International Economics ▮ (▮▮▮▮) ▮▮▮–▮▮▮

Contents lists available at ScienceDirect

International Economics

journal homepage: www.elsevier.com/locate/inteco

Africa: Out of debt, into fiscal space? Dynamic fiscal impact of the debt relief Initiatives on African Heavily Indebted Poor Countries (HIPCs)

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ARTICLE INFO

JEL classification:
H20
H54
H63
O55
F34

Keywords:
HIPC
MDRI
Debt relief
Fiscal revenue
Public investment
Fiscal response

ABSTRACT

After two debt relief initiatives launched in 1996 (the Heavily Indebted Poor Countries Initiative, HIPC) and in 1999 (The enhanced HIPC initiative), the G7 decided to go further by cancelling (most of) the remaining multilateral debt for these HIPC countries through the Multilateral Debt Relief Initiative (MDRI, 2005). Building on earlier literature that tries to assess the fiscal response effects of HIPC debt relief, we extend this assessment by explicitly including the fiscal response effects of MDRI debt relief, and by using an extended dataset and alternative econometric techniques, in order to have sufficient hindsight and better tackle methodological issues such as country-specific effects. We confirm earlier findings that debt relief, and especially the enhanced HIPC initiative, has had a positive impact on recipient country total domestic revenue and public investment (as percentage of GDP). Additionally, thanks to our large observation span, we also observe that the MDRI led to a significant increase in current primary expenditures and domestic revenue ratios, although these effects are on average smaller than the HIPC Initiative ones.

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http://dx.doi.org/10.1016/j.inteco.2015.04.007
2110-7017/

Please cite this article as: Cassimon D, et al. Africa: Out of debt, into fiscal space? Dynamic fiscal impact of the debt relief Initiatives on African Heavily Indebted Poor Countries (HIPCs). International Economics (2015), http://dx.doi.org/10.1016/j.inteco.2015.04.007

1. Introduction

Low Income Countries (LICs) have been granted debt relief by bilateral creditors and later by multilateral creditors under the 'Heavily Indebted Poor Countries' (HIPC) Initiative for debt reduction in 1996 and 1999, and from 2005 on under the Multilateral Debt Relief initiative (MDRI). By December 2014, 36 countries have benefited from the HIPC initiative (IMF and IDA, 2006–2014).

The HIPC initiative's first goal was to cancel debt down to a level that would restore debt sustainability. This was also supposed to eliminate the 'debt overhang'. According to this theory, a high debt burden depresses investment, reform willingness and, hence, future economic growth. Furthermore, debt relief should allow some public resources, otherwise being used for debt service, to be liberated for alternative use, which is the so-called 'fiscal space'; donors were to monitor the use of this money freed in order to make sure that this money was used to increase poverty-reducing public spending. To be more specific, in the late 90s, donors insisted that this money should be invested only in basic healthcare and primary education. Moreover, conditionality attached to receiving the debt relief (and in particular at the completion point of the HIPC initiative) should strengthen the probability of reaching the desired goals.

The rationale behind the MDRI is different, as it amounts to a full cancellation of the remaining debt after HIPC due to the International Monetary Fund, The World Bank, the African Development Bank and later also the Inter-American Development Bank. Nevertheless, IDA and IMF made it compulsory to reach the HIPC completion point before benefitting from the MDRI. By end-October 2013, 35 countries have benefited from the MDRI (Chad being the only one that did not yet reach the completion point). For equity reasons, IMF also provided debt relief under MDRI for Cambodia and Tajikistan, which did not previously benefit from HIPC debt relief. These initiatives resulted in a dramatic decrease of the debt ratios of the benefitting countries.[1] Even if IDA and IMF insist on an ongoing commitment to fight poverty after HIPC completion point and MDRI, their monitoring is much weaker. As the debt relief is irrevocable after this point (and because of the fiscal space thus created), the means of pressure on the benefitting governments are limited.

While the *fiscal space* effects were of secondary importance in the HIPC Initiative, they became central when donors decided to provide debt relief that went *beyond* HIPC, as through the MDRI. Here, rather than aiming at restoring debt sustainability, the focus shifted more towards providing recipient countries with additional resources to increase spending targeted at realizing internationally-agreed poverty reduction targets such as the MDGs. However, the resources freed by debt relief are a one-shot intervention. As such, improvements of tax collection are needed in order to make this increase in public expenditure sustainable.

Did this combination of debt overhang elimination, fiscal space and conditionality effects led to positive effects on the fiscal situation of the recipient countries, in terms of higher revenue, higher public investment or other public spending? The paper draws on earlier analysis focusing on the 'fiscal response' effects of (HIPC) debt relief, and more notably on Cassimon and Van Campenhout (2007, 2008), and tries to complement the preliminary findings of these studies by extending the time frame and using alternative estimation techniques. Moreover, the extended time frame provides an opportunity to complement the earlier studies by explicitly focusing for the very first time on the relative fiscal response effects of the additional debt relief provided through the MDRI.

The reminder of this paper is structured as follows. In Section 2, we describe the channels through which debt relief could affect fiscal variables, both in theory as in practice, referring to the existing literature that links debt relief, economic growth and fiscal variables. The Section 3 deals with the data and the empirical specification we used for this study. Finally, Section 4 presents our empirical results. Section 5 concludes.

2. What should we expect from the HIPC and MDRI initiatives?

The main goal of debt relief granted by the donor community through the HIPC initiative was cancelling the debt down to a '*sustainable*' level, as defined by specific threshold indicators of capacity-to-

[1] Cf. Fig. 1 in Appendix A.

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pay. This sustainable level was usually defined in balance of payments terms (a present value of foreign debt to exports threshold), or in fiscal terms (a present value of debt to fiscal revenue threshold) for very open economies. In order to be eligible (i.e. becoming an HIPC), the country had to be IDA-eligible, and hold an unsustainable external debt. In 1999, the initiative was enhanced by deepening debt relief and lowering the balance of payments and fiscal thresholds to 150% and 250%, respectively. Implementation of the (enhanced) Initiative followed a two-phased approach: after some initial conditions met (e.g. a track record of successful IMF program implementation), a country reached the so-called 'decision point', where creditors fixed the amount of debt relief granted to the recipient HIPC 'in principle', after which the country entered a second phase in which it had to fulfil a number of other country-specific conditions (the so-called 'triggers', including the execution of a poverty reduction strategy), that would ultimately lead to reaching 'completion point' status, when the envisaged debt relief was granted irrevocably. In between decision and completion point, the country already received (so-called 'intermediary') debt relief in the form of debt service relief on comparable terms as the debt cancellation to be received at completion point.

2.1. The debt overhang predictions

The idea to cancel debt down to the sustainability level was not only to formally acknowledge that these countries were not capable of (fully) servicing their debt and engaged in repeated debt rescheduling that resulted in further stockpiling debt. It was also inspired by the so-called 'debt overhang theory' developed by Krugman (1988) and Sachs (1989). This theory states that a high debt burden has a strong negative effect on the debtor country's creditworthiness, on investment behavior and on the capacity and willingness of these debtor governments to undertake necessary but painful economic and institutional reforms (most of the benefits accruing to external creditors). As such, cancelling debt could have positive impacts on investment and potentially on growth. The consequences of the debt overhang theory for debt relief programs and their expected fiscal implications become then quite obvious: eliminating debt overhang would have a positive effect on public investment and could thus lead to higher fiscal revenues through higher investments (both private and public) and higher growth. Moreover, according to the debt overhang approach, it might also result in an increasing willingness for tax policies implementation as it will directly benefit to the recipient country and no longer to the creditors.

The debt-growth nexus evidence so far is mixed. From an empirical perspective, many studies (Elbadawi et al., 1997; Pattilo et al., 2011; Clements et al., 2003, 2005; Chowdhury, 2001; Presbitero, 2010, 2012) tried to test this debt overhang hypothesis and its implied non-linear relationship between debt, investment and growth[2] . Results widely differ according to the samples, the indicators (e.g. referring to stocks versus flows measures) and the methodology used. Most papers dealing with this issue and finding significant nonlinear relationships agree to conclude that the negative impact of debt on national investment level (private and public) remains negligible. Moreover, most studies rely on panels mixing LICs and Middle Income countries. By making specific assessments, Cordella et al. (2005) showed that no impact of debt relief is to be observed on HIPCs.

2.2. Fiscal space: potential and real

Next to curing debt overhang, debt relief was supposed to provide debtor governments with fiscal space resulting from money freed by debt relief. According to Heller's (2005) definition, there is fiscal space when a government experiences budgetary room which enables it to allocate extra resources to specific purposes without threatening the sustainability of public finances. It is however not straightforward that debt relief allows for direct fiscal space, and it is not easy to measure. First of all, a

[2] Following the 'debt overhang' theory, debt positively affects economic growth up to a particular threshold in the debt-to-GDP ratio. After that, if this debt-to-GDP ratio increases further (and debt becomes unsustainable), debt would impact negatively on economic growth as described above. This indebtedness threshold would represent the turning point of a Laffer curve-type relationship between debt and growth (Krugman, 1988).

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decision to cancel a given nominal stock of debt results in cash flow gains distributed over a period of time, depending on the original debt service schedule. Second, if the debt service due would not have been paid in the absence of debt relief, no cash flow savings materialize (Addison (2006)). As in practice debt forgiven often would have been serviced only in part, debt relief is more correctly measured as the gap between the new debt service and the one *that would have been serviced* in the absence of debt relief (Cohen, 2000). In some cases, the direct cash flow effect on recipient government resources may be close to zero; in others it may be substantial. Third, when granting debt relief, donors may decide to cut back on their other aid interventions, which may lead to no net fiscal space effects for the recipient countries.

For these reasons, we make a distinction in this paper between countries that were repaying a significant part of their debt and countries that were not before debt relief. In the second case, no fiscal space is likely to materialize. However, this distinction is not really easy to implement as most HIPCs were running at least some arrears to some creditors. In particular, some HIPCs were indebted to USSR, China, or even other African countries without being pressed for repayment (a kind of de facto moratorium). In order to build our two sub-samples of "good payers" and "bad payers", we use the ratio of arrears on External Debt Stock to the Long Term Debt Stock (using the World Bank data) in 1995 (one year before debt relief under HIPC initiative was made public) (see Table 5).

2.3. Fungibility and potential conditionality effects

Moreover, as is well known from the aid fungibility approach (Heller, 1975; Feyzioglu et al., 1998; Van de Sjipe, 2012), benefitting governments could also try to optimally allocate the resources saved, e.g. by cutting down domestic revenues (tax burden), or reducing the fiscal deficit. All this means that it is not always granted that (HIPC) debt relief leads to more resources available, and that they are being spent according to the donor's objectives. It is important to note the difference, at least in principle, between HIPC and MDRI debt relief. HIPC debt relief might be considered partly fictitious, leading to little fiscal space effects. At the opposite MDRI debt relief should in principle be considered real resource savings that would otherwise have been fully spent as actual debt service, because the pre-MDRI debt was supposed to be sustainable. This is one specific feature that we want to test in this paper, complementing existing research on this issue.

