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THE CARROT AND STICK APPROACH TO DEBT RELIEF: OVERCOMING MORAL HAZARD

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Abstract

Using an event-study framework, this paper empirically assesses the impact of debt relief on government's tax effort. Our results suggest that having reached the decision point leads to higher level of tax effort. But our findings also reveal that HIPCs' governments seem to adopt moral hazard behavior (especially when institutional quality is weak) since they deploy the bulk of their tax effort before the decision point in order to get debt relief and then loosen it as they come close to the end of the debt relief process. However, post-debt relief tax effort remains significantly larger than the level recorded before the anticipatory effects took place, thus emphasizing an overall positive effect of the Enhanced HIPC initiative.

Key words: Debt Relief, Tax Effort, Event-Study, Moral Hazard.

Résumé

Cet article évalue l'impact des initiatives d'allègement de la dette multilatérale sur l'effort fiscal des gouvernements bénéficiaires. Les résultats de cette étude indiquent qu'avoir atteint le "point de décision" de l'initiative PPTE conduit les gouvernements concernés à enregistrer un effort fiscal plus important que s'ils n'avaient atteint ce point. Mais des tests additionnels révèlent également un certain aléa moral de la part de ces derniers puisqu'ils semblent déployer l'essentiel de leur effort fiscal dans le but d'obtenir des réductions de dette avant de réduire progressivement ce même effort au fur et à mesure qu'ils s'approchent du "point d'achèvement" et donc de la fin du processus PPTE. Cependant, malgré ce relâchement, le niveau d'effort fiscal observé en fin de parcours reste supérieur à celui enregistré avant que l'effet d'anticipation ne prenne place, permettant ainsi de conclure à un effet global positif de l'initiative PPTE.

Mots Clés: Annulation de dette, Effort fiscal, Event-Study, Aléa Moral.

JEL Code: F34, F35, H20, H30, H60

1 Introduction

"The importance of public revenue to the underdeveloped countries can hardly be exaggerated if they are to achieve their hopes of accelerated economic progress." Kaldor [1962]

"Development success stories go hand in hand with better mobilization of a country's own resources and less dependence on aid and other foreign finance." OECD [2010]

By the end of 2014, debt relief granted under the Enhanced Heavily Indebted Poor Countries (HIPC) initiative and the Multilateral Debt Relief Initiative (MDRI) was peaking around $76 billion (in NPV) and had been provided to 36 countries, 30 of them located in Sub-Saharan Africa.

These initiatives which aimed for the very first time to go beyond the international financial institutions' (IFIs) dogma by canceling multilateral claims, were associated with strong conditionality in terms of public finance management such as tax system improvements. In addition, following the debt overhang theory, taxation in benefiting countries was also supposed to improve after debt cancellations. According to this literature, governments of countries benefiting from debt relief should be then more willing to engage in tax reforms since they now would be able to fully benefit from the reforms' outcomes (which would no longer accrue to external creditors under debt repayments). The combination of these theoretical intuitions with the HIPC program's conditionality could hence lead to think that debt relief might have positive impacts on government's tax effort. However, such relationship is not straightforward. As many other development financing programs, the design of the Enhanced HIPC initiative is likely to induce moral hazard behaviors that may severely blur the way in which debt relief positively affects tax effort. Debt relief expectations might indeed foster eligible countries to deploy, in front of IFIs, substantial efforts in terms of fiscal performances. But once debt relief would be provided, governments could also totally reduce their tax effort since there is no debt relief to get anymore. This paper therefore explores how debt relief provided under the Enhanced HIPC initiative impacts tax effort of benefiting governments, and also tries to identify potential moral hazard effects that could be at play in such relationship.

So far, the impact of debt relief on government's tax effort has not been investigated. However some studies have examined the relationship between public debt and taxation, and more recent papers have even tested the impact of debt relief on taxation and institutional quality, but without really focusing on the government's willingness to tax. These existing studies can nevertheless provide some intuitions about the potential impact of debt relief on tax effort. First, within the literature about tax determinants, several studies include the stock of debt as structural factors of taxes in developing countries. In most of these studies, results suggest that public debt tends to negatively impact tax ratios in developing countries, underlining debt overhang's prediction where more indebted countries gradually loosen their tax policies since collected revenues directly go to creditors. Except the study by Crivelli and Gupta [2014] that finds a positive contribution of foreign debt to tax ratios in resource-rich countries, these of Teera and Hudson [2004] and Gupta [2007] expose a negative correlation between public debt and tax ratio in low-income countries. In the same vein, Mkandawire [2010] confirms these results on a sample of Sub-Sahara African countries. Finally and even more interesting, Clist and Morrissey [2011] show that, in a sample of 82 developing countries, there would be a threshold above which the amount of external loans (which are external debt flows) reduces taxation, emphasizing here also predictions of the debt overhang theory. Then, and in a more straightforward way, some studies have tried to directly test the impact of debt relief on fiscal variables such as tax ratio or government capacity. Presbitero [2009], for instance, investigates the impact of debt relief on CPIA index but do not find any significant result. However his study as well as these by Freytag and Pehnelt [2006] and Chauvin and Kraay [2007] suggest that debt relief is provided to countries recording an increasing quality of their institutions. These results might therefore support the idea that in prospect of debt relief, potential eligible countries deploy increasing endeavors to implement structural

reforms that *in fine* improve institutional quality. On the impact of debt relief on taxation *per se*, Chauvin and Kraay [2005] estimate the impact of debt relief on the tax revenues to GDP ratio and find positive but not significant effects.[1]

However the absence of debt relief's effects on taxation and on other fiscal variables in all these studies can largely be attributed to the sample and the period of study considered since Presbitero [2009], Chauvin and Kraay [2005], and Johansson [2010] all estimate the impact of debt relief on macroeconomic outcomes up to 2003. Besides, they all transform their annual database in three or four years-average periods to estimate the impact of debt relief in T on outcomes in T+1, considering thus only the impact of debt relief provided around 2000 when 22 countries had just reached their decision point and did not receive substantial amounts of debt forgiveness yet. Therefore, the time span of these studies **i)** neither allow to observe the impact of the total debt relief provided along the Enhanced HIPC process; **ii)** nor enable to consider debt relief provided under the MDRI that occurred in 2005; what logically leads to find no significant result. As a consequence, two other studies by Cassimon and Campenhout [2008] and Cassimon et al. [2015] have tried to tackle these shortcomings using longer time series and considering more HIPCs that have been granted substantial amounts of debt relief. Collecting data from 1986 up to 2012 for 24 HIPCs having at least reached their decision point and using time series analysis, Cassimon et al. [2015] highlight that debt relief flows are positively associated with larger public investment, current expenditures, and tax ratio, hence supporting the debt overhang predictions. Nevertheless, as explained by the authors, these studies, realized on a sample exclusively composed of Heavily Indebted Poor Countries (HIPCs), do not provide external validity for these debt relief fiscal effects.

