and strain the resources of development countries, it was agreed that donor programs should be aligned with national procedures for planning, implementation, and monitoring (Knoll, 2008). This change included having donor funds flow through recipient countries' national budgets. In the light of these new requirements, several aid modalities emerged.

The three subsequent chapters of this dissertation analyze several aspects of these recent changes in the conventional wisdom on development economics and in the modalities of aid delivery:

Chapter 2 deals with the prominence of the governance concept. In recent years, the supply of governance indicators has risen exponentially in line with the development community's growing demand for quantifiable metrics of good governance. Recent estimates suggest that there are currently more than 140 sets of indicators available, comprising several thousand individual quantitative measures (World Bank Institute, 2006). The best-known indicators are those provided by the World Bank Institute, Freedom House, the Heritage Foundation, and Transparency International. Because of their extensive country coverage, sophisticated statistical methodology, and excellent methodological documentation, the indicators by the World Bank Institute have been widely used and quoted in recent years (Kaufmann et al., 2008).

The most prominent example of the application of these governance indicators is the US Millennium Challenge Account (MCA), a bilateral development assistance program launched in 2003 with an annual volume of 1.7 billion USD (Tarnoff, 2009; The White House, 2010). In the process of selecting potential beneficiary countries a set of perception-based governance indicators is applied as ex-ante conditionality. Only countries that have a track-record of above average performance according to these indicators may qualify for assistance under the MCA.

Chapter 2 assesses the validity of the governance indicators used by the MCA for ex-ante conditionality, and seeks to determine whether sound and robust measures for the quality of governance are actually available in the context of development economics. The results of the empirical analysis undertaken in this chapter suggest that while the indicators applied by the MCA purport to measure seven distinct dimensions of governance, only two discrete underlying dimensions, the perceived 'participatory dimension of governance' and the perceived 'overall quality of governance', can actually be identified. The results also show that some of the doubts

that have been raised concerning the validity of perception-based governance indicators are less warranted when the indicators are applied exclusively to developing countries.

However, the research presented here shows that the meaningful application of quantitative perception-based governance indicators for the allocation of ODA is a difficult undertaking that is fraught with problems. This is primarily because of intractable uncertainties regarding measurement reliability and the conceptual validity of the selected metrics. The seven indicators applied by the MCA appear to have been selected in a somewhat arbitrary manner, in the absence of an effort to scrutinize their measurement validity and dimensionality. The result is a distorted and only ostensibly quantitative and objective allocation mechanism for development assistance.

Chapter 3 aims to contribute to another main strand of discourse in development economics and policy over the last two decades: The role of external public debt. At the end of the 1980s Krugman (1988) and Sachs (1989), who in response to the Latin American debt crisis each published seminal theoretical contributions on the adverse effects of excessive public debt, proposed debt relief as an appropriate means for stimulating productivity enhancing investment and encouraging structural adjustment. The hypothesis developed by Krugman (1988) and Sachs (1989) – namely, that the over-accumulation of external debt creates negative incentives for investment and macroeconomic policy reform – has been a centerpiece in the debt discourse. The HIPC Initiative and the MDRI, which represent the largest and most comprehensive efforts to permanently eliminate unsustainable levels of public external debt in developing countries thus far, were both implemented on the assumption that the removal of excessive debt burdens would boost investment and economic growth. Using a quasi-experimental research design to compare the performance of investment and growth between low income countries that have benefited from relief and those that have not, this chapter assesses whether debt relief under the HIPC-Initiative and MDRI has yielded the expected effects. Unfortunately, the results indicate that while debt relief programs have led to higher private-sector investment in beneficiary countries, they have not had any measurable effect on public sector investment and growth. While the reasons for this outcome are not entirely clear, they cast doubt on assumptions concerning the benefits that accrue to LICs as a result of debt relief.

The last chapter of this dissertation is concerned with the evolution of new instruments and modalities of development finance. The most prominent of these is General Budget Support (GBS). GBS, jointly provided by a group of bi- and multilateral donors to the central governments' budgets or to a specific sector, appeared to cater to various requirements that were part of the new consensus in development cooperation. First, the aid delivery is un-earmarked, untied, and fungible, and therefore can be allocated according to national priorities – a substantive element of the ownership concept. Furthermore, unlike project aid, the on-budget funding makes the government the owner of the prioritization, planning, and implementation process. Second, donor harmonization is, compared to other aid delivery instruments, easy to achieve. Amongst donors, consensus has to be reached only on conditionality; on reporting, review, and monitoring

procedures. Third, from the donors' perspective, thanks to harmonized conditions, control over the process remained quite significant. Fourth, as a relatively fast disbursement instrument, GBS allows donors to meet their commitments for scaled-up aid (Knoll, 2008). As a consequence, GBS schemes have been adopted in a number of developing countries, particularly in sub-Saharan Africa. However, the provision of budget support was and still is associated with the concern that due to its highly discretionary character, it provides recipient governments with a substitute for domestic revenue collection, thus increasing aid dependency. Recent empirical research suggests that high levels of development aid, particularly if provided in the form of grants, are, indeed, associated with lower revenue efforts and a higher degree of aid dependency (Gupta et al., 2004; Gupta et al., 2004; Gupta, 2007; Clist and Morrissey, 2011).

As joint GBS financing is a relatively recent form of aid, an empirical assessment of its revenue mobilization impacts has not previously been undertaken. Therefore, the last chapter of this dissertation, applying a model for recipients' fiscal responses to budget aid, explores the extent to which new GBS programs have been able to overcome the conundrum whereby high levels of on-budget aid may potentially result in negative fiscal incentives. The analysis covers the period from 2000 to 2008 and comprises 37 sub-Saharan developing countries. According to the empirical results, joint on-budget assistance financing – although highly discretionary – does not undermine recipients' revenue mobilization efforts. On the contrary, while aid in general has no measurable impact on recipients' revenue performance, GBS programs are found to be associated with higher revenue mobilization. This suggests that on-budget aid, when coupled with well-targeted conditionality, and intensive policy dialogue, successfully mitigates adverse resource mobilization incentives and enhances fiscal space.

In summary, the contributions of this dissertation suggest that while the change in the conventional wisdom has led – at least with regard to outputs – to a partly successful revision of how development assistance is being provided, several underlying assumptions and hypotheses that inform these new approaches and modalities of assistance are rather fragile. While this certainly is not a very comforting insight, it may be helpful in the sense that it prevents the reemergence of a universalistic and prescriptive stance in development economics and policy.

2. The Good Governance Indicators of the Millennium Challenge Account: How many dimensions are really being measured?[2]

Joint work with Petra Zloczysti

Abstract

This paper assesses the validity of the perception-based governance indicators used by the US Millennium Challenge Account (MCA) for aid allocation decisions. By conducting Explanatory and Confirmatory Factor Analysis of data from 1996 to 2009, it shows that although the MCA purports to measure seven distinct dimensions of governance, only two discrete underlying dimensions, the perceived 'participatory dimension of governance' and the perceived 'overall quality of governance,' can be identified. The results also show that some of the doubts that have been raised concerning the validity of perception-based governance indicators *are less warranted when the indicators are applied exclusively to developing countries.*

Keywords: Aid Allocation, Governance Indicators, Factor Analysis, MCA, United States

JEL Classification: C38, F35, O10, O51

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2.1 Introduction

In 2003, the Bush administration launched the US Millennium Challenge Account (MCA), an innovative development assistance program whose aid allocation mechanism is largely based on a competitive assessment of developing countries' governance performance. In contrast to the donor agencies who, in response to the aid effectiveness debate, implemented new or modified existing aid programs in order to encourage improved governance under existing partnership frameworks, the MCA made good governance an explicit and rigid precondition for the granting of aid to developing countries. The MCA is the first and only bilateral aid agency that has adopted a competitive aid allocation mechanism which explicitly relies on a set of publicly available governance indicators.

With the MCA's increasing significance – the program has since its foundation in 2003 committed nine billion US dollars in grants to 18 developing countries – an extensive debate on its modalities of delivery has ensued. Various aspects, such as the strictly bilateral approach to program implementation without participation in donor harmonization efforts on the ground; its ambiguous relationship to existing US aid agencies such as USAID; and the issue of funding volumes and the absorptive capacities of recipient countries, have been abundantly analyzed and discussed (see for example Sperling and Hart, 2003; Clemens and Radelet, 2003).

Yet little attention has been devoted thus far to a key question: Are the perception-based governance indicators used by the MCA conceptually valid, robust, and therefore appropriate for making aid-allocation decisions? In light of the general debate that has emerged on whether perception-based governance indicators satisfactorily measure and distinguish between various dimensions of governance, this question is particularly salient (Langbein and Knack, 2010; Thomas, 2010; Arndt and Oman, 2006).

This paper discusses the validity of the MCA's governance assessment framework. In particular, it explores the merits of the argument often voiced in the literature that the perception-based governance indicators used by the MCA fail to distinguish between various dimensions of governance, especially in the case of developing countries. Using standard statistical techniques to detect latent variables, including Explanatory and Confirmatory Factor Analysis, we find that while the MCA ostensibly measures seven distinct dimensions of governance, only two distinct underlying dimensions – namely, the perceived *participatory dimension of governance* and the perceived *overall quality of governance* – can be identified. The results suggest that the general doubts that have been voiced concerning these indicators – in particular the singular dimensionality of perception-based governance indicators are less warranted when the indicators are applied exclusively to developing countries.

The following section reviews the current debate on the reliability and validity of perception-based governance indicators. Section 2.3 provides an overview on the MCA's program modalities and its allocation mechanism. Section 2.4 assesses empirically to what extent the MCA's specific indicator-based method for measuring the quality of governance is reliable, robust and conceptually valid.

2.2 Literature Review

While issues such as institutional development, democratic legitimacy, and accountability were of ancillary importance to geo-political and geo-strategic considerations for aid allocation during the Cold War era, in the 1990s *good governance* emerged as the new *sine qua non* of development cooperation (for example Dornboos, 2001; Hermes and Lensink, 2001; Chhotray and Hulme, 2009). The seminal paper by Burnside and Dollar (2000), which identified a strong relationship between sound policies and economic growth, as well as an abundance of subsequent research provided the empirical grounds for a realignment of aid allocation mechanisms towards explicit or implicit conditionality on good governance (for example Berthélemy and Tichit, 2004; Burnside and Dollar, 2004; Arndt and Oman, 2006).

In recent years, the supply of governance indicators has risen exponentially in line with the development community's growing demand for a quantifiable operationalization of the governance concept. The World Bank Institute suggests that there are currently more than 140 sets of indicators available, comprising several thousand individual quantitative measures (World Bank Institute, 2006). The best-known indicators are those provided by the World Bank, the World Bank Institute, the International Country Risk Guide, Freedom House, the Heritage Foundation, and Transparency International. Because of their extensive country coverage, sophisticated statistical methodology, and excellent methodological documentation, the indicators provided by the World Wide Governance Project of the World Bank Institute have in recent years advanced to become the most widely used and quoted governance indicators (Kaufmann et al., 1999a; 1999b; 2004; 2005; 2007a; 2008; Arndt, 2010).[3]

Recent research has discussed several aspects of conceptual and technical limitations of perception-based governance indicators in general, and the World Wide Governance Indicators (WGIs) in particular. Kurtz and Schrank (2007) suggest that the dominant measures of governance, in particular the WGIs, are problematic and suffer from perceptual biases and adverse selection in sampling. Similarly, Thomas (2010) warns that lacking empirical evidence in support of their construct validity, the WGIs might amount to little more than an elaborate but unsupported hypothesis. Langbein and Knack (2010) generally question the ability of the WGIs to measure

[3] The Worldwide Governance Indicators were initially developed by Daniel Kaufmann, Aart Kraay, and Pablo Zido-Lobatón in 1999. Since 2003 the authors' team has been composed of Daniel Kaufmann, Aart Kraay, and Massimo Mastruzzi.

distinct underlying concepts and present empirical evidence of strong content overlap and a tautological construct.

Due to a lack of alternatives, these perception-based indicators are nevertheless used for ranking countries and for subsequent aid allocation (Kaufmann et al., 2002); the most prominent example being the MCA. Accordingly, the question is naturally raised as to whether these indicators are suitable for assessing policy performance in developing countries.

The existing literature focuses to large extent on some general properties of governance indicators (e.g. Kurtz and Schrank, 2007; Langbein and Knack, 2010), including their intertemporal incomparability, the limitations of cross-country comparability due to large standard errors, and the methods used to aggregate a varying number of source measures (Kaufmann et al. 2007b). The present paper instead seeks to make a unique contribution by assessing to what extent the application of these indicators to developing countries yields reliable and robust conclusions in terms of dimensionality and measurement reliability. In this way, the analysis, which specifically examines the MCA's aid allocation mechanisms, aims to provide important insights into the dimensionality and validity of governance assessments of Low Income Countries (LICs).

2.3 The Millennium Challenge Account

2.3.1 Scale and scope

At the 2002 UN Financing for Development Conference, President G.W. Bush announced the establishment of a new Millennium Challenge Account to provide an additional five billion dollars per year in grants to developing countries. In the words of the President, aid would be disbursed to those countries that *govern justly*, *invest in their people*, and *encourage economic freedom*.[4] Aside from the amount of aid promised, the most notable aspect of the MCA program is its competitive allocation process, which uses predefined and transparent governance measures to determine country eligibility. This means that the MCA's mechanism to identify eligible countries is clearly segregated from US foreign policy objectives; an aspect that has received considerable attention (Radelet, 2002a; 2002b; OECD, 2003a).[5] Furthermore, the program displays a commitment to strengthening recipient ownership and accountability by assigning developing countries the lead in program development and implementation. This has been perceived as a progress towards delivering on the commitments to provide more effective aid made by the international donor community at Monterrey.

[4] See: Remarks to the United Nations Financing for Development Conference in Monterrey, Mexico, March 22, 2002.

[5] Foreign policy objectives might well play a relevant role when the compact volumes are determined. The volume of overall commitment is formally framed by the MCA's administration on basis of the compact program proposal submitted by eligible countries.

Although the original commitment of an additional five billion US dollars per year has never been met, the scale of MCA funds is significant in both absolute and relative terms (Table 1). In 2008, funds appropriated under the new program amounted to 1.75 billion US dollars and accounted for approximately 12.5 per cent of US core development assistance, as classified under the budgetary sub-function International Development and Humanitarian Assistance (IDHA).[6]

Table 1: MCA Appropriations in USD Billions

	2004	*2005*	*2006*	*2007*	*2008*	*2009*
MCA funds requested by the President	1.300	2.500	3.000	3.000	3.000	2.225
MCA funds appropriated by Congress	0.994	1.488	1.752	1.752	1.752	1.486
US International Development and Humanitarian Assistance*	13.807	17.696	16.693	15.524	14.074	22.095
MCA funds as a percentage of US International Development and Humanitarian Assistance	7.20	8.41	10.50	11.29	12.45	6.73

* *According to outlays of functions and sub-functions of the Office of Management and Budget of the White House. This includes funding for bilateral development programs such as USAID, the MCA, the Global HIV/AIDS Fund, assistance to transition countries, contributions to multilateral organizations, the Child Survival and Disease Program, humanitarian aid, emergency relief, migration and refugee assistance, and efforts to combat the drug trade.*

Source: Tarnoff (2009) and The White House (2010).

This is a substantial figure, considering that a large share of US assistance subsumed under the IDHA function is dedicated to emergency relief or tied to reconstruction programs from the military interventions in Afghanistan and Iraq. Since fiscal year 2004, a total of 9.22 billion US dollars has been appropriated to the MCA from the US federal budget.[7] So far, 18 recipient countries have received funding through so-called Millennium Challenge Compacts.[8]

In order to realize the MCA's transformational potential and encourage recipient countries to implement projects and programs critical to their economic and social development, the MCA intended to place its assistance among the top aid donors in eligible countries (Nowels, 2006). Over the last five years the financial value of compact programs has constantly increased. While the compact agreements signed in 2005 averaged around 180 million US dollars, more recent programs have been significantly larger in size, with commitments in 2008 reaching an average of approximately 450 million US dollars. In several heavily-aided developing countries that receive

6 Data reported under this sub-function are not identical with OECD/DAC Official Development Assistance (ODA) figures as the two statistical concepts diverge significantly. A comparison of Official Development Assistance and US Foreign Assistance Reporting can be found under http://gbk.eads.usaidallnet.gov/about/reporting_comparison.html.

7 However, program disbursal is significantly behind schedule. By March 2009 only USD 1.2 billion had been released for projects and programs under implementation (Tarnoff, 2009).

8 The countries are Armenia, Benin, Burkina Faso, Cape Verde, El Salvador, Georgia, Ghana, Honduras, Lesotho, Madagascar, Mali, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Tanzania, and Vanuatu.

significant amounts of aid, including Burkina Faso, Ghana, Mozambique, and Tanzania, the MCA has become one of the largest bilateral development assistance programs (Tarnoff, 2009; OECD/DAC CRS, 2011).

2.3.2 The MCA's allocation methodology

Recipient countries are selected based on three-step procedure:[9]

i) Each year *candidate countries* are identified according to GNI per capita thresholds, as defined by the World Bank's International Development Association (IDA) for Low Income Countries (LICs) and Lower Middle Income Countries (LMICs).[10] Countries subject to legal provisions prohibiting assistance by US legislation are excluded (Millennium Challenge Act of 2003 Sec. 606(a) (1) (b)).

ii) On the basis of a range of third-party indicators (17 at present), grouped into three broad policy dimensions – *ruling justly*, *investing in people*, and *economic freedom* – the MCA's board subsequently determines which of these *candidate countries* are generally eligible for MCA assistance (Table 2).[11] To qualify for funding, countries must perform above the median in the first governance indicator under the *ruling justly* category (the World Bank Institute's *Control of Corruption* indicator) in relation to their peers, i.e. other LICs or LMICs, and score above the median in at least half of the indicators under each of the three policy categories.[12]

iii) Finally, *eligible countries* may prepare and negotiate compact program proposals.

Selection of eligible countries depends in large part on their perceived *good governance* performance: The *ruling justly* category consists solely of indicators measuring governance *outcomes*.[13]

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9 To encourage committed non-qualifying countries to improve their overall governance and service delivery performance the MCA also provides funding under so-called 'Threshold Programs'. Threshold Programs aim to help countries undertake institutional and policy reforms in areas where they have failed to meet MCA's performance criteria. According to current legislation, not more than 10 percent of overall MCA appropriations may be provided to Threshold Countries (Nowels, 2006).

10 The definition follows the thresholds as defined in the World Bank's lending categories and not according to the analytical classifications of the World Development Indicators. In fiscal years 2004 and 2005, candidate status was restricted to LICs only. For thresholds in current USD see Appendix II.

11 This refers to the list of indicators for fiscal year 2009. Indicators have been repeatedly revised and amended (MCA, 2004; 2005; 2006; 2007; 2008; 2009).

12 The board is however left with substantial discretion in selecting eligible countries: 'A review of the history of the MCA selections suggests that the Board is guided by, but not entirely bound to, the outcome of the performance indicator review process; board members can apply discretion in their selection. Performance trends, missing or old date, and recent policy actions might come into play during selection deliberations.' Further: 'The Board also examines whether a country performs substantially below average on any single indicator and whether their selection was supported by supplemental information' (Tarnoff, 2009).

13 It is important to note that the indicators used here measure perceived governance outcomes and do not compare institutions which would require a deeper *de jure* analysis.

Table 2: Indicators used in 2009

Category	Indicator	Type/Remarks	Source
Ruling Justly	WGI Control of Corruption (WGI CC)*	Perception-based composite indicator measuring the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.	World Bank Institute (WGI Project)
	WGI Government Effectiveness (WGI GE)*	Perception-based composite indicator measuring the quality of public services, the quality of the civil service, and the degree of its independence from political pressures, the quality of policy formulation, and implementation, and the credibility of the government's commitment to such policies	
	WGI Rule of Law (WGI RL)*	Perception-based composite indicator measuring the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.	
	WGI Voice and Accountability (WGI VA)*	Perception-based composite indicator measuring citizens' ability to participate in selecting their government, freedom of expression, freedom of association, and a free media.	
	Political Rights (FH PRI)	Perception-based indicators consisting of three (FH PRI) and four (FH CLI) sub-categories measuring on a 40 (FH PRI) and 60 (FH CLI) point scale to what extent universal political rights and civil liberties can be freely exercised. Assessment is undertaken by selected analysts and affiliated advisers.	Freedom House
	Civil Liberties (FH CLI)		
Investing in People	Immunization Rates	Un-weighted average of (third dose of diphtheria toxoid, tetanus toxoid, and pertussis vaccine) DPT3 and measles immunization rates.	WHO
	Public Expenditure on Primary Education	Total expenditures on primary education by government divided by GDP	UNESCO's Institute of Statistics (UIS) National Governments (secondary source)
	Public Health Expenditure	Measures General Government Health Expenditure (GGHE) as share in GDP	WHO
	Primary Girls' Education Completion Rate	Gross intake ratio to last grade of primary education for females, measuring the total number of new female entrants in the last grade of primary education, regardless of age, as a share of the total female population of theoretical entrance age.	UIS
	Natural Resource Management	Index indicator calculated as un-weighted average from Eco-Region Protection, access to clean water and sanitation, and child mortality	CIESIN and YCLEP
Economic Freedom	Inflation Rate	Measures annual percentage change averages in consumer prices for the year. Hurdle currently set at 15 per cent.	IMF World Economic Outlook
	Fiscal Policy	Share of central government's budget deficit including the consolidated public sector in GDP, averaged over a three-year period.	IMF World Economic Outlook and National Governments
	Trade Policy	Composite indicator measuring scale of tariff and non-tariff trade barriers relative to all other countries using average tariff rates and a non-tariff barrier penalty scale.[14]	Heritage Foundation
	WGI Regulatory Quality* (WGI RQ)	Perception-based composite governance indicator measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank Institute
	Business Start-Up	Index indicator ranging from 0 to 1 calculated from the un-weighted average of the two index sub-indicators 'number of days to start a business' and 'cost of starting a business' as percentage of GNI per capita.	IFC
	Land Rights and Access	Weighted average calculated from IFAD's Access to Land indicator (50 per cent) and IFC's indicators measuring the days and the costs to register property (25 per cent each).	IFAD and IFC

** Definitions taken from Kaufmann et al., (2007a).*

Furthermore, one of the six governance indicators in this category, the Control of Corruption indicator, serves as an absolute hurdle. Thus, in an extreme case, a candidate country may

[14] The indicator draws on trade-weighted average tariff rates and penalty scores for non-tariff barriers (NTB). Weights are calculated based on the share of imports for each good. Penalty scores reflect the extent to which NTBs are used to impede imports of goods and services. See also http://www.heritage.org/index/Download.aspx.

perform well on 16 of the 17 indicators, but fall below the median on the Control of Corruption indicator, thus become ineligible for aid (Radelet, 2002b). In total, seven of the 17 MCA policy measures are governance indicators.

Two of the seven indicators, the Civil Liberties Indicator (CLI) and the Political Rights Indicator (PRI), are compiled by the conservative Washington-based think tank Freedom House (FH). According to Freedom House's methodological note, the FH PRI aims to map the quality of the electoral process, the degree of political pluralism and participation, as well as the functioning of government. The FH CLI seeks to measure country performance in the following three sub-categories: freedom of expression and belief; associational, organizational rights and rule of law; and personal autonomy and individual rights.[15] Coverage currently includes 193 countries and 15 territories.

The remaining five indicators in the ruling justly categories are published by the World Bank Institute under its Worldwide Governance Indicators (WGIs) project.[16] The WGIs are composed of several hundred sub-indicators drawn from 37 different data sources. According to the authors, these indicators capture the fundamental dimensions of governance:

— Control of Corruption (WGI CC; extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests);

— Voice and Accountability (WGI VA; the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media);

— Regulatory Quality (WGI RQ; the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development),

— Rule of Law (WGI RL; extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence); and

— Government Effectiveness (WGI GE; quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy

[15] Based on expert appraisals, a weighted scale ranging from 1 to 7 is computed for each of the two indicators. According to Freedom House, the sources used for computing the scores are selected and evaluated by a number of analysts and consultants who use an array of information, including news reports and information from NGOs, to review the scorings and to check for consistency. A more detailed description of the methodology, the experts' questionnaire and the aggregation process can be obtained from http://www.freedomhouse.org.

[16] The WGI project includes the computation of six indicators, five of which are used for the MCA selection process.

formulation and implementation, and the credibility of the government's commitment to such policies).[17]

As with the FH indicators, the WGIs are entirely based on perceptual data and currently cover 203 countries and territories from 1996 to 2009.[18]

2.3.3 The MCA's governance concept

The MCA's selective and competitive allocation methodology was strongly influenced by the international development discourse of the late 1990s (Chhotray and Hulme, 2009). While Good Governance emerged as a mainstream concept in development cooperation and research, evidence suggested that conventional policy conditionality had because of its ineffectiveness in inducing institutional, political, and economic reforms yielded dissatisfying results (Lockwood, 2005; Van de Walle, 2005). For this reason, ex-post selectivity (meaning the allocation of development assistance to countries which have already shown credible ownership and commitment towards comprehensive reforms) evolved as a new guiding principle for the allocation of development assistance (World Bank, 1998; Burnside and Dollar, 2000). The competitive aid allocation mechanism established under the MCA reflects and incorporates the principle of ex-post selectivity.

Another factor affecting the MCA's allocation scheme is public opinion in the US (Chhotray and Hulme, 2009). With civil society, influential NGOs and media taking a much more critical stance towards public aid monies than in Europe, the new aid program has been premised on a tightly supervised and deductive framework to ensure domestic accountability and the regular provision of evidence on the proper use of funds to the public.

Under the institutional economic theory that informs the aid programs of the World Bank and other leading development agencies, governance is understood as a set of institutional rules for the coordination of social, political, and economic activities, rules that determine and/or shape a country's ability to develop and generate economic growth (Benz et al., 2007). Yet while institutional economics are per se positivistic, perception-based governance indicators composed of third-party *expert assessments* and *expert polls* do not represent a form of *de jure* or *de facto* assessment, but instead draw on a universalistic, normative governance concept whose determinates are explicitly invariant across political, cultural, and sociological contexts, i.e. across countries as well as over time (Chhotray and Hulme, 2009).

While the MCA justifies the use of governance indicators by appealing to the aforementioned research that suggests there is a positive relationship between good policies and growth on the one

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17 All definitions provided in parenthesis are taken from Kaufmann et al., 2007a.

18 The WGIs are composed from 310 individual underlying data sources that are assigned to one of the dimensions and are then aggregated using an unobserved component model that attributes weights to individual variables according to their estimated precision. For a more detailed description of construction and aggregation and the data sources, see Kaufmann et al., 2004; 2005.

hand and the effectiveness of aid on the other, the MCA does not provide any empirical or analytical evidence that the seven governance indicators reflect or relate to this very abstract and broad concept of governance. As the reliability of the seven governance indicators depends on their validity and ability to discriminate effectively among the MCA's seven dimensions of governance, the lack of an explicit conceptual foundation seems particularly problematic. This is all the more true in light of recent research that has raised considerable concerns about the reliability of perception-based governance indicators, particularly the WGIs.

2.4 Dimensionality of MCA's Governance Concept

To analyze whether the governance indicators used by the MCA depict one or perhaps several dimensions of governance, we use Explanatory Factor Analysis (EFA) to identify dominant underlying, unobservable variables. Based on these results, a causal model is set up and tested by means of Confirmatory Factor Analysis (CFA). The time frame for the analysis is determined by the availability of the indicators; it covers the years 1996 to 2009.[19] Before turning to the empirical results, statistical relations between the indicators, either by cause or by definition, are highlighted.