Moreover, according to the design of these debt relief initiatives, a conditionality effect may be at play. Debt relief comes with some strings attached by donors. Enhanced HIPC debt relief was granted after the successful completion of donor-imposed conditionality, some comparable to an IMF program, others related to the elaboration and implementation of a broadly-owned recipient country development and poverty reduction strategy. On top of this, some country-specific 'triggers' were included on, say, the quality of public management and public service delivery. The IMF indeed tried to monitor the relation between actual cash flow savings from debt relief and increases in poverty reduction-targeted as well as in capital spending. Looking at decision point documents produced by the IMF and the IDA, one can indeed clearly see that money freed up thanks to debt relief under the Enhanced HIPC initiative was also planned to be partially spent on capital expenditures. For instance, this document exposes for Cameroon that "The substantial debt service savings from HIPC Initiative assistance will be used to overcome the severe structural obstacles to social development" by financing the education sector "[…] school construction, construction of school catering facilities and health rooms, […]", or for the rural development by supporting "[…] investments in increasing agricultural productivity, […], construction and maintenance of rural roads, […]"(IMF and IDA, 2000 p. 22–23). Similar examples can easily be found for other HIPCs. In addition, we often observe within the governments' financial operations tables that part of future capital spending is directly financed by HIPC proceeds.

However, one might not expect to find such conditionality effect at play under the MDRI since this ultimate debt relief initiative differs from the enhanced HIPC by its one-off nature.[3]

[3] In fact, for those countries that already reached the HIPC decision or completion point before 2005, additional MDRI relief in 2005/2006 was granted after a light conditionality check by donors only; in the end, all then-eligible countries received the

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2.4. Credit constraints and government's impatience rate

Finally, another interesting approach that could provide some intuitions about the expected fiscal effects of the debt relief initiatives would be to model recipient governments as rational economic agents receiving a future stream of revenues such as the debt service savings from debt relief and using them parsimoniously in order to maximize their utility which can be defined as a positive function of present and future government spending. Under this framework, the expected correlation between debt relief flows and public spending would thus depend on governments' choices in terms of consumption path and savings, themselves determined by state's impatience rate and credit-constraints.

For instance if we first consider the (presumed unlikely) case of an HIPC's government which is not credit-constrained and indifferent between consuming now or tomorrow, one would not expect to see any correlation between debt relief flows and public spending. Such government, in prospect of future debt service savings, would indeed initially borrow to finance its current level of public spending using the expected future debt relief flows to finance future public spending and to repay the initially contracted loan. Under such assumptions, the path of government spending would be flat and the correlation with debt relief flows equal to zero. However, if this government is now initially credit constrained, one might expect to find positive and strong correlation between these flows, at least for the first periods following the initial debt reduction. This government which cannot initially borrow would indeed spend revenues from debt relief for the first few periods but would then reduce its level of public spending since it prefers a flat path of consumption (given that it equally values present and future consumption).

Considering finally a most likely credit-constrained and impatient government with a high discount rate would lead to observe a large and positive correlation between debt relief flows and public spending since, given its inability to borrow, such a government would be more willing to immediately consume the debt relief proceeds. Under such assumption an even larger discount rate would lead to an almost perfect correlation between debt relief flows and public spending.

Nevertheless, numerous reasons, of a political economy nature for instance, suggest that the relevance of these assumptions of rationality or credit constraints (and therefore this approach) should be considered with caution in the context of Heavily Indebted Poor Countries. Moreover, as we explained above, the conditionality attached to the Enhanced HIPC initiative and the absence of it associated with the MDRI would probably blur these theoretical fiscal impacts of debt relief savings on public expenditures.

3. Sample, data and empirical framework

Consecutively to these expected effects of debt relief suggested by the existing literature, our study aims to test the realized impact of debt relief on a small set of fiscal variables, namely taxes and both capital and current expenditures. In order to observe debt relief's impact on the main public budget components of the recipient countries, we based our empirical approach on a theoretical framework of fiscal behavior introduced by Heller (1975), known as a *fiscal response model,* and widely used within the literature that looks at the fiscal effects of (traditional) foreign aid (Franco-Rodriguez, 2000; Franco-Rodriguez et al., 1998; Mavrotas, 2002; McGillivray and Ouattara, 2005). This model of structural equations allows us to look at the recipient government's response to specific aid flows such as debt relief flows. We therefore used a vector autoregressive approach (VAR) as developed in Osei and Morrissey (2005) and in Cassimon and Van Campenhout (2008), since this approach fully matches the theoretical foundations of the *fiscal response model*. Moreover, as in Cassimon and Van Campenhout (2008), we attempt to identify these fiscal responses over a range of African HIPCs. We

(*footnote continued*)
additional MDRI relief. For those countries that only received (completion point) HIPC debt relief after 2005, there was no additional conditionality effect stemming from the MDRI, as both the HIPC and MDRI relief was granted at the same time.

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thus applied the vector autoregressive specification to a panel data set composed by 24 African HIPCs observed over 27 years (1986–2012).

3.1. HIPCs selection

A necessary condition to correctly observe the debt relief's impacts on public finances is to consider a sample of HIPCs that received substantial debt relief over the period of study and that experienced a sufficient "post-debt relief period" to benefit from potential fiscal space. To date, on the 39 countries eligible for the HIPC initiative, 35 have reached the completion point which grants full and irrevocable debt relief. One country (Chad) has reached the decision point which also allows of benefiting from substantial ('interim') debt relief. The three remaining countries (Eritrea, Somalia and Sudan) are still stuck in the pre-decision phase where no debt relief is granted (IMF and World Bank, 2014). Therefore, as they did not receive debt relief yet, we definitively cannot include them into our sample. Furthermore, the aim of our study is to identify an average debt relief impact over a set of African HIPCs. By consequence, in order to maintain the African dimension we decided to restrict our sample to only African HIPCs. Our final sample consists of 30 African countries which have at least reached the decision point.

The vector autoregressive approach identifies the government's responses to debt relief flows. In order to observe these fiscal responses over the short/medium term (and according to the Akaike and Schwarz criterion), we use a VAR specification with two periods lagged. We then need sufficient temporal step back (the so called "post-debt relief period") to correctly identify the impact of debt relief granted under the HIPC and MDRI initiatives. We thus chose to not include in the study countries that entered late into the HIPC initiative.[4] Therefore we remove from our sample the six latest African HIPCs having reached the decision point, since they do not have long enough post-debt relief period (Togo, Côte d'Ivoire, Comoros, Liberia, Central African Republic and the Republic of Congo[5] entered into the HIPC initiative between 2006 and 2010).

Finally, the sample we consider for this analysis contains twenty-four African HIPCs that have at least reached the decision point and that have been granted from HIPC and MDRI soon enough to experience dynamic fiscal impacts from these initiatives (Benin, Burkina Faso, Burundi, Cameroon, Chad, Democratic Republic of Congo, Ethiopia, The Gambia, Ghana, Guinea, Guinea Bissau, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao-Tome-and-Principe, Senegal, Sierra Leone, Tanzania, Uganda, and Zambia).

In this way, the panel dimensions (24 countries[6] and a 27 years time span [1986–2012]) solve the principal issues that existing studies about debt relief face. Indeed, some empirical assessments of debt relief's impacts (and especially of debt relief's fiscal effects) tried to estimate the effects of debt relief granted on several budgetary outcomes around the early 2000s when just few countries had fully benefited from the Enhanced HIPC initiative (Kraay and Depetris-Chauvin, 2005; Johansson, 2010; Presbitero, 2009)). The latest observation points of these analyses often refer to 2001–2003 when around 20 countries reached the decision point but less than ten countries had reached the completion point and had been granted full and irrevocable debt relief. These previous studies consider therefore too few post-completion point countries, too little debt relief amounts and above all does not have sufficient hindsight to correctly assess the impact of the debt relief initiatives, and especially those related to the MDRI initiative (Cassimon and Van Campenhout, 2008), on public finance aggregates.

Thanks to our specific panel data sample, we are able now to consider numerous post-completion point countries over a period of study long enough for observing dynamic debt relief effects and implementing the VAR approach (which needs long time series).

[4] Cf. Table 2 in Appendix A.

[5] Republic of Congo and Central African Republic entered in the HIPC initiative respectively in 2006 and 2007 which is not that late. But for serious data issues about debt relief variables (too low level of debt relief flows for the Republic of Congo and numerous missing values for Central African Republic), we preferred not to include them into our sample.

[6] Of which 23 have reached the completion point.

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3.2. Data

Complete and reliable time series on public finances for low income countries are somewhat rare in existing datasets. Even though the IMF GFS dataset tries to gather data from existing country reports and from IMF country offices, GFS time series are rather short for HIPCs, are not sufficiently detailed (e.g in terms of the accounting for debt relief) and contain many missing values which would prevent a correct assessment of HIPCs fiscal responses. Therefore the principal sources used are Articles IV and Staff Reports from the International Monetary Fund (IMF, 1978–2013) which provide detailed data on public sector financial operations. Data have been gathered for the whole sample over 27 years (from 1986 to 2012) using for each data point entry the most recent country report (making sure that this entry was stable and consistent with older staff reports). Following the standard *fiscal responses model* we collected data for both revenue and expenditure sides in order to constitute a classic public budget framework.

On the revenues side, we gathered data for total revenues, oil related revenues and grants. We then construct our main revenue variable, the total domestic revenue (*TTREV*) which is net from external grants but includes oil related revenues. However, debt relief mainly occurred around mid-2000s when oil prices experienced continuous increases. Moreover, some countries of our sample like Guinea also enjoy significant non-oil natural resources such as minerals. Therefore, in order to properly identify the domestic tax mobilization response to debt relief flows, we also created a more restricted revenue variable; the domestic revenue net from external grants and from oil revenues (*REVNFO*).

On the expenditures side, we collected data for current primary expenditures (net from interest payments) which basically contain wages and salaries of civil servants, public goods and services provision, and public transfers and subsidies. Additionally to this variable (*CRPREXP*), we also gathered data for government investment (*GINVT*) formulated as capital expenditures within IMF Government Financial Operations tables.

The (budget) financing variables are both external and domestic. For the domestic financing sources, we used the net domestic financing (DFINA) which represents financing from the domestic banking system (central bank and commercial banks) and from other sources such as government bonds issuances. For the external financing sources (also referred as aid variables below), we collected data for total external grants (net from debt relief grants) (*TTGRANT*) and for total external loans (*TTLOAN*), both financing development programs as well as projects.