Building on these latter studies, the current paper therefore considers longer enough time series in order to have sufficient temporal depth regarding debt relief provision and also tries to properly assess the impact of debt relief using relevant control groups to provide external validity to our findings. In order to estimate the debt relief effects on government's tax effort, we have collected data on tax revenues for 115 developing countries over 1992-2012 using IMF Staff Papers and other Article IV. After having identified the structural tax determinants in developing countries by referring to the existing literature about taxation and development, we build tax effort indexes for each country and each year using residuals of the structural tax equation. Such method allows to isolate structural factors that explain the country's potential tax base, from the real government's endeavors to collect these potential taxes. Then, using the bootstrap procedure in an event-study framework, we test the reaction of government's tax effort to debt relief provision around different stages of the Enhanced HIPC process such as the decision point, the completion point, and the interim period.

The event-study methodology enables to run difference in mean analysis before and after debt relief provision and to add control group countries as counter-factual. In that sense, event-study draws on difference-in-differences estimates except that the regular time calendar is now replaced by an event-calendar. Regarding control group countries, we define several counter-factuals using HIPC eligibility criteria such as income and indebtedness thresholds. Our selection process allows to identify a group of 16 countries which recorded the income status (low income countries) and the debt ratio required to become eligible (or close to be eligible) for the Enhanced HIPC initiative but which never benefited from debt relief under this program. In addition, we also compare our treated group of HIPCs to our whole sample of developing countries and to a control group composed of non-HIPC African countries in order to control both for potential trends that would affect the "developing world" or the African continent.

The article is structured as follows. Section 2 exposes the debt relief initiatives as well as the mechanisms potentially at play between these programs and the domestic resource mobilization. Section 3 describes our empirical approach to estimate the effects of debt relief on government's tax effort. Section 4 explains the

[1] Coefficients are statistically significant at the 10% level but are not robust to specification or debt relief measure changes.

concept of tax effort and identifies the tax effort variable we chose. Section 5 shows impacts of debt relief on benefiting countries' tax effort under the different stages of the Enhanced HIPC process (the decision point, the completion point, and the interim period), presents several robustness checks, and tries to decompose the timing reaction of tax effort according to debt relief provision. Finally, section 6 concludes.

2 International Debt Relief and Tax Effort

2.1 The Debt Relief Initiatives

Over the past fifty years, from Nicholas Kaldor to the OECD, domestic resource mobilization has been largely recognized as one of the keystones in the low-income countries' development process. Most of development actors have acknowledged that growing financial needs for infrastructures construction, social spending, or national security could not be entirely fulfilled with domestic resources and that foreign aid was therefore strongly needed. But they have also admitted that efficient tax system was essential to the state building process and to gradually cut loose from international financial assistance. As a consequence, for decades, low-income countries and international institutions have deployed increasing endeavors to design, set up and foster tax systems across the developing world, although tax ratios hardly took off over this period. In the meantime, and as one consequence of the stiffened embryonic tax systems, external public debt in low income countries considerably increased, reaching at the end of the 80s' unsustainable levels which were calling for sizable cancellations.

First policy responses to what will be later called "the third-world debt crisis" only consisted in debt treatments under the Paris Club. These agreements mostly aimed to postpone the debt-due date by rescheduling debt service payments. The first debt treatment canceling bilateral debt for poor countries (of around one-third) was the Toronto terms set up in 1988 and replaced by the London terms in 1991 with 50% debt cancellation. This was then replaced by the Naples terms in 1994 which provided bilateral debt cancellations of around 67% (Thugge and Boote [1997]). The debt forgiveness threshold was then extended up to 80% under the Lyon terms in 1996. Cologne terms of 1999 finally pulled this ceiling up to 90% (Daseking and Powell [1999]).

However, although the two latest terms helped to reduce the average external public debt of highly indebted poor countries[2], debt ratios were still unsustainable and sky-scraping at the end of the 1990s. Indeed, even if debt cancellations at the Paris Club were substantial, they were only focused on bilateral debt reduction whereas a significant share of low-income countries' debt was owed to multilateral financial institutions such as the World Bank, the IMF, and the regional development banks. The need for multilateral debt relief cancellation thus rose up in the middle of the 1990s and alongside with the setting up of the Naples terms, the IFIs decided in 1996 to launch the Heavily Indebted Poor Countries Initiative providing for the very first time, debt relief on multilateral commitments.

The HIPC initiative has been designed as a process where debt relief is provided conditionally to target achievements which, once reached, lead to different stages such as the "decision point" for the entry in the debt relief initiative, and the "completion point" for the exit. At the decision point, the country is considered eligible for debt relief under the HIPC initiative only if it fulfills four criteria required by the international financial institutions (IFIs) which are **(i)** being a low income country following the World bank classification; **(ii)** being IDA-eligible only (not blend); **(iii)** having successfully implemented reforms under IMF-PRGF programs, and finally **(iv)** having an unsustainable external public debt defined as a ratio of external public debt in net present value (NPV) over exports superior to 250%.(IMF [2000-2012]) Once identified as eligible, the government reaches the decision point and first receives debt service cancellation. Then, additional debt relief is granted conditionally to the implementation of a Poverty Reduction Strategy Papers (PRSP) listing

[2]Contrary to former debt treatments (except the London terms) that did not managed to stop debt stockpiling - Cf. Figure 1 in appendix.

several targets to reach. If multilateral creditors judge that the government undertakes enough efforts to implement the PRSP, they continue to provide debt relief on debt service payments during this post-decision point phase called the interim period. Finally, once the government satisfies the targets defined within the PRSP, it reaches the completion point where IFIs cancel a previously agreed-part of its multilateral debt stock with an eventual topping-up.