2.4.1 Preliminaries

A certain lack of clarity in the MCA's governance concept is already apparent in the arbitrary and partially redundant classification framework. For example, FH CLI (Civil Liberties) and FH PRI (Political Rights) are used as two representative source indictors for the construction of the aggregated WGI VA (Voice and Accountability) (Kaufmann et al., 2008). All three indicators comprise measures of perceived freedom of expression and association, as well as the right to organize; FH PR and WGI VA both gauge the extent to which the political system incorporates meaningful participation of the citizenry in selecting the government and shaping its activities. The substantive overlap between the WGI VA, FH PRI, and FH CLI is thus significant. Furthermore, it shows that several sub-components of the WGIs in particular those of the WGI CC, WGI GE, WGI RL and WGI RQ are difficult to separate delineate accurately. The perceived enforceability of contracts, for example, is probably a dimension of both the WGI RL and WGI GE. Moreover, the perceived degree of effectiveness of institutions such as general accounting offices or public audit services could be subsumed under both the WGI GE and WGI CC. Table 3 provides an indicative and incomplete overview of the classification congruence among the seven indicators. A high degree of substantive overlap (grey shaded fields) appears to exist between the WGI VA, FH PRI, and FH CLI as well as the WGI CC, WGI GE, WGI RL, and WGI RQ.

[19] Summary statistics for the six indicators are provided in Appendix I.

Table 3: Classification Overlap among MCA's Governance Indicators

	FH CLI	FH PRI	WGI CC	WGI GE	WGI RL
FH PRI	Right to organize in political parties and groups				
WGI CC		FH PRI index includes assessment of corruption			
WGI GE			Existence and effectiveness of anticorruption policies and accounting institutions Corruption among public officials reduces institutional effectiveness and service delivery		
WGI RL	Existence of rule of law, protection of personal property rights, and equal treatment under the law		Existence and effectiveness of anticorruption laws Extent to which corruption and financial fraud is being persecuted	Accessibility of information on laws and regulations Adequate protection of property rights Enforceability of contracts Integrity of elections and political financing Independence of judiciary	
WGI RQ			Does corruption negatively impact the business environment and distort the economic and financial environment	Quality of public administration Administration of prices and market prices Ease of doing business Effectiveness of rules and regulations for market access Importance of the informal sector	Enforcement of the regulatory framework Government respect for contracts Settlement of economic disputes
WGI VA	Freedom to choose where to travel, reside, and work Freedom of assembly, association, and demonstration Independence of the media Freedom of expression Freedom to select a marriage partner, and determine whether or how many children to have	Free, fair, and regular elections with equal campaigning opportunities and an independent and credible electoral process Rights and participation of minority groups Transparency and accountability of the government	Freedom from pervasive government corruption Transparency and accountability in the public sector	Public access to information and government–citizen relations	Enforcement of political and participatory rights Accountability of policymakers and the judiciary

Source: Partly following Kaufmann et al. (2007a)

Simple bivariate correlations calculated from a sample covering nine years and a minimum of 185 countries (all countries sample) confirms this pattern. Two principle interdependent groups of variables with an extremely high bivariate correlation (above 90 per cent) can be distinguished:

— The first group includes the WGI CC, WGI GE, WGI RL, and WGI RQ,

— The second group comprises the two FH indicators and the WGI VA.

The same pattern can be found in the bivariate correlation matrix calculated from LICs (LIC sample), albeit with a significantly lower degree of correlation.

Table 4: Bivariate correlation coefficients of MCA governance indicators, 1996–2009

All Countries							
	WGI CC	WGI GE	WGI RL	WGI RQ	WGI VA	FH CL	FH PR
WGI CC	1.000						
WGI GE	0.932	1.000					
WGI RL	0.939	0.936	1.000				
WGI RQ	0.856	0.916	0.881	1.000			
WGI VA	0.763	0.763	0.793	0.771	1.000		
FH CL	0.615	0.616	0.646	0.641	0.937	1.000	
FH PR	0.667	0.666	0.704	0.690	0.947	0.937	1.000
Low Income Countries							
WGI CC	1.000						
WGI GE	0.676	1.000					
WGI RL	0.764	0.783	1.000				
WGI RQ	0.505	0.715	0.653	1.000			
WGI VA	0.391	0.464	0.536	0.532	1.000		
FH CL	0.301	0.363	0.428	0.424	0.915	1.000	
FH PR	0.331	0.392	0.466	0.485	0.897	0.868	1.000

Source: Own calculations.

These results yield two preliminary indications: First, the indicators might be, as suggested by Langbein and Knack (2010), generally tautological or have difficulties in distinguishing between the seven dimensions they purport to measure. Second, as bivariate correlation patterns for LICs are much weaker, indicators seem to have heteroscedastic properties with respect to income since developed countries generally score high in all seven governance dimensions.[20]

Accordingly, previous findings deducted from empirical analysis which did not discriminate between different country groups (that is LICs, LMICs) might have produced premature

[20] The latter hypothesis can be specifically validated by testing the results of bivariate OLS regression for each indicator on GNI/capita. The White-test indicates that the null hypothesis of a constant variance of OLS residuals can be rejected at the 10 percent level in all cases, except for WGI RQ. The Preusch-Pagan test clearly rejects the homoscedasticity hypothesis in five of the seven cases.

conclusions with regard to the dimensionality of the perception-based indicators, and of the WGIs in particular (Langbein and Knack, 2010).

2.4.2 Explanatory Factor Analysis

A method frequently used to test for construct validity and to control for underlying or unobservable source variables (that is abstract concepts) is Explanatory Factor Analysis, or EFA. This analytical method is based on the assumption that a set of observable variables is loaded by a number of underlying factors of which some are common and some are unique (Kim and Mueller, 1990; 1994). Hence, EFA provides an indication of the extent to which the variance of the seven indicators can be explained by separate, distinguishable dimensions (unique factors), and the extent to which variance is driven by a structure of common, indistinguishable dimensions (common factors). It is assumed that (i) common factors are orthogonal, (ii) that unique factors are uncorrelated with each other, and (iii) that common factors are uncorrelated with the unique factors.

Starting with the sample covering all countries, the calculations identify one dominant factor that explains 80 per cent of the existing variance. The corresponding eigenvalue of this factor is 5.6, compared to 0.8 for the second (Table 5). The criteria applied to determine how many common factors to retain are taken from Kaiser (1974) and Jolliffe (2002). Kaiser recommends dropping factors with an eigenvalue smaller than one. Jolliffe (2002) suggests a cutoff of 0.7, as simulation studies find that Kaiser's criterion might in the presence of sampling errors lead to a situation in which the population eigenvalue is significantly higher than the sampling eigenvalue. As both criteria yield the same result, a one-factor model can be considered appropriate in the all-country sample. This finding is in line with previous studies, e.g. Langbein and Knack (2010), who also emphasize that the WGI indicators in fact all measure the same basic concept.

Table 5: Explanatory Factor Analysis, All Countries, 1996–2009

Factors	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	5.664	4.868	0.809	0.809
Factor 2	0.796	0.762	0.114	0.923
Factor 3	0.034	0.048	0.005	0.928
Observations				1,820

Source: Own calculations.

As MCA uses the governance indicators to identify good performers among the group of developing countries for purposes of aid allocation, the subsequent empirical analysis focuses on LICs. It yields a surprisingly clear-cut result: The assumption of a one-factor model is indeed problematic. The explained variance of the first factor drops to 60 per cent and the eigenvalue of the second factor rises to 1.23 (Table 6). The second common factor explains 16 per cent of total

variance. Even though the LIC sample might display considerably more noise, approximately 80 per cent of total sample variance can still be explained by these underlying factors. Accordingly, both the Kaiser and Jolliffe criterion recommend sticking to a two-factor solution.

Table 6: Explanatory Factor Analysis, Low Income Countries, 1996–2009

Factors	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	4.165	2.934	0.595	0.595
Factor 2	1.231	1.124	0.176	0.771
Factor 3	0.107	0.136	0.015	0.786
Observations				741

Source: Own calculations.

The EFA results do not significantly change when factors are determined for each year or for sub-periods between 1996 and 2009 (see Appendix IV and V). Furthermore, they are robust with respect to the factor extraction method used.[21] In the case of orthogonal factor analysis with standardized variables,[22] factor loadings are equivalent to correlations between factors and variables (Kim and Mueller, 1990).

As displayed in Figure 1, the factor loading and uniqueness pattern of the rotated solution further support the hypothesis of two interdependent sets of indicators, each predominantly driven by one underlying factor:[23]

i) The first set is loaded primarily by indicators measuring the perceived *quality and efficiency of government institutions*. These are WGI GE, WGI CC, WGI RL, and WGI RQ.

ii) The second is mainly loaded by FH PRI, FH CLI, and WGI VA, reflecting the extent to which civil society and the citizenry is perceived to be in the position to control and monitor government institutions. This can be considered as the *participatory dimension of governance*.

These findings partly contradict the conclusions of Langbein and Knack (2010) who, based on a similar statistical analysis, comprising developed and developing countries, suggest that the WGIs generally fail to distinguish between different dimensions of governance and are a function of only one latent variable or underlying factor. The inclusion of developed countries with high across-the-board rankings probably results in a lower factor complexity, which is corroborated by the analysis

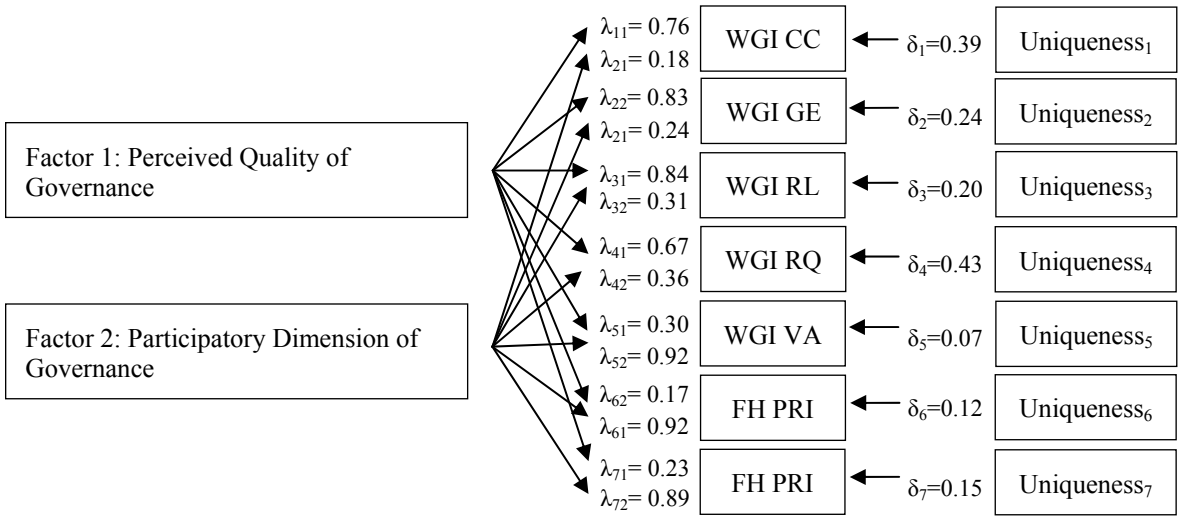
[21] Maximum Likelihood and iterated principal factors yield very similar results with only minor deviations. For an overview on methods of factor extraction see Kim and Mueller (1994).

[22] For EFA and CFA the sample and sub-samples are normalized such that average is zero and standard deviation is 1 in each year.

[23] λ_{ik} describes the loading of the observed variable j by the common (unobservable) factor k. δ_j describes the loading of the unique factor on the observable variable j. In the case of EFA, squared loadings, for both common and unique factors, can be interpreted as the share in the observable's variance, as the variables are normalized such that their variance is 1. For the applied method of rotation see Appendix III.

covering the full sample. However, in case of the aid allocation, the concentration on a model tailored for LIC countries seems appropriate.

Figure 1: Loading Pattern, Orthogonal Two Common Factor Model (LIC Sample)



Source: Own calculations.

2.4.3 Confirmatory Factor Analysis

The EFA model with two common factors measuring the perceived *quality and efficiency of government institutions* and the perceived *participatory dimension of governance* provides well-interpretable and useful results. However, as EFA rests on several rigid assumptions (for example that all observed variables (indicators) are directly affected by all common factors and that common factors are uncorrelated) results should be subjected to further scrutiny, such as Confirmatory Factor Analysis (CFA). The CFA model structure of the observed and unobserved factors is identical to the one derived by EFA (two common factor model).[24]

Yet in contrast to EFA, which aims to determine the number of latent variables – that is the number of unobservable governance dimensions based on a set of assumptions about the latent variables' relation to the observables – CFA allows for different identified model specifications to be compared and tested, such as the number of common factors, correlated common factors, correlated errors, and different degrees of factor complexity.[25] The standard CFA estimation technique of Maximum Likelihood estimation gives standard errors for factor loadings and several fit criteria, such as the Root Mean Square Residual (RMSR), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI).

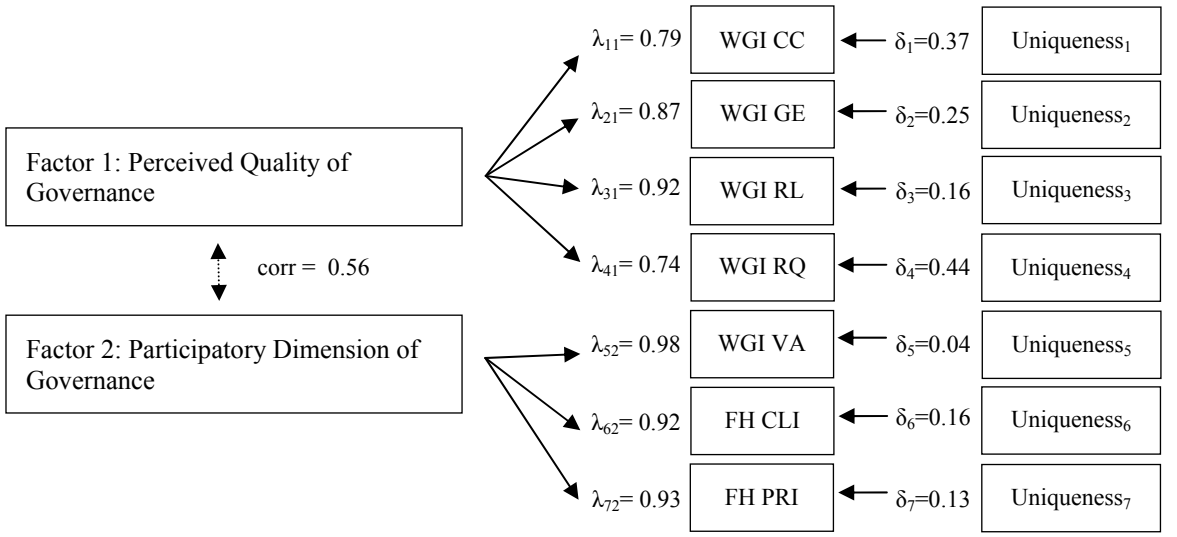
The loading structure of the best fitting CFA LIC model is shown in Figure 2. All factor loadings are significant at the one-per cent level. Confidence intervals for the point estimates are rather

[24] An explanatory note on the difference between the EFA and CFA method is provided in Appendix III.

[25] The CFA estimation is based on the STATA Confa algorithm devised by Kolenikov (2009). Results for best fit CFA specifications can be found in Appendix VI (LIC country sample).

small (see Appendix V). RMSR (0.02), CFI (0.95), and TLI (0.93) indicate an overall very good fit of the specification (Hair et al., 2006). Other loading specifications, in particular those with a single common factor, correlated errors, and a lower or higher factor complexity, had to be rejected due to inadequate fit or insignificant loading patterns.[26]

Figure 2: Loading Pattern CFA Model (LIC Sample)



Source: Own calculations.

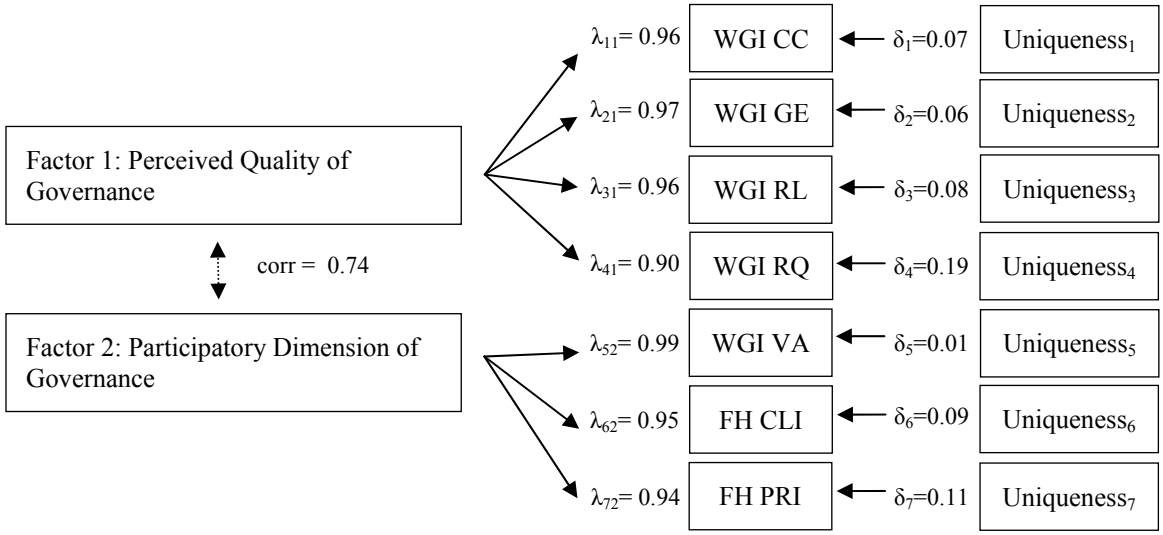
While the strong CFA loading pattern confirms the two common factors result for LICs derived from EFA, it detects a significant positive correlation between the two unobservables. Accordingly, the perceived *overall quality and efficiency of government institutions* and the perceived *participatory dimension of government* have to be considered as discrete but related concepts that in the case of the MCA are measured through several similar proxies.

To verify that the findings, particularly the level of factor complexity, are specific to the group of LICs, CFA estimations are replicated for the non-LIC, i.e. the Middle and High Income Countries sample. Two non-LIC sample CFA estimation specifications qualify for consideration: A simple one common factor model (Appendix VII) yields statistically significant loadings in a meaningful range from 0.62 to 0.97. However, the overall fit of the model is weak with an RMSR of 0.15.

The loading structure of the second CFA non-LIC specification (Figure 3) is comparable to the LIC-sample two common factor model (Figure 2). While loadings show similar levels of significance but superior overall fit compared to the non-LIC one common factor model, the high positive correlation (0.74) between the two principal factors suggests, that the two underlying concepts for the case of the non-LIC sample could well be indiscrete (Appendix VIII).

[26] Results are available from the authors upon request.

Figure 3: Loading Pattern CFA Model (Non-LIC Sample)



Source: Own calculations.

2.4.4 Considerations on construct validity

While EFA and CFA advises on the dimensionality of the seven here considered perception-based indicators, these methods do not allow us to draw conclusions regarding the extent to which the indicators are based on a conceptually viable construct, i.e. to what extent aggregated perceptions can serve as valid proxies for abstract dimensions of governance. As a direct verification of the measurement validity of MCA's perception-based indicators is not possible due to the inherently unobservable characteristics of the construct of governance, an indirect verification strategy such as assessing how the perception-based indicators relate to coextensive measures derived from objective, *de jure* and/or *de facto* assessment criteria can be applied.

As devising such objective measures for a large country sample is a complex and encyclopedic undertaking demanding a careful appraisal of the legislative regulatory framework (*de jure*) and/or the identification and assessment of criteria for regulatory implementation (*de facto*), only few data sources with satisfying country and time coverage are available.

A recognized source of indicators based on *de jure* and *de facto* assessment using unambiguous criteria, having considerable country coverage and possessing good methodological documentation is the Global Integrity Initiative (GII).[27] The GII sub-indicator Public Access to Information, for example, records whether citizens are entitled to access basic government records by law, whether citizens have a right of appeal should access to a basic government record be denied (both *de jure*);

[27] The GII publishes six government performance indicators, aggregated from 23 sub-indicators (see Table 7 and 8) which in turn are computed from quantitative assessments of observable *de jure* and *de facto* criteria. GII indicators have been published for 2004, 2006, 2007, 2008, and 2009. Country coverage varies by year. For GII a comprehensive description of the methodology the reader is referred to the GII web site http://www.globalintegrity.org/information/downloads.

but also reflects whether in practice citizens actually receive responses to access to information requests within a reasonable time period and at reasonable cost (*de facto*).

When assessing the validity of abstract constructs Thomas (2010) suggests considering two criteria, convergent and discriminant validity. While the former is concerned with the extent to which the measure is correlated with other measures to which in theory it should relate, the latter reflects the extent to which the measure is uncorrelated with measures or variables to which in theory it should not relate.

Significant convergent validity can be detected when calculating Spearman rank coefficients for the Middle- and High Income country sample (Table 7). It shows that congruence or significant overlap in measurement content (bold correlation coefficients) is indeed associated with a higher degree of correlation (differently grey shaded fields according to degree of correlation). A particularly high correlation can be detected between indicators presumed to measure the accountability and participatory dimensions of governance, i.e. between WGI VA, FH CLI, FH PRI and GII Civil Society, Public Information and Media, GII Elections, and GII Government Accountability, respectively.

The considerable noise, i.e. high correlation among indicators where no explicit overlap in measurement content can be expected, in turn indicates that discriminant validity of WGI and FH perception-based indicators is however rather limited.

Table 7: Spearman Rank Coefficients of MCA and GII indicators: non-LIC sample, 2004–2009

GII Indicators	*WGI CC*	*WGI GE*	*WGI RL*	*WGI RQ*	*WGI VA*	*FH CLI*	*FH PRI*
i Civil Society, Public Information and Media	*0.663*	*0.671*	*0.632*	*0.708*	***0.766***	***0.748***	*0.767*
1 Civil Society Organizations	0.392	0.416	0.407	0.425	**0.595**	**0.619**	0.586
2 Media	0.681	0.608	0.659	0.681	**0.796**	0.766	0.770
3 Public Access to Information	0.463	0.525	0.414	0.511	**0.413**	0.381	0.434
ii Elections	*0.570*	*0.536*	*0.492*	*0.622*	***0.763***	*0.746*	***0.774***
1 Voting & Citizen Participation	0.624	0.514	0.536	0.602	**0.781**	0.788	**0.799**
2 Election Integrity	0.554	0.497	0.472	0.566	**0.720**	0.681	**0.732**
3 Political Financing	0.464	0.488	0.433	0.543	**0.593**	0.574	**0.586**
iii Government Accountability	***0.550***	*0.506*	*0.480*	*0.591*	***0.736***	*0.706*	***0.742***
1 Executive Accountability	**0.575**	0.539	0.521	0.619	**0.738**	0.687	**0.720**
2 Legislative Accountability	**0.546**	0.488	0.468	0.518	**0.684**	0.658	**0.712**
3 Judicial Accountability	**0.125**	0.147	0.071	0.222	**0.304**	0.295	**0.359**
4 Budget Processes	**0.508**	0.459	0.475	0.524	**0.619**	0.580	**0.551**
iv Administration and Civil Service	*0.493*	***0.480***	*0.467*	*0.408*	*0.372*	*0.355*	*0.359*
1 Civil Service Regulations	0.544	**0.503**	0.523	0.557	0.634	0.624	0.622
2 Whistle-blowing Measures	0.250	**0.230**	0.235	0.130	0.081	0.085	0.083
3 Procurement	0.337	**0.342**	0.308	0.303	0.332	0.330	0.328
4 Privatization	0.513	**0.506**	0.471	0.488	0.413	0.377	0.392
v Oversight and Regulation	***0.598***	***0.583***	*0.545*	*0.590*	*0.714*	*0.708*	*0.734*
1 National Ombudsman	0.190	**0.185**	0.146	0.205	0.304	0.345	0.372
2 Supreme Audit Institution	**0.538**	**0.580**	0.489	0.553	0.672	0.673	0.688
3 Taxes and Customs	0.520	**0.460**	0.498	0.504	0.588	0.530	0.571
4 State-Owned Enterprises	0.343	**0.300**	0.281	0.301	0.445	0.397	0.464
5 Business Licensing and Regulation	0.707	**0.686**	0.685	0.681	0.634	0.607	0.618
vi Anti-Corruption and Rule of Law	***0.588***	*0.491*	***0.541***	*0.480*	*0.552*	*0.555*	*0.557*
1 Anti-Corruption Law	**0.241**	0.108	0.211	0.197	0.206	0.256	0.161
2 Anti-Corruption Agency	**0.402**	0.334	0.363	0.273	0.433	0.454	0.461
3 Rule of Law	**0.544**	0.470	**0.539**	0.467	0.512	**0.490**	0.506
4 Law Enforcement	**0.585**	0.516	**0.526**	0.517	0.529	0.495	0.533

Source: Own calculations.

Interestingly, the Spearman rank correlation pattern cannot be reproduced when calculating MCA and GII indicator rank coefficients for the LIC sample (Table 8). Instead, correlation among MCA and GII indicators is found to be weaker in almost all areas where congruence is given by definition of the indicators' measurement content.

Table 8: Spearman Rank Coefficients of MCA and GII indicators: LIC sample, 2004–2009

GII Indicator	*WGI CC*	*WGI GE*	*WGI RL*	*WGI RQ*	*WGI VA*	*FH CLI*	*FH PRI*
i Civil Society, Public Information and Media	*0.175*	*0.155*	*0.191*	*0.213*	***0.470***	***0.428***	*0.428*
1 Civil Society Organizations	0.092	0.014	0.101	0.051	**0.391**	**0.435**	0.400
2 Media	0.098	-0.064	0.064	-0.005	**0.435**	**0.470**	0.449
3 Public Access to Information	0.085	0.175	0.108	0.204	**0.252**	0.172	0.210
ii Elections	*0.080*	*0.159*	*0.070*	*0.169*	***0.382***	*0.365*	***0.399***
1 Voting & Citizen Participation	0.381	0.369	0.362	0.401	**0.739**	**0.674**	**0.703**
2 Election Integrity	0.162	0.142	0.117	0.092	**0.261**	0.264	**0.335**
3 Political Financing	-0.150	-0.064	-0.138	-0.044	**0.170**	0.167	**0.182**
iii Government Accountability	***0.089***	*0.242*	*0.161*	*0.265*	***0.336***	*0.354*	***0.328***
1 Executive Accountability	**0.260**	0.325	0.257	0.340	**0.392**	0.370	**0.405**
2 Legislative Accountability	**0.016**	0.210	0.109	0.275	**0.304**	0.299	**0.266**
3 Judicial Accountability	**0.045**	0.143	0.066	0.120	**0.174**	0.201	**0.178**
4 Budget Processes	**0.071**	0.138	0.168	0.191	**0.344**	0.388	**0.343**
iv Administration and Civil Service	*0.135*	*0.353*	*0.265*	*0.257*	*0.154*	*0.172*	*0.117*
1 Civil Service Regulations	0.197	0.310	0.305	0.368	0.287	0.340	0.249
2 Whistle-blowing Measures	-0.012	0.102	0.104	0.005	-0.019	-0.037	-0.046
3 Procurement	0.190	0.299	0.178	0.155	0.211	0.243	0.187
4 Privatization	0.127	0.346	0.242	0.223	0.108	0.094	0.100
v Oversight and Regulation	***0.307***	***0.485***	*0.382*	*0.401*	***0.287***	*0.329*	*0.296*
1 National Ombudsman	0.175	**0.237**	0.202	0.239	0.278	0.319	0.283
2 Supreme Audit Institution	**0.322**	**0.380**	0.336	0.383	**0.358**	0.379	0.401
3 Taxes and Customs	0.230	**0.169**	0.163	0.120	0.262	0.223	0.244
4 State-Owned Enterprises	0.154	**0.433**	0.237	0.270	0.192	0.169	0.174
5 Business Licensing and Regulation	**0.340**	**0.354**	0.290	0.284	0.174	0.164	0.178
vi Anti-Corruption and Rule of Law	***0.297***	*0.358*	***0.334***	*0.256*	*0.415*	***0.402***	*0.390*
1 Anti-Corruption Law	**0.023**	0.029	0.065	-0.043	0.047	-0.003	0.024
2 Anti-Corruption Agency	**0.210**	0.337	0.252	0.227	0.368	0.411	0.420
3 Rule of Law	**0.306**	0.277	**0.294**	0.218	0.313	**0.257**	0.277
4 Law Enforcement	**0.172**	0.218	**0.154**	0.107	0.272	0.311	0.278

Source: Own calculations.