Finally, our variables of interest which represents the impact of debt relief are the debt service savings from debt relief. These measures have been computed thanks to the annual 'Status of Implementation' reports of HIPC/MDRI, also provided, jointly by the IMF and the World Bank. We used the discrepancy between the debt service due without the Enhanced HIPC and the debt service due after the Enhanced HIPC to compute the debt service savings from the Enhanced HIPC. In the same vein, we computed the debt service savings from the MDRI by subtracting the debt service due after the Enhanced HIPC and the MDRI to the debt service due only after the Enhanced HIPC.[7] The aggregated measure of debt relief (*DEBT_RELIEF*) is simply the addition of debt service savings from the Enhanced HIPC (*HIPC_RELIEF*) and from the MDRI (*MDRI_RELIEF*). We will use alternatively the two disaggregated measures and the aggregated one in order to see which program impacts the most our fiscal variables.

Our measures of debt relief flows might be seen as misleading because we do not take into account the debt service savings from the first HIPC initiative (1996). However, we believe this does not represent a limit to our analysis because of the low level of debt forgiveness granted under HIPC I and the small number of countries concerned by this initiative between 1996 and 1999. Moreover, the HIPC I initiative did not require recipient countries to earmark any debt relief savings into increased fiscal spending.[8] Indeed, most of the HIPCs reached the decision point after 1999 and the launch of the second version of the HIPC initiative, i.e. the Enhanced HIPC[9] initiative.

All these variables are expressed in percentage of GDP to avoid complications of comparison between countries due to exchange rates and inflation problems.[10] In a nutshell, our panel data is

[7] Cf. Fig. 2 in Appendix A.

[8] As such, the IMF does not provide sufficient data to compute the debt service savings from HIPC I, as its time series for debt service before and after HIPC only start in 1999. This might reflect our belief about the low level of debt relief granted before 1999.

[9] Cf. Table 1 in Appendix A.

[10] Cf. Table 2 for descriptive statistics and sources of our variables.

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almost perfectly balanced,[11] covers 24 countries over 27 years (from 1986 to 2012) and contains 10 variables: two domestic revenue variables (*TTREV* and *REVNFO* which will be alternatively used), two expenditure variables (*CRPREXP* and *GINVT*), three financing variables (one domestic; *DFINA*, and two external; *TTGRANT* and *TTLOAN*), and three debt relief measures (*DR_RELIEF*, *HIPC_RELIEF* and *MDRI_RELIEF*, which will be also alternatively used into the specifications).

Before turning to the empirical specification, visual examination of these fiscal variables' evolution around the decision point can provide some intuitions about the effects of the debt relief flows occurring after the entry into the enhanced HIPC process. Fig. 3 in Appendix A presents the average level of domestic revenues net from external grants and from oil revenues (*REVNFO*), government investment (*GINVT*) and the current primary expenditures (*CRPREXP*) over the seven years before and after countries have met their decision point. We observe that having reached the decision point seems to be positively associated with higher level in domestic revenues and current primary expenditures, As regards public investment, we notice a gradual increase after the decision point which nevertheless vanishes five years later. This drop could be due to the attainment of the completion point which marks the end of the interim period and therefore of the conditionality tied to the debt relief savings' uses. This suggests that debt relief granted under the Enhanced HIPC initiative has indeed led to some fiscal space as shown by this acceleration in public spending after the decision point. In addition, a potential positive effect on tax revenues could also be at play, supporting the debt overhang intuition that debt relief fosters the implementation of fiscal reforms.

3.3. *Empirical framework: dealing with heterogeneity*

As we previously explained the vector autoregressive approach (VAR) is the best suited specification to observe how budgetary variables react to debt relief granting. Indeed, Heller (1975) built his *fiscal response model* as a set of structural equations within which budgetary variables are successively the dependent and the explanatory variable. Therefore, the VAR specification becomes obviously the best way to empirical assess the nature of the interactions between budgetary components following the theoretical *fiscal response model*.

Once the reduced form of the VAR specification is set, the VAR estimator basically applies the classic OLS estimator on each equation of the system. However our VAR specification, which pools the observations, has to consider the panel dimension of our data set. As we now work with numerous HIPC countries, the OLS estimator cannot be used anymore. Indeed, the OLS estimates will definitively be biased because of potential correlation between explanatory variables and the error term since estimate residuals will surely contain omitted but potentially important country-specific factors.

Therefore we decide to pool observations and include country and time fixed effects in our VAR specification (now called “panel VAR”) in order to account for the sample heterogeneity and for potential trend effects that might occur on such long period of study (as there are now repeated time values in our sample). We resort to the panel VAR approach because we want to observe an average effect of the debt relief initiatives within our sample. However, it would be misleading to claim that HIPCs are perfectly identical to justify the use of such methodology, but we reasonably think that these countries present enough similar features to use a common specification.

As alternative methodology and with longer time series, Juselius et al. (2014) test the impact of aid on long term growth using one VAR/VECM model for each country of their sample. Such method allows to get individual coefficients and to observe aid impacts on GDP growth for the considered country. However, two things let us think that the panel VAR approach is most suited for our research question.

First, Juselius et al. (2014) are able to run individual VAR models thanks to really long time series on aid data and GDP growth (more than 40 years). We do not have such time perspective what therefore directly prevents to apply similar models. Second, the resort of individual models is also justify by the heterogeneity of their sample which contains 36 sub-Saharan African countries exposing really different income level (Botswana, Gabon, DRC and Somalia) and contrasting access to external financing. However, in our case, we argue that our sample of 24 African HIPCs is much more

[11] We only have five missing values.

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homogenous since HIPCs were all classified as Low-Income Country (LIC) following the World Bank classification and were all IDA eligible (only, not blend) prior the Enhanced HIPC initiative in order to be eligible for debt relief under this initiative.

Finally and as explained in Lof et al. (2014) another argument in favor of the panel VAR methodology is that pooled panel VAR allows to significantly increase the number of observations since instead of estimating individual VAR on observations (at the country level), we are now able to run one VAR with observations. Our empirical specification therefore takes the following form:

$$\begin{bmatrix} r_{i,t} \\ v_{i,t} \\ h_{i,t} \\ X_{i,t} \end{bmatrix} = \begin{bmatrix} c_r^0 \\ c_v^0 \\ c_h^0 \\ C_X^0 \end{bmatrix} + \sum_{j=1}^{2} \begin{bmatrix} \alpha_{rj}^r & \alpha_{rj}^v & \alpha_{rj}^h & A_{rj}^X \\ \alpha_{vj}^r & \alpha_{vj}^v & \alpha_{vj}^h & A_{vj}^X \\ \alpha_{hj}^r & \alpha_{hj}^v & \alpha_{hj}^h & A_{hj}^X \\ A_{Xj}^r & A_{Xj}^v & A_{Xj}^h & A_{Xj}^X \end{bmatrix} \begin{bmatrix} r_{i,t-j} \\ v_{i,t-j} \\ h_{i,t-j} \\ X_{i,t-j} \end{bmatrix} + \tau_t + \delta_i + \begin{bmatrix} \varepsilon_{i,t}^r \\ \varepsilon_{i,t}^v \\ \varepsilon_{i,t}^h \\ E_{i,t}^X \end{bmatrix}$$

where $r_{i,t}$ are the total domestic revenues for country i in year t, $v_{i,t}$ the government investment for country i in year t, and $h_{i,t}$ the current primary expenditures for country i in year t. $X_{i,t}$ is the vector that collects financing and debt relief variables. More specifically, we have $X'_{i,t} = \begin{bmatrix} f_{i,t} & l_{i,t} & g_{i,t} & d_{i,t} \end{bmatrix}$, where $f_{i,t}$ is the domestic financing for country i, in year t, $l_{i,t}$ is the total loans for country i in year t, $g_{i,t}$ are total grants (net from debt relief grants) for country i, in year t and finally $d_{i,t}$, our variable of interest, are debt service savings from debt relief for country i, in year t, but can be a vector of two variables when disaggregated $\left(d'_{i,t} = \begin{bmatrix} hipc_{i,t} & mdri_{i,t} \end{bmatrix}\right)$. The number of lags in our VAR system is represented by j and is equal to 2 (according to Akaike and Schwarz criterion). α_j are all VAR parameters to be estimated for each equation of our system (A_j being the vector of VAR parameters for the rest of variables). c^0 is a constant for each equation (C^0 being the constant vector for the remaining variables of the system). δ_i represents $N-1$ country fixed effects in each equation and τ_t represents $T-1$ time fixed effects in each equation of the system. $\varepsilon_{i,t}^r$, $\varepsilon_{i,t}^v$ and $\varepsilon_{i,t}^h$ are standard error terms and $E_{i,t}^X$ a vector of the standard error terms of our set of financing and debt relief variables.

From our panel VAR estimates, we will only report the results for three equations. These are the ones that show the effect of debt relief on total domestic revenues (and alternatively on revenue net from oil receipts), on government investment and on current primary expenditures. More in particular, we report results for three following equations:

$$r_{i.t} = c_r^0 + \delta_i + \tau_t + \sum_{j=1}^{2} \alpha_{rj}^r r_{i.t-j} + \sum_{j=1}^{2} \alpha_{rj}^v v_{i.t-j} + \sum_{j=1}^{2} \alpha_{rj}^h h_{i.t-j} + \sum_{j=1}^{2} A_{rj}^{X-1} X_{-1,i.t-j} + \sum_{j=1}^{2} \alpha_{rj}^d d_{i.t-j} + \varepsilon_{i,t}^r$$

$$v_{i.t} = c_v^0 + \delta_i + \tau_t + \sum_{j=1}^{2} \alpha_{vj}^r r_{i.t-j} + \sum_{j=1}^{2} \alpha_{vj}^v v_{i.t-j} + \sum_{j=1}^{2} \alpha_{vj}^h h_{i.t-j} + \sum_{j=1}^{2} A_{vj}^{X-1} X_{-1,i.t-j} + \sum_{j=1}^{2} \alpha_{vj}^d d_{i.t-j} + \varepsilon_{i,t}^v$$

$$h_{i.t} = c_h^0 + \delta_i + \tau_t + \sum_{j=1}^{2} \alpha_{hj}^r r_{i.t-j} + \sum_{j=1}^{2} \alpha_{hj}^v v_{i.t-j} + \sum_{j=1}^{2} \alpha_{hj}^h h_{i.t-j} + \sum_{j=1}^{2} A_{hj}^{X-1} X_{-1,i.t-j} + \sum_{j=1}^{2} \alpha_{hj}^d d_{i.t-j} + \varepsilon_{i,t}^h$$

Another interesting feature of our empirical specification (related to the VAR approach) is the ability to compute impulse reaction functions (IRFs) using the Sims' approach popularized in 1980 and which requires Cholesky decomposition to orthogonalize the shocks. IRFs represent graphically how a budgetary variable reacts (holding everything else constant) over the short- and the medium-term to a shock on an explanatory variable (such as debt relief flows). The use of IRFs will bring additional information on the fiscal responses' length to debt relief granted as well as information about the validity of our model since convergence in IRFs attests the stability of the VAR model. Finally, when using disaggregated measures of debt relief, the risk that the model becomes over-parametrized increases,

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which is why, as a robustness check, we also estimate our panel VAR with an aggregated measure of aid (loans and grants together). Results of these estimates are not reported in order to save space but they are similar to those obtained when the aid measure is separated between loans and grants.