Nevertheless, between 1996 and 1999, only few low-income countries benefited from the HIPC initiative because eligibility criteria were too selective and did not allow considering countries that were trapped in an indebtedness trap with a ratio of external public debt over exports inferior to the required threshold. As a consequence, the IFIs decided in 1999 to lower the minimum required debt-to-export ratio down to 150% (still in NPV).[3] In addition, the process of debt relief delivery was also accelerated in order to relieve low-income countries as fast as possible of their debt burden (Daseking and Powell [1999]). These improvements contributed to rename the HIPC initiative as the Enhanced HIPC initiative. Finally, in order to achieve the MDGs, the international community decided in 2005 to give a final push by canceling the whole remaining multilateral debt stock of HIPCs that had already reached their completion point. This ultimate debt relief initiative is called the Multilateral Debt Relief Initiative (MDRI).

2.2 Reforms Incentives and Design of the Debt Relief Initiatives

The Enhanced HIPC initiative comes with strong conditionality in terms of both macroeconomic stabilization and poverty-reducing policies. One of the eligibility criteria required to benefit from the Enhanced HIPC initiative is indeed to have implemented an IMF PRGF program and to have undertaken the structural reforms defined into it. Moreover and as underlined in the IMF documents specific to the HIPC process' implementation, most of the PRGF's reforms for low-income countries are strongly focused on fiscal deficit reduction and therefore on taxation improvements (Ghosh et al. [2005]).[4]

As a matter of fact, looking into details at the *Decision Point Document Under the Enhanced HIPC Initiative* for several HIPCs, one can see that the IDA and the IMF strongly advice to undertake significant reforms to improve the tax system and increase the domestic resource mobilization. For instance, the *Decision Point Document Under the Enhanced HIPC Initiative* prepared by the IDA and the IMF for Benin (IMF [1997-2005]) highlights that "*Benin satisfies the eligibility criteria for assistance under the Enhanced HIPC initiative. [...]. Performance under the adjustment programs has been satisfactory, [...], the primary fiscal deficit has been considerably reduced, [...]. These achievements reflect mostly an improvement in government revenue and better controls over the government spending.*". For Mali (IMF [1997-2005]) Decision Point Documents also underlines that "*Mali's current three-year ESAF arrangement, approved on April 10, 1996, supports a program of policy reforms covering the period 1996-1999; [...]. In support of his request, the Malian authorities significantly strengthened macroeconomic policies and deepened structural reforms, [...], with regards public finances, [...] revenue enhancement (including a sharp reduction of exemptions, unification of the value-added tax at a single rate of 18 percent, and improving the efficiency of tax-collection agencies*". Many examples can be also found for other HIPCs using these documents that list the structural reforms to implement and provide detailed follow-up of those already undertaken.

Therefore debt relief granted under the Enhanced HIPC initiative could represent a sufficient reward to push potentially eligible countries to implement needed and recommended structural tax reforms that would improve the efficiency of the entire tax system leading thus to increase the level of taxes collected.

[3] Or superior to 250% of their domestic revenues for really open economies.

[4] Though the IMF was more focused on spending cuts in the 80s since reduction in expenditures had the advantage of speeding up budgetary adjustments.

2.3 Theoretical Considerations

The economic theory also provides intuitions about how tax effort should react to debt relief. Following the developing countries' debt crisis of 1982, many authors, in the late 1980s, looked into details at the macroeconomic effects of high level of public indebtedness. Studies by Krugman [1988], Sachs [1989], and in a larger extend by Cohen [1990], transposed the debt overhang theory developed by Myers [1977] from the corporate level to the government level and applied it to the low-income countries' debt crisis. According to them, a debtor country experiences a situation of debt overhang when it becomes beneficial for both the debtor and its creditors to partially cancel its stock of debt. Indeed, when public debt reaches unsustainable levels, it can negatively impact the economic growth what finally lowers the debtor's capacity to pay and hence the creditors' asset value.

Transmission channels from large public indebtedness to slowed economic growth are threefold. First, high level of public indebtedness must be paid back and is thus often associated with large debt service payments. Sizable debt service payments can therefore monopolize the bulk of government's resources and crowd public development expenditures out. Second, a really large stock of public debt can be considered by domestic and foreign investors as an implicit tax burden that persuades them to postpone their investment by fear of future hikes in capital taxes. These two effects simultaneously reduce the capital accumulation process (both private and public) what, by definition, tends to hamper the economic growth.

The third effect, which is directly related to the debtor's capacity to pay and thus at the heart of this study, is relative to the negative incentives induced by large amounts of public debt. Krugman [1988], Sachs [1989], and Corden [1989] expose that a substantial public debt can create disincentives for the debtor to invest or deploy efforts in order to raise additional revenues since the benefits of these efforts will directly accrue to creditors as debt repayments. In other words, Krugman explains that if "*the debt burden on a country is as large as the maximum that the country could positively pay, even with maximum adjustment effort. Then there is in fact no reason for the country to make the adjustment effort, since the reward goes only to its creditors*" (Krugman [1988], p.14). Sachs also summarizes this trade-off in a quite straightforward way maintaining that "*Why should a country adjust if that adjustment produces income for foreign banks rather than for its own citizenry?*" (Sachs [1989], p.257).Sachs [1989] even gives a simple but really representative example of this situation where he defines the adjustment effort not as an improvement in direct tax effort but as extra public investment explaining that such additional capital expenditures contribute to generate future government's resources (although public resources from investment are likely to be collected through taxation if public investment supports the development of the private sector).

