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Aid effectiveness, debt relief and public finance response: Evidence from a panel of HIPCs

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Research Paper No. 2007/59

Aid Effectiveness, Debt Relief and Public Finance Response

Evidence from a Panel of HIPCs

Danny Cassimon and Bjorn Van Campenhout*

September 2007

Abstract

Substantial amounts of debt relief have been granted to a set of low-income countries, as an alternative aid modality. Although the theoretical case for debt relief is firmly established, only empirical analysis can show whether debt relief is indeed a (more) effective mode of aid delivery. We investigate the linkages between debt relief and other fiscal variables such as current expenditure, government investment, taxation and domestic borrowing, in comparison to the effects of grants and concessional loans. We find that the fiscal impact of HIPC debt relief follows fairly complex dynamics. For example, debt relief initially reduces government investment, but the effect becomes positive after two years, well outperforming other modes of aid delivery.

Keywords: HIPCs, debt relief, fiscal response, aid effectiveness

JEL classification: F34, F35, O11, O19

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Acronyms

GMM	generalized method of moments
HIPCs	heavily indebted poor countries
MDGs	Millennium Development Goals
PRGF	poverty reduction and growth facility (of the IMF)
PRSPs	poverty reduction strategy papers
PV	present value
VAR	vector autoregressive modelling framework

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1 Introduction

The international community has recently embarked on an ambitious quest to trigger a substantial acceleration of economic growth and development. Ambitions are centred around an international consensus on a concrete, albeit broad, set of development goals, the Millennium Development Goals (MDGs). For low-income countries, documents such as the Poverty Reduction Strategy Papers (PRSPs) should translate these broad targets into country-owned development strategies. On the donor side, it has provoked a substantial redrawing of the overall aid architecture, at such a scale that some authors refer to it as a true paradigm shift (Renard 2006). Apart from the scaling up of aid, improving the effectiveness of aid is a crucial element of concern in this new paradigm.

Traditionally, economists have tried to answer the aid effectiveness question using standard cross-sectional macroeconomic growth models, through the inclusion of aid flows as an explanatory variable. Perhaps not surprisingly, the results are inconclusive, reflecting the heterogeneous way in which aid is both given and used by different governments. More recently, especially since the World Bank Policy Research Report on *Assessing Aid* (1998), a new consensus seems to emerge. If aid is given to countries characterized by good governance, there is a positive impact on economic growth (Van de Walle and Johnston 1996; Burnside and Dollar 2000). This seems to confirm that, as in Franco-Rodriguez, Morrissey and McGillivray (1998: 1242),

> the core deficiency of this 'aid-growth' literature is that it fails to recognize explicitly that aid is given primarily to the government, and that hence any impact of aid on the economy will depend on government behaviour, in particular how fiscal decisions on taxation and expenditure are affected by aid revenues.

During the last decade, debt relief has slowly made its way as an important element of the international 'financing for development' agenda, through initiatives such as the Heavily Indebted Poor Countries (HIPC) Initiative. It is important to note that these debt relief initiatives fit nicely into the new aid architecture and the aid effectiveness debate: since debt relief to low-income countries is almost exclusively for debt owed to official creditors, these creditors are the same as those that provide (traditional forms of) aid to those countries. As such, debt relief is just one of the instruments of donor intervention (Berlage et al. 2003). So the crucial question is to what extent, and under which circumstances, i.e., debt relief a more promising instrument than the more 'traditional' modes of aid delivery (project aid, programme aid, technical assistance, etc.).

A large theoretical literature discussing arguments both in favour and against debt relief has since evolved (see, e.g., Cassimon and Vaessen 2007). Although these theoretical arguments are now fairly well-established, the extent to which they are valid in practice ultimately remains an empirical issue. One powerful tool to analyse the issue is to look at the recipient government's fiscal response behaviour on donor interventions on the debt relief type, as is done in so-called 'fiscal response' models. These models focus on the interactions between several categories of public expenditure and domestic and foreign revenue. More specifically, they look at the recipient government's response to aid flows in terms of the decisions between various sources of revenue like taxation and domestic borrowing and areas of expenditure like public investment and recurrent government expenditure. Starting from the seminal Heller (1975) study, research

focusing on the fiscal response of aid has developed into a huge literature.[1] Although the importance of disaggregating aid is well established in literature (see, e.g., Mavrotas 2002), the literature has largely disregarded the potential effect of debt relief as a separate aid category. This is rather surprising, as debt relief may be able to provoke fiscal response effects that diverge, and are perhaps more desirable than other aid interventions. In examining the cases of debt-ridden countries, the literature has definitely considered debt service as an important element in fiscal response behaviour,[2] and a few recent fiscal response studies (such as the recent synthesis study by Fagernäs and Roberts 2004 on Malawi, Uganda and Zambia) do discuss the impact of debt relief, but not as a separate (aid category) variable. As such, this paper aims to contribute to the literature by looking at the fiscal (response) effects of debt relief, relative to other donor interventions, for a panel of 28 heavily indebted poor countries (HIPCs) that have at least reached the decision point in the HIPC Initiative, and are currently receiving debt relief.