4. Results, discussions and further analysis

In this section, we present the results of our panel vector autoregressive model. We only report results for three equations out of the system of seven (eight in the case of disaggregated debt relief) equations in the interest of space. First of all, we focus on government investment since it is often thought to be a particular sign of structural investment in social services, as favored by donors. This type of government expenditure is also assumed to have a positive impact on future growth as compare to current primary expenditures (that we will also review). We also look at the results for the effect of debt relief on future tax collection. This is because, as debt relief is not sustainable in itself, the fiscal space created by debt relief can only be preserved in the future if debt relief also leads to improve tax mobilization. In addition, we try to qualify our results by differentiating the debt relief impact using two sub-samples, the HIPC "bad payers" and the HIPC "good payers".

4.1. Dynamic fiscal effects of debt relief on government investment and current primary expenditures

Table 3 shows the results of the public investment equation and of the current primary expenditures equation as estimated by our panel VAR model. Columns I and III report results for aggregated debt relief effects on government investment using alternatively total domestic revenues and revenues net from oil as revenue variables. Columns II and IV present results for disaggregated debt relief impacts on public investment using also the two measures of domestic revenues. Government investment seems to be persistent, with an increase in the past period being associated to an increase in the future.

For the aid variables, as we might expect, past increases in loans seem to have important effect. Indeed, government investment in developing countries and especially in sub-Saharan African countries is mostly externally financed. This financing mainly occurs through concessional borrowing from international financial institutions since these countries are excluded from international financial markets. For total grants, the results suggest a strongly positive effect in the year immediately after the increase of grants, although this effect seems to be slightly offset in the following year.

As regards our variables of interest, we find statistically a significant effect of aggregated debt relief on government investments. According to our results, the debt relief impact occurs after one year and is around 0.35 suggesting that an increase in debt service savings from debt relief initiative by 10% in T is associated with a 3.5% increase in public investment in T+1. More interesting, when we distinguish debt relief between our two initiatives, it appears that the bulk of this effect is due to the Enhanced HIPC initiative. In particular, an increase in debt service savings of 10 per cent under the Enhanced HIPC initiative in the previous year is associated with an increase of around 4.6% in government investment as a share of GDP the year after. The effect is similar and even higher in magnitude than those of total grants and total loans.[12] The absence of result for debt service savings from the MDRI however suggests that the fiscal space created by MDRI does not get used to increase investment. This may be explained by the fact that, unlike HIPC debt reduction, MDRI is much less able to let the conditionality effect work due to its one-off nature. HIPC and the Enhanced HIPC initiatives were indeed accompanied by a close follow-up of expenditures financed by money freed by debt relief (which had to be transferred to a special banking account), that aimed to promote public investment mainly in social sectors over the short- and medium-term as its impulse response attests in Fig. 4.[13] Granting the completion point of HIPC initiative was subject to a precise set of conditions. At the opposite, after completion point, debt relief under HIPC becomes irrevocable and MDRI is granted without further conditions.

[12] Moreover, we do not find crowding-out effects of the debt relief initiatives on other aid flows (total grants and loans) which confirms the realization of a net fiscal space induced by these initiatives.

[13] Cf. Fig. 4 in Appendix A. Note that convergence in the IRFs attests the absence of unit root in our panel VAR (stable necessary condition). IRF are only interpreted for statistically significant results.

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The debt relief impacts on current primary expenditures seem to validate this explanation. Columns V and VII from Table 3 expose an absence of effect from debt relief granted as a whole. However when we look at the disaggregated effects of debt relief, we observe a strong and positive effect of debt service savings from the MDRI on current primary expenditures. These results provide therefore empirical support to what we argue in introduction and in the Section 2.3. Debt relief under MDRI indeed seems to significantly free-up resources that would have been otherwise spent on debt service payments (since the debt post-Enhanced HIPC initiative should have been sustainable). Moreover, looking at coefficients magnitude, results could suggest that HIPCs' governments are close to the most extreme picture we depict in Section 2.4 where they were qualified as both credit-constraint and highly impatient (what is, according to us, the most likely case out of the four exposed). In addition, the MDRI savings allocation toward current primary expenditures rather than capital spending, also appears quite intuitive if one look at the design of the debt relief initiatives. Since under the HIPC initiative, government was biased to target money freed up by debt relief predominantly to public investment, positive impacts of debt relief flows from the MDRI could simply reflect the fiscal space created combined with the absence of conditionality under this latter initiative and the return of beneficiary governments to their prior behavior where current expenditures were preferred to structural ones.

However, we could also imagine a more positive picture where the increase in current primary expenditures due to debt relief under the MDRI reflects additional financial supports related to initial investments realized thanks to debt relief granted under the Enhanced HIPC initiative. This increase in current primary expenditures would therefore prove that investments induced by debt relief are not destined to become "white elephants" but are intended to be perennial with associated future operating costs (which are defined as current primary expenditures) guaranteed by the recipient government.

4.2. *Dynamic fiscal effects of debt relief on tax mobilization*

Table 4 presents the results from the equations of our panel VAR that model the effect of different fiscal variables on total domestic revenue. We present results for our two revenue variables (total domestic revenue and revenue net from natural resources receipts) and using alternatively aggregated and disaggregated debt relief variables. As for the government investment and the current primary expenditures equation, domestic revenues seem to be persistent over time, with an increase in the past period also being associated to an increase in the future.

Columns I–IV expose results for our broader measure of domestic revenue. Column I and II show a positive debt relief impact on the total domestic revenue. When we differentiate between HIPC and MDRI, we find that this positive impact seems to be essentially due to debt relief granted under MDRI.

Nevertheless, as explained in the previous section, there is a risk that positive correlation between debt relief and total domestic revenues might be due to the spike in oil prices that occurred in the middle of the 2000s. Some countries of our sample rely significantly on oil-related revenues (Chad, Cameroon) and received debt relief around the mid 2000s. In order to identify the impact on debt relief on a proper domestic effort in tax collection, it should be therefore more interesting to look at the effects on domestic revenues net from oil and other natural resources receipts.

Columns V–VI in Table 4 expose equations where revenue net from natural resources receipts is the dependent variable. Once again tax revenues are positively associated with their past values. And here also, debt service savings from debt relief taken as a whole is positively and significantly associated with tax revenues. But contrary to results in column (II), we cannot identify the initiative responsible for this effect.

Finally, since resource rich countries have large revenues from their natural resources which can impact both the revenues and the GDP, we also run panel VAR models where we excluded three countries of our sample that have in average and over the period considered at least 25% of their domestic revenues that comes from natural resources industries. This leads us to remove from the sample Cameroon (with 32% of its domestic revenues that are oil revenues), Chad (with 25% of total domestic revenues coming from oil revenues) and Guinea (with 36% of revenues related to the mining sector). Columns (III), (IV), (VII) and (VIII) expose the results. Excluding these resource-rich countries

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does not distort the results. Debt service savings from debt relief is significant at the 5% level with the aggregated measure of domestic revenues and significant at almost 5% (the associated p-value is equal to 0.051) with the revenues net from natural resources receipts[14]. Using this last measure, we also notice that as before, the effect from the overall debt relief seems to be driven by the MDRI. By consequence, and although not obvious in the impulse response function[15], it is likely that debt relief under the MDRI is the key driver of the positive reaction of domestic revenues to debt relief. So to conclude, if we consider debt relief as a whole (which is more intuitive when looking at the impact on domestic revenues), results suggest that an increase in debt service savings of 10% in the previous year is associated with an increase between 1.5 and 1.9% in domestic revenues net from natural resources receipts (and net from grants) as percentage share of GDP two years after.

4.3. *Bad payers versus good payers: does being a good payer increase relative impact?*

As previously explained our measure of debt relief might be subject to the criticism that debt service in the absence of debt relief would not have been serviced. In such a case, cash flow gains from debt relief would be closed to zero. In order to consider the fact that debt relief's benefits are not as high for bad payers as for good payers we then split our sample in two sub-samples; the bad payers (sub-sample) and the good payers (sub-sample). This distinction is based on the share of long-term debt arrears of HIPCs countries the year before the HIPC initiative was made public, so in 1995.[15] We decided to choose the 1995 year because once HIPC was made public (in 1996), some HIPCs would have been tempted not to reimburse their debt and accumulate arrears in order to pass the insolvency threshold and get debt relief from international financial institutions. By consequent, our bad payers' sub-sample contains eleven countries for which the share of long-term debt arrears over the external debt was higher than 10% in 1995. The good payers' sub-sample contains the remaining thirteen countries for which this share was below 10% in the same year.

However this proxy for the government's willingness to pay should be taken cautiously since Table 5 exposes level of arrears that are relatively low as compare to what we expected. Explanations for such low stock of arrears can be found in the ever greening practice from international financial institutions which, over the 1990s, continued to provide loans to these countries in order to make them able to repay the old ones. Therefore, since the stock of arrears does not take this defensive lending in account, one could consider that our proxy reflects more potential disagreements between governments and IFIs in debt repaying procedures rather than the exact measure of willingness to pay. That said, to our knowledge, building a proxy for the state's willingness to pay that accounts for defensive lending would require a loan-by-loan approach which in the case of Sub-Saharan African HIPCs seems quite unrealistic given the data availability and the blurred boundary between what could be considered as defensive lending and what cannot. That is why we finally decided to keep the stock of arrears as our proxy for the government's willingness to pay, although we acknowledge this proxy has some limits.