Therefore, it is quite easy to take again this numerical example but now assuming that expenditures actually aim to improve tax collection (like additional tax administrators, taxpayers registering software, tax offices, etc.).[5] So following Sachs [1989], we assume that a country owes $150 million to its creditors but can just raise $100 as domestic revenues which represents its capacity to pay. Now, let's suppose that in the future, the debtor country will honor its debt as much as he can and will default on the remaining debt service payments (what is a strong assumption). We can then see that, given its debt overhang situation, any attempt to raise domestic revenues up to $150 millions (so additional tax-related expenditures or just additional government tax effort) would entirely go to creditors rather than to the debtor's government. For instance, let's assume that the debtor country can spend $10 millions today to improve the efficiency of its tax system. These current expenditures will lead to collect more taxes in the future which will increase its capacity to pay to $120 million in the subsequent period. This adjustment effort would be beneficial for creditors but totally irrational for the debtor country. Indeed, it renounces to $10 million in current consumption to get nothing in the future since all additional revenues will naturally fall to the creditors. But

[5] We can also assume that government does not spend more to improve the tax system but just reallocate civil servant to tax collection activities rather than public investment production. This reallocation or adjustment effort would therefore represents a current opportunity cost which is expected to be offset by induced future earnings, raising *in fine* the future capacity to pay.

if we add for creditors the possibility to cancel debtor's liabilities, things become different. Assuming that creditors agree to provide debt relief of \$45 million (so 30% of debt forgiveness) and continue to ask for total repayment of the remaining stock of debt, so \$105 million. If the debtor country spends now \$10 millions or reduces its current consumption to reallocate civil servants to tax collection activities, its earnings raise its capacity to pay up to \$120 million what is now enough to repay its debt and even allows to consume the remaining \$15 million. Under such circumstances, debt relief leads to improve government future utility of a little bit more than \$1.5 million if we assume a government's discount rate of 0.3.[6]

By consequence, according to this simple numerical application and assuming a government's preference for present not too high[7], one could theoretically expect to observe a government raising its tax effort and therefore its tax level once debt relief has been provided, since it can now reap the benefits of its efforts. However, it is not really clear when HIPCs should engage in such fiscal efforts. According to the debt overhang theory, countries should undertake structural reforms once debt relief is provided. BUt considering conditionality attached to the Enhanced HIPC initiative, tax efforts should be made before the debt relief process i.e. before the decision point and the first debt relief provision. So combining these two effects, one could expect to see tax effort increase around the decision point and last after debt relief has been provided.

Nevertheless, once debt forgiveness granted, one also needs to cautiously consider the "after-debt relief". Indeed, if under the debt overhang settings countries receiving debt relief should rationally continue to deploy larger than before efforts to collect domestic resources; it is not guaranteed that the pre-debt relief conditionality of the HIPC initiative on public finances will not create moral hazard leading to misbehavior from benefiting countries afterward. There is indeed a risk that potentially eligible countries show substantial adjustment efforts (such as tax improvements) in order to get debt relief but then, once debt relief granted, just relax their efforts, loosen their tax policies and even worst engage in uncontrolled new external borrowing. Empirically, Dijkstra [2013] in her study on the impacts of debt relief in Nigeria shows that, although non-HIPCs, the country engaged in significant fiscal reforms in prospect of debt relief agreements with its bilateral creditors at the Paris club, confirming that such incentive effects might be at play. But her study does not emphasize any moral hazard and loosening in fiscal policies during the post-debt relief period.

3 Empirical Approach and Data

3.1 The Event-Study Methodology

Given the temporal distance as regards the Enhanced HIPC initiative (more than 10 years for HIPCs entered in 2000) and its one-shot feature, this study resorts to an event-study methodology to analyze the effect of having benefited from debt relief under different stages of the Enhanced HIPC process. This methodology initially designed to observe abnormal returns in finance (see MacKinlay [1997] for an extensive literature review) has been gradually applied to macroeconomic and political economy issues (Chen et al. [2008], Rodrik and Wacziarg [2005], Papaioannou and Siourounis [2008], Méon et al. [2009]). The interest of the event-study is the ability to look at the evolution of a given outcome over a calendar that has as central point the occurrence of a particular event, such as the Enhanced HIPC initiative in our case. Using this approach, one can then compare the evolution of the outcome before and after the event occurred. Therefore, under our debt relief setting, this methodology provides opportunities to graphically and econometrically see what happens before and after debt relief is granted and so run difference in mean analysis. Moreover, the event-study design also enables to observe how the outcome reacts one, two, three or ten years after a country experienced this exceptional event which, considering our research question, allows to gradually analyze the response of our variable of interest, the government's tax effort, to debt relief provision under

[6] Government's utility gain in net present value is equal to $-10 + 15/(1.3) = 1.54$

[7] What is also questionable in the context of developing countries.

the decision point, the completion point, or to the entire debt relief process.

From a technical point of view, the event-study methodology turns the regular time-calendar into an "event-calendar" where each year is now defined according to its distance from the occurrence year of the event in which we are interested in. This transformation allows reviewing the impact of an event that commonly occurred for a set of countries, but at different dates. By consequence, since several low-income countries have benefited from the Enhanced HIPC initiative at different periods, this event-study methodology allows to settle these countries on a similar calendar; the "debt relief-calendar". Under this calendar, the point that anchors the data (i.e. the year 0 in the "debt relief calendar") is defined as the "debt relief point" which can alternately be the decision point, the completion point, or the interim period. Therefore the year +1 and +2 will be respectively the year after and the second year after this "debt relief point". In the other way around, the year -1 and -2 will respectively denote one and two years before the "debt relief point" occurs, and so on.