This paper is organized as follows. The next section provides a brief review of the hypothetical fiscal response effects of actual debt relief practices. Section 3 describes our empirical strategy using a panel vector autoregressive model and deals with data issues. The fourth section presents the estimation results and the last section concludes.

2 Comparative fiscal response effects of (HIPC) debt relief

As already indicated in the introduction, the theoretical (fiscal response) effects of debt relief are well established. In principle, debt relief frees resources in the recipient country government budget that can be rechannelled into other spending (or used to reduce the fiscal deficit), i.e., it creates 'fiscal space' (Heller 2005). As such, from a resource viewpoint, operations on debt relief are very much equivalent in nature to new (aid) money inflow, when the new aid is delivered in grant form through some budget support modality. However, these fiscal space effects may not be so considerable in practice. As shown in the literature (see, e.g., Cassimon and Vaessen 2007), the general principle that debt relief mobilizes resources for other uses is only valid to the extent that debt would have been serviced. Otherwise the fiscal space effect of debt reduction is virtual and mainly refers to an accounting clean-up of historical and future arrears accumulation. Real fiscal space equals to the share of debt service actually transferred in the absence of debt relief.[3]

But fiscal response may be provoked in a more indirect way: an excessive debt burden can provoke a series of actions by the government, creating a vicious circle that can be

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1 See e.g., McGillivray and Morrissey (2004) for a recent overview of this literature. A review of the fiscal response literature is also provided in an earlier version of this article (Cassimon and Van Campenhout 2006).

2 Several studies (e.g., Pack and Pack 1993 for the Dominican Republic; McGillivray and Ouattara 2005 for Côte d'Ivoire) conclude that the bulk of aid is allocated to debt servicing.

3 This is sometimes referred to as the *economic value* of debt relief, i.e., the present value of all future debt service payments that would effectively have been paid by the debtor in the absence of debt relief, with present value ideally measured at an appropriate (recipient country) discount rate and allowing for (partial or full) default.

stopped only by reducing debt to a sustainable level. Excessive debt service might severely not only crowd-out spending on development priorities, but also provoke suboptimal fiscal and other government behaviour (e.g., excessive domestic borrowing, excessive inflationary financing, excessive taxation of some sectors in the economy) and lessen incentives for economic reform. As a consequence, both private domestic as well as foreign investors might be discouraged from investing in the recipient economy. This is generally referred to as the *debt overhang hypothesis*.[4] Removal of debt overhang through debt relief may lead to a number of different fiscal response effects, such as an increase in public investment and, over time, through the impact on private investment and ultimately on higher economic growth, which may lead to increased domestic revenue mobilization in absolute terms.

An additional response effect might be at play. Several studies have shown that a large part of aid fungibility referred to aid being used for debt servicing. Moreover, Birdsall, Claessens and Diwan (2003) show that donors are engaged in 'defensive' lending, providing relatively more aid to debt-ridden countries for the purpose of allowing them to keep current on debt servicing rather than for direct development purposes. Again, debt relief might remove many of the incentives for governments to engage in this kind of aid fungibility, and for donors to engage in disbursing aid for these 'defensive' purposes. Both cases may make *all* aid granted to the particular recipient country more effective.

So far, empirical analysis has not focused on the factual fiscal response effects. Rather, the existing literature focuses on the effect of debt relief on outcome variables associated with aid effectiveness such as income (per capita) growth, poverty or private as well as public investment (as in Chauvin and Kraay 2005, for example). Our approach is much less ambitious in that we restrict ourselves to analysing the effect of debt relief on the fiscal sphere. In doing so, we are much closer to the literature that studies the fiscal response of governments. However, is explained later, we opt for a vector autoregressive (VAR) approach instead of the usual non-linear three stage least squares (NL3SLS). Furthermore, we also deviate from the fiscal response literature which is generally characterized by a case study approach in that we will look at a panel of countries.

In this paper, we restrict our analysis to debt relief embedded into the HIPC Debt Reduction Initiative. In 1996, on top of debt relief practices by bilateral creditors embodied in the Paris Club, the HIPC Initiative pledges additional relief for a specific subset of low-income countries in a once-and-for all effort that should bring the HIPCs back to the level of sustainability, by reducing their debt to a common threshold debt level. The Initiative was enhanced in 1999, with threshold debt levels being lowered (in external terms, down to a present value (PV) of debt-to-exports ratio of 150 per cent; in fiscal terms down to a PV of debt-to-fiscal revenues ratio of 250 per cent).

Currently, eight years down the road, 22 countries have fully completed the HIPC process, have reached the so-called 'completion point', and have received irrevocable

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4 The seminal reference is Krugman (1988). A lot of authors question the negative strict causality between external debt and growth for low-income countries. Rather, an excessive external debt is one of the symptoms of the systemic development problem of these countries. As such, a lasting solution calls for systemic changes, including tackling institutional, political and other weaknesses, for which debt relief will also be a necessary ingredient.

debt stock relief down to the threshold level.[5] Furthermore, another eight countries are somewhere halfway, implying that they have reached a decision point agreement when the amount of HIPC debt relief is determined (in principle). Also determined are additional conditionalities which the recipient countries must comply with in order to reach completion point. In the meantime, these countries receive so-called interim debt relief. About ten additional countries still have to fulfil certain entry requirements.[6] Overall, currently committed debt relief amounts to about US$33 billion in present value terms (IDA and IMF 2006).