Table 6 shows the results on public spending for bad payers only. The impact of debt relief on capital expenditures is positive and significant at the 10% level though we do not know by which programs (HIPC or MDRI) this impact is fueled. But the magnitude of this impact ranges now between 0.30 and 0.26 which is less than when we consider the entire sample. This is therefore consistent with the fiscal space prediction suggesting that fiscal space created by the Enhanced HIPC initiative should be less important for countries which were not fully servicing their debt prior debt cancellations. By comparison, the impact of debt relief on government investment for countries that did honor their debt service is quite interesting. Table 7 indeed exposes a significant and positive impact of HIPC debt relief that is almost three times larger than the one found for bad payers and for the whole sample, although maybe less perennial according to the IRFs.[16] This also supports the fiscal space intuition arguing that, on the contrary, countries which were previously repaying their debt should have

[14] Cf. Fig. 4 in Appendix A.

[15] Cf. Table 5 in Appendix A.

[16] Cf. Figs. 5 and 6 in Appendix A. Convergence in IRFs for the two sub-samples also verifies the stable condition of the corresponding panel VAR.

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benefited from a significant fiscal space when international creditors decided to cancel their debt down. Broadly speaking, it basically means that debt relief has been more effective in terms of public investment for countries that were honoring their commitments prior to the HIPC initiative (and that maybe also had better institutions).

Furthermore, columns (V) and (VII) show that this larger fiscal space perceived by good payers also helped to increase current primary expenditures two years after the debt relief provision (and according to column (VI) after debt relief provided under the Enhanced HIPC initiative). This is quite consistent with what we have seen in Table 3 where increase in current primary expenditures due to debt relief was probably intended to finance investments' running costs initially undertaken thanks to the first wave of resources freed up by the Enhanced HIPC initiative (in the case of good payers).

Finally, looking at Table 8 which presents results for good and bad payers on domestic revenues, we find that debt relief provided under the Enhanced HIPC initiative has a positive and significant impact on revenues net from natural resources for good payers. Following the debt overhang theory developed by Krugman (1988), such fiscal reaction might be motivated by the fact that prior to benefiting from debt relief, highly indebted countries were in a stranglehold by external creditors for debt repayments. Therefore the additional taxes receipts that indebted countries might have collected would have been immediately grabbed by creditors. Then, it would have been more interesting for those indebted countries not to engage in such tax collection effort, not reimburse debt service and to await debt relief before implementing such policy which could then favor directly the domestic public administration and not be "expropriated" by external creditors. In addition other conditionality effects might be at play since eligible criteria prior to the Enhanced HIPC initiative also required to implement macroeconomic reforms such as tax base improvements. The reason for larger impacts on domestic revenues for good payers could be thus explained by the fact that good payers probably have better institutions and therefore strongly stuck to IMF and IDA recommendations in order to get debt relief which *in fine* might have helped to increase tax collection. Looking in comparison to domestic revenues reaction for bad payers, we see that the magnitude of the debt relief effect on domestic revenue is less important and less robust which goes in favor of this argument, even though one can be dubious about the real impact of debt relief on taxation for bad payers since the coefficient on does not remain significant when we use our preferred revenue measure (column (VII)).

5. Conclusion

Over the last 20 years, debt relief has been added to the tools of development interventions used by bilateral donors at the macro level as well as multilateral development organizations as the World Bank, the International Monetary Fund, African Development Bank, and the Inter-American Development Bank. As with other development interventions such as (concessional) loans and grants, there is a substantial body of literature describing how, in theory, debt relief could lead to growth and poverty reduction. Now that over US$ 76 worth of debt relief (in present value terms) has been given through HIPC and MDRI, the question emerges if these benefits can also be established empirically.

In this paper, we use a standard Vector Auto Regressive fiscal response model. Contrary to the standard "aid-growth" literature, these models explicitly acknowledge that aid is given primarily to the government, and that hence any impact of aid on the economy will depend on government behavior, in particular how fiscal decisions on taxation and expenditure are affected by aid revenues (Franco-Rodriguez, 2000; Franco-Rodriguez et al., 1998). In particular, we focus on the fiscal response effects of debt relief as an alternative instrument of aid delivery on three important fiscal variables. We make a distinction between HIPC and MDRI, as the logic behind these two debt relief initiatives is quite different. In addition we also differentiate the fiscal response of debt relief according to the credit reputation history of beneficiary countries.

Using appropriate panel vector autoregressive model, we do find positive and substantial effects for aggregate debt relief on government investment. Moreover, when we differentiate debt relief between HIPC and MDRI, we observe that debt relief under HIPC fosters government investment with a stronger effect for countries that were repaying their debt, bringing valuable empirical support to the fiscal space predictions. According to our result debt relief under the Enhanced HIPC also favor fiscal

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space creation under the MDRI which seems more targeted to current primary expenditures than capital spending. We feel this may be because HIPC came with a close follow-up of public spending financed by debt relief and strong conditionality at completion point. Threats of not meeting donor's expectations leading to less debt reduction in the future were credible. HIPC debt relief after completion point and MDRI are different, as they represent irrevocable debt relief granted to governments. Nevertheless, MDRI impacts on current primary expenses can be either considered as a "back to normal" behavior from government or an increasing financial support (operating costs) for public investments achieved through the HIPC initiative.

Finally, even if this study show that debt relief leads to the creation of fiscal space, one might wonder whether this fiscal space is expected to be perennial and serve economic growth over the short- and medium-term. Hence, for fiscal space created by debt relief to be sustainable and effective, other types of fiscal revenue should respond positively as well (Addison, 2006). We find that aggregated debt relief has this sort of crowding in effect on tax collection, although we do not know exactly by which initiatives this effect might be fueled. Furthermore, the response of tax revenues following the decomposition between good and bad payers brings additional empirical support to the debt overhang theory and also emphasizes potential conditionality effect related to eligible criteria which would deserved to be more investigated.

In general, it seems that the enhanced HIPC initiatives had led to significant fiscal space that fostered government investment in the benefiting countries. However, the lack of conditionality attached to MDRI did not result in similar increase in capital expenditures, although positive effects on current primary expenditures might be seen as running cost financing for investments undertaken under the enhanced HIPC. Moreover, a robust positive effect of MDRI on domestic tax collection is lacking, casting doubt about the sustainability of the fiscal space created by this debt relief initiative.

Appendix A

Please see Figs. 1–6 and Tables 1–8 here.

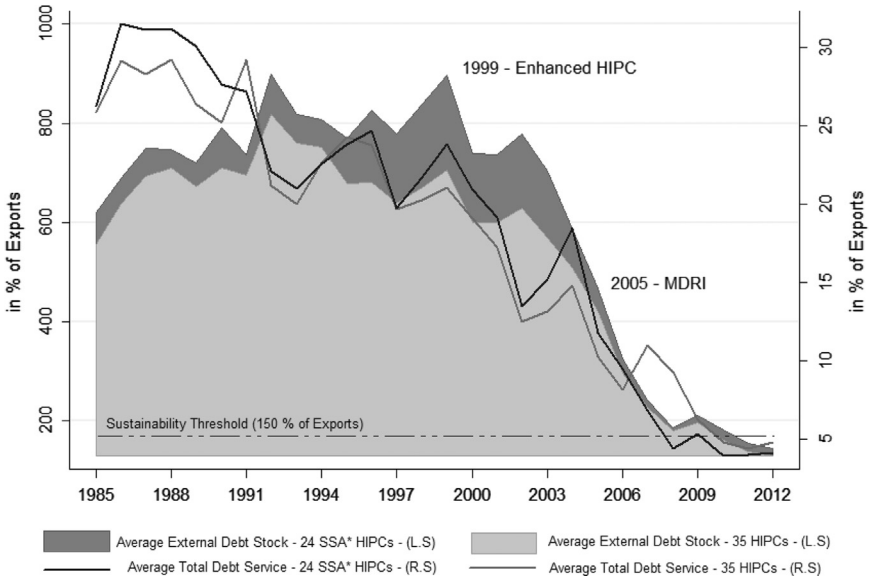

Fig. 1. Evolution of average indebtedness in Heavily Indebted Poor Countries (HIPCs). *24 SSA HIPCs: 24 Sub-Sahara African HIPCs of our sample.
Sources: International Debt Statistics, World Bank, Downloaded on March the 6th, 2014.

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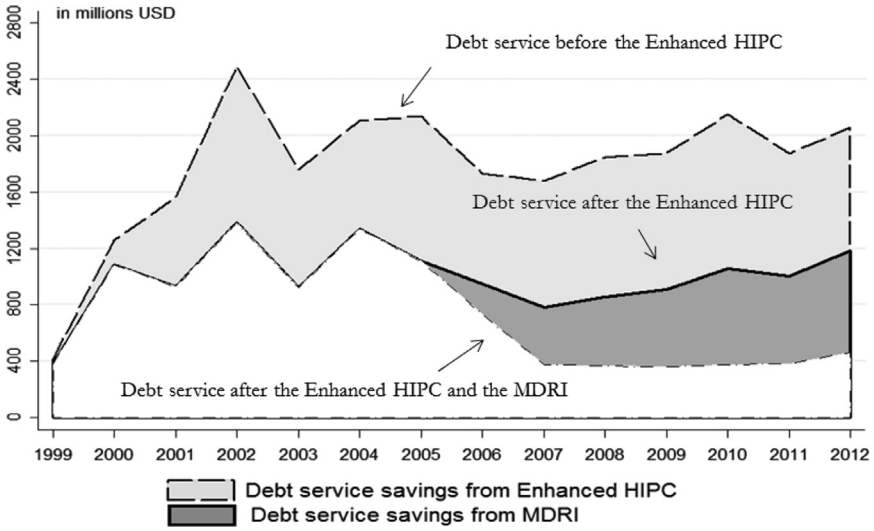

Fig. 2. Evolution of debt relief flows from the enhanced HIPC initiative and the MDRI.
Sources: Decision Point & Completion Point Documents, IMF and IDA.

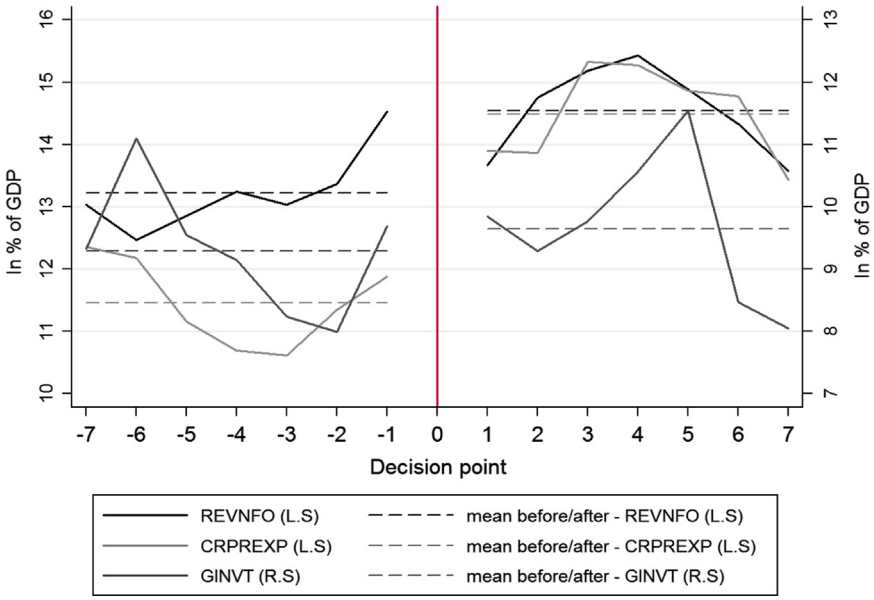

Fig. 3. Evolution of fiscal variables around the decision point.
Sources: IMF Article IV and Staff Reports. Authors' computation.