As the GII indicators reflect both, the level of *de jure* and *de facto* conditions of governance, the weaker relation between the MCA's perception-based indicators and the GII measures detected for the LIC sample cannot be explained by potentially greater implementation gaps in LICs. Instead, the degraded convergent validity of the MCA's perception-based indicators might be caused by a bias in the perceived quality of governance in LICs and/or a high degree of persistence of once formed perceptions of LICs' governance performance.

2.5 Conclusion

Whereas past research has focused on the conceptual characteristics of perception-based governance indicators in general, this paper provides a specific analysis of the MCA's application of governance indicators for aid allocation. The research is of special interest to policy makers who rely on these indicators when making aid-allocation decisions.

The analysis suggests that the general concerns that have been raised in numerous papers with regard to the singular dimensionality of perception-based governance indicators such as the WGIs appear less problematic insofar as the assessment of developing countries is concerned. The single dimensionality identified for the WGIs by Langbein and Knack (2010) is apparently to large extent caused by the heteroscedastic properties of the all-country sample. When excluding more developed countries who generally perform well across the board and produce little sample variance, a more nuanced picture emerges. Looking exclusively at the MCA's use of the WGIs to assess developing and least developed countries, a higher degree of common factorial causation is found.

However, the results show that the meaningful use of quantitative perception-based governance indicators for the allocation of ODA to developing countries is a delicate and non-trivial undertaking. This is the case not only because of the difficulties in ranking point estimates in the presence of large measurement errors and relative peer-related, time-variant scaling – a topic that has been frequently discussed – but also, and more crucially, because of persisting uncertainties regarding measurement reliability and the conceptual validity of the selected measures. The seven indicators appear to have been selected in a somewhat arbitrary manner, in the absence of an effort to scrutinize their measurement validity and dimensionality. The result is a distorted and only ostensibly transparent allocation mechanism.

Although the MCA uses seven indicators that purportedly measure different dimensions of governance, only two underlying governance concepts can be clearly identified – namely, the perceived *participatory dimension of governance*, and the perceived *overall quality of governance.* While the *participatory dimension* focuses on the citizenry's ability to actively participate in political will-formation and to hold public agents accountable, the overall quality of governance is understood as construct for the extent to which the spheres of the legislative, executive, and judiciary are able to provide an efficient, predictable and rule-based governance framework.

To eliminate the most fundamental dimensionality-related shortcomings, the indicators could be merged in accordance with the identified dimensional pattern using weighted factor scores or redundant indicators could be dropped. This would substantially reduce overrepresentation of congruent perception-based indicators in the MCA's *ex-ante* performance assessment although such adjustments could be negatively perceived as reducing the transparency of MCA's selection process of eligible countries.

At the same time however, a basic analysis of Spearman rank coefficients provides some indication that in the case of LICs, the MCA's perception-based indicators' convergent and discriminant validity might be diluted. Two explanations seem plausible: perception of LICs' governance performance might be strongly biased and/or perception of the quality of governance in LICs is particularly persistent.

As potentially weak construct validity would present a serious defect and a reason for questioning the use of perception-based governance indicators in aid allocation decisions, further and more comprehensive research on this topic is required.

3. The Heavily Indebted Poor Countries and the Multilateral Debt Relief Initiative: A Test Case for the Validity of the Debt Overhang Hypothesis

Abstract

The Heavily Indebted Poor Countries Initiative (HIPCI) and the Multilateral Debt Relief Initiative (MDRI) were both implemented based on an assumption derived from the debt overhang hypothesis – that is, that the removal of excessive debt burdens would help to boost investment and economic growth. Using a quasi-experimental research design to compare the performance of investment and growth between LICs that have benefited from HIPCI and MDRI and those that have not, this study assesses whether the two programs have yielded the expected effects. The results indicate that while debt relief programs have led to higher private-sector investment in beneficiary countries, they have not had any effect on public sector investment and growth. While the reasons for this outcome are not entirely clear, assumptions concerning the benefits that accrue to LICs as a result of debt relief appear to be in doubt.

Keywords: **HIPC, MDRI, debt relief, debt overhang hypothesis, difference-in-differences**

JEL Classification: C 21, F34, O19

3.1 Introduction

The Heavily Indebted Poor Countries Initiative (HIPCI) and the Multilateral Debt Relief Initiative (MDRI) are arguably the most comprehensive debt relief operations undertaken in bi- and multilateral development cooperation thus far. Since the initiation of HIPCI in 1996, its enhancement in 1999 and the launch of MDRI in 2006, a total of 32 Low Income Countries (LICs) have benefited from irrevocable debt cancellation, reducing their average debt burden from 160 percent of GDP in 1992 to around 30 percent in 2010.[28] Thus, the two consecutive initiatives have enabled LICs burdened with unsustainable levels of external public and publically guaranteed debt (PPGD) to return to viable fiscal conditions and less critical balance-of-payments positions.

The approach taken under the HIPCI and MDRI is unprecedented in several respects: First, it represents a strategy for a permanent exit from the serial rescheduling of official bilateral debt under the auspices of the Paris Club (Gautam, 2003), going well beyond temporary relief in debt service payments.[29] Second, it follows the principle of burden sharing, and for the first time covers debt owed to bilateral, multilateral and commercial creditors.[30] Third, although debtor countries have to negotiate their specific terms individually, it sets commonly applied, sustainability-oriented eligibility criteria and a predefined program for macroeconomic stabilization, fiscal consolidation, and poverty reduction that is mandatory for irrevocable debt cancellation.

While these ostensibly laudable programs have been embraced enthusiastically by the largest part of the community of development practitioners, NGOs, and academia, they hinge crucially on the validity of the debt overhang hypothesis. This hypothesis states that highly indebted poor countries suffer from low levels of investment and economic growth partly because they are confronted with an inherited debt stock that disincentivizes investment and productivity enhancing adjustment efforts, as future returns would accrue primarily to creditors.[31] Conversely, the removal of a debt overhang would be an appropriate means for boosting investment and economic growth.

While commonly accepted, these assumptions have been challenged by various academics who instead suggest that unsustainable debt is primarily an outcome rather than a cause. According to Easterly (2002) and Arslanalp and Henry (2004, 2006), inherently unfavorable socioeconomic characteristics prevailing in LICs' debtor societies, including patrimonial governance structures, interest group polarization and political instability, result in a strong preference for high near-future

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28 As by December 2011, for a list of countries see Appendix X.

29 According to Gautman (2003), objective formulation became more ambiguous over time. Whereas in 1995 the World Bank only considered debt reduction as part of a broader strategy, in 1999, when the original HIPCI was enhanced, it was declared to aim at providing a clear and permanent exit from unsustainable debt burdens.

30 It showed that the objective of including commercial claimants has not fully been met as HIPCI does not have a legally binding character. Various commercial creditors have refused to participate or engaged in litigation. At least 20 HIPCs have been threatened or subject to litigation by commercial creditors (Gueye et al., 2007).

31 The term "debt overhang" achieved prominence in a paper by Krugman (1988). His theoretical work aimed to show that under certain conditions, an inherited high debt stock creates significant disincentives for the debtor to make efforts to redeem obligations in full. Accordingly, creditors can minimize their losses by pursuing a combination of defensive lending and conditional debt relief.

public expenditure financed through debt expansion. From the perspective of these authors, debt relief is ineffective in stimulating investment and growth, as beneficiary LICs can be expected to return to the previous unsustainable fiscal and macroeconomic policy stance after receiving debt treatment.

The HIPCI and MDRI can be used to shed more light on this fundamental dispute in development economics. Since 1996, 32 countries of a total of 80 LICs have under HIPCI and MDRI undergone and completed unprecedented debt relief and debt restructuring programs.[32] This provides an ideal treatment and control group setting, in which the validity of the debt overhang hypothesis can be tested indirectly. Using difference-in-differences analysis, which is suitable for non-randomized treatment selection, this paper assesses the extent to which debt relief under the HIPCI and MDRI has indeed been associated with a measurable increase in productivity, investment and growth.

The empirical results are somewhat sobering: While the HIPCI and MDRI appear to have been partially successful in stimulating total and particularly private investment, a measurable positive effect on public investment cannot be seen. Since public investment is at least as important for enhancing economic growth as private investment, an important channel for stimulating per capita income appears dysfunctional. Furthermore, the HIPCI and MDRI have not led to a measurable increase in productivity in beneficiary countries. As the results presented here confirm the findings of past studies that identify productivity growth as a principal source of per capita income growth (e.g. Easterly and Levine, 2001; Pattillo et al., 2003), the systematic weaker growth performance of HIPCs in comparison to non-HIPCs is not very surprising. All in all, these findings call into question the assumptions of the debt overhang hypothesis, which sees a causal chain between debt, investment and growth.

The chapter proceeds as follows: Section 3.2 reviews the theoretical and current empirical literature on debt relief in developing countries, placing a particular emphasis on the debt overhang debate. After providing an overview of the context and procedures for implementing the HIPCI and MDRI in Section 3.3, Sections 3.4 presents the modeling strategy and results, and also provides an interpretation of the findings. Section 3.5 concludes.

3.2 The Theoretical Underpinning for Debt Relief – A Brief Literature Review

The Latin American debt crisis, which brought the global financial system close to the brink of collapse, sparked a series of theoretical and empirical studies on international sovereign borrowing in which the debt overhang hypothesis emerged as a conceptual centerpiece (Krugman, 1988; Sachs, 1989) subsequently used as an argumentative underpinning for debt relief initiatives such as the HIPCI and MDRI.[33]

[32] As by December 2011, see Appendix X.

[33] The debt overhang model was first developed in corporate finance (see Myers, 1977).

In his seminal contribution, Krugman (1988) uses a two-period utility model under uncertainty to suggest that once a country has accumulated an external debt larger than the expected present value (PV) of potential future transfers to its creditors, the debtor country is disincentivized to implement productivity enhancing fiscal and macroeconomic adjustment that would augment national income and, in turn, the government's debt servicing capabilities. Disincentives are said to result from economic returns accruing entirely or large part to a country's creditors, leaving the debtor with an insufficiently small reform dividend.

Sachs (1989) makes a similar point. He develops an intertemporal utility model distinct from Krugman's in that a country's adjustment efforts are captured solely through the debtor country's aggregate investment choice. Sachs shows that an excessive external debt stock and the resulting service burden distort the investment choice, thereby inducing an inefficiently low level of future output. This occurs as in the presence of a debt overhang, debt service ceases to be a function of formally outstanding obligations. Instead, future transfers to a country's creditors are constrained by its ability to pay, i.e. by the size of its future gross national product. Consequently, any effort to augment future output via current capital accumulation, i.e. investment, is subject to debt-induced distortionary taxation. To overcome this dilemma, Sachs proposes the reduction of external debt to manageable levels such that the character of debt service is transformed from a marginal tax to a lump-sum burden. Consequently, the adverse distortive effects of debt on investment would be removed with debt service ceasing to impair aggregate investment.

While the theoretical argument for debt relief was motivated by a sovereign debt crisis, in Sachs' analytical framework the investment decision is modeled as a national aggregate and is therefore applied to total, i.e. private and public, investment. This implies the existence of a mechanism whereby the public socio-economic cost of an external debt overhang is internalized in private-sector investment decisions (Borensztein, 1990; Diwan and Rodrik, 1992). Thus, it is assumed that if the public sector accumulates external debt levels perceived as unsustainable by domestic and foreign private investors, the latter lower their return expectations as they anticipate the burdens of future public debt service, whether this burden is explicit – in the form of higher taxation – or implicit – through the costs of macroeconomic instability (Patillo et al., 2003).

Interestingly, empirical work aiming to verify the debt overhang hypothesis has, probably for practical reasons, in most cases elided Krugman's more complex notion of productivity enhancing structural adjustment effort. Instead, it syncopated the analysis to factor accumulation via the debt-investment-nexus. Warner (1992), estimating investment functions and examining out-of-sample forecasts for 13 developing countries considered to have accumulated an external debt overhang prior to 1982, finds no evidence for a debt-induced contraction of investment. He instead suggests that the observed decline in investment in the wake of the debt crisis in 1982 can be attributed to the same adverse economic shocks that caused the global recession. Chauvin and Kraay (2005)

indirectly test the debt-investment and debt-growth link by estimating the growth and the investment enhancing effects of sovereign debt relief using a sample of 62 LICs from 1989 to 2003. They do not find evidence that debt relief positively affects aggregate investment and economic growth. This partly confirms earlier findings by Cohen (1997), who argues that the level of external debt does little to explain economic growth.

The effort to define a debt overhang threshold for developing countries beyond which the marginal impact of debt on investment and growth turns negative has also yielded inconclusive results. Elbadawi et al. (1997) infer an overhang threshold at approx. 100 percent of GDP. Pattillo et al. (2002) identify a much lower threshold (a present-value debt stock amounting to approx. 20 percent of GDP). Imbs and Ranciere (2005) suggest that a threshold exists at a present-value debt stock of around 40 percent of GDP.

A recent strand in the literature has moved from the mono-causal capital accumulation paradigm towards a duo-causal approach that incorporates Krugman's notion of productivity enhancing policy. Pattillo et al. (2003) find evidence that the negative effect of debt on growth primarily operates through total factor productivity (TFP), while the negative effect of debt on physical capital accumulation is only of subordinate importance. The contribution by Pattillo et al. (2003) draws heavily on empirical findings by Easterly and Levine (2001), who argue that TFP rather than factor accumulation is the main source of economic growth.

The debt overhang hypothesis is, however, clearly grounded on the assumption that developing countries will be willing and able to implement productivity enhancing reforms and investment if the debt overhang is removed. Easterly (2002) challenges this assumption, suggesting that debt relief fails to provide a viable exit strategy from excessive borrowing, as it neglects the underlying cause for debt accumulation. Analyzing a sample of 41 highly indebted LICs for the period from 1979 to 1997, he finds evidence that over-indebtedness appears to be caused by inherently high discount rates against the future. According to Easterly (2002), such high discount rates are the consequence of patrimonial governance structures, interest group polarization and political instability. Due to a highly uncertain future, the elites exercising allocational control over the country's resources display a strong preference for debt-financed current and near-term consumption, thereby imposing high discounts on the far distant returns from long-term economic activities. Easterly finds that LICs that have undergone non-concessional or concessional debt rescheduling, have – presumably due to those underlying elites' intertemporal preferences – re-accumulated similarly large debt stocks, or, if new external borrowing had been restricted, drawn down public assets. However, a principal caveat concerning Easterly's findings is that they have been derived from data mainly covering a period in which the external public debt of highly indebted LICs was rescheduled at concessional terms and not forgiven (1979–1994), thereby in many cases further increasing the PV of outstanding debt (cf. Section 3.3).

In an effort to reconcile Easterly's claim with previous findings regarding the effect of debt on investment and growth, Presbitero (2008) and Cordella et al. (2010) assess the effects of external indebtedness and quality of governance on aggregate investment and economic growth. Cordella et al. (2010), in a study covering 79 developing countries for the time period from 1970 to 2002, find the debt-investment and debt-growth nexus to be statistically irrelevant for highly indebted countries with bad institutions and policies. At the same time, they detect a negative marginal effect of public external indebtedness on growth and investment beyond a debt PV-to-GDP threshold of 25 percent for countries with good governance. This is consistent with previous findings by Prespitero (2008), according to which the link between indebtedness and economic growth depends on institutional quality, such that debt relief is likely to be more effective in developing countries with sound governance standards. Arslanalp and Henry (2004 and 2006), by contrast, claim the debt overhang hypothesis to be inapplicable to most sub-Saharan Heavily Indebted Poor Countries (HIPCs). Due to these countries' poor macroeconomic performance, generally weak institutional frameworks, and resulting low productivity, long-term profitable economic activity is significantly hampered.

Thus, it remains unclear whether the large-scale cancellation of debt for countries judged as suffering from a debt overhang is indeed effective in inducing a higher rate of economic growth through enhanced investment activity and/or an increase in total factor productivity. In an effort to clarify this issue, the present paper assesses the extent to which LICs whose debt stock has been reduced to sustainable levels under HIPCI and MDRI have been able to attain higher investment and growth rates in comparison to LICs that have not benefited from debt cancellation.

3.3 Overview of Recent Debt Rescheduling Operations

Although innovative in several regards, HIPCI and MDRI only represent a preliminary end-point in a series of increasingly concessional debt restructuring initiatives conducted under the auspices of the Club of Paris and the IMF.[34]

3.3.1 The Paris Club

During the 1970s and most of the 1980s, the period in which many LICs accumulated unsustainable external public debt positions, the modus operandi consisted in non-concessional flow rescheduling of long-term official bilateral debt under the auspices of the Paris Club (Boote and Thugge, 1997). Typically, only the interest and principal for debt due during a rather short consolidation period were subject to deferral or restructuring (Daseking and Powell, 1999). To

[34] The Paris Club is an informal group consisting of 19 permanent OECD member countries with large exposures to other states. Those are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, the Russian Federation, Spain, Sweden, Switzerland, the United Kingdom, and the USA. The IMF plays an important advisory role. The UNCTAD, the World Bank and the RDBs have observer's status. The Secretariat of the club is hosted by the French Treasury. For a more detailed delineation of the Paris Club's history and method of operation the reader is referred to Cosio-Pascal (2008).

protect the preferred creditor status of the IMF and World Bank, multilateral debt remained excluded from treatment (Kuhn et al., 1994). LICs undergoing Paris Club rescheduling were requested to implement structural adjustment programs with the IMF (Cosio-Pascal, 2008; Boote et al., 1998).[35] Accordingly, restructuring was primarily aimed at providing a time window for the implementation of macroeconomic adjustments that would permit a re-assumption of normal relations with the debtor country's creditors (Callaghy, 2004; Mistry, 1994). Hence, at that time, the notion of rescheduling was inherently one of adjusting the way out of debt distress.

However, as external public debt levels continued to rise dramatically in many LICs during the 1980s (Figure 4), the conventional approach of limited non-concessional case-by-case service rescheduling for bilateral debt appeared increasingly inappropriate (Mistry, 1992). In response, Paris Club debt treatment operations between 1988 and 1995 became increasingly concessional but remained limited to flow rescheduling, i.e. the restructuring of eligible debt service. At the G7 summit held in 1988 in Toronto, it was agreed that LICs would be granted a reduction of 22 to 33 percent of the PV of debt service falling due in the consolidation periods under future Paris Club rescheduling operations (Toronto Terms). The degree of concessionality was further increased to up to 50 percent at the G7 summit of 1991 in London (London Terms).[36]

Nevertheless, the scope of these concessional rescheduling operations remained highly limited for various reasons. First, the increasing volume of outstanding multilateral debt continued to be excluded from rescheduling and cancellation (Mistry, 1994; Dijkstra, 2008; Kuhn et al., 1994). Second, the volume of long-term bilateral debt treated under Paris Club agreements remained very modest in relation to overall outstanding external debt, as PV reductions were only applied to the service of debt issued before a certain cutoff date and falling due in the consolidation period. Third, as part of their defensive lending strategies, official bi- and multilateral creditors continued to provide new financing, further aggravating the existing debt problem. Due to these limiting factors the debt consolidated under Toronto Terms and London Terms amounted to only USD 6 billion and USD 9 billion, respectively, while the overall nominal external stock of long-term PPGD owed by beneficiary countries stood at USD 106 billion by the end of 1996.[37]

In a first attempt to provide a permanent exit to perpetual rescheduling, the G7 at its Naples summit in 1994 further enhanced the degree of concessionality under Paris Club arrangements.[38] Under the Naples Terms, highly indebted LICs would receive a PV reduction of 67 percent on eligible debt. Furthermore, the consolidation period was significantly extended, and now covered between two

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35 The IMF's macroeconomic adjustment programs were from the mid-1980s provided under concessional lending facilities – from 1986 to 1987 through the Structural Adjustment Facilities (SAF); from 1987 to 1999 through the Enhanced Structural Adjustment Facilities (ESAF); and from 1999, through the Poverty Reduction and Growth Facility (PRGF).

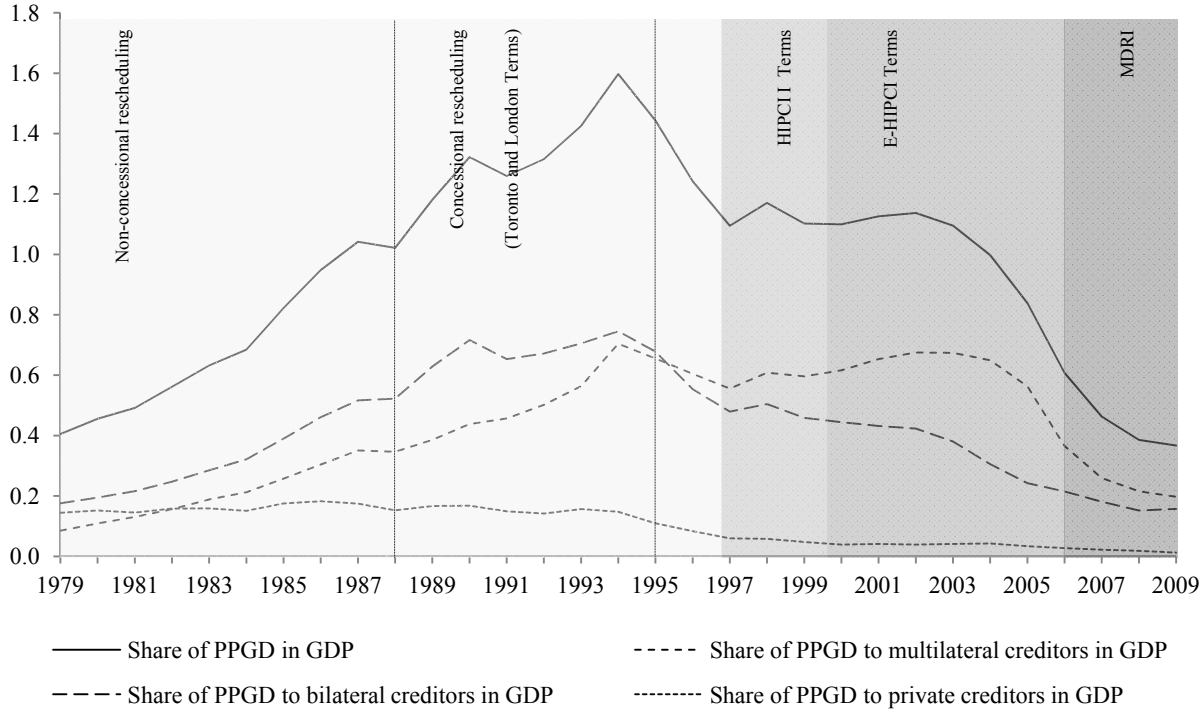
36 Toronto and London Terms included a menu of options for providing debt and debt-service reduction to LICs.

37 In this context consolidation does not imply full cancellation but only restructuring at concessional terms.

38 The G7 proposal was endorsed by Paris Club members in December 1994. Naples Terms were applied between January 1995 and November 1996.

and three years (generally coinciding with the implementation of an IMF structural adjustment program).[39] More importantly, for the first time, concessional Paris Club modalities went beyond flow treatment: Upon satisfactory completion of IMF programs, an exit rescheduling option allowed for a stock of debt treatment, namely a 67 percent PV reduction in external long-term public debt owed to Paris Club members (Boote et al., 1998).[40]

Figure 4: PPGD by creditor as a share of HIPC GDP



Source: World Bank, World Development Indicators, 2012.

3.3.2 Heavily Indebted Poor Countries and Multilateral Debt Relief Initiatives

While this enhancement of concessionality contributed to slowing down and eventual halting the continuous growth of highly indebted LICs' PPGD (see Figure 4), it became evident that without the inclusion of multilateral debt in future debt relief operations, a substantive and sustainable reduction in highly indebted poor LICs' external PPGD stocks would not be achievable. Under continuously growing pressure, in 1995 the World Bank and the IMF switched from fundamental

[39] Eligibility criteria for the 67 percent PV reduction under Naples Terms were i) an income of 500 USD per capita and below and ii) a debt stock (PV) to exports ratio of 350 percent or more. LICs failing to meet these criteria only received a 50 percent PV reduction (Boote et al., 1995).

[40] London Terms already contained a goodwill clause allowing for debt stock treatment upon satisfactory completion of IMF-supported programs that, however, had not been applied (Boote and Thugge, 1997; Boote et al., 1998). Naples Terms debt-stock treatment was provided to Benin, Bolivia, Burkina Faso, Guyana, Mali and Uganda (Boote et al., 1998).

opposition to relief deals to the role of fair brokers for a comprehensive and once-and-for-all debt reduction program that would encompass multilateral, bilateral and private debt (Callaghy, 2004).[41]

In autumn of 1996, the executive boards of the IMF and the World Bank endorsed the staff proposals for a comprehensive reform program: the HIPC Initiative. Its core objective was to reduce HIPCs overall external debt stock – including multilateral debt – to sustainable levels (World Bank and IMF, 1996). As the initial HIPCI got off to a slow start and appeared to be insufficient in scale to attain its goals, the terms and eligibility thresholds were reviewed and substantively lowered in September 1999.[42] Under a revised HIPCI framework, known as Enhanced HIPCI (E-HIPCI), the original core objective was extended to additionally target economic development and poverty reduction (World Bank and IMF, 1999, Gautam, 2003). To ensure that the fiscal space gained from debt service and debt stock cancellation would be used for additional poverty reduction spending, beneficiary governments were required under E-HIPCI to develop and implement comprehensive Poverty Reduction Strategies, which had to be approved by the Bank and the Fund (World Bank and IMF, 1999).[43]

Eligibility under HIPCI and E-HIPCI was subject to two pre-conditions: Potential beneficiaries had to be eligible for funding under the World Bank's concessional lending arm, the International Development Association (IDA); and they were required to successfully complete Naples Terms restructuring. The ultimate decision on a country's participation under HIPCI and E-HIPCI was taken based on a tripartite debt sustainability analysis, jointly conducted by the staff of the IMF, the World Bank and country authorities. If the results suggested that the external debt stock after Naples Terms treatment would continue to range above predefined sustainability thresholds, the respective country became eligible for HIPCI and later E-HIPCI treatment.[44] The purpose of the debt sustainability analysis in this context was twofold: First, it served as a tool for determining

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41 It is interesting to note that while the IMF and the World Bank in most of their official documents claim at least the role of accoucheur of HIPC, the two institutions until 1995 repeatedly disavowed the fact that LICs undergoing serial Paris Club rescheduling were facing embarrassingly severe solvency crises. Instead they repeatedly claimed that those countries where primarily facing short-lived liquidity constraints. An excellent account of the evolving political-economy processes leading to the HIPC Initiative is provided by Callaghy (2004).

42 According to Gautam (2003), from 1996 to 1999, only seven countries reached the decision point and became eligible for debt relief. While the dissatisfactory slow start of the HIPCI might have played a role, the pressure of debtor governments, the G7, civil societies and NGOs upon the World Bank and IMF to lower the thresholds seems to have been pivotal for the enhancement of the initiative (Callaghy, 2004).