A detailed study and assessment of the HIPC Initiative is beyond the scope and purpose of this paper.[7] However, it has been shown that the HIPC Initiative is more than an 'accounting clean-up' operation leading only to 'virtual' debt relief. Partly due to the fact that also multilateral creditors (IMF, World Bank, regional development banks) reduced their claims, roughly half of total debt relief can be said to reflect real savings, available for additional priority spending. Moreover, this issue was acknowledged explicitly as it was determined in each country what part of the total HIPC debt relief had to be explicitly 'budgetized' (typically accounted for as grants in the recipient country budget), and its use is monitored separately.

This brings us to the issue of response effects linked to earmarking, conditionality and monitoring, which is crucial in the case of HIPC debt relief. It is well known that the HIPC Initiative has come about with a heavy and diversified portfolio of conditionality, including not only broad macroeconomic and structural reforms through the conventional IMF programme, but also with broad poverty focus through the poverty reduction strategy papers (PRSP), and country-specific tracking mechanisms to monitor the use of HIPC debt savings. These tracking mechanisms range from counterpart funds, to virtual funds over comprehensive budget tracking.[8] In all cases, donors want to make sure that the (real) fiscal space created is used for activities that target poverty reduction.

All these features have specific fiscal response effects, most of them linked to limiting debt relief fungibility. In fact, viewed from a fungibility perspective, the general objective of the PRSP instrument, by emphasizing ownership, was not only to increase the focus on poverty reduction, but also to assure that donor and recipient country objectives coincide, eliminating the very basis for fungibility. Broad earmarking to actions indicated as priories in the PRSP allows the budgetized HIPC debt service savings to be used for a wide range of activities, from additional social sector and basic infrastructure spending, to reducing domestic debt, or merely reducing the fiscal deficit. Broadly speaking, donor (and recipient country civil society) monitoring is to make sure that governments are indeed using the resources for priority sectors, however defined, as

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5 Benin, Bolivia, Burkina Faso, Cameroon, Ethiopia, Ghana, Guyana, Honduras, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Rwanda, Senegal, Sao Tomé and Principe, Sierra Leone, Tanzania, Uganda and Zambia.

6 Furthermore, the extension of the so-called sunset clause up to the end of 2006 enabled some additional countries (Haiti, Kyrgyz Republic and Nepal) to qualify as a HIPC.

7 See, e.g., Claessens et al. (1997) and Cohen (1996) for details of the rationale for HIPC, and e.g., World Bank (2004, 2006), Chauvin and Kraay (2005) for examples of preliminary detailed assessment studies.

8 See, e.g., IMF and IDA (2001) for a comprehensive treatment.

determined in the PRSP, and reflected in the budget. But broad IMF programme conditionality (including the specific completion point triggers) has shown to be potentially restrictive in effectively using the fiscal space created. To give one example, Weeks and McKinley (2006), argue that in the case of Zambia, HIPC debt relief even had a negative effect on fiscal space, mainly due to expenditure and other ceilings coming from IMF programme conditionality.

On the issue of the additionality of debt relief, and the impact on other donor flows, it has been witnessed that, although some short-term donor fungibility could be detected in some cases, clear signs of additionality have been witnessed from the year 2002 onward at recipient country level, especially for post completion-point countries where net flows have indeed gone up more than the amount of debt reduced (World Bank 2006).

Although debt relief practices have not been limited to the HIPC Initiative, we prefer to limit our analysis to HIPC debt relief. One reason is that most of the pre-HIPC debt relief did not provide fiscal space, in the sense that most likely it did not lead to more resources being available in the budget in a cash flow sense, and, as such, fiscal response effects will have been extremely limited. The same applies to the debt overhang story: (repeated) small amounts of debt relief may not trigger a shift in the economy out of a low investment low growth debt overhang regime (Bulow and Rogoff 1991). The final reason for limiting ourselves to HIPC debt relief is data availability.

3 Model estimation, empirical strategy and data issues

In this study, we do not confine ourselves to the timeseries data of one country, as is usual in the fiscal response literature. Instead, we derive our coefficient estimates from a panel of 28 HIPC countries. There are several reasons for this choice.

First of all, note that the specific interest of this paper lies in studying the fiscal effects of debt relief, relative to other effects. Restricting ourselves to a single country would probably leave us with too little variation to adequately identify the effects of debt relief on other variables. A second reason is that timeseries data for developing countries is difficult to come by, and the quality may be questionable. Third, the aim of this paper is to look at the aggregate effect of a policy decision of the entire international donor community, namely that to grant additional debt relief to a set of countries, rather than the effect of an individual donor policy decision on a specific country. If we want to estimate the likely effects that debt relief has on the public finance of recipient countries in general, it makes more sense to look at the average effect of different countries than to try to extract information about these effects only from a certain country's own history.