However, in order to see how tax effort reacts to debt relief, one needs to consider HIPCs having received debt relief soon enough to be able to observe tax effort evolution over a sufficient time period after debt relief has been granted. A longer enough ex-post period therefore implies to exclude from the sample countries like Comoros, Cote d'Ivoire, Togo or Liberia that all entered and exited the Enhanced HIPC initiative in the late 2000s. Following this idea and in order to conserve a constant sample overtime, the study only considers HIPCs for which six years before and six years after the "debt relief point" are available. By consequent, the definition of the HIPC sample evolves according to the "debt relief point" considered. Indeed, taking the decision point as "debt relief point" allows to include into the sample 29 HIPCs[8] that had at least reached their decision point in 2006.[9] However if the "debt relief point" considered is now the completion point or the interim period, the sample reduces to 21 HIPCs[10] that exited the Enhanced HIPC initiative no later than 2006. So to summarize, the pre-debt relief period is defined as the 6 years before the HIPC has reached the "debt relief point" whereas the post-debt relief period denotes the 6 years after this point. In addition we also review the impact of having reached the decision point for a sample of 26 HIPCs having met their decision point no later than 2002 what enables to observe government's willingness to tax over the ten years following this point and therefore to have longer insight on the decision point impacts.

Consequently, we draw on the empirical specification used in Chen et al. [2008] which, in our debt relief context, allows to observe the average difference before and after this "debt relief point". The model takes the following form:

$$TE_{i,s} = \alpha + \beta Post_{i,s} + \nu_i + \epsilon_{i,s} \tag{1}$$

Where $TE_{i,s}$ is the tax effort for HIPC i in debt relief-period s (with s running from -6 to +6 or -10 to +10 depending on the sample reviewed), $Post_{i,s}$ is a dummy variable that takes 1 for all the period after the "debt relief point" with the year of the "debt relief point" included (so over [0; +6]) and 0 otherwise (so over [-6; -1]), and ν_i is n-1 HIPC fixed effect. Under this model, our parameter of interest β therefore represents the average absolute difference in tax effort between the pre- and the post-debt relief point periods.

3.2 Providing External Validity: Looking for a valid Control Group

Under the event-study settings, the empirical analysis aims to examine the average difference between the pre- and post-debt relief period. However, if we want to identify and generalize potential impacts of debt

[8] Haiti is excluded from the sample because of the 2010 earthquake that devastated the country and directly impacted macroeconomic aggregates.

[9] Countries that are not in *italic* in Table 1

[10] Countries in **bold** in Table 1. Sao Tome and Principe is not included in this sample because of numerous missing values that prevent to have a complete observation set over -6/+6.

Table 1: Heavily Indebted Poor Countries and "Debt Relief Points"

Countries	Decision point	Completion point	Interim Period
Uganda	**2000**	**2000**	**2000-2000**
Mozambique	**2000**	**2001**	**2000-2001**
Bolivia	**2000**	**2001**	**2000-2001**
Mauritania	**2000**	**2002**	**2000-2002**
Tanzania	**2000**	**2001**	**2000-2001**
Honduras	**2000**	**2005**	**2000-2005**
Senegal	**2000**	**2004**	**2000-2004**
Benin	**2000**	**2003**	**2000-2003**
Burkina Faso	**2000**	**2002**	**2000-2002**
Mali	**2000**	**2003**	**2000-2003**
Cameroon	**2000**	**2006**	**2000-2006**
Guyana	**2000**	**2003**	**2000-2003**
Nicaragua	**2000**	**2004**	**2000-2004**
Niger	**2000**	**2004**	**2000-2004**
Madagascar	**2000**	**2004**	**2000-2004**
Rwanda	**2000**	**2005**	**2000-2005**
Zambia	**2000**	**2005**	**2000-2005**
Malawi	**2000**	**2006**	**2000-2006**
Ethiopia	**2001**	**2004**	**2001-2004**
Ghana	**2002**	**2004**	**2002-2004**
Sierra Leone	**2002**	**2006**	**2002-2006**
Sao Tome & Principe	2000	2003	2000-2003
The Gambia	2000	2007	2000-2007
Guinea Bissau	2000	2010	2000-2010
Guinea	2000	2012	2000-2012
Chad	2001	-	-
Democratic Republic of Congo	2003	2010	2003-2010
Burundi	2005	2009	2005-2009
Republic of Congo	2006	2010	2006-2010
Haiti	*2006*	*2009*	*2006-2009*
Afghanistan	*2007*	*2010*	*2007-2010*
Central African Republic	*2007*	*2009*	*2007-2009*
Liberia	*2008*	*2010*	*2008-2010*
Togo	*2008*	*2010*	*2008-2010*
Cote d'Ivoire	*2009*	*2012*	*2009-2012*
Comoros	*2010*	*2012*	*2010-2012*

Sources: HIPC and MDRI Status of Implementation - International Monetary Fund

relief initiatives, we definitely needs to examine the reaction to debt relief with respect to control group countries and therefore find a valid counter-factual.

As exposed above, studies of Cassimon and Campenhout [2008] and Cassimon et al. [2015] have showed that debt relief might have positive fiscal impacts among benefiting countries, especially on tax ratio. But these analysis warn us against the fact that results obtained are only valid for reviewed countries and do not guarantee that debt relief policy leads to positive fiscal effects regardless the country we consider. We could indeed say that positive reactions of fiscal variables to debt relief flows might be due to other economic phenomenon that are shared by other and relatively similar developing countries which, however, did not benefit from the Enhanced HIPC initiative. For example, a non-HIPC country that was classified as low-income country at the end of the 1990s possibly experienced fiscal improvement during the early 2000s, when debt relief mainly occurred. Cassimon et al. [2015] account for this potential trend by including

time fixed effects as exogenous block in their structural vector auto-regressive model, which finally do not influence their results.

But some other facts that are not considered in their study might also potentially affect the external validity of their results. Though they control for potential unobservable country characteristics, the economic situation of the benefiting countries before debt relief could be considered as a potential explanation for the subsequent fiscal improvements. Indeed, HIPCs from the 1980s to the 1990s always had difficulty to meet their debt service obligations and as many other low-income countries, hardly controlled their fiscal deficit. In order to tackle these issues, the IMF and other multilateral institutions provided macro-stabilizing programs (which were not tied to debt relief in the first place, but became afterward) which aimed to improve and balance public finances. As a result, one could say that the positive reaction of HIPCs' public finances to debt relief flows during the early 2000s might be due to efforts deployed by these countries under the early and mid-1990s PRGF rather than debt relief provided from 2000 onward. In order to outshine these doubts, it is therefore essential to find low-income countries which were similar to HIPCs in the early and mid-1990s but which did not benefit from debt relief under the HIPC initiative.