43 Poverty Reduction Strategies (PRSs) should contain an assessment of poverty and its key determinates, set targets for poverty reduction, prioritize government activity to achieve development objectives, establish a monitoring framework that maps poverty trends and can be used to evaluate the impact of government interventions, and describe the participatory process in preparation of the strategy (World Bank, 2002). As the participatory development of comprehensive PRSs threatened to delay implementation, an interim-PRSs was also deemed sufficient to qualify for irrevocable debt cancellation under E-HIPCI. Interim PRSs were considered a binding commitment, containing a statement of intent and a roadmap for developing and implementing a full PRSs (Gautam, 2003).

44 The principal sustainability threshold was the ratio of the PV of the debt stock in PV terms to gross exports of 150 percent (200-250 percent under HIPCI). For very open economies with gross exports amounting to above 30 percent of GDP (40 percent under HIPCI), an alternative fiscal criterion, the PV debt stock to central government revenue ratio (250 percent under E-HIPCI and 280 percent under HIPCI) was applied (Gueye et al. 2007; Gautam, 2003). As a necessary condition for the application of the alternative criterion, the ratio of budget revenue/GDP had to be above 15 percent (20 percent under HIPCI) (Gueye et al. 2007).

external PV debt stock in order to assess HIPCI/E-HIPCI eligibility. Second, it was used to project the development of the country's external debt position under several plausible medium-term macroeconomic scenarios in order to determine the volume of relief required to bring the debt below sustainability thresholds.[45] The burden of relief operations is shared among multilateral, official bilateral and commercial creditors in proportion to their share in the PV of outstanding debt at the time of the country's qualification for HIPCI or E-HIPCI (Gueye et al., 2007).[46]

Countries qualifying for the HIPCI – i.e. who had reached, in official jargon, the "Decision Point" – were required during an interim period to implement another IMF macroeconomic stabilization program. During this interim period, as under previous Paris Club arrangements, beneficiary countries received substantive debt service reduction. In the case of pre-cutoff bilateral debt, these reductions in almost all cases amount to 100 percent, whereas the terms for flow treatment of multilateral debt were generally less generous.[47] After completing the IMF's program and demonstrating the successful implementation of the Poverty Reduction Strategy, the country would reach the so-called "Completion Point," upon which remaining relief was provided in the form of bilateral debt stock cancellation and – depending on the terms applied by the individual multilateral organization – continued service relief or in some cases stock treatment for multilateral debt.[48]

Through the increasingly concessional and comprehensive Paris Club terms HIPCs' PPGD owed to bilateral creditors as a share of GDP was slashed from around 70 percent of GDP in 1994 to 30 percent by 2005. Yet by 2005, the share of multilateral PPGD still stood at 60 percent of GDP (cf. Figure 4). As particularly OECD and Paris Club members were demanding greater contributions by multilateral institutions, in July 2005 the G8 proposed another relief initiative, which this time was to focus solely on the comprehensive reduction of multilateral debt. In January 2006, the IMF and African Development Fund (AfDF) began implementation of the Multilateral Debt Relief Initiative (MDRI).[49] IDA and the Inter-American Development Bank (IDB) joined in July 2006 and January

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45 Although not used as an explicit threshold, the E-HIPIC aimed at reducing the PV-debt to GDP ratio to a level comparable to that of non-HIPC LICs and LMIs, which were on average ranging around 40 percent of GDP. As the projections of future debt levels critically depend upon assumptions regarding key macroeconomic variables such as GDP growth, exchange rate trends, revenue mobilization, etc., conducting debt sustainability analysis was a highly political undertaking. As documented by Gautam (2003), these projections, particularly the growth rate and export share projections, were often overly optimistic such that at the completion point, sustainability thresholds could not be met.

46 As described by Gueye et al. (2007), the reduction of commercial debt under HIPC was mainly achieved through the Commercial Debt Reduction Facility, which provides grants co-funded by IDA, France, Germany, the Inter-American Development Bank, the Netherlands, Sweden, Switzerland, and the USA to buy back commercial debt. As the HIPCI and E-HIPCI have no legally binding character, HIPCs had hardly any leverage to achieve substantive relief on commercial debt. At least 20 HIPCs have been addressees of litigation measures pertaining to commercial debt amounting to approx. USD 2 billion (Gueye et. al., 2007).

47 This refers to non-concessional (i.e. non-ODA) debt. Original Paris Club cutoff dates were maintained under HIPCI and E-HIPCI unless treatment of pre-cutoff-date non-concessional debt proved insufficient to meet HIPCs sustainability thresholds (Gueye et al., 2007). A list of the cutoff dates by country applied under HIPCI and E-HICI is provided in Appendix IX. Under E-HIPCI terms, the entire concessional debt stock (i.e. ODA loans) contracted prior to and after the cutoff date was subject to cancellation (Vilanova and Martin, 2001).

48 A detailed description of the individual debt relief arrangements applied by multilateral organisations is provided in Gueye et al. (2007).

49 The African Development Fund is the concessional lending arm of the African Development Bank.

2007, respectively. Under MDRI, the debt to AfDF, IMF and IDB which had been issued prior to 2005 and all IDA debt issued prior to 2004 would be cancelled for HIPCs reaching the Completion Point.[50] The overall volume of MDRI is estimated at USD 57 billion in nominal terms (Gueye et al., 2007).[51] By the end of 2011, 32 countries had reached the HIPCI Decision Point and were benefiting from relief under MDRI.

3.4 Testing the Debt Overhang Hypothesis

The total amount of debt cancelled under HIPCI, E-HIPCI and MDRI is estimated at 109.8 billion USD (in end-2010 PV terms).[52] Through the substantive reduction of HIPCs' debt, the average ratio of nominal PPGD to GDP declined on average from its all-time high of 160 percent in 1994 to approx. 30 percent in 2010; a level comparable to that of non-HIPC control group countries (Table 9).

Table 9: Public and Publically Guaranteed Debt as a Share of GDP

Year		HIPCs	Non-HIPCs
1994	Average	159.48	63.86
	Obs.	28	30
2010	Average	27.17	28.41
	Obs.	29	30

Source: World Bank, World Development Indicators, 2012.

This provides the basis for the following considerations: As highlighted in Section 3.2, efforts to empirically determine a viable and robust threshold beyond which the marginal impact of debt on investment and growth turns negative remain inconclusive (Warner, 1992; Cohen, 1997; Elbadawi et al., 1997; Pattillo et al., 2002; Pattillo et al., 2003; Chauvin and Kraay, 2005; Imbs and Ranciere, 2005). However, irrespective of where the true threshold level may fall, it can be assumed that if the adverse mechanics of debt overhang were in effect prior to HIPCI and MDRI, they now have most definitely been removed, thanks to the scope of relief provided under HIPCI and MDRI. Thus, the removal of overhang-driven adverse effects should have induced a measurable increase in national investment, productivity and economic growth.

3.4.1 Methodology

To trace the possible effects of debt relief, in the following empirical analysis the evolution of proxy indicators for investment and growth of real per capita income are compared between HIPCs

[50] Furthermore, the following conditions had to be met: i) satisfactory performance on the IMF's macroeconomic programs, ii) satisfactory implementation of the country's PRS, and iii) no adverse development in Public Financial Management (Hurley, 2007).

[51] A flow chart for the HIPCI and MDRI relief framework is provided in Appendix XI. Appendix XII provides an overview on the volume, modalities and degrees of concessionality of relief operations since 1988.

[52] IDA and IMF (2011) preliminary estimates for HIPCI and E-HICI: 76.0 billion USD (end-2001 PV terms, excluding relief under Naples terms) and MDRI: 33.8 billion USD (end-2010 PV terms).

– a sub-group of IDA countries and a control group, i.e. IDA countries not participating in the HIPCI and MDRI. The debt relief considered here for a selected sub-group of IDA countries can be modeled as a quasi-experimental setting with the non-random assignment of countries to either the treatment group, i.e. IDA countries receiving debt relief, or to the control group, i.e. IDA countries that have not received debt relief (Ashenfelter, 1978; Ashenfelter and Card, 1985; Meyer, 1995; Buckley and Shang, 2003). Therefore, a feasible methodology for quantifying HIPCs response behavior would be to estimate the average treatment effect on the treated (ATET).

A first simple strategy is to draw on the baseline specification of a difference-in-differences estimator that is derived from the equation for repeated cross-sectional observations in the form of

$$(1) \qquad Y_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta\left(T_i \cdot t_i\right) + \varepsilon_{i,t}, \text{ for } i = 1,....,N \text{ and } t = 0,1,$$

where $Y_{i,t}$ denotes the outcome variable, T is the treatment dummy (0,1), and t indicates the pre- and post-treatment periods for which observational data of the outcome variable are available. The error term ε_i captures all omitted determinates of Y_i. The coefficient δ represents the ATET and is consistently estimated through

$$(2) \qquad \hat{\delta}_{DD} = \overline{Y}_1^T - \overline{Y}_0^T - \left(\overline{Y}_1^C - \overline{Y}_0^C\right),$$

or applying OLS on the differenced equation in the form of

$$(3) \qquad Y_{i,1} - Y_{i,0} = \gamma + \delta T_i + \varepsilon_i,$$

where γ captures the joint time trend in the control and treatment group. The estimator is efficient and un-biased if

$$(4) \qquad \operatorname{cov}\left(\varepsilon_i, T_i\right) = 0;\ \operatorname{cov}\left(\varepsilon_i, t_i\right) = 0;\ \operatorname{cov}\left(\varepsilon_i, t_i \cdot T_i\right) = 0.$$ [53]

However, particularly the last of these three assumptions, which implies a parallel time trend among treated and controls, is critical.[54] It can be relaxed through the incorporation of time invariant and time variant covariates that are expected to cause different trends in outcomes among treated and controls alike, such that

$$(5) \qquad Y_{i,t} = \alpha + \beta T_i + \gamma t_i + \delta\left(T_i \cdot t_i\right) + \boldsymbol{x}_i\boldsymbol{\phi}_t' + \boldsymbol{z}_{it}\boldsymbol{\varphi}_t' + \varepsilon_{i,t}$$

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[53] Under these assumptions the simple Diff-in-Diff estimator is unbiased as
$E\left[\hat{\delta}_{DD}\right] = E\left[\overline{Y}_1^T\right] - E\left[\overline{Y}_0^T\right] - \left(E\left[\overline{Y}_1^C\right] - E\left[\overline{Y}_0^C\right]\right) = \alpha + \beta + \gamma + \delta - \alpha - \beta - (\alpha + \gamma - \alpha) = \delta \cdot$

[54] If the parallel trend assumption is violated, such that $\operatorname{cov}\left(\varepsilon_i, t_i \cdot T_i\right) = E\left(\varepsilon_i, t_i \cdot T_i\right) = \Delta$, than δ will be biased as
$E\left[\hat{\delta}_{DD}\right] = E\left[\overline{Y}_1^T\right] - E\left[\overline{Y}_0^T\right] - \left(E\left[\overline{Y}_1^C\right] - E\left[\overline{Y}_0^C\right]\right) = \gamma^T + \delta - \gamma^C = \gamma + \Delta + \delta - \gamma = \delta + \Delta \cdot$

where ϕ_t and φ_t are the effects of the time invariant (pre-treatment) and time variant covariates on the outcome for each of the two time points (Meyer, 1995; Buckley and Shang, 2003). Differencing yields

(6) $$Y_{i,1} - Y_{i,0} = \gamma + \delta\left(T_i \cdot t_i\right) + \boldsymbol{x}_i\boldsymbol{\phi}' + \Delta \boldsymbol{z}_i\boldsymbol{\varphi}' + \varepsilon_i \text{ , with}$$

(7) $$\boldsymbol{x}_i\boldsymbol{\phi}' = \boldsymbol{x}_i\boldsymbol{\phi}_1' - \boldsymbol{x}_i\boldsymbol{\phi}_0' = \boldsymbol{x}_i\left(\boldsymbol{\phi}_1' - \boldsymbol{\phi}_0'\right) \text{ and } \Delta z_i\boldsymbol{\varphi}' = z_{i1}\boldsymbol{\varphi}_1' - z_{i0}\boldsymbol{\varphi}_0' = \Delta z_i\left(\boldsymbol{\varphi}_1' - \boldsymbol{\varphi}_0'\right).$$

As changes in time variant covariates may result from treatment, i.e. could possibly be endogenous, they should be applied carefully.

While the specification presented here uses repeated cross sections, most empirical studies have applied difference-in-differences estimations on panel data. However, as Bertrand et al. (2004) show, difference-in-differences estimations based on long panel data significantly underestimate standard errors of the treatment effect coefficient, due to serial correlation of the outcome variable. This in turn leads to an over-rejection of the null hypothesis (i.e. that the average treatment effect is not different from zero). To avoid this common problem, the approach used here applies one possible solution proposed by Bertrand et al. (2004) – to collapse the panel data to a repeated cross-section by averaging pre- and post-treatment period observations. This brings down the rejection rate to the expected level and, according to the authors, works well even for a small number of treatment and control cross-sections.[55]

As outlined in Section 3.3, substantive debt cancellation did not taken place prior to the introduction of Naples Terms, which were first applied in an agreement with Guinea in January 1995 (Boote et. al., 1998). Accordingly, pre-treatment observations for each country are calculated from averages of the respective outcome variable for the period from 1991 to 1994, i.e. the time before Naples terms were adopted. Post-treatment observations are obtained by averaging the respective outcome variables for the period from 2008 to 2011.[56] Averages, in this context, are expected to provide more reliable point estimates for pre- and post-treatment observations as short term fluctuations are leveled out.

[55] In a Monte-Carlo simulation undertaken by the authors for a sample consisting of 50 cross-sections and a length of $T = 21$, the rejection rate for estimating the ATET of a placebo intervention declines from around 50 percent to 5 percent for the five percent confidence level.

[56] Afghanistan, Burkina Faso, Central African Republic, Rep. of Congo, Dem. Rep. of Congo, Guinea-Bissau, Haiti and Liberia that are included in the treatment group only reached the *completion point* between 2008 and 2010, i.e. during the post-treatment period. However, for all of these countries the debt burden had already been substantively reduced during the interim period due to the suspension of interest and principal payments (flow relief) on bilateral debt and partially front loaded relief for multilateral debt (IDA and IMF, 2011). Furthermore, it had become clear that none of the participating countries would be disqualified and denied completion of HICPI and support MDRI, although several HIPCs had temporarily fallen off track with the IMF's interim macroeconomic stabilization programs (Fontana, 2005). This allows assuming that the here considered potential disincentives stemming from a potential debt overhang would have been removed by 2008 for all treatment group countries.

The overall sample comprises countries that theoretically would have been eligible for debt relief under HIPCI/E-HIPCI and MDRI, i.e. all countries which were entitled to borrow at IDA terms as of end 1994. All IDA countries that underwent Naples flow and stock treatment, subsequently qualified for HIPCI or the enhanced framework and successfully reached completion point by end 2010, thereby benefiting from MDRI, were assigned to the treatment group.[57] The control group, by contrast, includes all IDA countries that have not benefited from structured Paris Club and multilateral concessional debt treatment since 1995.[58] The number of countries in the treatment and control groups is fairly balanced (29 treatments units and 30 controls; see Appendix X).

3.4.2 Debt Overhang and Investment

As outlined in Section 3.2, according to Sachs (1989) and the related strand of literature, over-indebtedness is expected to induce an inefficiently low level of investment as future output is subject to marginal taxation in the form of debt service. In order to assess the potential effects of the HIPCI and MDRI on investment, the performance of appropriate proxies for national investment is analyzed.

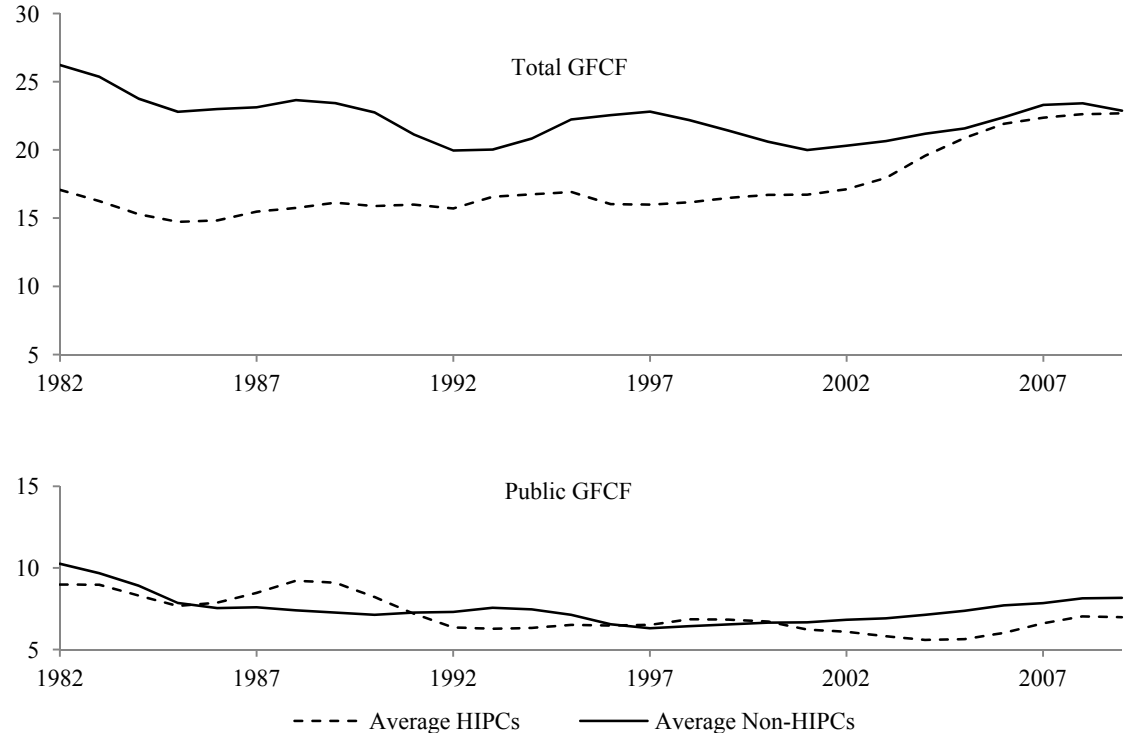
The natural place to look at is fixed capital formation, as it provides information on the accumulation of non-current and illiquid assets by the public and the private sector. Figure 5 shows the three year moving average of total and public gross fixed capital formation as a share of GDP for HIPCs and non-HIPCs between 1983 and 2009.

While throughout the 1980s and the first half of the 1990s the average share of total gross fixed capital formation (GFCF) for HIPCs and non-HIPCs was fairly stable, HIPCs' GFCF-to-GDP ratio stayed consistently below that of non-HIPCs. In subsequent years, however, HIPCs' share of GFCF in GDP started to catch up, resulting in an almost complete equalization by 2007/08. As this development coincided with the implementation of Naples Terms relief and the subsequent HIPCI and MDRI, the data provide some preliminary indication that debt relief exerts a positive stimulating effect on total investment.

[57] HIPCs, which did not complete the HIPCI itinerary until end-2010, were removed from the sample. This applies to Chad, Comoros, Côte d'Ivoire, and Guinea (IDA and IMF, 2011). Cf. Appendix X.

[58] For reasons of comparability, small island economies and countries with a population of less than one million have been excluded.

Figure 5: GFCF for HIPCs and non-HIPCs as a percentage of GDP (three-year moving averages)



Data source: World Bank, World Development Indicators, 2012.

Interestingly, as Figure 5 shows, this observation appears not to apply to public investment. Except for minor fluctuations, the level of public GFCF has been stagnating at between 5 and 8 percent of GDP for HIPCs and non-HIPCs alike. This implies that the observed increase in total investment as a percentage of GDP between 1995 and 2010 has primarily been driven by a rise in private investment ratios. Hence, if debt relief under the Naples Terms, HIPCI and MDRI has had a statistically and economically significant stimulating effect on investment, this apparently occurred through an increase in private investment. To investigate whether these preliminary indications are economically and statistically robust, the difference-in-differences framework as specified above is applied to separately estimate the ATET for total, public and private investment.

The difference-in-differences baseline specification (Eq. 3) is associated with the risk of confounding the ATET with other unobserved effects specific to the treatment or control group, as trend-determining covariates may have been omitted. To avoid the risk of unobserved confounders, structural variables identified in the previous empirical research as determinant of total, public, and private investment – following the specification as in Eqs. 6 and 7 – have been included as pre-treatment controls in the respective specifications.[59]

[59] Only covariates that can be assumed to be strictly exogenous with respect to treatment are included as time variant variables (cf. see Section 3.4.2). As the summary statistics presented in Appendix XIII suggest, the averages of pre-treatment covariates – except for urbanization – differ substantively between HIPCs and non-HIPCs such that controlling for these appears to be a necessary measure of prudence.

Drawing on the findings by Cordella et al. (2010), the specification used here for total investment is modeled as function of

i) pre-treatment GNI per capita (measured in constant 2000 US dollars),
ii) the level of political and economic stability and governance (in this case approximated by the State Fragility Index developed by Marshall and Cole, 2011b),[60]
iii) and the degree of trade openness measured by the volume of trade as a share of GDP.

As total investment is an aggregate of public and private investment, determinates identified as specific to public investment (Sturm, 2001; Clements et al. 2003) have also been included:

iv) urbanization, approximated by the share of the total population living in urban areas, is expected to induce a reduction in the demand for public investment, which mostly concerns infrastructure,[61]
v) development aid, measured as official development assistance per capita,[62] exerts a positive effect on investment spending as it creates additional fiscal space that allows for extra-recurrent expenditure,
vi) high public debt and the resulting interest service appear to crowd out public investment,
vii) a growing population is expected to stimulate the demand for public infrastructure, requiring additional public investment.

Furthermore, a dummy for sub-Saharan African countries has been included in all three specifications as most HIPCs (24 out of 32) are located south of the Sahara. This is to avoid the treatment effect coefficient potentially being driven by regionally specific investment behavior.

The dependent variable is the difference between the four year pre- and post-treatment averages of the share of total, public, and private GFCF in GDP, thereby representing the average percentage increase in the control and treatment group countries during the implementation of HIPCI and MDRI.

[60] The Worldwide Governance Indicators developed with a similarly large time and country coverage are available to measure the quality of governance more directly. However, due to the documented methodological limitations (see Kurtz and Schrank, 2007; Langbein and Knack, 2010; Thomas, 2010; Knoll and Zloczysti, 2012), I refrain from using them in a repeated cross-section estimation.

[61] This hypothesis, however, appears rather doubtful, as in many developing countries public investment lags behind the rapidly growing demand for infrastructure in urban areas, particularly in the fields of water and sanitation, electricity, transportation, public transport, sewage and waste management.

[62] Official development assistance as reported by OECD/DAC Creditor Reporting System excluding assistance related to debt treatment received from DAC countries, i.e. OECD/DAC purpose codes 60020 (debt forgiveness), 60030 (relief of multilateral debt), 60040 (rescheduling and refinancing), 60061 (debt for development swap), 60062 (other debt swap), and 60062, 60063 (debt buy-back).

Table 10: Effects of debt relief on total and private investment

Variable	***Total Investment***	***Private Investment***	***Public Investment***
Treatment Dummy	0.070 **	0.061 *	0.006
	(2.00)	*(1.92)*	*(0.36)*
SSA Dummy	-0.013	0.001	-0.002
	(-0.40)	*(0.03)*	*(-0.16)*
State Fragility Index (pre-treatment)	-0.006 **	-0.004	-0.001
	(-2.24)	*(-1.55)*	*(-0.40)*
GNI per capita (pre treatment)	-0.001	0.023	-0.022**
	(-0.03)	*(1.27)*	*(-2.20)*
Trade openness (pre-treatment)	0.001 **	0.001	0.001**
	(1.36)	*(1.24)*	*(2.42)*
Population growth (time variant)	0.004	n.a.	0.003
	(0.39)		*(0.47)*
Urbanization (time variant)	-0.001 *	n.a.	-0.001
	(-1.64)		*(-0.80)*
Aid (pre-treatment)	0.001 *	n.a.	0.001
	(1.67)		*(1.12)*
N	87	89	77
Baseline	44	44	38
- *o/w control*	21	22	16
- *o/w treated*	23	22	22
Follow-up	43	45	39
- *o/w control*	22	24	18
- *o/w treated*	21	21	21
R^2	0.33	0.22	0.22
F-test	5.11	3.27	3.82
	0.00	0.01	0.00

** p<0.1, ** p<0.05, *** p<0.01*
Robust standard errors (Huber/White robust variance estimates) are used.

The specification used to estimate the effects of debt relief under HIPCI and MDRI on private investment includes those covariates of the total investment specification that are not specific to public investment (cf. Warner, 1992; Sturm, 2001; Clements, 2003; Cordella et al., 2010), i.e. the sub-Saharan Africa dummy, the State Fragility Index, the level of initial GDP per capita and the degree of trade openness.[63]

[63] A complete list of sources used is provided in Appendix XIII.

As the results presented in Table 10 suggest the average treatment effect on total investment amounts to a statistically and economically significant above time trend increase of approx. 7 percentage points in GDP.[64] This would indicate that the debt relief provided under Naples Terms, HIPCI and MDRI is indeed associated with a substantive and statistically significant increase in total GFCF. In the specification to estimate the ATET on total GFCF, the state fragility, trade openness, urbanization and development assistance covariates are statistically and economically significant.

The results also confirm the aforedescribed data indicating that the above-average increase in total GFCF is entirely driven by private investment, while a positive and meaningful treatment effect on public GFCF is not observable. The results are robust with respect to the selection of covariates and also hold in the most simple difference-in-differences specification where pre-treatment control variables are excluded (Eq. 3).

These findings clearly contradict the mechanics of debt relief as postulated by Sachs (1989), as well as the empirical findings of Clements et al. (2003), who suggest that the negative effects of high external sovereign debt are more pronounced for public than for private investment. A possible reason for the lack of a measurable above time-trend increase in public investment could be that, as outlined in Section 3.3, with the introduction of the E-HIPCI in 1999 and although under MDRI, a strong emphasis was put on the implementation of the short- and medium-term Poverty Reduction Strategies (World Bank, 2002). The ambitious goal of poverty reduction, while laudable, might have come at the cost of higher government consumption and lower investment expenditure, as the long-term effects of socio-economic investment were considered second-order priorities in governments' target functions. However, this hypothesis needs further investigation to be substantiated.

The observed positive effect on private investment suggests that the reduction of public debt has indeed led, as suggested by Borensztein (1990) and Diwan and Rodrik (1992), to a decline in the socio-economic cost associated with unsustainable public debt, either by fostering a more favourable macroeconomic environment or by augmented return expectations. This raises the question as to whether the positive treatment effect of debt relief on private investment has been strong enough to have meaningful effects on growth.

3.4.3 Debt Overhang and Growth

To determine the ATET of HIPCI- and MDRI-based debt cancellation on GNI per capita, a reduced-form growth model as utilized in Barro (1997) and subsequently in Clements et al. (2003), Pattillo et al. (2003), Presbitero (2008), and Cordella et al. (2010) is applied to the difference-in-differences framework. The dependent variable is the difference between the four year pre- and

[64] For difference-in-differences estimations the STATA algorithm devised by Villa (2011) has been used.

post-treatment averages of real GNI per capita (in logarithms), thereby approximating the average percentage increase in control and treatment group countries during the implementation of HIPCI and MDRI.

The specification is in the form of Eq. 6 and includes the standard pre-treatment as well as time variant controls (the former are those that are possibly endogenous, the latter are those that are entirely exogenous with respect to treatment). The applied pre-treatment controls are those identified in previous research to determine development countries' growth paths, i.e. the initial level of real GDP per capita to account for the convergence assumption (Barro, 1997; challenged by Easterly and Levine, 2001), the level of trade openness (measured as ratio of exports to GDP, cf. Sachs and Warner, 1995), the terms of trade to approximate a country's relative beneficiary position in international trade (Cordella et al., 2010), and the initial level of inflation (in natural logarithms). As the availability of terms of trade data is limited, thereby reducing the number of total observations in the regression, the growth equation is estimated with (Table 11, estimation results IV-VI) and without (Table 11, estimation results I-III) the terms of trade covariate. As can be seen, the economic and statistical significance of the variables of interest is not affected by the inclusion or exclusion of the terms of trade variable.