3.1 A panel data VAR for fiscal response modelling

Traditionally, fiscal response models are estimated in their structural form using non-linear three stage least squares. However, it is well known that this method is extremely sensitive to the starting values. In this study, we follow Osei, Morrissey and Lloyd (2005) and estimate the fiscal response model in a VAR modelling framework. The rationale for this choice of econometric model is that fiscal aggregates are highly interlinked, and likely therefore to be endogenous (Fagernäs and Roberts 2004). In

addition, the VAR framework enables us to graph impulse-response functions, which provide a convenient way to evaluate the effect of a shock in one variable of interest on another variable of interest.

The first model we estimate is a pooled VAR with two lags. This model does not control for unobserved country heterogeneity, but might provide a useful baseline case. Indeed, if there are time invariant individual effects, these will be absorbed in the error term, causing correlation between the explanatory variables and the residual. Standard results for omitted variable bias indicate that, at least in large samples, the OLS levels estimator is biased upwards (Bond 2002).

Hence, in a second model, we allow for unobserved country-specific means in the dependent variable by estimating a fixed effects (within groups) model. However, it is well known that in short dynamic panels, the within transformation introduces non-negligible correlation between the transformed lagged dependent variable and the transformed error term. Nickell (1981) has shown that this correlation is negative. So, as a robustness check, a third model presents the generalized method of moments (GMM) estimates (Holtz-Eakin, Newey and Rosen 1988; Arellano and Bond 1991), which are consistent for small T large N panels. For an elaborate account of the selection of the estimator, see Cassimon and Van Campenhout (2006).

Since our panel is roughly square, it is not clear which estimation method is most appropriate for us. The fixed effects version potentially suffers from the correlation between the transformed lagged dependent variable and the transformed error term mentioned above. However, the fact that our panel is roughly square also means that we are constrained in the number of instruments we can use. Since the system GMM method creates one instrument for each time period, variable and lag distance, using only t-2 as instruments would result in about 140 instruments, well above the suggested rule of thumb to keep the number of instruments smaller than the number of groups. In cases where the number of instruments is large relative to the number of observations, system GMM results are biased toward those of OLS. Given this, we feel that the efficiency gains from system GMM will be rather small, hence our preferred model is the fixed effects model on which we base the impulse response functions.

Moreover, as in Osei et al. (2005), we also investigate the fiscal response of the different variables using impulse response functions. Impulse response functions can be used to graphically show the response of one variable of interest (for instance, government investment) to a shock in another variable of interest (for example, debt relief). More specifically, we will use orthogonalized impulse response functions, which allow us to answer such questions as: how does an innovation to external loans, holding everything else constant, affect government investment after three periods? To calculate the impulse response functions, we use the most popular approach proposed by Sims (1980), which involves a Cholesky decomposition to orthogonalize the shocks.

3.2 Data issues

The model is estimated for a sample of 28 HIPCs that have reached at least the decision point status, and are receiving HIPC relief, either as interim relief, or, at completion point, irrevocable HIPC debt relief. For this sample, a database of fiscal variables is constructed by the authors, using data for these countries taken essentially from the budgetary data presented in IMF country reports, such as Article IV reports, the poverty

reduction and growth facility (PRGF) reviews, as well as HIPC decision and/or completion point documents. To the extent possible, data are gathered for the period 1991-2004.

The VAR model we estimate consists of seven variables. Most of the variables are standard in the fiscal response literature, only the dissagregation may vary. The first variable in the system is government revenue. This variable is both tax and non-tax revenue. It also includes, when relevant, oil revenues, profits from state-owned enterprises, etc. Next, we disaggregate government expenditure into current expenditure and government investment. Government current expenditure is net of interest payments. Government investment includes net lending. The fourth variable in our system is net domestic borrowing. We also decided to disaggregate external financing into external borrowing and external grants. Obviously, both loans and grants are net of any HIPC component. All HIPC relief, both loan and grant components, are in the last variable called debt relief. We estimate a VAR with two lags, as more lags would leave us with too few degrees of freedom, and experimentation showed further lags were generally insignificant.

Before running the VAR, we choose to express the different variables in our system as percentages of GDP rather than using absolute amounts. There are different reasons for this option. First, it relieves us from having to convert the absolute figures into a common currency and to deflate them. Next, it also controls for the size of the economy. Furthermore, it removes unobserved effects that influence all countries and series in the same way as, for instance, the effect of the global economy.

It is important to discuss the debt relief data derived for this paper somewhat more extensively. Debt relief, including the HIPC Initiative, cannot always be read immediately from the budgetary information provided by IMF reports, and different countries use different ways of accounting for debt relief in their budget (see De Groot, Jennes and Cassimon 2003 for a more detailed treatment of this issue). HIPC debt relief has two major components: multilateral and bilateral debt relief. The multilateral part is typically accounted for as a grant and is usually given as a separate budget line.[9] Bilateral debt relief is often much more difficult to trace, as debt service is generally presented in the budget net of debt relief, without a separate budget line indicating the amount of debt relief embedded. However, within the framework of the completion-point triggers and the PRSP, IMF (and World Bank) usually track the actual granted amount of HIPC debt relief very closely, which means that total HIPC debt relief figures are available. As such, it is in general feasible to construct a variable that represents the total *annual* debt service relief resulting from the Initiative.