As previously explained, the Enhanced HIPC initiative of 1999 came with strict eligibility criteria (low-income countries classification, IDA only, PRGF program, external public debt in NPV superior to 150% of exports). By consequent, proper control group should definitely be composed of countries that were satisfying these criteria (more or less strictly) alongside HIPCs but which finally did not benefit from the Enhanced HIPC initiative. Nevertheless, finding an adequate control group for HIPCs is not an easy task. Indeed, a poor country with a really high level of indebtedness has been confronted inevitably to the HIPC program, and probably received a proposal from international institutions to benefit from it. So if some countries were satisfying eligibility criteria in the early 2000s, it is quite sure that these countries have benefited from the HIPC initiative or have turned down the IFIs proposal in order to take care of their indebtedness issues by themselves. By consequence, given the discretionary feature of the Enhanced HIPC initiative and the inability to enforce countries to benefit from it, there will still exist some differences between treated and control groups that might explain, in a certain extent, why some have accepted to enter into the HIPC initiative and why some have not.

Then when defining the control group, an important point to be very cautious with is that HIPCs did not reach their decision point the same year. By consequence, following the approach of Chen et al. [2008] we define a control group specific to each HIPCs' cohort, relatively to their decision point.[11] So we first consider, for what we call the "narrow" control group, countries which, over the five years preceding the decision point (for each HIPCs' cohort), have been classified by the World Bank as low-income countries[12] at least over three years and experienced an average ratio of external public debt over exports superior to 170% in nominal values. It would have been better to use a threshold in net present value but long time series on such data are not available in international financial sources and computing them by ourselves would have exposed this criteria to debatable assumptions (such as the value of the discount rate). We therefore choose the threshold of 170% of debt-to-exports ratio in order to account for the degree of concessionality that contributes to reduce this ratio if we would have considered it in net present value.

Table 2 exposes figures for our "narrow" control groups associated to each HIPCs' cohort and shows that in average the level of indebtedness in nominal value for our "narrow" control group is in average around 300% of the exports over the five years preceding the HIPCs' decision point. Therefore, although not in net present value, the control groups' indebtedness level fits pretty well as regards the eligibility criteria since even a concessionality rate of 50% on the external debt would lead to an average indebtedness ratio satisfying the required threshold of 150% in the debt-to-exports (NPV) ratio.

[11] In other words, we match a control group with a group of HIPCs belonging to the same cohort, i.e. which have reached their decision point the same year.

[12] Note that low-income countries that were receiving aid from the World Bank and/or the IMF were systematically under and ESAF or PRGF program.

Table 2: External PPG Debt Stock over Exports ratio - Average level over 5 years before Decision Point

HIPC Cohorts:	Cohort 2000	Cohort 2001	Cohort 2002	Cohort 2003	Cohort 2005	Cohort 2006
Control Group						
Bangladesh	**282.76**	**255.60**	**241.14**	**235.95**	**214.42**	**202.59**
Bhutan	119.56	136.30	166.47	**200.81**	**233.57**	**230.59**
Cambodia	**191.86**	**178.18**	155.55	142.13	104.82	94.60
Eritrea	**173.36**	**249.57**	**340.82**	**514.53**	**789.52**	**872.66**
Georgia	**213.65**	**216.17**	**195.72**	**180.06**	131.22	110.98
India	**177.62**	164.62	150.79	132.56	79.79	62.56
Kenya	**188.35**	**181.60**	**177.69**	**176.20**	152.35	137.75
Kyrgyz Republic	150.41	**171.73**	**189.79**	**206.88**	**205.07**	**195.40**
Lao PDR	**503.87**	**499.98**	**498.84**	**461.33**	**379.24**	**327.59**
Lesotho	**274.68**	**244.55**	**223.32**	**199.59**	142.14	114.77
Nepal	**222.50**	**219.90**	**227.97**	**250.28**	**257.11**	**265.08**
Nigeria	**201.47**	**254.33**	**260.04**	**257.75**	**230.23**	**213.30**
Pakistan	**251.72**	**254.33**	**260.04**	**257.75**	**230.23**	**213.30**
Sudan	**1177.49**	**1055.14**	**908.73**	**739.79**	**446.08**	**388.81**
Vietnam	**179.32**	136.54	110.74	94.04	60.02	54.48
Yemen	**266.46**	**189.69**	166.60	161.95	103.46	97.09

Included in the relative cohort control group
Not included in the relative cohort control group

Author's computation - Data sources: International Debt Statistics, IMF/World Bank

In a second time, we define as the "extended" control group, all countries that were ranked by the World Bank as low-income countries or lower-middle-income countries at least one time over the five years preceding the HIPCs decision point.[13] This second control group, as in Chen et al. [2008], controls for a potential trend within the "developing world" that might influence the evolution of HIPCs' willingness to tax and that could be fallaciously attributed to debt relief. Finally, considering the geographical composition of the HIPC sample[14], we also control for potential regional trend by considering a third control group of non-HIPC African countries[15], regardless to their indebtedness and income level during the five years preceding the decision point.

Therefore, equation (1) now includes three different control groups what allows to make sure that the average pre- and post-debt relief difference is due to the debt relief program *per se* and not to a tendency that affects countries having the same economic features as the treatment group, or to a common trend within the "developing world" or the African continent. In order to add the counter-factuals' evolution, we then replace the dependent variable by its difference from the control group average. The dependent variable $TE_{i,s}$ of equation (1) can then take four different values:

$$TE_{i,s} = \begin{pmatrix} TE_{i,s} \\ TE_{i,s} - T\bar{E}_{i,s} \\ TE_{i,s} - T\tilde{E}_{i,s} \\ TE_{i,s} - T\breve{E}_{i,s} \end{pmatrix} \tag{2}$$

[13] Cf. Table 13 in appendix.
[14] Cf. Table 13 in appendix.
[15] Which have also been at least once classified as low-income or lower-middle-income countries by the World Bank between 1993 and 2000.