Again, the State Fragility Index developed by Marshall and Cole (2011b) has been included as time invariant pre-treatment variable to control for the anticipated positive effect of political, economic and social stability on growth, as HIPCs appear to be systematically less stable than non-HIPCs. As for the regression specifications in Section 3.4.2, an SSA dummy is applied to avoid potential confounding of treatment and region specific effects. Furthermore, in line with the assumption of capital formation being an important determinant of economic growth, the estimation specification controls for pre-treatment total (Table 11, results I and IV), public (Table 11, results II and V) and private gross fixed capital formation (Table 11, results III and VI), respectively. As indicators on human capital (mostly approximated using secondary school enrolment rates), in all cases remained statistically and economically insignificant (cf. Barro, 1997 and Clements et. al., 2003), they are omitted in the current specification.

Table 11: Impact of debt relief on real GNI per capita growth

Variable	I	II	III	IV	V	VI
Treatment Dummy	-0.153	-0.090	-0.062	-0.206	-0.141	-0.113
	(-0.96)	*(-0.52)*	*(-0.35)*	*(-1.22)*	*(-0.76)*	*(-0.60)*
SSA Dummy	-0.053	-0.063	-0.047	-0.090	-0.124	-0.119
	(-0.56)	*(-0.52)*	*(-0.46)*	*(-0.85)*	*(-1.15)*	*(-1.04)*
State Fragility Index (pre-treatment)	-0.023	-0.024	-0.029 *	-0.022	-0.025	-0.027
	(-1.56)	*(-1.61)*	*(-1.83)*	*(-1.22)*	*(-1.36)*	*(-1.37)*
Trade Openness	0.042	0.044	0.037	0.062	0.068	0.068
(pre-treatment)	*(0.61)*	*(0.63)*	*(0.51)*	*(0.83)*	*(0.92)*	*(0.91)*
Terms of Trade index (pre-treatment)	n.a.	n.a.	n.a.	-0.124	-0.156	-0.167
				(-0.77)	*(-0.96)*	*(-0.99)*
Inflation	0.013	0.012	-0.007	-0.004	-0.008	0.008
(pre-treatment)	*(0.32)*	*(0.29)*	*(-0.15)*	*(-0.09)*	*(-0.20)*	*(0.16)*
GNI per capita	0.002 ***	0.002 ***	0.001 ***	0.002 ***	0.002 ***	0.001 ***
(pre-treatment)	*(6.33)*	*(6.11)*	*(5.22)*	*(6.03)*	*(5.76)*	*(5.09)*
Population growth	0.051	0.043	0.004	0.033	0.018	-0.016
(time variant)	*(1.66)*	*(1.25)*	*(0.12)*	*(1.02)*	*(0.55)*	*(-0.50)*
GFCF in percent of GDP (pre-treatment)	0.308 ***	-	n.a.	0.244 **	-	n.a.
	(3.03)			*(2.38)*		
Public GFCF in percent of GDP	-	0.288 ***	n.a.	n.a.	0.200 *	n.a.
(pre-treatment)		*(2.63)*			*(1.94)*	
Private GFCF in percent of GDP	-	-	0.111	n.a.	-	0.063
(pre-treatment)			*(1.47)*			*(0.90)*
TFP index	0.335 **	0.328 **	0.343 **	0.274 *	0.251 *	0.249 *
(pre-treatment)	*(2.22)*	*(2.19)*	*(2.22)*	*(1.96)*	*(1.87)*	*(1.76)*
N	70	66	66	66	60	60
Baseline	35	33	33	33	30	30
o/w control	11	10	10	9	8	8
o/w treated	24	23	23	24	22	22
Follow-up	35	33	33	33	30	30
o/w control	11	10	10	9	8	8
o/w treated	24	23	23	24	22	22
R^2	0.86	0.86	0.85	0.87	0.87	0.87
F-test	51.82	46.92	45.36	52.25	48.46	54.28
	0.00	0.00	0.00	0.00	0.00	0.00

** p<0.1, ** p<0.05, *** p<0.01*
Robust standard errors (Huber/White robust variance estimates) are used.

Following the more recent literature on determinates of growth (Easterly and Levine, 2001; Pattillo et al., 2003) which identifies TFP as the principal explanatory force for cross-country and over-time variation in per capita growth rates, with capital accumulation of only subordinate importance,

the average pre-treatment level of TFP has been included.[65] As population growth can be considered exogenous of debt relief, it is included as time variant variable. Population growth may negatively affect the level of GNI per capita as it, if associated with a growing labor force, results in a decline in the capital-to-labor-ratio, thereby reducing productivity per capita (Barro, 1997).

The results suggest the following: While the pre-treatment level of national investment (particularly public investment), the regional dummy, the fragility and governance proxy and particularly the level of total factor productivity appear to be decisive factors in determining per capita GNI growth during the observation period, the treatment dummy is negative but statistically insignificant in all six specifications. This would suggest that debt relief under HIPCI and MDRI has apparently not had a substantive positive effect on growth, despite the indications that the two debt relief initiatives had substantive positive effects on private investment.

This result raises the question as to why HIPCI and MDRI have not been more successful in stimulating economic growth. There are three possible answers, which might have joint or partial validity: First, it may simply be too early to tell, as more time may be needed before the positive growth effects of debt relief become visible and measurable. If the level of public debt is a determinate of economic growth over the long-term, the post treatment period covered in the empirical analysis may be too brief to reveal possible stimulating effects. As indicated, most HIPCs reached the completion point in the years between 2000 and 2006, such that positive treatment effects may not be reflected in the 2007 to 2010 data.

Second, while HIPCI and MDRI apparently have been successful in stimulating private investment, a positive effect on public investment, measurable vis-à-vis the treatment group, is, as discussed above, not observable. Yet as the results from the growth regression and previous research suggest (Clements et al., 2003), public investment is at least as important in stimulating economic growth as private investment. Therefore, one important mechanism through which debt relief is expected to trigger growth in accordance with the debt overhang hypothesis – namely, through the enhancement of public investment – appears broken, at least for the HIPCI and MDRI.

Third, and probably most importantly, while the two initiatives have had some impact on capital accumulation, it seems that the HIPCI and MDRI are not associated with measureable above time-trend increase in TFP, which, according to the results presented here and confirming earlier findings by Easterly and Levine (2001) and Pattillo et al. (2003), is the second and actually most important channel through which debt relief is expected to boost economic growth.

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[65] The data are drawn from UNIDO's World Productivity Database, which contains information on the level and the growth of productivity for 112 countries from 1960 to 2000. The database has the comparative advantage that it for the first time provides time- and cross-section-consistent data for a large sample of developing countries. The level of TFP is calculated as an index and relative to US total factor productivity. A more detailed description is provided in Appendix XIII.

As Table 12 shows both, HIPCs' average pre-treatment level of TFP and the average annual growth rates in TFP during the treatment period remain significantly below those for non-HIPCs during the period of HIPCI and MDRI implementation.

Table 12: Total Factor Productivity for HIPCs and non-HIPCs

Period		HIPCs (I)	Non-HIPCs (II)	T-test
Pre-treatment level (TFP-index; relative to US TFP)	Average	0.170	0.236	H1: Diff (II-I)>0:
	S.E.	0.01	0.02	Pr(T > t) = 0.00
Average annual TFP growth rate 1996-2010 in percent	Average	0.129	0.605	H_1: Diff (II-I)>0:
	S.E.	0.19	0.34	Pr(T > t) = 0.10
N:		*22*	*14*	

Source: Isaksson, A. (2007).

Furthermore, if it is assumed that the main channel for enhancing productivity is economic policy and adjustment effort, as suggested by Krugman (1988) and Easterly and Levine (2001), then the results may point towards the fact, that the HIPCI and MDRI are not associated with effective productivity enhancing policies.

3.5 Conclusion

The HIPCI and MDRI represent the largest and most comprehensive effort to permanently eliminate unsustainable levels of public external debt in low income countries thus far. The debt overhang hypothesis as developed by Krugman (1988) and Sachs (1989) has been a principal building block in the intellectual edifice underpinning these debt relief initiatives. This hypothesis claims that if a debt overhang is accumulated or inherited, it discourages productivity enhancing investment and adjustment efforts, thereby leading to an inefficiently low level of future output.

While a growing strand in the literature has found some evidence that the over-accumulation of debt appears to have negative effects on capital accumulation and factor productivity, the implicit converse assumption underlying the HIPCI and MDRI – namely, that debt relief therefore must be associated with increased investment activity, growth in TFP and a subsequently increase in economic output – has previously never been validated, primarily due to a lack of relevant data. As almost all beneficiary countries have by now received irrevocable cancelation of debt under the HIPCI and MDRI, the two initiatives serve as an ideal test case for examining the debt overhang hypothesis, as least as it applies to debt relief measures for low income countries.

Using a quasi-experimental research design to compare the performance of investment and growth between low income countries that have benefited from relief (HIPCs) and those that have not (non-HIPCs), this study assessed whether debt relief under the HIPCI and MDRI has yielded the expected effects.

The empirical results do not confirm the mechanisms posited by the debt overhang hypothesis. While the HIPCI and MDRI appear to have been partially successful in stimulating private investment, a measurable positive effect on public investment is not observable. As public investment is at least as equally decisive in enhancing economic growth as public investment, key assumptions concerning how debt relief is expected to drive growth as per the debt overhang hypothesis would appear to be erroneous. A possible reason for why debt relief fails to stimulate public investment could be the strong emphasis put on short and medium-term poverty reduction within the scope of the HIPCI and MDRI. This emphasis may have led to higher government consumption and lower investment expenditure. Nevertheless, further research is required to investigate this question.

Most importantly, the data show that the HIPCI and MDRI have not had positive effects on TFP; in fact the average TFP growth rate for HIPCs stayed well below that of non-HIPCs. As the more recent literature (Easterly and Levine, 2001; Pattillo et al., 2003) identifies TFP as a principal factor that accounts for cross-country and over-time variation in per capita growth rates, the systematically weak performance of HIPCs is not surprising. If Krugman's (1988) argument that productivity growth is primarily achieved through macroeconomic adjustment and policy reform is correct, the results presented indicate that the HIPCI and MDRI are ineffective in facilitating the adoption of macroeconomic policies that would support growth.

4. Foreign Aid and Revenue Response: An Examination of Joint General Budget Support

Abstract

The present paper explores the extent to which new joint General Budget Support (GBS) systems have been able to overcome the problems of aid dependency and negative fiscal incentives that can potentially result from high levels of on-budget aid. As approximately 90 percent of new joint GBS goes to sub-Saharan Africa, this analysis, which covers the period from 2000 to 2008, evaluates data from 37 sub-Saharan developing countries. According to fixed effect and system GMM estimations, joint GBS assistance – although highly discretionary – does not undermine recipients' revenue mobilization efforts. Indeed, on the contrary, while aid in general has no measurable impact on recipients' revenue performance, joint GBS programs are associated with higher revenue mobilization. This suggests that on-budget aid delivered under well-targeted conditionality successfully mitigates adverse fiscal incentives while substantially enhancing recipients' fiscal space.

Keywords: **budget support, fiscal response, revenue mobilization, sub-Saharan Africa**

JEL Classification: **C33, F35, O23, O55**

4.1 Introduction

The question of whether or under which circumstances development assistance discourages revenue mobilization efforts by recipient countries has been the subject of extensive debate in academia and among development practitioners for many years (e.g. Heller, 1975; Devarajan and Swaroop, 1998; McGillvray and Morrissey, 2000, McGillvray and Morrissey 2004; Teera and Hudson, 2004). A frequently raised concern is that development aid, particularly when delivered through highly discretionary arrangements, provides recipient governments, whose policymakers naturally aim at minimizing political cost, with a "free lunch" substitute for domestic revenue collection, thus increasing aid dependency. Recent empirical research suggests that high levels of development aid, particularly if provided in the form of grants, are, indeed, associated with lower revenue efforts and a higher degree of aid dependency (Gupta et al., 2004; Gupta, 2007; Clist and Morrissey, 2011).

However, new assistance and partnership strategies, based on national ownership and self-responsibility have emerged in response to the legitimacy crisis of the 1990s and to the growing consensus that development assistance had been largely ineffective – i.e. ill-targeted, poorly managed and highly fragmentary, and, in many cases, lacking the imperative buy-in from recipients (Stiglitz, 1998; Van de Walle, 1999; Menocal and Mulley, 2006). As a consequence, the way in which development assistance is delivered has changed considerably since the beginning of the new millennium (Mosely and Eckhout, 2000; Koeberle and Stavreski, 2006; Knoll, 2008). At a series of high-level fora, donors committed to significantly scale up aid and to adopt better coordinated intervention strategies. They also resolved to shift away from financing geographically specific projects, which often have limited and unsustainable impacts, and to focus more on assisting countries with good governance and policy records.[66]

To meet donor commitments of scaled-up and more effective aid, new policy approaches, such as harmonized on-budget assistance by bilateral and multilateral agencies, referred to as joint General Budget Support (GBS), have been adopted in a number of Low and Lower Middle Income Countries (LICs and LMICs), particularly in sub-Saharan Africa (SSA). Joint GBS modalities serve as policy-based modalities of aid delivery whose purpose is to provide recipients with significant discretionary resources for implementing domestically developed and owned poverty reduction strategies. To sustainably enhance recipients' fiscal space, conditionality of joint GBS focuses, to a large extent, explicitly on Public Financial Management (PFM) reforms, comprising both revenue mobilization and expenditure management.

[66] These comprise the 2002 UN Conference on Financing for Development in Monterrey (UN, 2002) and the High Level Fora on Aid Effectiveness in Rome (OECD, 2003b), Paris, and Accra (OECD, 2008) held in 2003, 2005, and 2008 respectively.

As joint GBS financing is a relatively recent modality, an empirical assessment of its revenue mobilization impacts has yet to be undertaken. To address this gap in the research, the present paper, applying a straight forward approach to model recipients' fiscal responses to budget aid, explores the extent to which new GBS programs have been able to overcome the conundrum whereby high levels of on-budget aid may potentially result in negative fiscal incentives.

The analysis covers the period from 2000 to 2008 and comprises 37 SSA LICs and LMICs.[67] According to the empirical results using fixed effect and dynamic panel estimations, joint on-budget assistance financing – although highly discretionary – does not undermine recipients' revenue mobilization efforts. On the contrary, while aid in general has no measurable impact on recipients' revenue performance, GBS programs are found to be associated with higher revenue mobilization. This suggests that on-budget aid, when coupled with well-targeted conditionality, intensive policy dialogue, and embedded technical assistance, successfully mitigates adverse resource mobilization incentives and enhances fiscal space.

The chapter proceeds as follows: After providing an overview on the context and implementation procedures of GBS delivery in Section 4.2, Section 4.3 reviews the literature on fiscal revenue mobilization in developing countries, placing a particular focus on recent empirical findings. Sections 4.4 and 4.5 present the modeling strategy and specify the data used in the subsequent analysis. After outlining the estimation techniques employed to adequately control for fiscal revenue responses to GBS financing, Section 4.6 presents and interprets findings for the fixed effects and dynamic specifications. Section 4.7 concludes with a summary and final assessment.

4.2 Expansion of joint GBS

Traditional budget support, as provided until the late 1990s under the structural adjustment programs of the World Bank and IMF, was conceived primarily for the short-term, stand-alone redress of macroeconomic and fiscal policy imbalances (Phillips, 2009) and usually drew on a set of predefined Washington-formulated conditionality (Rodrik, 2006). The new approach to GBS financing, which has evolved since the beginning of the new Millennium, serves instead as a common platform for bi- and multilateral medium-to-long-term policy-based lending operations[68] and aims at supporting a nationally owned development strategy, as laid out in the Poverty Reduction Strategy Paper (PRSP). While the composition of bi- and multilateral GBS donor groups varies from country to country, a group of leading donors has emerged over time, including the World Bank, IMF, African Development Bank (AfDB), European Commission (EC), and several bilateral agencies.[69]

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67 For a list of countries included see Appendix XIV.

68 That is, concessional loans or grants with disbursement conditional upon the implementation of a policy menu.

69 World Bank budget support to SSA recipients is generally provided under Poverty Reduction Strategy Credits (PRSC) at concessional IDA terms (World Bank, 2010). The IMF concessional lending window in support of the PRS has since 1999 been the Poverty Reduction and Growth Facility (PRGF). In January 2010 the PRGF has been

The Development Assistance Committee of the OECD (OECD/DAC) defines General Budget Support as an aid modality in which foreign funds from various official donors are transferred to the recipient's treasury and are managed and spent according to national budgetary regulations and priorities (OECD, 2005a; OECD, 2006). In addition to the use of recipients' allocation, procurement, and auditing systems (which are referred to in the following as PFM systems), the key characteristic of joint GBS, as outlined by Koeberle and Stavreski (2006), is the provision of support at regular intervals (ideally, synchronized with recipients' budget cycle) with conditionality particularly focusing on public sector reform, institution and capacity building, and the strengthening of budgetary as well as other PFM processes.

Joint GBS is generally provided within a framework of institutionalized continuous policy dialogue between GBS donors and recipients. Policy dialogue serves as a platform for agreement on specific policy and reform measures directly related to the PRSP, to assess their implementation and decide on the release of funds to the recipient's treasury.

With donors' commitments to significantly scale up aid, budget support has become– when conditions on the ground are considered satisfactory – the modality of choice for various reasons:

First, with on-budget aid delivery untied and fully fungible, monies can be allocated according to national priorities – a significant element of the concept of country ownership. Second, compared to other forms of aid delivery, donor harmonization is easy to achieve, as co-ordination is limited to strategic targets and conditionality, reviewing, monitoring, and disbursement procedures. Donors can thus align with a set of conditionality negotiated with the recipient government, while joint allocation decisions or earmarking are obsolete. Third, GBS, in its capacity as a fast disbursing instrument, canalizes disbursement pressures and provides donors with significant leverage and a degree of control in the policy dialogue, which is an important factor for fiduciary risk mitigation.

Against this backdrop, GBS financing has gained increasing prominence over the last ten years, particularly in sub-Saharan Africa. According to OECD/DAC data maintained by the creditor reporting system (CRS), approximately 90 percent of joint GBS is allocated to Africa south of the Sahara.[70]

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formally replaced by the Extended Credit Facility (Adam and Bevan, 2001; IMF 2009; IMF, 2011a). AfDB's budget support aid to its regional member countries is delivered through its concessional lending arm, the African Development Fund (AfDF). The EC provides budget support grants to SSA recipients from the European Development Fund (EC, 2007). The most important bilateral GBS donors to SSA recipients, providing either grants or concessional loans are Canada, France, Germany, the Netherlands, Norway, Sweden, and the UK (OECD/DAC CRS, micro data for purpose code 51010).

70 OECD/DAC data can only be used as proxy for joint GBS activity as the respective CRS budget support purpose code (51010) only reports general budget support operations by donors irrespectively of the degree of whether GBS is provided jointly with harmonized conditionality and disbursement procedures. The methodology for collection of GBS data used in the subsequent empirical analysis is described in Section 4.4. Data sources are provided in Appendix XIV.

Since the gradual introduction of joint GBS funding, a group of 14 African countries has benefited from the modality.[71]

Table 13: GBS share in total ODA (percent)/Contribution to total domestic revenue excl. grants (percent)

Year	*Start of Operation*		*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Benin	*2004*	*GBS /total ODA*					15.7	26.5	17.8	29.3	13.0
		GBS /total revenue					8.9	13.1	8.4	12.2	6.7
Burkina Faso	*2001*	*GBS /total ODA*		16.4	26.9	22.3	23.2	27.7	25.1	29.1	33.1
		GBS /total revenue		22.3	34.4	22.6	22.9	28.2	29.3	30.2	30.6
Cape Verde	*2005*	*GBS /total ODA*						18.6	9.7	21.5	13.6
		GBS /total revenue						11.2	4.1	8.6	5.7
Ghana	*2003*	*GBS /total ODA*				33.9	25.2	26.3	38.7	25.3	30.5
		GBS /total revenue				21.7	16.8	11.8	16.8	7.6	8.8
Madagascar	*2004*	*GBS /total ODA*					16.1	13.4	18.4	13.3	29.1
		GBS /total revenue					38.5	22.1	21.6	13.6	21.7
Malawi	*2000*	*GBS /total ODA*	15.0	11.8	0.0	4.5	13.0	24.8	13.2	15.0	26.3
		GBS /total revenue	20.9	15.3	0.0	4.1	10.0	20.3	12.0	16.1	27.3
Mali	*2002*	*GBS /total ODA*			10.5	18.4	13.7	16.1	22.5	11.2	18.4
		GBS /total revenue			10.7	14.4	9.4	11.8	19.1	9.6	13.0
Mozambique	*2000*	*GBS /total ODA*	17.5	17.6	10.5	20.3	18.3	23.9	22.9	23.5	27.9
		GBS /total revenue	28.3	31.4	41.5	35.4	24.1	28.4	26.1	22.0	23.1
Niger	*2001*	*GBS /total ODA*		4.2	21.2	15.4	13.7	12.4	12.3	13.7	9.0
		GBS /total revenue		5.9	28.0	26.5	23.9	18.0	13.6	12.8	6.6
Rwanda	*2002*	*GBS /total ODA*			18.2	19.8	25.7	32.7	18.2	30.7	21.7
		GBS /total revenue			33.0	27.6	46.0	52.4	30.5	51.6	30.4
Senegal	*2004*	*GBS /total ODA*					5.5	8.1	7.2	6.5	23.8
		GBS /total revenue					4.0	3.3	3.2	2.4	9.8
Tanzania	*2001*	*GBS /total ODA*		4.0	15.1	27.9	25.0	39.5	32.8	29.5	28.7
		GBS /total revenue		4.5	16.2	36.7	28.7	33.2	29.3	31.0	19.9
Uganda	*2001*	*GBS /total ODA*		19.4	13.0	29.3	22.8	21.6	23.4	13.9	15.9
		GBS /total revenue		25.9	13.3	40.2	30.0	23.8	28.9	15.8	13.8
Zambia	*2004*	*GBS /total ODA*					29.4	9.3	10.2	19.7	21.6
		GBS /total revenue					33.9	8.5	8.0	9.8	8.6
Unweighted Average		***GBS/total ODA***	*16.2*	*12.2*	*15.0*	*21.5*	*17.7*	*20.2*	*18.8*	*18.6*	*21.4*
Unweighted Average		***GBS /total revenue***	*24.6*	*17.5*	*23.8*	*25.2*	*21.2*	*19.6*	*17.6*	*16.8*	*15.7*

Source: World Bank, Global Development Finance, 2011, series codes DT.ODA.ODAT.GN.ZS (ODA in current USD), GC.REV.XGRT.GD.ZS (Central Government Revenue as share in GDP), and GBS disbursement data gathered by the author (see Appendix XIV).

[71] Sierra Leone has been excluded from the sample as it does not represent a classical joint GBS operation but has been designed as a medium-term post-conflict and state building assistance program (Lawson, 2007).

Drawing on GBS disbursement data gathered by the author, the average share of joint GBS operations in overall Official Development Assistance (ODA) has, as shown in Table 13, reached significant levels, with a fairly stable average level of approximately 20 percent for the time period from 2005 to 2008. With such high shares of aid provided in the form of joint on-budget funding, GBS significantly expands recipients' fiscal space, increasing available resources by between 16 and 25 percent of domestic revenue (Table 13).

As joint GBS has become the modality of choice for donors to deliver on their commitments to scale up and harmonize the provision of aid, the question becomes highly relevant whether GBS, as unearned free-lunch income, negatively impacts domestic revenue mobilization. To answer this question, the following sections will explore the extent to which joint GBS, along with structural determinates, impacts recipients' revenue-raising performance.

4.3 Determinants of Revenue Mobilization Efforts in Developing Countries

Harnessing increasingly advanced econometric tools, a series of recent empirical research studies has identified and validated a set of structural determinates of revenue mobilization in developing countries. According to the seminal analysis by Tanzi (1992), which has been used as the point of departure for most subsequent studies, developing countries' revenue mobilization efforts, proxied by the share of tax revenue in GDP, to a significant extent depend on i) the structural composition of value added, ii) per capita income, iii) the volume of trade, and iv) the stock of public debt.

i) The composition of GDP, in particular the share of agricultural value added in aggregate output, is a salient factor affecting the tax base (Tanzi, 1992). As Teera and Hudson (2004) note, this is due to demand as well as supply effects. Economies with a high share of agricultural output tend to have a significantly smaller demand for publically provided goods and services. At the same time, the sector's ability to contribute to the financing of government activities and public services is, in the case of developing countries generally, limited by its subsistence and small-scale informal character (Stotsky et al., 1997; Teera and Hudson, 2004). Industrial production and services, on the other hand, generally require more publically produced goods as intermediate inputs for production. Consequently, these sectors are organized in more formal and easier-to-tax structures (Teera and Hudson, 2004). Nevertheless, to avoid collinearity problems in econometric analysis, it is recommended to control for the share of agriculture in GDP only, which has been identified by previous research as having the most explanatory power (see Table 14).
ii) Per capita income (GNI per capita) proxies the level of socio-economic development and serves as an index of surplus income available for taxation (Teera and Hudson, 2004). Furthermore, it is assumed that higher degrees of economic development entail higher levels of institutional capacity to levy and collect revenue (Chelliah, 1971).

iii) Customs and other trade related excises, levies and taxes – the extent of which primarily depends on the overall volume of trade – have been a major source of revenue in developing countries (albeit with declining volumes after the Uruguay Round). Compared to income and value added taxes, trade related revenue is easy to collect, as administrative structures required for effective collection and enforcement are relatively small. Furthermore, trade operates within the formal economy, providing a significant base for various taxes, such as value added or general sales taxes (Tanzi, 1992). The intensity of trade is generally measured by the sum of exports and imports as share in GDP.

iv) Accumulation of public and publically guaranteed debt (PPGD) entails recurrent government expenditure in the form of interest payments, which can either be financed through additional net borrowing or increased revenue mobilization. Studies covering longer and more distant time periods find empirical evidence for a substantive effect of PPGD on tax revenue mobilization (Tanzi, 1992; Gupta et al., 2004).[72] More recent research, however, has failed to detect a significant and meaningful positive relation, a point that will be considered in Section 4.6.

While these factors represent a rather parsimonious baseline set, more recent studies also control for other potential factors, such as the quality of governance (Gupta, 2007) or the assumed size of the informal economy (Teera and Hudson, 2004). However, while Gupta (2007) tests specifications with various Intra Country Risk Guide governance indicators (ICRG) such as political stability, law and order, government stability, and corruption – all of which would be expected to affect revenue mobilization efforts – only the perceived level of corruption appears to be moderately significant in some specifications.[73] Teera and Hudson's (2004) informal economy indicator is significant and meaningful, but counter-intuitively suggests that in the case of LICs, revenue mobilization positively depends on the size of the shadow economy.[74]

With the debate on the general effectiveness of aid, the focus has, however, shifted from determining and confirming principal factors for the revenue mobilization capacity of developing countries to identifying the effect of aid on domestic revenue collection (Gupta et al., 2004; Teera and Hudson, 2004; Gupta, 2007; Clist and Morrissey, 2011). The current predominate view taken by academia is that a recipient's fiscal response depends on whether aid comes in the form of grants or concessional loans (Gupta et al. 2004; Clist and Morrissey, 2011). While grants represent mere windfalls and free-lunch substitutes for politically costly revenue mobilization, it is assumed that concessional loans, due to the intrinsic repayment motive, tend to encourage spending

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72 The here cited studies use total external debt as proxy for PPGD as at this point in time consistent PPGD data was unavailable.