4 A discussion of empirical results

Table 1 reports on the fiscal response effects of the different variables in our system. As outlined above, we present three estimates of the VAR, one based on pooled OLS (panel A), a fixed effects VAR (panel B) and a system GMM VAR (panel C). Remember

9 As such, HIPC debt relief in the form of grants has to be deducted from the amount of aid given in the form of grants, so grant figures in our database are of course net of HIPC debt relief grants.

Table 1
All HIPCs

		Government revenue	Current primary expenditure	Government investment	Domestic borrowing	External borrowing	External grants	Debt relief
		PANEL A: Pooled regression						
Government revenue	L1	0.773**	0.259**	0.164	-0.073	0.159*	0.149+	0.002
	L2	0.116	-0.241**	-0.151	-0.053	-0.193*	-0.278**	0.038
Current primary expenditure	L1	0.164*	0.741**	-0.063	0.165	-0.216**	-0.022	0.145**
	L2	-0.103	0.200*	0.138	0.019	0.351**	0.151+	-0.162**
Government investment	L1	-0.076	0.104	0.400**	0.106	0.034	-0.09	-0.072+
	L2	0.099	0.06	0.441**	-0.059	0.082	0.239**	0.048
Domestic borrowing	L1	-0.058	-0.077	0.180*	0.164*	0.162**	0.225**	-0.014
	L2	0.034	-0.002	-0.112	0.353**	-0.146**	-0.152**	0.004
External borrowing	L1	-0.121	-0.142+	0.117	-0.025	0.485**	0.202*	0.023
	L2	0.127+	-0.017	-0.052	0.067	0.097	-0.149+	-0.025
External grants	L1	-0.024	-0.057	0.229+	-0.054	0.015	0.640**	0.081+
	L2	-0.05	-0.065	-0.177	-0.018	-0.09	-0.002	-0.017
Debt relief	L1	0.13	0.157	-0.351*	-0.305	-0.292*	-0.288*	0.780**
	L2	0.137	0.036	0.522**	-0.171	0.363*	0.417**	0.007
R^2		0.89	0.82	0.86	0.27	0.65	0.8	0.61
		PANEL B: Fixed effects regression						
Government revenue	L1	0.515**	0.203*	0.130	-0.094	0.072	0.237**	-0.018
	L2	0.006	-0.177*	0.096	-0.065	-0.095	-0.051	0.047
Current primary expenditure	L1	0.127+	0.525**	-0.02	0.188	-0.192*	-0.051	0.151**
	L2	-0.135+	0.133	0.077	0.082	0.358**	0.071	-0.159**
Government investment	L1	-0.148+	0.086	-0.005	0.139	-0.075	-0.233**	-0.055
	L2	-0.004	0.084	-0.026	0.06	-0.084	-0.004	0.036
Domestic borrowing	L1	-0.037	-0.128*	0.108+	-0.077	0.072	0.195**	-0.015
	L2	0.044	-0.091	-0.105	0.156+	-0.189**	-0.135*	0.006
External borrowing	L1	-0.115	-0.253**	0.228*	-0.128	0.369**	0.199*	-0.02
	L2	0.077	-0.163*	0.008	-0.039	0.005	-0.113	-0.047
External grants	L1	0.136	-0.043	0.042	-0.134	-0.137	0.340**	0.056
	L2	0.109	-0.171+	-0.082	-0.194	-0.157+	-0.09	-0.029
Debt relief	L1	0.063	0.169	-0.314*	-0.193	-0.432**	-0.282*	0.694**
	L2	0.237+	0.017	0.438*	-0.370+	0.176	0.286*	-0.025
R^2		0.92	0.86	0.91	0.41	0.76	0.87	0.65

Table 1 continues

Table 1 (con't)
All HIPCs

		Government revenue	Current primary expenditure	Government investment	Domestic borrowing	External borrowing	External grants	Debt relief
		PANEL C: System GMM						
Government revenue	L1	0.604**	0.212	0.124	-0.342	0.119	0.222	-0.135
	L2	0.092	-0.314**	-0.230+	-0.082	-0.329**	-0.337**	0.006
Current primary expenditure	L1	0.173	0.777**	-0.036	0.350*	-0.089	-0.086	0.173*
	L2	-0.05	0.202+	0.341*	0.238	0.559**	0.146	-0.116+
Government investment	L1	-0.13	0.253+	0.532**	0.283	0.247+	0.1	0.001
	L2	0.091	0.165	0.660**	-0.001	0.285*	0.462**	0.099
Domestic borrowing	L1	-0.126	-0.215*	0.056	0.088	-0.047	0.119	-0.053
	L2	-0.055	-0.125	-0.329**	0.342**	-0.386**	-0.307**	-0.037
External borrowing	L1	-0.261+	-0.297*	0.063	-0.236	0.401**	0.01	-0.046
	L2	0.075	-0.042	-0.257	-0.092	-0.001	-0.284*	-0.096
External grants	L1	0.171	-0.211	0.215	-0.158	-0.226	0.498**	0.092
	L2	-0.092	-0.276*	-0.286+	-0.001	-0.332*	-0.302*	-0.014
Debt relief	L1	0.244	0.218	-0.573*	-0.572*	-0.452*	-0.239	0.748**
	L2	0.399+	-0.124	0.422	-0.428	0.064	0.28	0.037

Notes: **,* and + denotes coefficient is significant at a 1%, 5% and 10% significance level.