Where $TE_{i,s}$ is still the tax effort for HIPC i in debt relief-period s, $T\bar{E}_{i,s}$ is the average tax effort of the "narrow" control group associated to HIPC country i in debt relief-period s, $T\tilde{E}_{i,s}$ denotes the average level of the "extended" control group associated to HIPC country i in debt relief-period s, and where $T\breve{E}_{i,s}$ denotes the average level of the "African" control group associated to HIPC country i in debt relief-period s.

4 Estimating Developing Countries' Tax Effort

Before running these event-study models, we must first find a relevant measure of the government's willingness to tax in order to assess its reaction to the debt relief provision under the different Enhanced HIPC initiative's stages.

4.1 What is Tax Effort and How can We Measure it?

How can we define the government's willingness to tax? Many studies have attempted to estimate this intangible measure using proxies or first-stage estimate procedure. In their paper estimating the impact of government's fiscal capacity on institutions quality in a sample of Sub-Sahara African countries, Baskaran and Bigsten [2013] use several measures for the state's fiscal capacity. They first explain that fiscal capacity can be proxied by the total amount of tax revenues given that domestic resources of Sub-Saharan African countries substantially rely on non-tax revenues such as natural resources receipts coming from nationalized corporates that operate and trade these resources (Burgess and Stern [1993]). They then suggest to only use income taxes which, given the low rate of tax compliance in developing countries (Fjeldstad and Therkildsen [2008]), can be seen as a real effort from the government if it increases. Finally they document on the classic tax effort measure which is computed as the ratio of actual over potential tax revenues.

Following the definition of Gupta [2007], this latter measure of tax effort can be considered as the endeavors deployed by a government to collect what its economy actually offers. Indeed, domestic economic performances and abroad activities lead to shape the tax base from which government can collect taxes. The extend of this tax base actually depends on economic, social, demographic or even historical characteristics and therefore represents the potential tax revenues or the country's "Tax Capacity" (Fenochietto and Pessino [2013]). But if there is a gap between what the government can levy and what it actually collects (the actual tax revenues), one can then consider that this shortage in domestic revenues is mostly due to insufficient efforts from the government in collecting taxes, and so associate this to a weak desire for mobilizing domestic resources or to an inefficient tax system. By consequences, any tax effort ratio inferior to one means that the government does not meet its level of "Tax Capacity" and can be interpreted as low willingness to tax.

So even if tax effort ratio might be subject to measurement errors (Baskaran and Bigsten [2013]), it still represents the best proxy for the government's willingness to tax since it denotes the variation in tax level which is exogenous from taxes' structural determinants. Moreover, looking at other potential proxies exposed above, it appears that the total amount of taxes is not the best one for the government's willingness to tax given that it includes international trade-related taxes which are quite easy to collect and are therefore not so much representative of the government's fiscal effort. Finally, given the data availability about disaggregated taxes in developing countries, it is rather complicated to gather long and full time-series for our entire sample (both HIPCs and control group countries) on income taxes (although this paper reviews this alternative measure in section 5 using a newly released dataset), what therefore prevents us to use it as the benchmark proxy for the government's fiscal effort.

4.2 Taxation's Structural Determinants and Tax Effort Model

We design our tax effort model using most of the contributions from the tax effort literature. But since we want to observe the reaction of the residuals from this first stage estimate to debt relief provision, we decide to not include as tax structural determinants, factors which are theoretically at play in this relation, such as the stock of debt (Teera and Hudson [2004], Gupta [2007], Mkandawire [2010] and Clist and Morrissey [2011]) and the institutional quality[16] (Kaldor [1962], Tanzi and Davoodi [1998], Ghura [1998], Teera and Hudson [2004], Gupta [2007], Mahdavi [2008], Bird et al. [2008], Bornhorst et al. [2009], Thomas and Treviño [2013]). By consequence, the final model of tax effort for the whole sample of 115 developing countries which includes HIPCs and countries of our three control groups, can be represented as follow:

$$Tax_{i,t} = \alpha + \mu_i + \gamma_t + \beta X_{i,t} + \phi Z_{i,t} + \epsilon_{i,t} \tag{3}$$

Where $Tax_{i,t}$ is the government's tax revenues in percentage of GDP, net from natural resources receipts, grants and other non-tax revenues for country i in time t. $X_{i,t}$ is a vector of economic structural determinants of taxation for country i in period t that includes the logarithm of per capita GDP in 2005 constant \$USD (following studies by Lotz and Morss [1967], Heller [1975], Bahl [1971], Chelliah et al. [1975], Tait et al. [1979], and Leuthold [1991]), the trade openness of the economy computed as exports plus imports over GDP (Burgess and Stern [1993], Khattry and Rao [2002], Agbeyegbe et al. [2006] and Baunsgaard and Keen [2010]), the agriculture value-added in percentage of GDP (Gupta [2007]) as well as the share of the industry, the services sector and the total natural resources rent into the GDP (Bornhorst et al. [2009], Thomas and Treviño [2013], Crivelli and Gupta [2014]), the inflation rate (Tanzi and Davoodi [1998]), and the ODA grants net from debt relief grants[17] (Clist and Morrissey [2011]). Then, according to several studies (Bolnick [1978], Khattry and Rao [2002], Mahdavi [2008], Mkandawire [2010], and Thomas and Treviño [2013]), $Z_{i,t}$ denotes a vector of demographic variables that comprises the total population size (in logarithm), the age dependency ratio and the urbanization rate (in percentage of the total population), also for country i in time t. Finally α_i and γ_t represents respectively n-1 country and t-1 time fixed effects, and $\epsilon_{i,t}$ denotes the classic error term. Basic descriptive statistics and data sources for these variables are exposed in Table 14 in appendix.

Most of studies estimate tax effort using classic LSDV estimators (OLS with country fixed effects). However, as underlined by Gupta [2007] and Mkandawire [2010], tax revenues are subject to heteroskedasticity and serial auto-correlation issues. Looking at the evolution of tax revenues for some countries of our sample shows indeed that tax revenues seem to be highly persistent over time (Cf. Figure 2 in appendix). This persistence of tax revenues is quite expected since the volatility of domestic revenues in developing countries is often associated with fluctuations in natural resources receipts driven by exogenous shocks on international commodities prices. But given that we net out our variable of tax revenues from natural resources receipts, we logically suspect the tax revenues variable to be serially auto-correlated. This intuition is reinforced by the Wooldridge test[18] that confirms tax revenues series are affected by serial auto-correlation. Therefore, as in Gupta [2007] and Mkandawire [2010], we estimate equation (3) using the Prais-Winsten estimators (or the Panel Corrected Standard Error (PCSE) methodology) which account for both serial auto-correlation and heteroskedasticity.