73 Measures of perceived corruption generally aggregate the perceived level of petty corruption and the perceived level of heavy embezzlement and the wilful causing of loss to the state.

74 An overview on explanatory variables, the time period covered, and the applied estimation technique used by previous studies is provided in Table 14.

decisions that yield positive socio-economic net benefits that, in turn, enable recipients to service and redeem outstanding concessional debt (Gupta et al., 2004; Bräutigam, 2000). The validity of this argument will be reviewed in the subsequent section.

Table 14: Significant variables for domestic revenue mobilization identified by previous empirical research

Authors	*Time period and sample*	*Significant explanatory variables for government revenue (percent in GDP)*	*Estimation technique*
Leuthold (1991)	1973 – 1981, 8 SSA countries	— Agricultural value added as share in GDP (–) — Trade openness (Imports + Exports)/GDP (+)	— Autoregressive model controlling for AR(1)
Tanzi (1992)	1978, 1981, 1983, 1985, 1988, 83 developing countries	— Per capita income (+) — Agricultural value added as share in GDP (–) — Imports as share in GDP (+) — External debt stock as share in GDP (+)	— Cross-section OLS
Stotsky et al. (1997)	1990 – 1995 43 SSA countries	— Per capita income (+) — Agricultural value added as share in GDP (–) — Exports as share in GDP (+) — Mining as share in GDP (–)	— One error component FE model — One error component RE model
Teera et al. (2004)	1975 – 1998 40 LICs*	— Agricultural value added as share in GDP (–) — Trade openness (Imports + Exports)/GDP (+) — Population density (+) — External debt stock as share in GDP (+) — Proxy for scale of non-taxed informal shadow economy (+)	— Log one error component FE model with time trend
Gupta, S. et al. (2004)	1970 – 2000 107 Developing Countries,	— Agricultural value added as share in GDP (–) — Industry value added as share in GDP (+) — Trade openness (Imports + Exports)/GDP (+) — Per capita income (+) — ODA loans as share in GDP (+) — (ODA loans as share in GDP)^2 (–) — ODA grants as share in GDP (–) — (ODA grants as share in GDP)^2 (+) — ODA as share in GDP (–) — (ODA as share in GDP)^2 (+)	— Semi-log (regressors) one error component FE model — Semi-log (regressors) one error component RE model (unbalanced panel structure)
Gupta, S. (2007)	1980 – 2004 50 LICs*	— GDP per capita (+) — Agricultural value added as share in GDP (–) — Imports as share in GDP (+) — ODA as share in GDP (–) — ICRG Corruption Index (–) — Tax revenue from goods and services as share in total revenue (+) — Tax revenue from income, profits, and capital gains as share in total revenue (+)	— One error component FE model
Clist et al. (2011)	1970-2005 107 Developing Countries	— ODA loans as share in GDP (+) — (ODA loans as share in GDP)^2 (–) — ODA grants as share in GDP (–) — (ODA grants as share in GDP)^2 (+) — Agricultural value added as share in GDP (–) — Industry value added as share in GDP (+) — Imports as share in GDP (+) — Exports as share in GDP (–)	— One error component FE with and without IV (lagged aid, unbalanced panel) — First differences (unbalanced panel)

* *This refers to sub-sample results. As the present paper focuses on SSA LICs, estimation results for LIC sub-samples are being cited here.*

4.4 Modeling Strategy

The econometric analysis of the present paper follows the fiscal response framework as presented in Heller (1975) and Gupta et al. (2004). The recipient's government budget constraint is given by

$$G_t = R_t + A_t + B_t \,, \tag{1}$$

with G_t, R_t, A_t, and B_t denoting overall government expenditure including interest on outstanding debt, total domestic revenue, total aid inflow, and net non-concessional borrowing in period t, respectively.[75] The revenue mobilization response to an exogenous increase in assistance is given by

$$\frac{\partial R_t}{\partial A_t} = \frac{\partial G_t}{\partial A_t} - \frac{\partial B_t}{\partial A_t} - 1. \tag{2}$$

Hence, if the increase in government expenditure and the downward adjustment in net non-concessional borrowing do not offset the provision of additional aid resources, such that

$$\frac{\partial G_t}{\partial A_t} - \frac{\partial B_t}{\partial A_t} < 1, \tag{3}$$

the revenue mobilization response turns negative, with

$$\frac{\partial R_t}{\partial A_t} < 0. \tag{4}$$

This scenario is particularly likely if revenue mobilization is perceived to induce political costs that exceed political benefits from expanding expenditure and/or reducing non-concessional lending.

However, while previous empirical studies have explicitly or implicitly drawn on this response framework, only Heller (1975) and Gupta et al. (2004) point to the fact that it rests on the strong assumption of aid generally being provided as fully fungible on-budget aid. Yet this is rather unrealistic, as a good portion of aid remains either entirely off-budget or is tied (earmarked) to the provision of specific public services or investment activities and therefore remains completely outside the recipient's public financial management (PFM) system or, in the case of earmarked funding, outside the recipient's direct allocational control (Adugna, 2009). Thus, the modeling framework presented above can only be considered appropriate if applied to on-budget and fungible aid, as only those aid flows inform the recipient's budget constraint in the way stipulated by Equation (1) and hence do indeed induce the possible fiscal responses discussed here.[76]

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[75] As aid comprises concessional borrowing, B_t refers to gross non-concessional domestic and foreign borrowing.

[76] As shown in Appendix XV, the share of total ODA that does not fulfil this precondition is quite substantial. A conservative, lower bound estimate for the share of committed total ODA delivered tied and/or off-budget ranges from approximately 30 to 50 percent to the SSA region for the period from 2000 to 2008.

As the present paper aims to detect the sign and magnitude of the revenue mobilization response to the provision of new joint GBS, the modality of fungible on-budget aid provision *par excellence*, the modeling framework appears valid and appropriate in this particular context.

4.5 Data

To undertake a meaningful empirical analysis of the effect of joint GBS on recipients' revenue mobilization efforts, a concise and unambiguous definition of the particular aid modality has to be applied. To this end, in the following paragraphs three principal qualitative, definitional and data source specifications are made explicit.

First, differences in the approach to joint provision of direct budget support, i.e. the degree of harmonization with respect to the formulation of conditionality, to the assessment of recipients' performance, and to disbursement decisions, have evolved over the last decade. To apply objective and unambiguous criteria for joint GBS operations, the present paper uses the definition provided by the World Bank (2010). According to this definition, recipients of joint General Budget Support are those where a common framework of conditionality (Policy Assessment Framework, PAF) or PAF-like framework are either being established or are partially or fully operational. According to the World Bank this is the case for Benin, Burkina Faso, Cape Verde, Ghana, Madagascar, Malawi, Mali, Mozambique, Niger, Senegal, Rwanda, Tanzania, Uganda, and Zambia.[77]

Second, as joint program features such as PAFs have evolved over time, we must address the question of how to correctly determine, in each particular case, the starting point for joint GBS interventions. As the preparation of government-owned PRSPs has been a universal and major precondition for budget support funding, the starting point for joint GBS has generally been the acknowledged acceptance of PRSPs by development partners. Hence, GBS disbursements to the above listed SSA countries, under evolving joint and harmonized policy frameworks after PRSP approval, are considered as fulfilling these definitional preconditions.[78]

Third, reliable aggregate disbursement data for joint GBS operations is hard to obtain, as the OECD/DAC CRS has reported bilateral as well as EU on-budget aid disbursals in a consistent manner only since 2004, while World Bank budget support lending operations have been continuously reported under varying categories.[79] In addition, CRS data on disbursals of the African Development Bank's budget support operations seem somewhat inconsistent with data reported in the bank's program reports and statistical compendia. To overcome these limitations, multilateral program data were gathered directly from the World Bank, the IMF and the African

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77 As noted by the World Bank (2010), donor harmonization takes different forms depending on the recipient aid architecture. Joint donor matrixes of policy actions, referred to as PAFs, are intended to "provide the basis for joint monitoring by all donors, for management according to a set of predefined common principles, however with disbursement still subject to individual donor decisions."

78 For data on PRSP approval, see the IMF's web page: http://www.imf.org/external/np/prsp/prsp.aspx

79 CRS General Budget Support purpose code is 51010. However, although entirely un-earmarked and fully on budget, IDA's Poverty Reduction Support Credits are reported under varying sector codes.

Development Bank program reports and databases. Bilateral and EU program data drawn from the OECD/DAC CRS have also been cross-checked for consistency with independent sources, such as cross-country evaluation reports on joint GBS financing, country assessment reports from various agencies, and recipients' government budget statements.[80]

The econometric baseline specification of the following econometric analysis controls for determinates of developing countries' revenue mobilization capacity, as discussed in the previous section and identified as statistically and economically significant in previous empirical research. Revenue mobilization efforts are proxied by central government revenue, excluding grants, as a share of GDP (*REV*). Explanatory variables comprise GBS as share in GDP (*GBS*), the share of agriculture in total value added (*AGRIC*), per capita income (*GNIPC*), the sum of imports and exports as share in GDP as a measure for trade openness (*TRADE*), and the stock of public and publically guaranteed debt as share in GDP (*PPGD*).[81] As oil production has gained importance in SSA, particularly in the Gulf of Guinea, a dummy variable (*OIL*) has been included to control for windfalls from royalties and other extraction related revenue in oil producing countries.[82]

The sample includes SSA LIC and LMICs that are eligible for funding under the World Bank's concessional lending arm (IDA) and hence qualify as potential recipients of joint GBS.[83] The empirical analysis comprises the period from 2000, when the first PRSP-based joint budget aid disbursals were made to SSA recipients, to 2008.[84]

4.6 Methodology and Presentation of Results

4.6.1 Methodology

In the first step, the baseline specification, as outlined above, is estimated using a one error component fixed effects model (FE). The estimation equation is in the form of

$$REV_{it} = \beta_0 + \beta_1 GBS_{it} + \beta_2 GNIPC_{it} + \beta_3 AGRIC_{it} + \beta_4 PPGD_{it} + \beta_5 TRADE_{it} + \beta_6 OIL_{it} + u_{it} \quad (5)$$

with *i* and *t* indexing countries and time, respectively. The one-error component model is such that

$$u_{it} = \mu_i + v_{it} . \quad (6)$$

[80] A complete list of sources used is provided in Appendix XIV.

[81] Tanzi (1992) and subsequent studies drew on external debt stock data to proxy PPGD, as this data was not available at that point in time. In the meantime PPGD data has been made available through the World Bank's Global Development Finance database, published online in September 2010 [accessed 12 June 2011].

[82] SSA sample countries with oil extracting industries comprise Angola, Cameroon, Congo, Gabon, Equatorial Guinea, and Nigeria. Since 2000 the Dem. Rep. of Congo, Mauritania, Sudan, and Chad have taken up oil production. Start of oil production in Ghana in 2011 is not covered by the sample.

[83] IDA borrowing countries excluded from the sample due to data constraints are Cape Verde, Lesotho, Sierra Leone and Somalia.

[84] For a list of sample countries, detailed description of data sources and respective summary statistics, including correlation coefficients of explanatory variables, see Appendix XIV and XVI.

Hence, the error term consists of the country specific time invariant effect μ_i and an individual time variant residual term v_{it} (cf. Baltagi, 2009).[85] To control for time specific effects and to avoid potential omitted variable biases caused by parsimonious specification, dummy variables have been included.

As error terms might be autocorrelated, it is advisable to test a dynamic model specification to control for robustness, with

$$REV_{it} = \alpha REV_{it-1} + \beta' \mathbf{X}_{it} + u_{it}, \tag{7}$$

where the error term is given by Equation (6), and $\mathbf{X}_{it}$ representing a vector of contemporaneous explanatory variables of Equation (5). As OLS produces biased and, hence, inconsistent estimators, the model specification is estimated using the Generalized Method of Moments (GMM) framework (Arellano and Bond, 1991; Blundell and Bond, 1998).

The differenced GMM in the form of

$$\Delta REV_{it} = \alpha \Delta REV_{it-1} + \beta' \Delta \mathbf{X}_{it} + \Delta v_{it}, \tag{8}$$

eliminates country specific effects in the error term, which are correlated with REV_{it} and subsequently with REV_{it-1}. Assuming that v_{it} are serially uncorrelated, values of *REV* lagged two periods qualify as an instrument for the first differenced Equation (7). This implies the moment condition

$$\mathrm{E}\left(REV_{it-s} \Delta v_{it} \right) = 0 \quad \text{for } t = 3, 4, ..., T, \text{ and } 2 \le s \le t-1. \tag{9}$$

As revenue shares in GDP are highly persistent (Leuthold, 1991) with α approaching one, lagged levels of *REV* can be expected to be weak instruments for the differenced equation, which, as shown by Blundell, Bond and Windmeijer (2000), can lead to finite sample biases. When augmenting the moment condition in Equation (9) by the level moment condition

$$\mathrm{E}\left(\Delta REV_{i,t-1} \left(\mu_i + v_{it} \right) \right) = 0 \quad \text{for } t = 3,4,...,T, \tag{10}$$

differenced lagged dependent variables can, as shown by Blundell and Bond (1998), be used as valid instruments in the level Equation (7). In this case the differenced GMM estimator is augmented by the system GMM estimator (Blundell and Bond, 1998), where Equation (7) and (8) are estimated simultaneously, drawing on moment conditions as expressed by Equation (9) and (10).

[85] The Hausman specification test consistently rejects random effects in favor of the fixed effects model.

If the explanatory variable x_{it}, which is assumed to be correlated with the country specific effect μ_i, is endogenous in the sense that it is also correlated with contemporaneous or past shocks of the error term v_{it}, two period lags or deeper can be applied as instruments for first-differenced Equation (7), assuming that

$$\text{(11)} \qquad \mathrm{E}\left(x_{i,t-s}\Delta v_{it}\right)=0 \quad \text{for } t = 3,4,\ldots,T, \text{ and } 2\le s\le t-1.$$

If, in addition to Eq. (10), it can be assumed that first-differenced explanatory variables are uncorrelated with the country specific time invariant effects, the following moment conditions are available:

$$\text{(12)} \qquad \mathrm{E}\left(\Delta x_{i,t-1}\left(\mu_i+v_{it}\right)\right)=0 \quad \text{for } t = 3, 4,\ldots, T.$$

Consequently, lagged first-differences of endogenous explanatory variables are suitable instruments for level Equation (7).

For the specification outlined by Equation (5) and (7), such endogeneity problems could, as discussed by Gupta et al. (2004) and Clist and Morrissey (2011), arise in two instances. First, joint GBS funding as share in GDP (*GBS*) could be endogenous if donors allocate GBS funds to those recipients with satisfactory PFM performance, which are therefore more likely to perform well in revenue mobilization. Such a selectivity bias can be caused by the significant fiduciary risks that are intrinsic to GBS financing, as donors' means to control and influence the use of funds are very limited. Second, Public and Publically Guaranteed Debt as share in GDP (*PPGD*) might be endogenous, as shortfalls in revenue mobilization can, as specified in Equation (1), translate into higher borrowing by the public sector and, thus, a higher debt level.

The system GMM estimator is obtained by imposing moment conditions for the dependent variable, given by Equations (9) and (10), and moment conditions for endogenous explanatories as given by Equations (11) and (12).[86]

4.6.2 Presentation and Discussion of Results

Estimation results are presented in Table 15. Columns (I) and (III) are for FE and system GMM outputs of the baseline specifications outlined in Equations (5) and (7). Columns (II) and (IV) report results for FE and system GMM estimations, where the explanatory GBS variable has been replaced by total ODA as share in GDP. The latter specification serves to control whether results of previous studies on recipient's revenue response to development assistance can be reproduced for the sample considered here (cf. Table 14).

[86] For system GMM estimation the STATA Xtabond2 algorithm devised by Roodman (2006) has been used.

Table 15: Determinates of Revenue Efforts in SSA LIC and LMICs, 2000–2008

Variable	*FE Model* [1)]		*System GMM Model*	
	(I)	(II)	(III)	(IV)
Lagged CG Revenue	n.a.	n.a.	0.760 ***	0.756 ***
			(8.89)	*(9.01)*
GNI per capita	0.005 **	0.005 **	0.002 ***	0.002 ***
	(2.56)	*(2.50)*	*(3.59)*	*(3.46)*
GBS Disbursal	0.319 *		0.141 *	
	(1.84)		*(1.79)*	
ODA Disbursal		0.014		0.012
		(0.85)		*(0.83)*
PPGD	0. 022	0.021	0.007	0.005
	(1.55)	*(1.48)*	*(2.33)*	*(1.34)*
Agric. Value Added	-0.127 *	-0.115	-0.035 **	-0.038 **
	(-1.73)	*(-1.55)*	*(-2.48)*	*(-2.13)*
Trade Openness	0.063 ***	0.055 ***	0.024 **	0.022 **
	(4.14)	*(2.80)*	*(2.44)*	*(2.27)*
Oil	2.456	2.584	2.148 **	2.134 **
	(1.35)	*(1.53)*	*(2.70)*	*(2.50)*
Constant	13.396 ***	13.490 ***	2.408 **	2.726 **
	(4.12)	*(3.94)*	*(2.06)*	*(2.19)*
Hansen Test (p-value) [a)]	n.a.	n.a.	0.35	0.65
Test for AR(1) in first differences (p-value) [b)]	n.a.	n.a.	0.03	0.03
Test for AR(2) in first differences P-value) [b)]	n.a.	n.a.	0.48	0.50
N	315	315	315	315
No. of groups	37	37	37	37
Max. no. per group	9	9	9	9
Avg. no. per group	8.5	8.5	8.5	8.5

** p<0.1, ** p<0.05, *** p<0.01*

[1)] Robust standard errors (Huber/White robust variance estimates) are used. Time invariant fixed effects capturing country specific factors such as institutional quality, colonial ties, and resulting government structures are jointly significant, as are time-specific effects controlling for external shocks.

[a)] H_0: instruments used are not correlated with the residuals. The null hypothesis cannot be rejected.

[b)] H_0: the errors in the first-differenced equation exhibit no first- or second-order serial correlation.

Dynamic estimation results report a high persistence for revenue as share in GDP with the lagged dependent variable's coefficient close to 0.8. Accordingly, system GMM compared to differenced GMM has to be considered the preferred estimation method, as the latter, due to weak instruments, tends to produce inefficient results (Blundell, Bond and Windmeijer, 2000).

In accordance with system GMM moment conditions (9) and (10), the first-differenced estimations REV_{it} is instrumented using REV_{it-2}, plus ΔREV_{it} for the level equation. All explanatory variables are treated as strictly exogenous. Specifications, where *GBS* or *ODA* and *PPGD* are treated as endogenous in the sense specified by Equation (11) and (12), yield similar results, albeit with increased statistical significance of *GBS* and *PPGD,* while total aid-over-GDP (*ODA*) remains economically and statistically insignificant.[87] Introducing lagged differences for these variables leads, however, to an excessive number of instruments, which significantly exceeds the number of groups. As shown by Roodman (2008), such instrument proliferation is likely to produce biased, and hence, misleading test statistics.

By contrast, the system GMM baseline specification presented in Table 15, where *GBS*, *ODA* and *PPGD* are treated as exogenous, produces consistent results: The null-hypothesis of the Hansen test of over-identified restrictions, that instruments as a group are exogenous, cannot be rejected. In addition, the Arellano-Bond test for first and second order autocorrelation in first-differenced residuals suggests that augmented instruments can be considered uncorrelated with the error terms and thus do meet the moment conditions set out in the previous section: As the hypothesis of first order autocorrelation cannot be rejected while the hypothesis of second order autocorrelation can be reliably rejected, there are no warning signs of serial correlation detected in the level residuals.[88]

Specifications (5) and (7) are rather parsimonious. Yet, as outlined in Section 4.3, recent empirical research has not been able to detect additional robustly significant determinates for the revenue performance of developing countries. Meanwhile, the inclusion of other control variables, such as the share of industry or the share of services in total GDP, respectively, leads to a substantial increase in correlation among explanatories, producing multi-collinearity problems.

FE and system GMM results confirm the significance of the structural determinates of revenue performance *AGRIC, GNIPC* and *TRADE*, identified by previous empirical research (cf. Table 14). When comparing the FE results presented here with those of Gupta et al. (2004), Teera and Hudson (2004), and Gupta (2007), signs of coefficients, except for *PPGD*, are shown to be identical, and magnitudes fall in a similar range. The inclusion of a dummy variable for oil production seems highly advisable, as petroleum extraction appears, unsurprisingly, to be associated with a quite significant increase in revenue as share in GDP.

PPGD is shown to have, in neither the static nor the dynamic specification, an economically strong or statistically significant effect on revenue mobilization. This suggests that the positive causal relation between the level of public debt and the level of domestic revenue detected in previous studies (cf. Tanzi, 1992; Teera and Hudson, 2004) has diminished, due to substantial debt

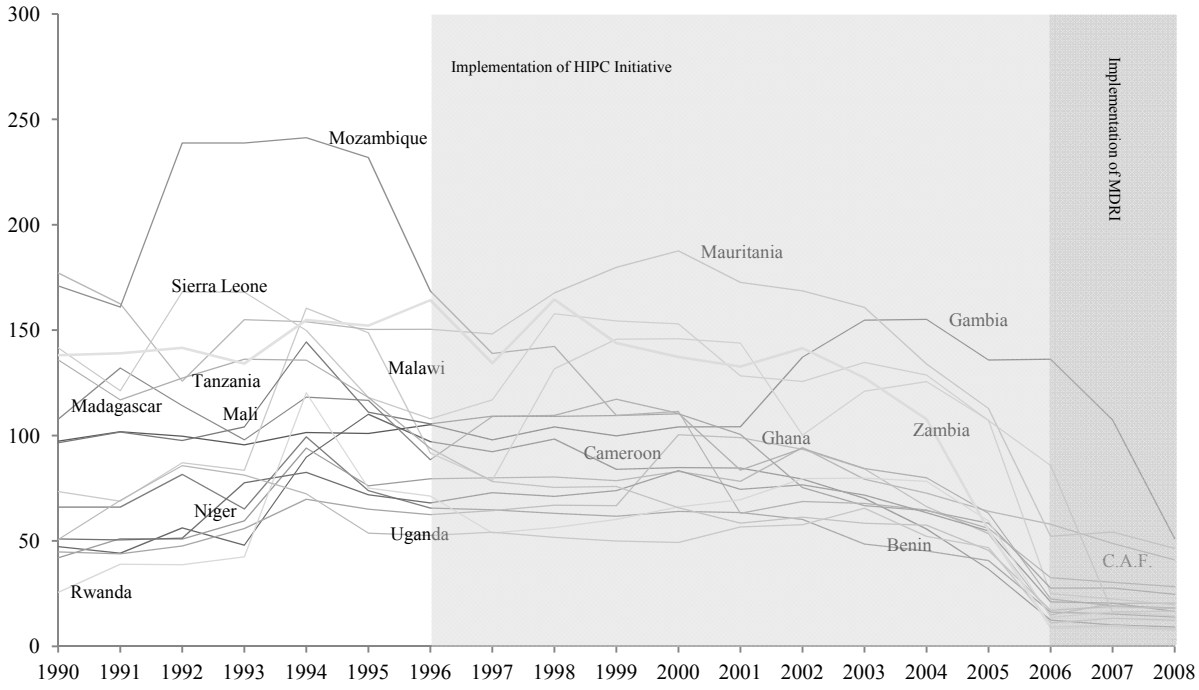
87 Results are available from the author upon request.

88 If residuals are serially uncorrelated, first-differenced residuals are, due to the time invariant country fixed effect, expected to follow a first order moving average process implying first-order autocorrelation. Second or higher order autocorrelation would, instead, hint towards autocorrelation in level residuals.

cancellations under the Heavily Indebted Poor Country (HIPC) and the Multilateral Debt Relief Initiative (MDRI).

As shown in Figure 6, *PPGD* ratios for HIPC eligible SSA countries, after unprecedentedly high levels in the 1980s and 1990s, declined strongly during the HIPC implementation period and sharply fell in 2006 and 2007, when multilateral debt was cancelled under the MDRI.[89] With public debt stocks in many SSA LICs cut to levels well below 50 percent of GDP, the desideratum for revenue fed interest and debt servicing has, evidently, declined accordingly.

Figure 6: Public and Publically Guaranteed Debt as Share of GDP*



* Includes only countries that have reached HIPC completion point before 2009 and hence did also benefit from MDRI, which, for these countries, became effective in 2006 and 2007.
Source: World Bank, Global Development Finance, 2011.

Most importantly, however, joint GBS modalities, for which the fiscal response can, as shown in Section 4.4, be appropriately modeled, appear to have a clear positive and statistically significant impact on revenue performance. This result holds true for both the FE and the system GMM specification, albeit with lower economic significance for the latter. Accordingly, joint GBS programs whose annual disbursements amount to around four percent of GDP (as is the case for Burkina Faso, Ghana, Malawi, Mozambique, Rwanda, and Tanzania) are associated with a 0.56

[89] The HIPC Initiative, launched in 1996 by the IMF and the World Bank and enhanced in 1999 (E-HIPCI), comprises substantive relief of multilateral, bilateral and commercial debt for 40 LICs who at the time of appraisal were eligible for IDA and SAF/PRSC/ECF funding and faced unsustainable debt burdens measured by debt-to-export and the debt-to-government-revenues ratio. To reach completion (irrevocable cancellation of debt) countries must establish a good record of macroeconomic policy and reform with IMF and the World Bank, develop and implement a PRSP and allocate freed-up budgetary resources to poverty reducing expenditure (see: IMF, 2011b; IDA and IMF, 2010). The MDRI was launched in 2006 and comprises the cancelation of all multilateral debt disbursed before 2004 by AfDF, IDB, IDA and the IMF. Countries eligibility depends on the successful completion of the HIPC initiative (see: IDA and IMF, 2010).

percent (system GMM coefficient) increase in revenue as a share in GDP. This suggests that the identified adverse effects from fully fungible aid provision on recipient's revenue mobilization efforts can be counteracted by effective GBS program features – i.e., as outlined above, an institutionalized medium-to-long-term policy dialogue, fiscal policy conditionality, and PFM-related technical assistance components.

The positive effect of GBS becomes even more pronounced when the dynamic specification is estimated for the time period from 2005 to 2008, a period in which joint GBS programs became well established and policy dialogue matured (see Table 13). For this sub-period, a joint GBS program amounting to around four percent of GDP relates to a 1.3 percent increase in revenue as share in GDP.[90]

When controlling for the effect of total ODA on revenue mobilization efforts, instead of for the effect of joint GBS, the coefficient approaches zero and is shown to be statistically insignificant. This result is consistent with the underlying assumptions of Section 4.4: Due to its limited on-budget and fungibility characteristics – as shown in Appendix XV, a substantial share of total aid is delivered tied or off-budget – ODA aggregates do not inform the recipient's budget constraint in the way stipulated by Equation (1) and hence do not induce the potential fiscal responses discussed above. These results are in line with those of Gupta et al. (2004), Teera and Hudson (2004), and Gupta (2007) who find the share of total ODA in GDP to be statistically and/or economically irrelevant in explaining recipients' revenue mobilization efforts.