All regressions include a constant, which is not reported.

The number of observations is 277.

L1 denotes lagged once and L2 denotes lagged twice.

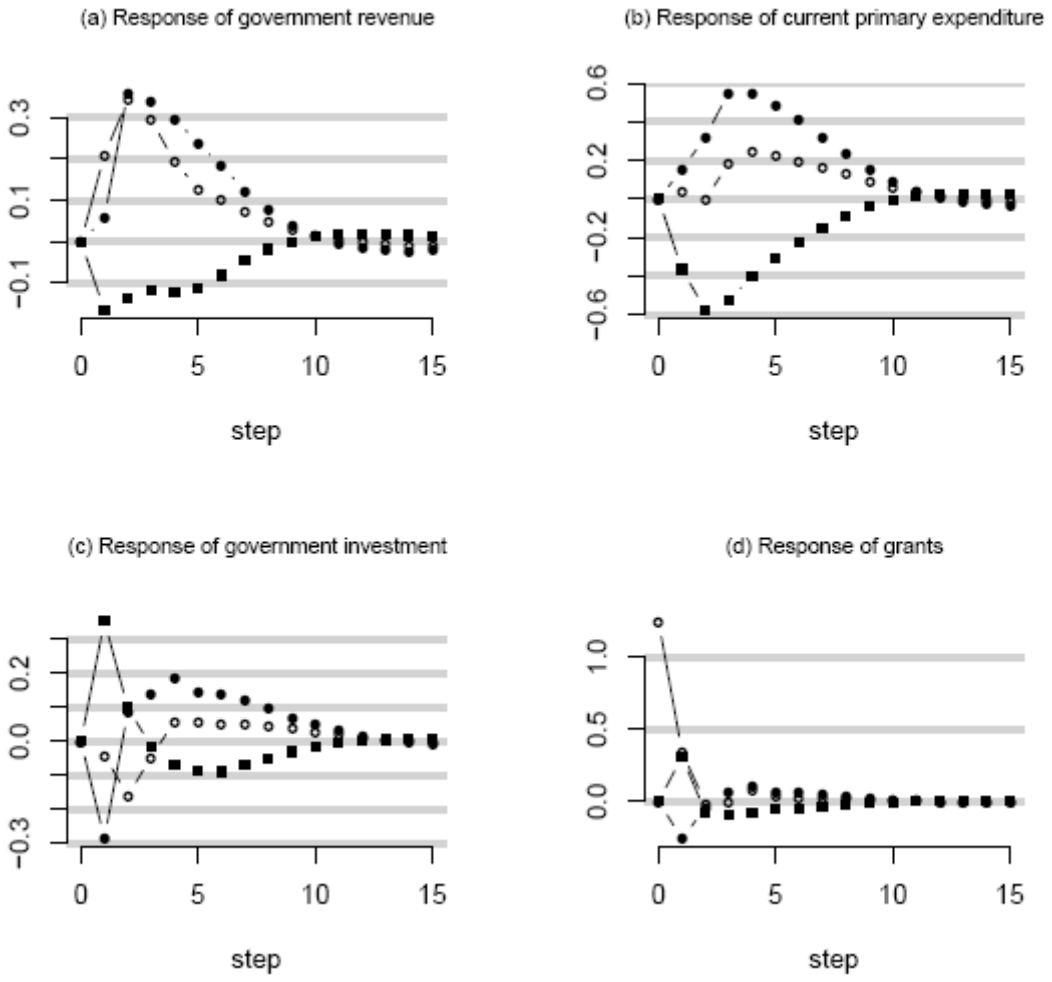
System GMM estimate uses lagged levels dated t-2 and t-3 as instruments for the difference equations, and t-1 and t-2 for the levels equations. However, instead of creating one instrument for each time period, variable and lag distance, we only create one instrument for variable and lag distance to avoid that the number of instruments becomes too large (i.e., we use the collapse option in xtabond2). Estimation was done in Stata9.2 for linux, using the xtabond2 function written by Roodman (2005) to do the system GMM.

That the pooled OLS model tends to overestimate the effects, while fixed effects tends to underestimate the effects. However, given the structure of our panel, we think the fixed effects model comes the closest to reality, so we focus the our interpretation on the results of panel B. Dependent variables are in the first row, explanatory variables (lagged once and twice) are in the first column. Since we are especially interested in the fiscal effects of aid, we concentrate on the lower half of panel B, which presents the impact of external borrowing, external grants and debt relief.