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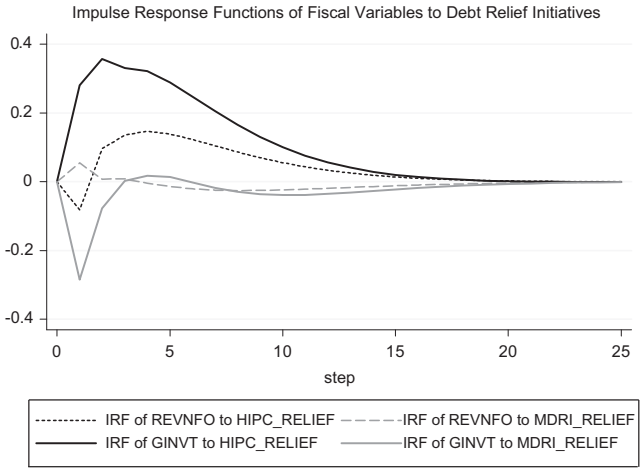

Fig. 4. Impulse reaction functions to debt relief flows.

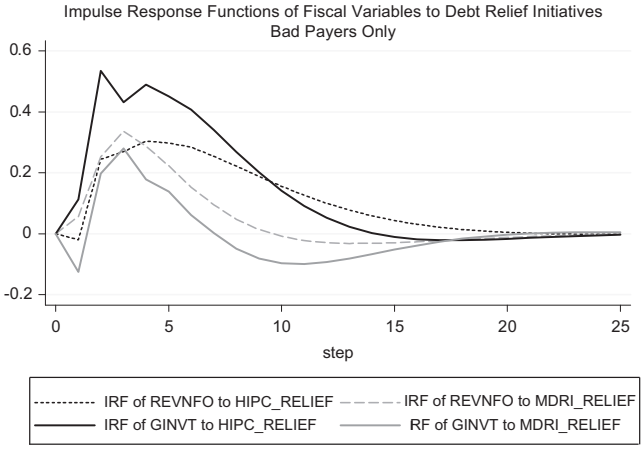

Fig. 5. Impulse reaction functions to debt relief flows.

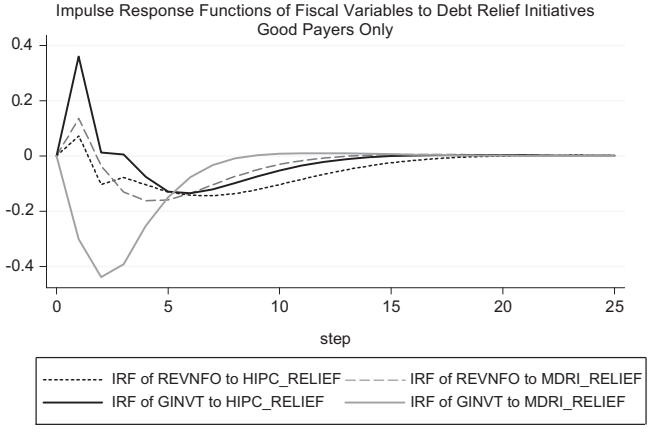

Fig. 6. Impulse reaction functions to debt relief flows.

Table 1
African Hipcs, decision and completion point.

Countries	Decision point reached the	Completion point reached the
Benin	July 07th 2000	March 24th 2003
Burkina Faso	July 10th 2000	April 11th 2002
Burundi	July 29th 2005	January 29th 2009
Cameroon	October 11th 2000	April 28th 2006
entral African Republic	September 09th 2007	June 30th 2009
Chad	May 05th 2001	–
Comoros	June 29th 2010	December 20th 2012
Côte d'Ivoire	March 27th 2009	June 26th 2012
Democratic Republic of Congo	July 28th 2003	July 07th 2010
Ethiopia	November 12th 2001	April 20th 2004
Ghana	February 22th 2002	July 13th 2004
Guinea	December 22th 2000	September 26th 2012
Guinea Bissau	December 15th 2000	December 12th 2010
Liberia	March 18th 2008	June 26th 2010
Madagascar	December 21th 2000	October 21th 2004
Mali	September 06th 2000	March 06th 2003
Malawi	December 21th 2000	August 31th 2006
Mauritania	February 02nd 2000	June 06th 2002
Mozambique	June 02nd 1999	September 25th 2001
Niger	December 13th 2000	April 08th 2004
Republic of Congo	March 09th 2006	January 27th 2010
Rwanda	December 22th 2000	April 13th 2005
Sao Tome & Principe	December 20th 2000	March 15th 2003
Senegal	June 20th 2000	April 19th 2004
Sierra Leone	March 19th 2002	December 15th 2006
Tanzania	April 04th 2000	November 27th 2001
The Gambia	December 11th 2000	December 12th 2007
Togo	November 11th 2008	December 14th 2010
Uganda	April 08th 1998	September 09th 2000
Zambia	December 08th 2000	April 04th 2005
included in the sample		
excluded from the sample		

Table 2
Variables, description, observation and descriptive statistic.

Variables	Description and *Sources*	Observations	Mean	Std. deviation
TTREV	Total domestic revenues (tax and non-tax revenues, including oil revenues) net of external grants in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	15.332	5.601
REVNFO	Total domestic revenues (tax and non-tax revenues, excluding oil revenues) net of external grants in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	14.026	5.145
CRPREXP	Current primary government expenditures (net of interest payments) in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	13.504	5.024
GINVT	Government investments. Can be viewed as capital expenditures in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	9.647	7.804
DFINA	Domestic financing, represents the financing need of the country in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	1.623	10.769
TTGRANT	Total grants effectively received by the country excluding debt relief assistance in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	5.432	5.292
TTLOAN	Total loans effectively received by the country in percentage of GDP. *Article IV and Staff Report (IMF documents)*	643	4.133	4.957
DEBT_RELIEF	Debt service savings in aggregate: debt service savings from HIPC + Debt service savings from MDRI. Expressed in percentage of GDP. *Status of Implementation (IMF Documents)*	648	1.163	2.215
HIPC_RELIEF	Debt service savings from HIPC; authors' computation. In percentage of GDP. *Status of Implementation (IMF Documents)*	648	0.870	1.785
MDRI_RELIEF	Debt service savings from MDRI; authors' computation. In percentage of GDP. *Status of Implementation (IMF Documents)*	648	0.292	0.748

Table 3
Debt Relief impacts on public spending.

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Dependent Variable		**GINVT**				**CRPREXP**		
$TTREV_{T-1}$	0.069	0.068			0.294***	0.298***		
	(0.066)	(0.067)			(0.042)	(0.043)		
$TTREV_{T-2}$	0.067	0.064			−0.040	−0.037		
	(0.068)	(0.069)			(0.044)	(0.044)		
REV_NFO_{T-1}			−0.050	−0.049			0.357***	0.368***
			(0.081)	(0.081)			(0.052)	(0.053)
REV_NFO_{T-2}			0.113	0.105			−0.214***	−0.215***
			(0.081)	(0.081)			(0.052)	(0.052)
$CRPREXP_{T-1}$	0.012	0.013	0.069	0.070	0.403***	0.394***	0.449**	0.439***
	(0.065)	(0.066)	(0.064)	(0.065)	(0.042)	(0.042)	(0.042)	(0.042)
$CRPREXP_{T-2}$	−0.026	−0.024	−0.030	-0.027	0.045	0.047	0.116***	0.120***
	(0.063)	(0.063)	(0.063)	(0.063)	(0.040)	(0.040)	(0.041)	(0.041)
$GINVT_{T-1}$	0.174***	0.171***	0.193***	0.190***	−0.076***	−0.075***	−0.045	−0.044
	(0.043)	(0.044)	(0.043)	(0.043)	(0.028)	(0.028)	(0.028)	(0.028)
$GINVT_{T-2}$	0.060	0.065	0.075*	0.079*	0.030	0.030	0.055**	0.057**
	(0.043)	(0.044)	(0.042)	(0.042)	(0.028)	(0.028)	(0.027)	(0.027)
$DFINA_{T-1}$	0.008	0.009	0.005	0.006	0.016	0.016	0.007	0.007
	(0.017)	(0.018)	(0.017)	(0.018)	(0.011)	(0.011)	(0.011)	(0.012)
$DFINA_{T-2}$	−0.024	−0.025	−0.029	−0.029	−0.007	−0.008	−0.007	−0.008
	(0.017)	(0.018)	(0.017)	(0.018)	(0.011)	(0.011)	(0.011)	(0.011)
$TTGRANT_{T-1}$	0.226***	0.218***	0.215***	0.208***	0.011	0.013	−0.047	−0.048
	(0.072)	(0.072)	(0.071)	(0.072)	(0.046)	(0.046)	(0.046)	(0.046)
$TTGRANT_{T-2}$	−0.134*	−0.138*	−0.154**	−0.158**	0.082*	0.092**	0.057	0.067
	(0.070)	(0.071)	(0.070)	(0.070)	(0.045)	(0.045)	(0.045)	(0.045)
$TTLOAN_{T-1}$	0.142**	0.145**	0.142**	0.146**	0.104***	0.100***	0.106***	0.103***
	(0.061)	(0.061)	(0.061)	(0.061)	(0.039)	(0.039)	(0.039)	(0.040)
$TTLOAN_{T-2}$	0.182***	0.186***	0.179***	0.183***	−0.048	−0.052	−0.049	−0.053
	(0.060)	(0.060)	(0.060)	(0.060)	(0.038)	(0.039)	(0.039)	(0.039)
$DEBT\_RELIEF_{T-1}$	0.353**		0.351*		−0.094		−0.112	
	(0.180)		(0.180)		(0.116)		(0.117)	
$DEBT\_RELIEF_{T-2}$	0.021		0.003		0.160		0.147	
	(0.176)		(0.176)		(0.113)		(0.114)	
$HIPC\_RELIEF_{T-1}$		0.469**		0.466**		−0.086		−0.077
		(0.199)		(0.200)		(0.128)		(0.129)
$HIPC\_RELIEF_{T-2}$		0.003		−0.004		0.018		−0.011
		(0.197)		(0.198)		(0.126)		(0.128)
$MDRI\_RELIEF_{T-1}$		−0.357		−0.341		−0.225		−0.414
		(0.572)		(0.574)		(0.367)		(0.371)
$MDRI\_RELIEF_{T-2}$		0.324		0.257		0.875**		0.979***
		(0.559)		(0.562)		(0.359)		(0.363)
Constant	−0.677	−0.186	−0.083	0.457	0.920	0.335	1.144	0.574
	(1.684)	(1.731)	(1.80)	(1.848)	(1.085)	(1.109)	(1.168)	(1.123)
Country/time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.665	0.666	0.664	0.665	0.673	0.677	0.667	0.671
x^2 test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	637	637	637	637	637	637	637	637

Note: The table reports VAR equations only for government investment and current primary expenditures. Coefficients are exposed with, in brackets, their associated standard errors. *T*–1 and *T*–2 reflects variables with respectively one and two period lags. Country and Time fixed effects (FE) are included as exogenous block.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

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Table 4
Debt relief impacts on total domestic revenues (gross and net from oil).