4.7 Conclusion

Drawing on the standard fiscal-response-modeling approach to fungible on-budget aid, first applied by Heller (1975) and used in subsequent research, the present paper provides empirical evidence that new joint general budget support funding, although bearing unearned income characteristics and being fully subject to the recipient's allocational control, does not negatively affect recipients' revenue raising efforts. On the contrary, the results suggest that general budget support programs are associated with a measurable increase in domestic revenue mobilization. Such an effect cannot be detected when controlling for aggregate levels of aid, as significant shares in total ODA are not subject to the budgetary control of the recipient. In general, the findings presented above allow two principle policy conclusions to be drawn:

First, it appears that there is no basis for anxieties that joint GBS funding, due to its windfall characteristics, negatively impacts developing countries' domestic revenue generation efforts, thus increasing aid dependency. It seems that the risk of adverse fiscal policy incentives can be successfully mitigated by the following features of joint GBS operations in SSA countries:

[90] System GMM estimation results for the 2005 to 2008 sub-period are presented in Appendix XVII. The FE estimations are not further considered, as system GMM, due to the dynamic properties of the dependent variable and the rather small number of years, is more appropriate.

i) Program conditionality focuses primarily on public financial management in order to provide incentives for the measurable improvement of PFM and fiscal policy. According to the Budget Support Working Group of the Strategic Partnership with Africa (SPA BSWG), the most common areas of conditionality in SSA joint GBS programs are those related to PFM reform measures and macroeconomic performance (SPA BSWG, 2005, 2006).

ii) GBS serves not only as a disbursement vehicle under the institutionalized policy dialogue between recipients and development partners, but it is also used as a platform for providing substantive technical assistance with a strong focus on institution and capacity building, particularly in the area of PFM.

iii) By establishing harmonized conditions for program assistance, donors' leverage and recipients' incentive to perform, i.e. to fulfill conditionality, may have significantly increased (Knoll, 2008), all the more so as GBS funding substantially increases available budgetary resources.

Second, while previous empirical studies have detected a statistically and economically weak overall effect of total aid, as well as a positive effect of loans and a negative effect of grants on recipients' revenue performance, respectively, this paper suggests that these findings are blurred as they rest on the unrealistic assumption of aid generally being provided on-budget and untied. OECD/DAC disbursement data by type of aid averaged for the SSA region for the years from 2000 to 2008 suggests that aggregate aid disbursal is an imprecise measure for on-budget aid provision as, at a conservative estimate, 30 to 50 percent of overall development assistance remains either tied or entirely off-budget and is therefore unlikely to directly impact the revenue mobilization behavior of the recipient government. This, in turn, suggests that when fiscal response to aid is being considered, the appropriate analytical approach and the resulting predominant policy question should not be whether development assistance is provided in the form of grants or loans, but rather whether it should come under an on-budget and untied modality of aid delivery.

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Appendices

Appendix I: Summary Statistics, MCA Governance Indicators, 1996–2009

All Countries*

Variable	Mean	Median	Std. dev.	Min	Max
WGI CC	-0.062	-0.288	0.966	-2.489	2.467
WGI GE	-0.053	-0.249	0.955	-2.394	2.267
WGI RL	-0.089	-0.268	0.950	-2.313	1.963
WGI RQ	-0.029	-0.152	0.923	-2.652	3.345
WGI VA	-0.054	-0.095	0.958	-2.150	1.827
FH CLI	3.310	3.000	1.720	1.000	7.000
FH PRI	3.368	3.000	2.110	1.000	7.000
Observations:	1,820				

Low Income Countries*

Variable	Mean	Median	Std. dev.	Min	Max
WGI CC	-0.734	-0.769	0.457	-2.489	0.825
WGI GE	-0.765	-0.771	0.460	-2.394	0.815
WGI RL	-0.781	-0.789	0.523	-2.313	0.864
WGI RQ	-0.703	-0.591	0.545	-2.652	0.688
WGI VA	-0.666	-0.637	0.646	-2.150	1.039
FH CLI	4.305	4.000	1.290	1.000	7.000
FH PRI	4.468	4.000	1.723	1.000	7.000
Observations:	741				

Source: Own calculations.

* For EFA and CFA the sample and sub-samples are normalized such that average is zero and standard deviation is 1 in each year.

Appendix II: Eligibility Criteria

Year	All Countries	LICs	MCA Threshold in USD*	LMICs	MCA Threshold in USD*
1996	138	61	1.505	22	3.035
1998	171	76	1.460	31	3.125
2000	170	78	1.445	24	2.995
2002	172	76	1.435	26	2.975
2003	173	73	1.415	30	2,935
2004	172	70	1.464	27	3,035
2005	171	70	1.575	30	3,255
2006	169	65	1.675	30	3,465
2007	168	64	1.735	28	3,595
2008	165	57	1.785	29	3,705
2009	151	51	1.855	26	3,855
Total:	1,820	741		303	

Source: World Bank, GNI per capita threshold (atlas method), MCA eligibility according to IDA eligibility thresholds.

Appendix III: Technical note on EFA and CFA

Explanatory Factor Analysis

EFA is a statistical technique to determine how many underlying common and unique factors account for the variance and covariance of the given data (Kim and Mueller, 1994).

It assumes that the observables are a linear combination of the common and unique factors, such that the model can be written in algebraic form:

$$y_j = \sum_{k=1}^{K} \lambda_{jk} \xi_k + \delta_j,$$

with: $y_j, j = 1,...,J$ obs. variables,

$\xi_k, k = 1,....K$ unobs. variables,

λ_{jk} loadings of common factors,

δ_j loadings of unique factors.

When standardizing variables, the variance of the observables can be expressed as the sum of the communality and the unique variance:

$$\mathbb{V}\left(y_j\right) = h_j^2 + \delta_j^2$$

with

$$h_j^2 = \sum_{k=1}^{K} \lambda_{jk}^2.$$

In orthogonal principal factor analysis, estimates for the factor loadings are obtained by solving the eigenequations of the adjusted correlation matrix, where diagonal elements are replaced by the estimated communalities h^2. Estimates are obtained by calculating the squared multiple correlations between each observed variable and the remaining observed variables. The squared multiple correlation of any variable with the remaining variables is given by:

$$SMC = \mathbf{I} - \left\{\text{diag}\, \mathbf{R}^{-1}\right\}^{-1}.$$

The relationship between the adjusted correlation matrix **R** and the factor loading matrix is not unique because (1) a specific adjusted correlation matrix can be reproduced by models with different numbers of factors and (2) a specific adjusted correlation matrix can be generated by a specific number of factors but different factor loading patterns.

For the extraction of loadings the postulate of *parsimonious factorial causation* (assuming that observables are loaded by a minimum number of factors) and the postulate of *simplicity* (the model with the smallest factor complexity) have to be made.

Solving the determinant form of the eigenequation and determine eigenvalues:

$$\text{Det}\left(\hat{\mathbf{R}} - \mathbf{I}\boldsymbol{\lambda}\right) = 0.$$

Where $\hat{\mathbf{R}}$ is the adjusted correlation matrix.

For determining the minimal amount of factors to be retained, several criteria are available, such as Kaiser's (criterion of eigenvalues above 1.0) and Jolliffe's (criterion of eigenvalues above 0.7).

To achieve maximal simplicity, factors have to be rotated to the final solution. Using the Varimax method, simplicity is measured by the variance of the squared loadings for each factor:

$$v_k = \frac{1}{J}\left[\sum_{j=1}^{J} \lambda_{jk}^2 - \frac{1}{J}\sum_{j=1}^{J} \lambda_{jk}^2\right]^2.$$

The general index of simplicity is defined as the sum of the simplicity $\boldsymbol{v}_k$ over all factors:

$$V = \frac{1}{J}\sum_{k=1}^{K}\left[\sum_{j=1}^{p}\lambda_{jk}^{2} - \frac{1}{J}\sum_{j=1}^{J}\lambda_{jk}^{2}\right]^{2}.$$

The greatest possible simplicity is obtained when the variance of squared loadings for each factor is maximized, subject to:

$$h_j^{2} = \sum_{k=1}^{K}\lambda_{jk}^{2}.$$

Confirmatory Factor Analysis

The explanatory power of EFA is limited, for two principal methodological problems exist: (i) the structure of factorial causation derived from EFA is obtained by imposing the arbitrary postulates of parsimony and simplicity, and (ii) a particular algorithm is imposed on the data without leaving much scope to control for model specification. Hence, EFA results can only be regarded as indicative and need to be validated by other means such as CFA.

The unrestricted relation between the observed variables and the underlying factors used in CFA is, except for the regression intercept, equivalent to EFA model specification:

$$y_i = \mu_j + \sum_{k=1}^{K}\lambda_{jk}\zeta_k + \delta_j \ .$$

In matrix form the equation can be expressed as:

$$\underset{(J\times 1)}{\mathbf{y}} = \underset{(J\times 1)}{\boldsymbol{\mu}} + \underset{(J\times K)}{\boldsymbol{\Lambda}}\ \underset{(K\times 1)}{\boldsymbol{\zeta}} + \underset{(J\times 1)}{\boldsymbol{\delta}}.$$

If unique factors are assumed to be independent of common factors and if variables are normalized, then the covariance matrix of the observables is given by:

$$\underset{(J\times J)}{\Sigma} = \underset{(J\times K)}{\Lambda}\ \underset{(K\times K)}{\Phi}\ \underset{(J\times K)}{\Lambda'} + \underset{(J\times J)}{\Theta} \ .$$

As the unconstrained covariance equation contains $J\,(J+1)/2$ independent equations, there are $J\,(J+1)/2 + J\,K+K\,(K+1)/2$ independent parameters. Hence, at least $J\,K+K\,(K+1)/2$ restrictions are needed to ensure that the model is identified. For sufficient conditions for the identification see Bollen (1989). The best model fit was obtained when using a factor complexity of one. In this case the model is always identified.

The maximum likelihood estimation equation in matrix from can be written as:

$$\begin{aligned}\ln L\left(\mathbf{Y},\Sigma(\theta)\right) &= -\sum_{i=1}^{n}\left[\frac{p}{2}\ln 2\pi + \frac{1}{2}\ln\left|\Sigma(\theta)\right| + \frac{1}{2}\left(\mathbf{y}_{\mathrm{i}} - \mu\right)\right] \\ &= \frac{np}{2}\ln 2\pi - \frac{n}{2}\ln\left|\Sigma(\theta)\right| - \frac{1}{2}\Sigma^{-1}(\theta)S\end{aligned}$$

where S is the maximum likelihood estimate of the covariance matrix of the data.

Suitable fit indices are (i) the Root Mean Square Residual where the square root of the mean of the squared residuals between observed and estimated correlation matrix indicates the fit quality (values below 0.05 are considered good fit) and the Comparative Fit Index which compares between estimated model and a null model (values above 0.9 are considered good fit).

Appendix IV: Explanatory Factor Analysis, Low Income Countries, 1996-2002

Factors	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	4.067	2.844	0.581	0.581
Factor 2	1.223	1.197	0.175	0.756
Factor 3	0.026	0.054	0.004	0.760
Observations				291

Source: Own calculations.

Appendix IV: Factor Loadings and Uniqueness (rotated)

Observables	**Factor 1**	**Factor 2**	**Uniqueness**
WGI CC	0.764	0.158	0.391
WGI GE	0.827	0.233	0.262
WGI RL	0.822	0.311	0.229
WGI RQ	0.632	0.387	0.451
WGI VA	0.314	0.909	0.075
FH CLI	0.200	0.888	0.171
FH PRI	0.151	0.920	0.131

Source: Own calculations.

Appendix V: Explanatory Factor Analysis, Low Income Countries, 2003-2009

Factors	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	4.317	3.101	0.617	0.617
Factor 2	1.216	1.006	0.174	0.790
Factor 3	0.209	0.232	0.030	0.820
Observations				450

Source: Own calculations.

Appendix V: Factor Loadings and Uniqueness (rotated)

Observables	**Factor 1**	**Factor 2**	**Uniqueness**
WGI CC	0.759	0.204	0.382
WGI GE	0.842	0.255	0.225
WGI RL	0.852	0.313	0.175
WGI RQ	0.698	0.353	0.389
WGI VA	0.276	0.928	0.062
FH CLI	0.269	0.899	0.120
FH PRI	0.181	0.924	0.114

Source: Own calculations.

Appendix VI: Confirmatory Factor Analysis, Low Income Countries 1996-2009

Log Likelihood = -5004.15 Number of observations: 741

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Means						
WGI CC	0.000	0.037	0.00	1.00	-0.072	0.072
WGI GE	0.000	0.037	0.00	1.00	-0.072	0.072
WGI RL	0.000	0.037	0.00	1.00	-0.072	0.072
WGI RQ	0.000	0.037	0.00	1.00	-0.072	0.072
WGI VA	0.000	0.037	0.00	1.00	-0.072	0.072
FH CLI	0.000	0.037	0.00	1.00	-0.072	0.072
FH PRI	0.000	0.037	0.00	1.00	-0.072	0.072
Loadings						
Governance						
WGI CC	0.791	0.031	25.16	0.00	0.729	0.852
WGI GE	0.866	0.030	28.61	0.00	0.806	0.925
WGI RL	0.917	0.029	31.43	0.00	0.860	0.974
WGI RQ	0.741	0.033	22.68	0.00	0.677	0.806
Voice						
WGI VA	0.979	0.020	36.61	0.00	0.927	1.031
FH CLI	0.918	0.028	32.57	0.00	0.862	0.973
FH PRI	0.933	0.028	33.58	0.00	0.879	0.988
Factor Covariance						
Governance – Governance	1.000	.	.	.	.	.
Voice – Voice	1.000	.	.	.	.	.
Governance – Voice	0.558	0.027	20.15	0.00	0.504	0.613
Error Variance						
WGI CC	0.373	0.023	16.20	0.00	0.328	0.418
WGI GE	0.249	0.020	12.63	0.00	0.210	0.288
WGI RL	0.158	0.017	9.08	0.00	0.124	0.192
WGI RQ	0.449	0.027	16.42	0.00	0.395	0.502
WGI VA	0.040	0.008	5.29	0.00	0.025	0.055
FH CLI	0.157	0.011	14.68	0.00	0.136	0.178
FH PRI	0.127	0.009	13.55	0.00	0.109	0.146
Fit Indices						
CFI	0.947					
TLI	0.933					
RMSR	0.022					

Source: Own calculations.

Appendix VII: Confirmatory Factor Analysis, One Common Factor Model, Middle and High Income Countries 1996-2009

Log Likelihood = -6542.43 Number of observations: 1079

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Means						
WGI CC	0.000	0.030	0.00	1.00	-0.060	0.060
WGI GE	0.000	0.030	0.00	1.00	-0.060	0.060
WGI RL	0.000	0.030	0.00	1.00	-0.060	0.060
WGI RQ	0.000	0.030	0.00	1.00	-0.060	0.060
WGI VA	0.000	0.030	0.00	1.00	-0.060	0.060
FH CLI	0.000	0.030	0.00	1.00	-0.060	0.060
FH PRI	0.000	0.030	0.00	1.00	-0.060	0.060
Loadings						
WGI CC	0.962	0.022	43.00	0.00	0.918	1.006
WGI GE	0.962	0.022	43.01	0.00	0.918	1.006
WGI RL	0.962	0.022	43.06	0.00	0.919	1.006
WGI RQ	0.901	0.024	38.25	0.00	0.855	0.947
WGI VA	0.784	0.026	30.72	0.00	0.734	0.834
FH CLI	0.673	0.027	24.90	0.00	0.620	0.727
FH PRI	0.629	0.028	22.80	0.00	0.575	0.683
Error Variance						
WGI CC	0.074	0.004	16.51	0.00	0.065	0.083
WGI GE	0.074	0.005	16.06	0.00	0.065	0.083
WGI RL	0.073	0.004	16.22	0.00	0.064	0.082
WGI RQ	0.187	0.009	20.41	0.00	0.169	0.205
WGI VA	0.384	0.017	22.15	0.00	0.350	0.418
FH CLI	0.545	0.024	22.64	0.00	0.498	0.593
FH PRI	0.604	0.027	22.77	0.00	0.552	0.656
Fit Indices						
CFI	0.476					
TLI	0.213					
RMSR	0.151					

Source: Own calculations.

Appendix VIII: Confirmatory Factor Analysis, Two Common Factor Model, Middle and High Income Countries 1996-2009

Log Likelihood = -4138.78 Number of observations: 1079

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Means						
WGI CC	0.000	0.030	0.00	1.00	-0.060	0.060
WGI GE	0.000	0.030	0.00	1.00	-0.060	0.060
WGI RL	0.000	0.030	0.00	1.00	-0.060	0.060
WGI RQ	0.000	0.030	0.00	1.00	-0.060	0.060
WGI VA	0.000	0.030	0.00	1.00	-0.060	0.060
FH CLI	0.000	0.030	0.00	1.00	-0.060	0.060
FH PRI	0.000	0.030	0.00	1.00	-0.060	0.060
Loadings						
Governance						
WGI CC	0.963	0.022	43.15	0.00	0.920	1.007
WGI GE	0.968	0.022	43.52	0.00	0.925	1.012
WGI RL	0.961	0.022	42.94	0.00	0.917	1.005
WGI RQ	0.902	0.024	38.27	0.00	0.856	0.948
Voice						
WGI VA	0.992	0.022	45.33	0.00	0.949	1.035
FH CLI	0.955	0.023	42.05	0.00	0.910	0.999
FH PRI	0.943	0.023	41.14	0.00	0.898	0.988
Factor Covariance						
Governance – Governance	1.000	.	.	.	.	.
Voice – Voice	1.000	.	.	.	.	.
Governance – Voice	0.739	0.017	44.52	0.00	0.706	0.771
Error Variance						
WGI CC	0.071	0.004	15.84	0.00	0.062	0.080
WGI GE	0.062	0.004	14.06	0.00	0.053	0.070
WGI RL	0.075	0.005	15.89	0.00	0.066	0.084
WGI RQ	0.186	0.009	20.24	0.00	0.168	0.204
WGI VA	0.015	0.006	2.45	0.014	0.003	0.027
FH CLI	0.087	0.008	11.47	0.00	0.073	0.102
FH PRI	0.110	0.008	13.64	0.00	0.094	0.125
Fit Indices						
CFI	0.931					
TLI	0.889					
RMSR	0.047					

Source: Own calculations

Appendix IX: Cutoff dates applied to Naples Terms and HIPCI operations

Country	Cutoff date
Afghanistan	06/20/1999
Benin	03/31/1989
Bolivia	12/31/1985
Burkina Faso	01/01/1991
Burundi	06/20/1999
Cameroon	06/20/1999
Congo, Dem. Rep.	06/30/1983
Congo, Rep.	01/01/1986
Central African Rep.	01/01/1983
Ethiopia	12/31/1989
Gambia	06/20/1999
Ghana	01/01/1983
Guinea-Bissau	12/31/1986
Guyana	12/31/1988
Haiti	10/01/1993
Honduras	06/01/1990
Liberia	01/01/1983
Madagascar	07/01/1983
Malawi	01/01/1982
Mali	01/01/1988
Mauritania	12/31/1984
Mozambique	02/01/1984
Nicaragua	11/01/1988
Niger	07/01/1983
Rwanda	01/01/1981
Sao Tome	04/01/1999
Senegal	01/01/1983
Sierra Leone	07/01/1983
Tanzania	06/30/1986
Togo	01/01/1983
Uganda	n.a.
Zambia	01/01/1983
Chad	n.a.
Comoros	06/20/1999
Cote d'Ivoire	07/01/1983
Guinea	n.a.

Appendix X: Country Categories

No.	IDA eligible countries as of end 1994	HIPCI Decision Point	HIPCI Compl. Point	Treatment[1)]	Control Group[1)]
1	Afghanistan	2007	2010	X	
2	Albania				X
3	Angola				X
4	Armenia				X
5	Azerbaijan				X
6	Bangladesh				X
7	Benin	2000	2003	X	
8	Bhutan***				
9	Bolivia	2000	2001	X	
10	Burkina Faso	2000	2002	X	
11	Burundi	2005	2009	X	
12	Cambodia				X
13	Cameroon	2000	2006	X	
14	Cape Verde*				
15	Central African Rep.	2007	2009	X	
16	Chad**	2001			
17	Comoros*	2010			
18	Congo	2007	2010	X	
19	Congo, Dem. Rep.	2003	2010	X	
20	Côte d'Ivoire**	2009			
21	Djibouti*				
22	Dominica*				
23	Egypt				X
24	Equatorial Guinea*				
25	Eritrea				X
26	Ethiopia	2001	2004	X	
27	Gambia	2000	2007	X	
28	Georgia				X
29	Ghana	2002	2004	X	
30	Grenada*				
31	Guinea**	2000			
32	Guinea-Bissau	2003	2010	X	
33	Guyana*	2000	2003		
34	Haiti	2006	2009	X	
35	Honduras	2000	2005	X	
36	Indonesia				X
37	Kenya				X
38	Kiribati*				
39	Kyrgyzstan				X
40	Lao People's Dem. Rep.				X
41	Lesotho				X
42	Liberia	2008	2010	X	
43	Madagascar	2000	2004	X	
44	Malawi	2000	2006	X	
45	Maldives*				
46	Mali	2000	2003	X	
47	Marshall Islands				X
48	Mauritania	2000	2002	X	
49	Micronesia				X
50	Moldova				X
51	Mongolia				X
52	Mozambique	2000	2001	X	
53	Myanmar				X
54	Nepal				X
55	Nicaragua	2000	2004	X	
56	Niger	2000	2004	X	
57	Nigeria				X
58	Pakistan				X
59	Papua New Guinea				X
60	Rwanda	2000	2005	X	
61	St. Lucia*				
62	St. Vincent and Grenadines*				
63	Samoa*				

No.	IDA eligible countries as of end 1994	HIPCI Decision Point	HIPCI Compl. Point	Treatment[1)]	Control Group[1)]
64	Sao Tome and Principe*	2000	2007		
65	Senegal	2000	2004	X	
66	Sierra Leone	2002	2006	X	
67	Solomon Islands*				
68	Somalia				X
69	Sri Lanka				
70	Sudan				X
71	Tajikistan				X
72	Tanzania	2000	2001	X	
73	Togo**	2008	2011		
74	Tonga				X
75	Tuvalu				
76	Uganda	2000	2000	X	
77	Uzbekistan				
78	Vanuatu*				
79	Vietnam				X
80	Yemen				X
81	Zambia	2000	2005	X	
82	Zimbabwe				X
Total				29	30

[1)] Subject to data availability

* IDA eligible under small island country exception. Due to economic specifics, they have been excluded from the sample.

** Excluded from sample because completion point reached after December 2010.

*** Excluded because population of below one million as of end-1995.

Control and Treatment Group Countries in alphabetical order

Control Group		Treatment Group	
1	Afghanistan	1	Albania
2	Benin	2	Angola
3	Bolivia	3	Armenia
4	Burkina Faso	4	Azerbaijan
5	Burundi	5	Bangladesh
6	Cameroon	6	Cambodia
7	Central African Republic	7	Egypt
8	Congo	8	Eritrea
9	Congo, Dem. Rep.	9	Georgia
10	Ethiopia	10	Indonesia
11	Gambia	11	Kenya
12	Ghana	12	Kyrgyzstan
13	Guinea-Bissau	13	Lao People's Dem. Rep.
14	Haiti	14	Lesotho
15	Honduras	15	Marshall Islands
16	Liberia	16	Micronesia
17	Madagascar	17	Moldova
18	Malawi	18	Mongolia
19	Mali	19	Myanmar
20	Mozambique	20	Nepal
21	Mauretania	21	Nigeria
22	Nicaragua	22	Pakistan
23	Niger	23	Papua New Guinea
24	Rwanda	24	Somalia
25	Senegal	25	Sudan
26	Sierra Leone	26	Tajikistan
27	Tanzania	27	Tonga
28	Uganda	28	Vietnam
29	Zambia	29	Yemen
		30	Zimbabwe

Appendix XI: Flow Chart for Debt Relief under E-HIPCI and MDRI

	Starting Point	***First Phase (3 years)***	**Decision Point**	***Second Phase (floating)***	**Completion Point**	**MDRI**
Bilateral Debt Treatment		*Naples Terms Flow Treatment (67 percent PV reduction)*	Naples Terms Stock Treatment (67 percent PV reduction)	*Cologne Terms Flow Treatment (90 percent PV reduction)*	Cologne Terms Stock Treatment (90 percent PV reduction)	
Commercial Debt Treatment		*Comparable Treatment*	Comparable Treatment	*Comparable Treatment*	Comparable Treatment	
Multilateral Debt Treatment				*Debt Service Relief*		Stock Treatment (100 percent PV) of IMF, IDA (cutoff date end 2003), and AfDF (cutoff end 2004) debt as by end 2004
Eligibility Criteria	LIC (IDA eligibility)	*Development of PRSP and approval by WB and IMF* →	• PV PPGD-to-export ratio above 150 percent **or** • PV PPGD to CG revenue above 250 percent	*Implem. of PRGF or a similar IMF staff-monitored program* →		

Appendix XII: Modalities and Volumes of Concessional Debt Relief Operations since 1988

	Classical Terms	Toronto Terms	London Terms	Naples Terms	HIPCI (Lyon Terms)	E-HIPCI (Cologne Terms)	MDRI
Application Period	Until Sept. 1988	Oct. 1989–June 1991	Dec. 1991–Dec. 1994	Jan. 1995–Nov. 1996	Dec.1996–Oct. 1999	Since Nov. 1999	Since January 2006
Eligibility							HIPC completion point
Debt covered	Long term bilateral	Long term bilateral	Long term bilateral	Long term bilateral	Long term bilateral	Long term bilateral	Multilateral
Concessionality (reduction of PV in percent)	n.a.	20-33[2)]	50	67	80	90	100
Treatment of Non-concessional debt[1)]							
Option 1: Debt Reduction (rescheduling at market interest rates)							
Grace period	n.a.	8	6	6	6	6	n.a.
Maturity	n.a.	14	23	23	23	23	n.a.
Option 2: Debt Service Reduction (at concessional interest rates)							
Grace period	n.a.	8	n.a.	3	8	n.a.	n.a.
Maturity	n.a.	14	23	33	40	n.a.	n.a.
Option 3: Capitalization of Memorandum Interest (at concessional interest rates)							
Grace period	n.a.	n.a.	5	8	8	n.a.	n.a.
Maturity	n.a.	n.a.	23	33	40	n.a.	n.a.
Option 4: Longer Maturities (at market interest rate, non-concessional rescheduling)							
Grace period	5-6	14	16	20	20	n.a.	n.a.
Maturity	10	25	25	40	40	n.a.	n.a.
Treatment of ODA (excluded from PV reductions)							
Grace period (years)	5-6	14	12	16	16	16	n.a.
Maturity (years)	10	25	30	40	40	40	n.a.
Memorandum items:							
No. of agreements reached	87	28	24	38			
HIPCs receiving treatment	28	20	22	26			
Nominal amounts consolidated	USD 23 billion	USD 6 billion	USD 9 billion	USD 17.5 billion	USD 76.0 billion (end-2010 PV terms)		USD 52.5 billion

Appendix XIII: Data Sources and Summary Statistics

Data Sources

Data	Description (taken from source):	Source:
Exports of Goods and Services (% of GDP	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Bank, WDI, national accounts data
External debt stocks, public and publicly guaranteed (PPGD)	Public and publicly guaranteed debt comprises long-term external obligations of public debtors, including the national government, political subdivisions (or an agency of either), and autonomous public bodies, and external obligations of private debtors that are guaranteed for repayment by a public entity. Data are in current US dollars.	World Bank, Global Development Finance
GDP in current USD	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.	World Bank, national accounts data
GNI per capita	Gross national income per capita is converted to US dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes not included in the valuation of output plus net receipts of primary income from abroad. GNI, calculated in national currency, is usually converted to US dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank.	World Bank national accounts data, and OECD national accounts data
Gross fixed capital formation (% of GDP)	Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.	World Bank national accounts data, and OECD national accounts data
Gross fixed capital formation, private sector (% of GDP)	Private investment covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.	World Bank national accounts data, and OECD national accounts data
Imports of Goods and Services (% of GDP	Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Bank, WDI, national accounts data
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	International Monetary Fund, International Financial Statistics
ODA per capita	ODA consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the DAC, by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Assistance related to debt treatment has been excluded. This comprises OECD/DAC purpose codes 60020 (debt forgiveness), 60030 (relief of multilateral debt), 60040 (rescheduling and refinancing), 60061 (debt for development swap), 60062 (other debt swap), and 60063 (debt buy-back). Data are in current US dollars. World Bank population estimates are used as denominator.	OECD/DAC
Population growth (annual in %)	Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship-except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin.	World Bank, WDI