4.1 Fiscal response effects on domestic revenue mobilization

First of all, the results in Table 1 show that for this panel of HIPCs, only debt relief of the three different aid variables significantly affects domestic fiscal revenue (i.e., tax and non-tax revenue) and that this effect appears only after two years. An increase in debt relief appears to increase government revenue collection. The effect proves quite robust, as it shows up in both the fixed effects and the system GMM results. There is some weak support in the system GMM results that external borrowing reduces government revenue collection in the next year, but the pooled OLS results suggest this effect is countered by an increased effort to raise tax and non-tax income in the second year.

Figure 1
Fiscal response of selected variables to grants (○), loans (■) and debt relief (●)



Source: Impulse response functions, as computed by authors based on results in Table 1 (panel B).

Furthermore, there is also some evidence that government revenue responds positively to government current expenditure. Both the pooled OLS results and the fixed effects specification indicate that government domestic revenue collection increases the year after an increase in government consumption.

Figure 1(a) shows the orthogonalized impulse response functions for the three aid variables for the all-HIPC fixed effects specification. The graph suggests similar effects of debt relief and grants on government revenue collection.

How do our findings relate to earlier literature and our a priori hypotheses? It is clear that these results do not confirm the results from recent panel data studies such as Gupta et al. (2004) that witness a significant negative effect of grant aid on government revenue, and a positive one from loan aid. But a lot of individual fiscal response country studies do show mixed or insignificant results; as such, the results of our panel may highlight the different impact for different countries that leads to largely insignificant results. These finding seem to be validated by recent country-specific fiscal response studies that also highlight different country trajectories: Fagernäs and Roberts (2004) show that domestic revenue increased in countries such as Malawi and Uganda, but decreased in Zambia, irrespective of the type of aid. However, the observed fiscal response effect of debt relief seems to confirm our a priori hypothesis, predicting an increase of domestic revenues mainly in later years, due to debt overhang removal. Overall, individual country IMF documents, as well as country-specific PRSP progress reports seem to confirm this increasing trend in domestic revenue mobilization in recent years for HIPC countries.

4.2 Fiscal response effects on recurrent primary spending

Debt relief does not seem to significantly affect government primary consumption. Loans, be it external or domestic, appear to discourage future current primary expenditure, as predicted in the literature. There is weaker evidence that external grants also reduce government consumption, but this effect is only significant after two years. Furthermore, our fixed effects estimation results suggest that an increase in government revenue is followed by an increase in government consumption, but this effect is offset in the following year.

Figure 1(b) shows the impulse response functions of the effect of the three aid variables on current primary expenditure. The graph clearly shows the discouraging effect external loans have on government consumption. Debt relief and, to a lesser extend, grants seem to increase government consumption over time. Again, this is largely in line with our a priori hypothesis on debt relief fiscal response. It also confirms recent observed trends on the evolution of public primary spending in individual HIPCs, related also to social sector spending. An analysis of individual IMF Article IV documents of the HIPCs as well as HIPC Initiative assessment studies (such as World Bank 2004) clearly shows that (mainly recurrent) social expenditures did go up significantly due to HIPC debt relief, leading in some but not all cases to increased primary expenditures. Thomas (2006) also shows that for a panel of low-income countries, debt relief manages to increase social spending more than grants.

4.3 Fiscal response effects on public investment

Our next variable, government investment, is an interesting one, as in other fiscal response applications, this variable is thought to be central in linking aid to poverty reduction. Our fixed effects estimates suggest that aid in the form of grants does not affect government investment. Aid in the form of loans increases the share of GDP that goes to government investment. This is in line with earlier fiscal response studies.

The effects of debt relief are particularly interesting. In the first year after receiving debt relief, government investment seems to decrease. However, this effect is more than offset in the following year, where a 1 per cent increase in debt relief as a share of GDP increases government capital expenditure as a share of GDP by 0.44. For the non-aid variables, domestic loans also encourage government investment, although this effect is less convincing, and the system GMM estimates suggest that this effect is offset after two years.

Figure 1(c) shows the corresponding impulse response functions. It is interesting to see the difference between debt relief and external loans. While loans have a positive effect during the first two years, it becomes negative in the third year, and remains so for the rest of the time span. For debt relief, we observe the reverse. Government investment is reduced the first year following a debt relief shock, but from the next year onward, the effect is positive, and fairly large.

The effect of debt relief is delayed, hinting at the existence of a J-curve effect. Again, this phenomenon is in line with our *a priori* hypothesis, again referring to debt overhang effects. It also confirms what is witnessed in a number of cases regarding the HIPCs, i.e., that most of the HIPC debt savings, especially early in the process, was spent on recurrent items, and less on investment outlays.

4.4 Fiscal response effects on domestic borrowing

When reviewing the fiscal response of aid categories in our panel, the only aid variable that affects domestic borrowing is debt relief. While the effect of a debt relief shock on domestic borrowing is clearly negative, our system GMM estimates find that this effect manifests itself a year after the shock—our fixed effects results suggest the effect is only significant at the second lag.