	(I)	(II)	(III)	(IV)		(V)	(VI)	(VII)	(VIII)
Dependent Variable		**TTREV**					**REV_NFO**		
TTREV $_{T-1}$	0.663***	0.664***	0.516***	0.516***					
	(0.042)	(0.043)	(0.045)	(0.045)					
TTREV $_{T-2}$	0.007	0.006	−0.024	−0.022					
	(0.044)	(0.044)	(0.043)	(0.043)					
REV_NFO $_{T-1}$						0.588***	0.590***	0.578***	0.579***
						(0.042)	(0.042)	(0.045)	(0.045)
REV_NFO $_{T-2}$						−0.043	−0.048	−0.019	−0.020
						(0.042)	(0.042)	(0.046)	(0.046)
CRPREXP $_{T-1}$	−0.016	−0.021	−0.009	−0.012	−0.028	−0.030	−0.037	−0.039	
	(0.042)	(0.042)	(0.038)	(0.038)		(0.033)	(0.034)	(0.037)	(0.037)
CRPREXP $_{T-2}$	0.007	0.010	0.016	0.015	0.025	0.028	0.024	0.025	
	(0.040)	(0.040)	(0.036)	(0.036)		(0.032)	(0.033)	(0.036)	(0.036)
GINVT $_{T-1}$	−0.017	−0.019	−0.021	−0.021	−0.003	−0.005	−0.009	−0.010	
	(0.028)	(0.028)	(0.025)	(0.025)		(0.022)	(0.022)	(0.024)	(0.024)
GINVT $_{T-2}$	0.004	0.007	0.004	−0.004	−0.0004	0.002	−0.006	−0.005	
	(0.027)	(0.028)	(0.025)	(0.025)		(0.022)	(0.022)	(0.024)	(0.024)
DFINA $_{T-1}$	−0.003	−0.004	−0.010	−0.010	−0.019**	−0.019**	−0.018*	−0.018*	
	(0.011)	(0.011)	(0.010)	(0.010)		(0.009)	(0.009)	(0.010)	(0.010)
DFINA $_{T-2}$	−0.008	−0.008	−0.012	−0.012	−0.006	−0.006	−0.004	−0.004	
	(0.011)	(0.011)	(0.010)	(0.010)		(0.009)	(0.009)	(0.010)	(0.010)
TTGRANT $_{T-1}$	0.001	−0.003	0.060	0.062	0.043	0.040	0.066	0.063	
	(0.046)	(0.046)	(0.049)	(0.049)		(0.037)	(0.037	(0.048)	(0.049)
TTGRANT $_{T-2}$	0.021	0.023	0.015	0.019	0.019	0.019	0.012	0.014	
	(0.045)	(0.045)	(0.048)	(0.048)		(0.036)	(0.037)	(0.047)	(0.047)
TTLOAN $_{T-1}$	0.052	0.053	0.047	0.047	0.037	0.039	0.040	0.041	
	(0.039)	(0.039)	(0.035)	(0.035)		(0.032)	(0.032)	(0.035)	(0.035)
TTLOAN $_{T-2}$	−0.014	−0.014	−0.004	−0.007	−0.017	−0.015	−0.021	−0.021	
	(0.038)	(0.038)	(0.035)	(0.035)		(0.031)	(0.031)	(0.034)	(0.034)
DEBT_RELIEF $_{T-1}$	−0.064		0.039		−0.032		−0.001		
		(0.115)		(0.102)		(0.093)		(0.100)	
DEBT_RELIEF $_{T-2}$	0.187*		0.215**		0.152*		0.192*		
		(0.113)		(0.100)		(0.091)		(0.098)	
HIPC_RELIEF $_{T-1}$		0.013		0.046		−0.032		0.046	
		(0.127)		(0.111)			(0.104)		(0.109)
HIPC_RELIEF $_{T-2}$		0.106		0.160		0.123		0.139	
		(0.126)		(0.110)			(0.103)		(0.108)
MDRI_RELIEF $_{T-1}$		−0.571		−0.055		−0.436		−0.357	
		(0.366)		(0.333)			(0.299)		(0.328)
MDRI_RELIEF $_{T-2}$		0.724**		0.535		0.414		0.594*	
		(0.358)		(0.328)			(0.293)		(0.323)
Constant	2.375*	2.397**	5.324***	5.126***	5.372**	5.561***	5.964***	5.939***	
	(1.077)	(1.107)	(1.015)	(1.107)		(0.938)	(0.963)	(0.994)	(1.018)
Country/time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Resource rich countries	Yes	Yes	No	No	Yes	Yes	No	No	
R-squared	0.740	0.741	0.765	0.765	0.794	0.795	0.773	0.774	
x^2 test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Observations	637	637	558	558	637	637	558	588	

Note: The table reports VAR equations only for Total domestic revenues and for Total domestic revenues net from natural resources receipts. Coefficients are exposed with, in brackets, their associated standard errors. *T*−1 and *T*−2 reflects variables with respectively one and two period lags. Country and Time fixed effects (FE) are included as exogenous block. Regressions without resource rich countries exclude Cameroon, Chad and Guinea from the sample.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

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Table 5
Sample Decomposition – Bad payers versus good payers.

Arrears (interest and capital on LDOD*) on External Debt Stock (DOD) in 1995 (in percentage)			
Bad payers (%)		Good payers (%)	
Democratic Republic of Congo	56.69	Sierra Leone	9.16
Ethiopia	39.44	Uganda	8.17
Madagascar	39.05	Niger	8.09
Guinea Bissau	37.92	Cameroon	7.74
Tanzania	32.50	Chad	5.23
Mozambique	17.91	Rwanda	6.00
Guinea	13.98	Benin	4.87
Zambia	13.64	Burkina Faso	3.86
Sao Tome & Principe	13.52	Ghana	2.04
Mali	12.50	Senegal	1.56
Mauritania	10.58	The Gambia	0.67
		Malawi	0.39
		Burundi	0.43

Note: Considered as Bad payer when the ratio of interest and capital arrears on external debt stock is above 10%.
* Long-term Debt Outstanding and Disbursed.

Table 6
Debt relief impacts on public spending – Bad payers only.

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Dependent variable		**GINVT**				**CRPREXP**		
TTREV $_{T-1}$	−0.106	−0.107			0.490***	0.492***		
	(0.082)	(0.082)			(0.080)	(0.079)		
TTREV $_{T-2}$	0.061	0.067			−0.229***	−0.197***		
	(0.078)	(0.079)			(0.076)	(0.076)		
REV_NFO $_{T-1}$			−0.107	−0.102			0.539***	0.555***
			(0.081)	(0.081)			(0.078)	(0.077)
REV_NFO $_{T-2}$			0.146*	0.145*			−0.292***	−0.282***
			(0.083)	(0.084)			(0.080)	(0.079)
CRPREXP $_{T-1}$	0.099	0.095	0.076	0.072	0.387***	0.361***	0.379***	0.350***
	(0.066)	(0.067)	(0.066)	(0.067)	(0.064)	(0.064)	(0.064)	(0.063)
CRPREXP $_{T-2}$	−0.072	−0.072	−0.098	−0.096	0.110*	0.100	0.134**	0.134**
	(0.064)	(0.064)	(0.064)	(0.064)	(0.062)	(0.061)	(0.061)	(0.060)
GINVT $_{T-1}$	0.344***	0.344***	0.334***	0.333***	−0.381***	−0.364***	−0.314***	−0.299***
	(0.083)	(0.083)	(0.080)	(0.080)	(0.081)	(0.080)	(0.077)	(0.076)
GINVT $_{T-2}$	−0.037	−0.039	−0.040	−0.040	0.242***	0.227***	0.224***	0.222***
	(0.082)	(0.082)	(0.075)	(0.075)	(0.080)	(0.079)	(0.072)	(0.071)
DFINA $_{T-1}$	−0.012	−0.012	−0.009	−0.009	0.024	0.024	0.019	0.019
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)
DFINA $_{T-2}$	−0.051***	−0.051***	−0.051***	−0.051***	−0.022	−0.021	−0.012	−0.012
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)
TTGRANT $_{T-1}$	0.158	0.160	0.176*	0.176*	0.066	0.065	0.024	0.022
	(0.099)	(0.099)	(0.099)	(0.099)	(0.097)	(0.095)	(0.095)	(0.093)
TTGRANT $_{T-2}$	−0.203**	−0.204**	−0.207**	−0.209**	0.063	0.061	0.077	0.068
	(0.096)	(0.095)	(0.095)	(0.095)	(0.093)	(0.092)	(0.091)	(0.089)
TTLOAN $_{T-1}$	0.041	0.036	0.032	0.029	0.248***	0.215**	0.257***	0.224**
	(0.096)	(0.097)	(0.095)	(0.096)	(0.093)	(0.093)	(0.092)	(0.091)
TTLOAN $_{T-2}$	0.443***	0.448***	0.458***	0.461***	−0.024	−0.027	−0.046	−0.051
	(0.096)	(0.096)	(0.094)	(0.094)	(0.094)	(0.093)	(0.090)	(0.089)
DEBT_RELIEF $_{T-1}$	0.187		0.192		−0.025		−0.098	
	(0.162)		(0.162)		(0.158)		(0.156)	
DEBT_RELIEF $_{T-2}$	0.302*		0.265*		−0.02		0.051	

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Table 6 (*continued*)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Dependent variable		**GINVT**				**CRPREXP**		
	(0.158)		(0.159)		(0.154)		(0.153)	
HIPC_RELIEF $_{T-1}$		0.226		0.218		−0.096		−0.122
		(0.177)		(0.176)		(0.170)		(0.167)
HIPC_RELIEF $_{T-2}$		0.259		0.230		−0.119		−0.125
		(0.174)		(0.176)		(0.168)		(0.166)
MDRI_RELIEF $_{T-1}$		−0.120		−0.015		0.607		0.168
		(0.597)		(0.599)		(0.575)		(0.566)
MDRI_RELIEF $_{T-2}$		0.647		0.528		0.702		1.136**
		(0.581)		(0.575)		(0.559)		(0.543)
Constant	1.565	1.496	1.255	1.188	1.214	−0.484	2.687*	1.196
	(1.691)	(1.799)	(1.557)	(1.642)	(1.649)	(1.731)	(1.498)	(1.552)
Country/time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.875	0.875	0.876	0.876	0.658	0.668	0.669	0.681
x^2 test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	265	265	265	265	265	265	265	265

Note: The table reports VAR equations on bad payers only for government investment and current primary expenditures. Coefficients are exposed with, in brackets, their associated standard errors. *T*−1 and *T*−2 reflects variables with respectively one and two period lags. Country and Time fixed effects (FE) are included as exogenous block

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table 7
Debt relief impacts on public spending – good payers only.