Data	Description (taken from source):	Source:
State Fragility Index	The State Fragility Index by Marshall and Cole lists all independent countries in which the total country population is greater than 500,000 in 2011 (165 countries). The Fragility Matrix scores each country on effectiveness and legitimacy in four performance dimensions: security, political, economic, and social. Each of the matrix indicators is rated on a four-point fragility scale: 0 "no fragility," 1 "low fragility," 2 "medium fragility," and 3 "high fragility" with the exception of the economic effectiveness indicator, which is rated on a five-point fragility scale (including 4 "extreme fragility"). The State Fragility Index, then, combines scores on the eight indicators and ranges from 0 "no fragility" to 25 "extreme fragility." A country's fragility is closely associated with its *state capacity* to manage conflict; make and implement public policy; and deliver essential services and its *systemic resilience* in maintaining system coherence, cohesion, and quality of life; responding effectively to challenges and crises, and sustaining progressive development.	Marshall and Cole (2011b)
Terms of Trade	Net barter terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. Unit value indexes are based on data reported by countries that demonstrate consistency under UNCTAD quality controls, supplemented by UNCTAD's estimates using the previous year's trade values at the Standard International Trade Classification three-digit level as weights. To improve data coverage, especially for the latest periods, UNCTAD constructs a set of average prices indexes at the three-digit product classification of the Standard International Trade Classification revision 3 using UNCTAD's Commodity Price Statistics, international and national sources, and UNCTAD secretariat estimates and calculates unit value indexes at the country level using the current year's trade values as weights.	UNCTAD, Handbook of Statistics and data files, and International Monetary Fund, International Financial Statistics
Total Factor Productivity	The TFP estimates rest on the assumption of a standard Cobb-Douglas production function with constant returns to scale and Hick-neutral technical change in a perfectly competition setting on factor markets. For a detailed technical description of the data sources and the method of computation the reader is referred to Isaksson (2007).	UNIDO, World Productivity Database, Isaksson (2007)
Urbanization (% of total)	Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.	United Nations, World Urbanization Prospects

Summary Statistics

Variable		***Treated***					***Control***				
		Mean	***SD***	***Min.***	***Max.***	***N***	***Mean***	***SD***	***Min.***	***Max***	***N***
Total Gross Fixed Capital Formation (% of GDP)	Baseline	16.73	5.49	7.69	25.57	24	21.04	11.70	10.34	69.59	27
	Follow-up	22.42	5.63	10.45	35.24	24	23.36	8.15	4.11	40.61	27
Gross fixed capital formation, private sector (% of GDP)	Baseline	9.19	5.46	-0.60	22.23	23	14.70	11.13	0.72	51.27	22
	Follow-up	14.64	6.69	5.86	29.48	24	14.45	7.28	1.26	26.31	23
Gross fixed capital formation, public sector (% of GDP)	Baseline	7.67	3.03	2.76	13.75	23	6.10	4.41	0.81	18.32	22
	Follow-up	7.76	3.34	2.38	15.95	24	7.79	4.91	1.99	25.58	23
GNI per capita (in constant 2000 USD, Atlas method)	Baseline	398.6	232.2	153.0	877.5	24	463.67	206.86	152.5	1,002.50	27
	Follow-up	715.1	465.0	195	1,872.50	28	1,911.4	2,522.3	285.0	13,632.5	28
ODA received (per capita)	Baseline	42.97	40.12	5.67	214.93	28	20.05	19.36	0.26	71.61	25
Trade Openness	Baseline	51.65	18.91	16.36	100.52	25	70.53	32.98	3.57	156.65	29
State Fragility Index	Baseline	17.81	3.46	13	25	27	15.61	4.22	8	24	29
Terms of Trade Index	Baseline	114.24	38.52	60.10	255.88	18	97.94	34.61	35.09	186.78	14
Urbanization (% of total population	Baseline	32.14	15.28	7.2	59.40	28	32.14	14.44	10.90	66.30	29
	Follow-up	37.63	16.66	10.25	65.35	28	36.09	13.67	12.55	63.90	29

Appendix XIV: Country coverage and data sources

Data sources:

Data	Description (taken from source):	Source:
Domestic Revenue (% of GDP)	Revenue is cash receipts from taxes, social contributions, and other revenues such as fines, fees, rent, and income from property or sales. Grants are excluded. To obtain a balanced panel structure, missing values (approx. 70 percent) were filled drawing on IMF staff country reports (including article IV consultation reports, program reviews, statistical appendices and annexes, and recent economic developments reports) available from the Fund's website (see table below).	IMF Government Finance Statistics / Country Staff Reports
Exports of Goods and Services (% of GDP	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Bank, WDI, national accounts data
Imports of Goods and Services (% of GDP	Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Bank, WDI, national accounts data
External debt stocks, public and publicly guaranteed (PPGD)	Public and publicly guaranteed debt comprises long-term external obligations of public debtors, including the national government, political subdivisions (or an agency of either), and autonomous public bodies, and external obligations of private debtors that are guaranteed for repayment by a public entity. Data are in current US dollars.	World Bank, Global Development Finance
GDP in current USD	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.	World Bank, national accounts data
GNI per capita	Gross national income per capita is converted to US dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes not included in the valuation of output plus net receipts of primary income from abroad. GNI, calculated in national currency, is usually converted to US dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank.	World Bank national accounts data, and OECD National Accounts data
Agriculture value added (% of GDP)	Agriculture includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification, revision 3. As the share of agriculture value added in GDP shows to be rather persistent with a weak time trend (the within variance coefficient for the time period from 2000 to 2008 is 0.12), missing values (9 percent) have been filled applying linear interpolation.	World Bank, national accounts data
Industry value added (% of GDP)	Industry comprises value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification, revision 3. As the share of industry value added in GDP shows to be rather persistent with a weak time trend (the within variance coefficient for the time period from 2000 to 2008 is 0.17), missing values (9 percent) have been filled applying linear interpolation.	World Bank, national accounts data
ODA received (in % of GDP)	ODA consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the DAC, by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Data are in current US dollars. World Bank GDP estimates are used as denominator.	OECD/DAC
GBS received (in % of GDP)	GBS consists of disbursements of loans on concessional terms and grants provided under CRS Purpose Code 51010 by official members of the DAC (incl. EU), under IDA PRSC and IMF PRGF arrangements, and ADF concessional lending operations if they are undertaken within the framework of a partially or fully harmonized and aligned policy dialogue (in particular with regard to conditionality and performance assessment). According to the World Bank (2010) a common PAF or PAF-like framework is either being developed or already in place in the following SSA countries: Benin, Burkina Faso, Cape Verde, Ghana, Madagascar,	As listed below

Data	Description (taken from source):	Source:
	Malawi, Mali, Mozambique, Niger, Rwanda, Senegal, Tanzania, Uganda, and Zambia. GBS to Ethiopia has been suspended in 2005. World Bank GDP estimates are used for the denominator.	

SSA countries included:

Angola, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Dem. Rep. of Congo, Comoros, Côte d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.

Sources used to fill missing values in the IMF GFS data base (revenue as share in GDP):

No.	*Country*	*IMF Source*
1	Angola	IMF Country Staff Reports No. 03/291, 05/228, 07/354, 10/302, and 11/51.
2	Benin	IMF Country Staff Reports No. 02/158, and 10/195.
3	Burkina Faso	IMF Country Staff Reports No. 02/3, 05/354, and 10/361.
4	Burundi	IMF Country Staff Reports No. 02/242, 04/41, 05/322, 06/311, and 10/313.
5	Cameroon	IMF Country Staff Reports No. 02/258, 05/413, 07/285, 08/279, and 10/259.
6	Cape Verde	IMF Country Staff Reports No. 03/153, 04/304, 06/332, and 10/349.
7	Central African Republic	IMF Country Staff Reports No. 04/159, 08/16, and 10/332.
8	Chad	IMF Country Staff Reports No. 04/115, 05/74, 07/21, 07/28, 09/68, and 10/196.
9	Congo, Dem. Rep.	IMF Country Staff Reports No. 01/123, 07/328, 10/88, and 11/54.
10	Congo, Rep.	IMF Country Staff Reports No. 03/184, 09/74, and 11/67.
11	Comoros	IMF Country Staff Reports No. 04/83, 04/259, 06/383, 09/307, and 11/72.
12	Côte d'Ivoire	IMF Country Staff Reports No. 04/157, and 10/228.
13	Equatorial Guinea	IMF Country Staff Reports No. 03/386, 06/233, 06/237, 08/156, 09/102, and 10/103.
14	Eritrea	IMF Country Staff Reports No. 03/165, and 03/166.
15	Ethiopia	IMF Country Staff Reports No. 02/214, 06/122, 09/34, and 10/339.
16	Gabon	IMF Country Staff Reports No. 04/29, 05/3, 08/24, and 09/107.
17	Gambia	IMF Country Staff Reports No. 04/143, 06/8, 08/324, 10/61, and 11/22.
18	Ghana	IMF Country Staff Reports No. 03/133, 05/292, 09/256, and 10/178.
19	Guinea	IMF Country Staff Reports No. 01/31, 02/66, 03/251, 05/222, 08/20, and 08/275.
20	Guinea-Bissau	IMF Country Staff Reports No. 05/93, 07/370, 09/123, and 10/379.
21	Kenya	IMF Country Staff Report No. 11/48.
22	Liberia	IMF Country Staff Reports No. 02/148, 05/167, 07/356, 08/108/10/199, and 10/373.
23	Madagascar	IMF Country Staff Reports No. 01/219, 03/7, 09/227, and 09/327.
24	Malawi	IMF Country Staff Reports No. 02/182, 04/380, 06/445, 07/147, 08/26, and 10/87.
25	Mali	IMF Country Staff Report No. 11/37.
26	Mauritania	IMF Country Staff Reports No. 02/263, 03/314, 08/231, and 10/346.
27	Mozambique	IMF Country Staff Reports No. 04/50, 05/318, 06/254, and 08/220.
28	Niger	IMF Country Staff Reports No. 03/110, 05/79, 06/40, and 10/146.
29	Nigeria	IMF Country Staff Reports No. 04/242, 07/20, and 11/57.
30	Rwanda	IMF Country Staff Reports No. 03/192, 05/333, 07/233, and 11/19.
31	Senegal	IMF Country Staff Reports No. 06/127, 06/274, 07/358, 08/209, and 10/362.
32	Sudan	IMF Country Staff Reports No. 03/390, 06/182, 07/343, and 10/256.
33	Tanzania	IMF Country Staff Reports No. 03/1, 03/238, 04/285, 06/138, 08/178, and 10/351.
34	Togo	IMF Country Staff Reports No. 03/383, and 11/10.
35	Uganda	IMF Country Staff Reports No. 03/84, and 10/132.
36	Zambia	IMF Country Staff Reports No. 04/160, and 10/383.
37	Zimbabwe	IMF Country Staff Reports No. 02/126, 05/359, and 09/139.

Data sources for joint GBS disbursals to SSA recipients:

Institution	***Principal Sources***	***Means of verification****
AfDB (African Development Fund)	- AfDB (2008): *Statistical Compendium on Bank Group Operations*. Volume XXXI. Table 3.08. - AfDB (2009): *Statistical Compendium on Bank Group Operations*. Volume XXXII. Table 3.08.	- OCED/DAC CRS - AfDB Country Programme Completion Reports - Gerster et al. (2007, 2008, 2009, and 2010) - IDD (2006) - SPA-BSWG (2005, 2006, and 2007)
Bilaterals (incl. European Commission)	- OECD/DAC Creditor Reporting System, Purpose Code 51010.	- OECD/DAC CRS - Gerster et al. (2007, 2008, 2009, and 2010) - IDD (2006) - SPA-BSWG (2005, 2006, and 2007)
IMF	- IMF online *Transactions with the Fund* database.	- OECD/DAC CRS - IMF Country Reports - Gerster et al. (2007, 2008, 2009, and 2010) - IDD (2006) - SPA-BSWG (2005, 2006, and 2007)
World Bank (International Development Association)	- World Bank (2010) *Poverty Reduction Support Credits: An Evaluation of World Bank Support*. Independent Evaluation Group. October. Appendix Table A1.3 Poverty Reduction Support Credits By Country and Date (FY01-08). - World Bank online *Projects and Operations* database.	- OECD/DAC CRS - Gerster et al. (2007, 2008, 2009, and 2010) - IDA country program documents - IDD (2006) - SPA-BSWG (2005, 2006, and 2007)

** Gerster, IDD, and Budget Support Working Group of the Strategic Partnership with Africa (SPA-BSWG) sources only cover disbursement data for selected years and/or for a sub-sample of recipients.*

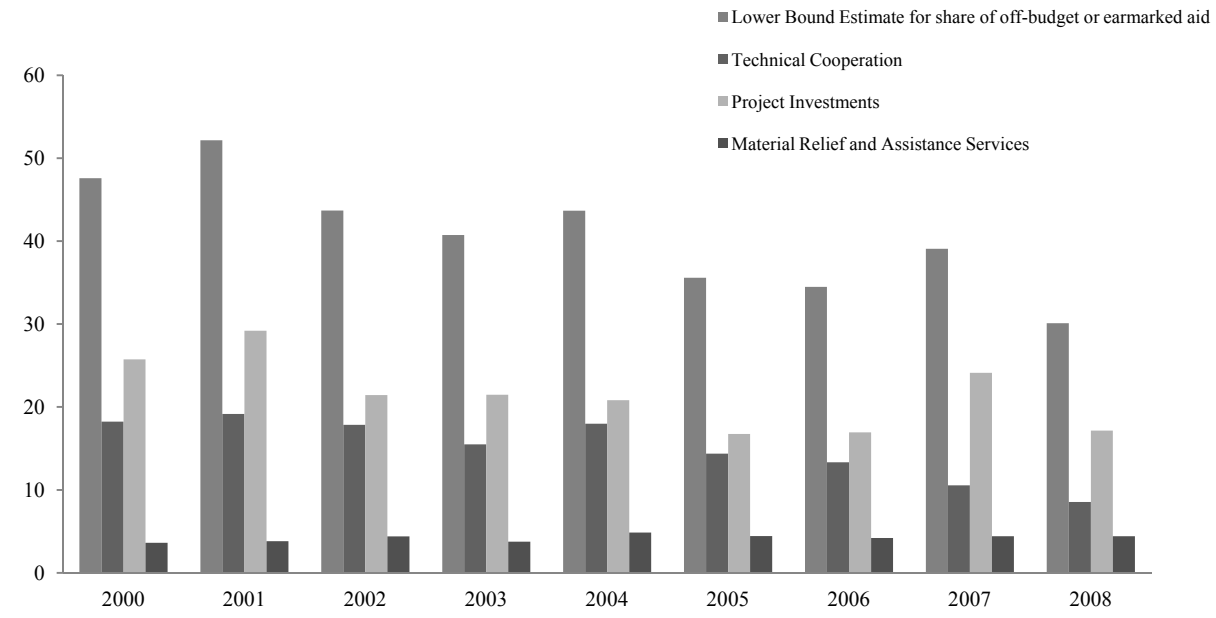
Appendix XV: Lower Bound Estimate for Tied and/or Off-Budget Aid Commitments to SSA

Using data from the OECD's Creditor Reporting System (CRS), a lower bound proxy can be calculated from several types of aid that are provided either entirely off-budget or subject to earmarking:

i) Off budget funding comprises stand-alone *Technical Co-operation* (TC), which is generally provided in kind by donor agencies for training, research, institutional capacity building, equipment, and administrative expenses (OECD/DAC, 2006; Adugna, 2009), and emergency assistance such as food aid, which is also directly managed by implementing agencies. Free-standing technical assistance refers to co-operation projects that are not embedded as components of other project or program activities. According to OECD/DAC (2006), the primary purpose of TC is to augment the level of knowledge, skills, technical know-how and productive aptitudes of people in aid recipient countries. Emergency and relief assistance is subsumed under CRS Purpose code 72010 (Material Relief and Assistance Services).

ii) The volume of aid provided under *Project Investments* (PI) can be used as a conservative, lower bound estimate for earmarked development assistance, as these funds are tied to specific sectors and expenditure items, i.e. investment. While PI funds clearly represent tied aid, they are also frequently kept off budget and are managed outside governments' consolidated accounts and PFM systems. Earmarked revenue is tied to specific expenditure programs and hence is infungible to the extent that it bypasses the consolidated account (Buchanan, 1963). In development cooperation practice there are, however, different approaches to PI financing: a) PI funds can be transferred to the recipient's treasury but kept and managed in special project accounts, using the governments or donors' procurement and auditing procedures, b) PI funds can be kept in commercial accounts outside the recipient's treasury and controlled either by the recipient government or donors, c) PI funds may be directly released by the donor agency to contracting partners upon request by the recipient government.

Lower bound estimates for committed off-budget and earmarked aid to SSA



Source: OECD/DAC CRS (2011).

Appendix XVI: Summary Statistics

Variable		*Mean*	*Std. Dev.*	*Min.*	*Max.*	*Observations*	
Domestic revenue	overall	19.135	8.722	3.734	51.700	N =	315
	between		8.192	9.424	43.800	n =	37
	within		3.519	8.552	32.978	T =	8.514
GNI per capita	overall	531.746	537.643	80.000	3340.000	N =	315
	between		559.467	108.889	2770.000	n =	37
	within		247.642	-414.921	2515.079	T =	8.514
GBS disbursal (in % of GDP)	overall	0.908	1.642	0.000	8.020	N =	315
	between		1.343	0.000	5.051	n =	37
	within		0.947	-3.235	6.007	T =	8.514
ODA received (in % of GDP)	overall	14.553	16.690	0.371	185.849	N =	315
	between		12.072	0.414	61.088	n =	37
	within		11.630	-36.982	139.313	T =	8.514
Agriculture value added (% of GDP)	overall	31.121	14.689	3.432	75.523	N =	315
	between		14.653	3.698	66.632	n =	37
	within		3.634	17.143	47.801	T =	8.514
Trade Openess	overall	71.472	35.790	19.350	219.179	N =	315
	between		32.120	34.178	179.729	n =	37
	within		15.043	14.461	186.181	T =	8.514

Source: Own calculations.

Correlation coefficients of explanatory variables

	GBS	*ODA*	*AGRIC*	*GNIPC*	*TRADE*	*PPGD*
GBS	1.000					
ODA	0.119	1.000				
AGRIC	0.055	0.345	1.000			
GNIPC	-0.134	-0.307	-0.621	1.000		
TRADE	-0.209	0.121	-0.432	0.390	1.000	
PPGD	-0.229	0.446	0.477	-0.373	0.050	1.000

Appendix XVII: System GMM Estimation Output for the 2005–2008 Sub-Period

Variable	*System GMM Model*)*	
Lagged CG Revenue	0.424 **	0.477 **
	(2.30)	*(2.65)*
GNI per capita	0.004 ***	0.004 ***
	(3.12)	*(2.91)*
GBS Disbursal	0.345 *	
	(1.92)	
ODA Disbursal		0.032
		(1.28)
PPGD	0.013	0.006
	(1.46)	*(0.98)*
Agric. Value Added	-0.063	-0.079 **
	(-1.59)	*(-2.07)*
Trade Openness	0.0484 ***	0.032 *
	(2.44)	*(1.88)*
Oil	4.152 **	3.595 **
	(2.69)	*(2.35)*
Constant	5.380 *	6.333 **
	(1.96)	*(2.54)*
Hansen Test (p-value) [a)]	0.21	0.28
Test for AR(1) in first differences (p-value) [b)]	0.04	0.03
Test for AR(2) in first differences (P-value) [b)]	0.35	0.36
N	135	135
No. of groups	36	36
Max. no. per group	4	4
Avg. no. per group	3.8	3.8

* *p<0.1, ** p<0.05, *** p<0.01*

*) In the first-differenced equation REV_{it} is instrumented using REV_{it-2}; plus ΔREV_{it} for the level equation. Explanatory variables are treated as strictly exogenous.

a) H_0: instruments used are not correlated with the residuals. The null hypothesis cannot be rejected.

b) H_0: the errors in the first-differenced equation exhibit no first- or second-order serial correlation.

Abstract

This thesis consists of the following three contributions:

The Good Governance Indicators of the Millennium Challenge Account: How many dimensions are really being measured?

This paper assesses the validity of the perception-based governance indicators used by the US Millennium Challenge Account (MCA) for aid allocation decisions. By conducting Explanatory and Confirmatory Factor Analysis of data from 1996 to 2009, it shows that although the MCA purports to measure seven distinct dimensions of governance, only two discrete underlying dimensions, the perceived 'participatory dimension of governance' and the perceived 'overall quality of governance,' can be identified. The results also show that some of the doubts that have been raised concerning the validity of perception-based governance indicators *are less warranted when the indicators are applied exclusively to developing countries.*

The Heavily Indebted Poor Countries and the Multilateral Debt Relief Initiative: A Test Case for the Validity of the Debt Overhang Hypothesis

The Heavily Indebted Poor Countries Initiative (HIPCI) and the Multilateral Debt Relief Initiative (MDRI) were both implemented based on an assumption derived from the debt overhang hypothesis – that is, that the removal of excessive debt burdens would help to boost investment and economic growth. Using a quasi-experimental research design to compare the performance of investment and growth between LICs that have benefited from HIPCI and MDRI and those that have not, this study assesses whether the two programs have yielded the expected effects. The results indicate that while debt relief programs have led to higher private-sector investment in beneficiary countries, they have not had any effect on public sector investment and growth. While the reasons for this outcome are not entirely clear, assumptions concerning the benefits that accrue to LICs as a result of debt relief appear to be in doubt.

Foreign Aid and Revenue Response: An Examination of Joint General Budget Support

The paper explores the extent to which new joint General Budget Support (GBS) systems have been able to overcome the problems of aid dependency and negative fiscal incentives that can potentially result from high levels of on-budget aid. As approximately 90 percent of new joint GBS goes to sub-Saharan Africa, this analysis, which covers the period from 2000 to 2008, evaluates

data from 37 sub-Saharan developing countries. According to fixed effect and system GMM estimations, joint GBS assistance – although highly discretionary – does not undermine recipients' revenue mobilization efforts. Indeed, on the contrary, while aid in general has no measurable impact on recipients' revenue performance, joint GBS programs are associated with higher revenue mobilization. This suggests that on-budget aid delivered under well-targeted conditionality successfully mitigates adverse fiscal incentives while substantially enhancing recipients' fiscal space.

Zusammenfassung

Die vorliegende Arbeit besteht aus den folgenden wissenschaftlichen Beiträgen:

Die Indikatoren zur Guten Regierungsführung des Millennium Challenge Account: Wie viele Dimensionen werden tatsächlich gemessen?

Der Artikel setzt sich mit der Frage auseinander, inwieweit die gegenwärtig im Rahmen des U.S. Millennium Challenge Accounts (MCA) zur Anwendung kommenden perzeptionsbasierten Indikatoren zur Messung der Qualität von Regierungsführung dimensionstreu und als Konstrukt valide sind.

Die Ergebnisse der angewendeten erklärenden und konfirmatorischen Faktoranalyse legen nahe, dass statt der seitens des MCA mit der vorgenommenen Indikatorenauswahl unterstellten sieben Dimensionen, lediglich zwei tatsächlich trennscharfe Dimensionen der Regierungsführung nachgewiesen werden können. Dies sind zum Einen die *wahrgenommene allgemeine Qualität* sowie zum Anderen die *wahrgenommene partizipative Dimension der Regierungsführung*. Weiterhin zeigt sich, dass einige, im Rahmen empirischer Untersuchungen identifizierte Defizite dieser Indikatoren weniger stark zum Tragen kommen, wenn die Indikatoren ausschließlich auf Entwicklungsländer angewendet werden.

Die HIPC- und die MDRI Initiativen: Ein Testfall für die Gültigkeit der Schuldenüberhangshypothese

Sowohl die Heavily Indebted Poor Countries Initiative (HIPC-Initiative) als auch die Multilateral Debt Relief Initiative (MDRI) wurden unter der Maßgabe der Gültigkeit der Schuldenüberhangshypothese implementiert. Diese besagt, dass vom Abbau eines Überhangs öffentlicher Schulden in Entwicklungsländern unmittelbar positive Impulse auf die gesamtwirtschaftlichen Investitionen und das wirtschaftliche Wachstum zu erwarten sind. Im Rahmen eines quasi-experimentellen Ansatzes wird im vorliegenden Artikel das Investitionsniveau und das Wachstum von im Rahmen der HIPC- und MDRI-Initiativen entschuldeter Länder (Treatment-Gruppe), mit dem Investitionsniveau und Wachstum jener Entwicklungsländer von der der Kontrollgruppe zugeordneten Entwicklungsländern verglichen.

Die Ergebnisse legen nahe, dass in den unter der HIPC-Initiative und MDRI entschuldeten Ländern zwar ein statistisch signifikanter Anstieg der privaten Investitionen zu verzeichnen ist, für die Investitionen der öffentlichen Hand und das wirtschaftliche Wachstum hingegen keine positiven Effekte nachweisbar sind. Es zeigt sich vielmehr, dass das Wirtschaftswachstum entschuldeter Länder im Vergleich zur Kontrollgruppe im betrachteten Zeitraum unterdurchschnittlich schwach ausfällt. Hauptursache hierfür scheint insbesondere das niedrige Niveau der totalen Faktor-

produktivität zu sein. Entsprechend sind die im Rahmen der Schuldenüberhangshypothese postulierten Wirkungszusammenhänge, zumindest in diesem spezifischen Kontext in Frage zu stellen.

Entwicklungshilfe und Eigenfinanzierungskapazitäten der Nehmerländer: Ein Untersuchung am Beispiel Allgemeiner Budgethilfefinanzierung

Der Artikel setzt sich mit der Frage auseinander, inwieweit es im Rahmen der in vielen Entwicklungsländern zur Anwendung kommenden Modalitäten der Allgemeinen Budgethilfefinanzierung (ABH) gelungen ist, das Dilemma zwischen finanzieller Entwicklungshilfe und sich in deren Folge verstärkender finanzieller Abhängigkeit der Nehmerländer zu überwinden.

Da 90 Prozent, und somit der Löwenanteil der ABH, an Länder südlich der Sahara ausgezahlt werden, wird dieser Fragestellung anhand einer empirischen Untersuchung von Daten zu 37 afrikanischen Ländern südlich der Sahara vorgenommen. Der untersuchte Zeitraum umfasst die Jahre von 2000 bis 2008.

Wie die Ergebnisse der Fixed-Effects- und der System-GMM-Schätzungen nahe legen, geht mit ABH-Modalitäten, obwohl die ausgezahlten Mittel vollständig diskretionär und fungibel sind, nicht mit einer Beeinträchtigung der Eigenfinanzierungskapazitäten einher. Im Gegenteil: Während Entwicklungshilfe insgesamt keinen signifikanten Einfluss auf die Mobilisierung der Eigeneinnahmen zu haben scheint, lässt sich im Rahmen der hier vorgenommenen Panel-Untersuchung ein positiver Effekt der ABH auf die Einnahmen der öffentlichen Hand nachweisen.

Dies legt nahe, dass ABH-Modalitäten, im Rahmen entsprechend sorgfältig ausgewählter Konditionalitäten und in Kombination mit Programmen der technischen Assistenz das Risiko negativer Effekte auf die Ressourcenmobilisierung des Staates mindern, und gleichzeitig den fiskalischen Handlungsspielraum der Nehmerländer erhöhen kann.

Erklärung

Berlin, 30. Mai 2013

Hiermit versichere ich, dass ich diese Arbeit selbstständig verfasst und alle Quellen ordnungsgemäß gekennzeichnet habe.

Ich versichere, dass die Dissertation nicht bereits in einem früheren Promotionsverfahren angenommen oder als ungenügend beurteilt worden ist.

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