Again, the debt relief response is in line with our stated hypothesis, hinting explicitly at the possibility of debt relief being used for domestic debt reduction. The fact that we do not observe any significant fiscal response effects for grant and loan aid also mimics the general results of earlier fiscal response studies, highlighting very mixed results when looking at different country experiences.

4.5 Fiscal response effects of debt relief on other aid

It is also interesting to look at the intertemporal interactions between the three aid variables. For instance, there is evidence that countries that receive debt relief are able to significantly reduce their external borrowing in the next year, providing support for the defensive lending hypothesis mentioned previously. In the fixed effects model, there is some evidence that debt relief reduces grants in the second year, but this negative

effect is offset in the next period. In any case, if we look at the system GMM results, debt relief appears to have no effect on aid in the form of grants. This is also shown in Figure 1(d), which shows the impulse response of the three aid variables on aid in the forms of grants. Indeed the response of grants to a shock in debt relief is initially negative, but is quickly offset. The response of grants to a shock in external borrowing mirrors the behaviour of debt relief.

This result confirms what has been witnessed recently both for individual HIPCs as well as country sample analysis. HIPC Initiative updates (such as World Bank 2006) refer to the increase of official flows (other than debt relief) some years after HIPC, an observation also confirmed by Ndikumana (2004) in an econometric analysis. However, exceptions do exist, as seems to be the case for Zambia (Weeks and McKinley 2006).

5 Conclusions and policy implications

In this paper, we try to shed some light on the fiscal response effects of (HIPC) debt relief, relative to other forms of aid intervention. Since we are agnostic about the precise channels through which aid affects outcome variables, we do not measure aid effectiveness in terms of increased growth or poverty reduction, but confine ourselves to identifying the fiscal effects of granting aid.

In doing so, we use recent advances in the fiscal response literature and study the impact of aid on fiscal variables in a vector autoregressive (VAR) framework as in Osei et al. (2005) and Fagernäs and Roberts (2004). We deviate from the case study approach that characterizes the fiscal response literature and estimate a panel version of the VAR, focusing on a panel of HIPCs. This panel approach allows us to draw conclusions and some preliminary policy consequences with respect to the 'average' fiscal response impact of a major debt relief initiative by international donor community, the HIPC Initiative, aimed at a group of debt-ridden countries. As the current debate in donor circles is concentrated very much on increasing aid effectiveness, and finding new aid instruments and modalities to achieve this objective, our results are potentially important for judging whether the use of debt relief as an aid instrument is superior to other aid instruments, and whether its use should be intensified.

In our empirical research, we find that an increase in debt relief does not lead to a reduction in domestic government revenue collection. Furthermore, debt relief seems to perform better than grants or loans, especially in the longer run, as it seems to increase revenue collection. Also, debt relief seems to have no negative effect on the foreign component of recipient country revenues, i.e., future aid either in the form of grants and loans. We find that countries that receive debt relief are able to significantly reduce their external borrowing in the next year, which provides support for the defensive lending hypothesis.

In line with the broad PRSP conditionality applied to HIPC debt relief, it can accommodate a broad range of more categorical fiscal response effects. While government consumption in general seems to be financed mainly through own tax revenue, non-tax revenue and grant aid, and external loans and domestic borrowing are typically more directed toward longer-term public investment projects, debt relief seems to affect all categories. Judged by the impulse response functions, debt relief seems to

encourage both recurrent and capital spending. However, in the later case, the effect is delayed, hinting at the existence of a J-curve effect, and providing some empirical support for the debt overhang hypothesis. Moreover, debt relief is observed to reduce domestic borrowing, more so than aid through grants or loans.

However, we should use these quite positive, preliminary assessments with caution. First of all, the absolute level of (real) fiscal space that is brought about by HIPC debt relief is likely to be very small, particularly in comparison to grant and loan aid interventions, especially in countries that have massively defaulted on their debt in the recent past. Thus even though the effects are reasonably interesting in relative terms, it remains an open question if whether they result in a big (fiscal response) dent in absolute terms.

The fiscal response effects of HIPC debt relief cannot necessarily be generalized in order to judge debt relief proposals for other type of countries (say, non-HIPC low-income countries) or additional debt relief proposals for countries in similar circumstances, such as the 2005 Multilateral Debt Relief Initiative (MDRI), for example. As discussed in more detail in Cassimon and Vaessen (2007), different types of debt relief may bring about very different response effects. A few examples can quickly illustrate this. As noted in section 2, the difference in HIPC between the total amount of debt relief granted and the real fiscal space effect might be considerable because otherwise debt service is unpaid while in MDRI, the real fiscal space will be close to the debt relief granted on paper. On the other hand, in theory the indirect fiscal response effect on investment—because of the decreasing debt overhang—will not be so big, as it may already be realized largely through granted HIPC debt relief. For these reasons, in the discussion of appropriateness of new debt relief activities, it might be unwise to draw immediate policy consequences on these results without further more detailed and country-specific analysis.

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