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Dependent variable		**GINVT**				**CRPREXP**		
TTREV $_{T-1}$	0.129	0.137			0.193***	0.200***		
	(0.100)	(0.100)			(0.044)	(0.044)		
TTREV $_{T-2}$	0.091	0.089			0.057	0.048		
	(0.108)	(0.109)			(0.048)	(0.048)		
REV_NFO $_{T-1}$			0.040	0.045			0.076	0.081
			(0.146)	(0.146)			(0.068)	(0.067)
REV_NFO $_{T-2}$			−0.004	−0.015			−0.063	−0.075
			(0.142)	(0.142)			(0.065)	(0.065)
CRPREXP $_{T-1}$	−0.013	−0.030	0.100	0.087	0.457***	0.447***	0.592***	0.585***
	(0.125)	(0.124)	(0.118)	(0.118)	(0.055)	(0.055)	(0.054)	(0.054)
CRPREXP $_{T-2}$	−0.005	−0.012	0.068	0.064	−0.016	−0.019	0.069	0.066
	(0.120)	(0.119)	(0.118)	(0.117)	(0.053)	(0.052)	(0.054)	(0.054)
GINVT $_{T-1}$	0.039	0.031	0.059	0.052	−0.027	−0.032	−0.003	−0.007
	(0.053)	(0.053)	(0.053)	(0.053)	(0.024)	(0.023)	(0.024)	(0.024)
GINVT $_{T-2}$	0.018	0.021	0.034	0.039	−0.005	−0.001	0.014	0.019
	(0.053)	(0.053)	(0.052)	(0.053)	(0.023)	(0.023)	(0.024)	(0.024)
DFINA $_{T-1}$	0.015	0.017	0.002	0.004	0.022	0.023	0.006	0.007
	(0.037)	(0.037)	(0.037)	(0.037)	(0.016)	(0.016)	(0.017)	(0.017)
DFINA $_{T-2}$	−0.021	−0.017	−0.028	−0.025	0.018	0.019	0.010	0.012
	(0.037)	(0.037)	(0.037)	(0.036)	(0.016)	(0.016)	(0.017)	(0.017)
TTGRANT $_{T-1}$	0.266***	0.243**	0.206**	0.181*	0.089**	0.069	0.015	−0.006
	(0.099)	(0.100)	(0.097)	(0.097)	(0.044)	(0.044)	(0.045)	(0.045)
TTGRANT $_{T-2}$	−0.020	−0.046	−0.074	−0.097	0.029	0.015	−0.029	−0.038
	(0.099)	(0.100)	(0.096)	(0.098)	(0.044)	(0.044)	(0.044)	(0.045)
TTLOAN $_{T-1}$	0.030	0.053	0.028	0.050	0.098***	0.114***	0.096**	0.110**
	(0.080)	(0.081)	(0.081)	(0.081)	(0.036)	(0.035)	(0.037)	(0.037)

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Table 7 (*continued*)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Dependent variable		**GINVT**				**CRPREXP**		
TTLOAN $_{T-2}$	−0.053	−0.026	−0.041	−0.017	−0.082**	−0.066*	−0.066*	−0.053
	(0.080)	(0.082)	(0.081)	(0.082)	(0.036)	(0.036)	(0.037)	(0.038)
DEBT_RELIEF $_{T-1}$	0.357		0.311		−0.216		−0.263	
	(0.434)		(0.440)		(0.192)		(0.203)	
DEBT_RELIEF $_{T-2}$	−0.301		−0.362		0.486***		0.400**	
	(0.421)		(0.429)		(0.186)		(0.198)	
HIPC_RELIEF $_{T-1}$		0.886*		0.843		0.210		0.164
		(0.532)		(0.539)		(0.234)		(0.247)
HIPC_RELIEF $_{T-2}$		−0.215		−0.337		0.429*		0.284
		(0.501)		(0.507)		(0.220)		(0.232)
MDRI_RELIEF $_{T-1}$		−0.733		−0.844		-1.227***		-1.330***
		(0.924)		(0.929)		(0.406)		(0.425)
MDRI_RELIEF $_{T-2}$		0.001		0.077		1.040***		1.090***
		(0.911)		(0.915)		(0.400)		(0.419)
Constant	0.515	1.256	1.347	2.141	−0.654	−0.147	0.646	1.193
	(2.369)	(2.392)	(2.863)	(2.886)	(1.050)	(1.051)	(1.321)	(1.322)
Country/time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.321	0.327	0.311	0.317	0.781	0.786	0.759	0.765
x^2 test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	372	372	372	372	372	372	372	372

Note: The table reports VAR equations on good payers only for government investment and current primary expenditures. Coefficients are exposed with, in brackets, their associated standard errors. *T*−1 and *T*−2 reflects variables with respectively one and two period lags. Country and Time fixed effects (FE) are included as exogenous block

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

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Table 8
Debt relief impacts on domestic revenues – good versus bad payers.

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
		Good payers only				**Bad payers only**		
Dependent Variable	**TTREV**	**REVNTO**			**TTREV**	**REVNFO**		
TTREV $_{T-1}$	0.709***	0.724***			0.496***	0.498***		
	(0.056)	(0.055)			(0.068)	(0.067)		
TTREV $_{T-2}$	0.048	0.020			−0.056	−0.047		
	(0.061)	(0.060)			(0.064)	(0.065)		
REV_NFO $_{T-1}$			0.576***	0.582***			0.577***	0.575***
			(0.053)	(0.052)			(0.068)	(0.068)
REV_NFO $_{T-2}$			−0.050	−0.066			−0.038	−0.039
			(0.052)	(0.051)			(0.070)	(0.070)
CRPREXP $_{T-1}$	0.144**	0.140**	0.081*	0.075*	−0.010	−0.017	−0.058	−0.055
	(0.070)	(0.069)	(0.043)	(0.042)	(0.055)	(0.055)	(0.055)	(0.056)
CRPREXP $_{T-2}$	−0.102	−0.101	−0.070	−0.072*	0.063	0.058	0.064	0.063
	(0.067)	(0.066)	(0.043)	(0.042)	(0.053)	(0.053)	(0.053)	(0.053)
GINVT $_{T-1}$	0.021	0.018	0.016	0.013	−0.111	−0.103	−0.044	−0.045
	(0.030)	(0.029)	(0.019)	(0.019)	(0.069)	(0.069)	(0.067)	(0.067)
GINVT $_{T-2}$	0.007	0.020	0.007	0.015	0.052	0.047	0.041	0.041
	(0.029)	(0.029)	(0.019)	(0.019)	(0.068)	(0.067)	(0.063)	(0.063)
DFINA $_{T-1}$	0.1637*	0.1238*	0.023*	0.024*	−0.019	−0.019	−0.035**	−0.035**
	(0.021)	(0.020)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
DFINA $_{T-2}$	0.025	0.025	0.023*	0.024*	−0.026*	−0.025*	−0.015	−0.015
	(0.020)	(0.020)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
TTGRANT $_{T-1}$	−0.013	−0.046	0.054	0.032	0.083	0.081	0.060	0.060
	(0.055)	(0.055)	(0.035)	(0.035)	(0.082)	(0.082)	(0.083)	(0.083)
TTGRANT $_{T-2}$	−0.007	−0.010	−0.009	−0.011	0.025	0.024	0.026	0.027
	(0.055)	(0.055)	(0.035)	(0.035)	(0.079)	(0.079)	(0.079)	(0.079)
TTLOAN $_{T-1}$	0.102**	0.119***	0.070**	0.083***	0.068	0.058	0.047	0.050
	(0.045)	(0.044)	(0.029)	(0.029)	(0.079)	(0.080)	(0.080)	(0.080)
TTLOAN $_{T-2}$	−0.020	−0.013	0.005	0.013	−0.025	−0.032	−0.046	−0.046
	(0.045)	(0.045)	(0.029)	(0.029)	(0.080)	(0.079)	(0.078)	(0.079)
DEBT_RELIEF $_{T-1}$	−0.193		0.014		0.076		0.017	
	(0.243)		(0.160)		(0.135)		(0.136)	
DEBT_RELIEF $_{T-2}$	0.081		0.058		0.243*		0.145	
	(0.235)		(0.156)		(0.131)		(0.133)	
HIPC_RELIEF $_{T-1}$		0.411		0.441**		0.005		0.013
		(0.293)		(0.193)		(0.146)		(0.148)
HIPC_RELIEF $_{T-2}$		−0.313		−0.170		0.234		0.166
		(0.276)		(0.182)		(0.144)		(0.147)
MDRI_RELIEF $_{T-1}$		-1.960***		-1.174***		0.678		0.043
		(0.509)		(0.333)		(0.494)		(0.501)
MDRI_RELIEF $_{T-2}$		1.643***		1.028***		0.211		0.0002
		(0.502)		(0.328)		(0.480)		(0.481)
Constant	0.398	0.894	4.857***	5.331***	3.900***	3.198**	2.142*	2.274*
	(1.327)	(1.318)	(1.043)	(1.034)	(1.050)	(1.486)	(1.302)	(1.373)
Country/time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.791	0.800	0.859	0.865	0.732	0.735	0.763	0.764
x^2 test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	372	372	372	372	265	265	265	265

Note: The table reports VAR equations on good and bad payers only for Total domestic revenues (with and without natural resources receipts). Coefficients are exposed with, in brackets, their associated standard errors. *T*–1 and *T*–2 reflects variables with respectively one and two period lags. Country and Time fixed effects (FE) are included as exogenous block.

* Significant at 10%.

** Significant at 5%.

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