Furthermore, according to this observed continuity in tax revenues, we could have also tested a dynamic

[16] We deliberately exclude institutional quality measures from the tax effort model because we want the contribution of this variable to tax mobilization be into the residuals. According to us, the relationship between taxes and the institution quality directly refers to the willingness of the government to tax and must therefore be captured by the residuals of the tax effort equation.

[17] We do not include ODA loans since their evolution would be to close to the HIPC process given that debt cancellations mostly bore on ODA loans.

[18] Not reported by save of space.

specification where the lagged dependent variable is included in the equation as determinant of the contemporaneous tax revenues value. Using this kind of specification with panel data would have necessarily required to instrument the lagged dependent variable included as explanatory variable. Such estimation usually resorts to GMM-class estimators of Arellano and Bond [1991] and Arellano and Bover [1995] which in addition provide adequate treatment for heteroskedasticity and serial auto-correlation issues. Moreover, looking at the model (3) one could hardly ignore the potential reverse causality between economic structural determinants and tax revenues. Indeed, a government that wants to quickly raise its domestic revenues might suddenly decide to increase tariffs on imports. Such discretionary policy is likely to negatively impact the volume of imported products and therefore to reduces the openness rate. The same reasoning can be adopted with GDP per capita or the sectors' value added share. However, the reverse causality between tax revenues and economic structural determinants largely depends on the government's willingness to raise or not its tax ratio. And since reverse causality goes through the equation error term that includes omitted variables, removing this reverse causality would then "wash" the residuals from the factor driving this endogeneity and which, in this case, is the government's willingness to tax. As a consequence, models trying to control strictly for potential endogeneity such as System-GMM will not be presented in the rest of the paper.[19] Nevertheless, models using alternative estimators such as LSDV estimators, or controlling softly for common unexpected events such as PCSE or LSDV models with lagged values of endogenous variables will be also used to estimate alternative tax effort indexes in order to test the robustness of the tax effort reaction to debt relief provision.

4.3 Results for the Whole Sample and Graphic Analysis

4.3.1 Tax Determinants in Developing Countries between 1993 and 2012

Table 3 exposes estimates of the equation 3 on our panel of 115 developing countries over 1993 to 2012 using PCSE estimators with panel specific correlation coefficients and with country and time fixed effects. Findings are in line with the existing literature. The per capita GDP (in log) is positively associated with tax revenues and the magnitude of its coefficient is really close from what we observe in Gupta [2007] or Mkandawire [2010][20] which respectively find a coefficient for per capita GDP (in log) that ranges between [3.521; 4.425] and [2.948; 5.339]. The openness trade also seems to positively play on tax revenues although its impact is quite smaller than what previous studies find Ghura [1998], Khattry and Rao [2002], Teera and Hudson [2004], Mkandawire [2010], and Thomas and Treviño [2013]. As regards the contribution of the different economic sectors such as agriculture our results expose expected negative coefficients for agriculture which are really close from those found in Mkandawire [2010] (-0.08; -0.1). Though we also expected to find a negative contribution of the natural resources rent share on tax revenues, the table does not expose significant results. However, running models with tax receipts from natural resources instead of the natural resources rent share[21] leads to find a kind of crowding-out effect from these resources that confirms findings by Bornhorst et al. [2009], Thomas and Treviño [2013], and Crivelli and Gupta [2014]. Looking at the demographic variables, we do not find strong evidences of contribution from the population density or the urban population. But we do find some significant and negative coefficients for the dependency ratio as in most of existing studies.

Over these four estimates, we define model (1) as our benchmark estimate since it includes the most commonly used explanatory variables in the existing literature. The PCSE estimators (without lagged

[19] As regards the GMM models, we can hardly consider the dynamic or system GMM-class estimators as appropriate for tax effort estimates since, in every cases, the lagged dependent variable explains most of the contemporaneous dependent variable (revealing thus the serial correlation features of taxes in developing countries) what prevents to expose the role played by the country's tax base.

[20] Keeping in mind that Mkandawire [2010] runs tax effort models for continental Sub-Saharan Africa only

[21] Cf. Table 15 in appendix.

Table 3: Tax Effort Model for 115 Developing Countries

Model:	(1)	(2)	(3)	(4)
Dep. Variable:	Tax revenues			
Estimators:	PCSE			
Log GDP pc	2.737***	2.546***	1.702**	1.424*
	(3.287)	(2.951)	(2.032)	(1.656)
Openness rate	0.025***	0.025**	0.018	0.021*
	(2.577)	(2.523)	(1.599)	(1.853)
Agriculture share	-0.067***		-0.051***	
	(-4.513)		(-3.239)	
Resources share	0.008		0.021	
	(0.611)		(1.631)	
Industry share		0.035**		0.025
		(2.181)		(1.292)
Service share		0.063***		0.050***
		(3.755)		(2.844)
Log Pop. density	-0.657	-1.592	0.162	-0.451
	(-0.578)	(-1.347)	(0.130)	(-0.341)
Age dependency	-0.051***	-0.062***	-0.032	-0.039*
	(-2.634)	(-3.220)	(-1.429)	(-1.744)
Urban population	0.053	0.066	0.048	0.060
	(1.140)	(1.417)	(1.037)	(1.261)
Inflation			-0.000**	-0.000**
			(-1.986)	(-2.567)
ODA (Grants)			0.009	0.005
			(0.431)	(0.230)
SSA			-0.284	-1.444
			(-0.051)	(-0.265)
AMLAT			-2.325	-1.321
			(-0.640)	(-0.360)
Country / Time FE	Yes	Yes	Yes	Yes
Observations	2,058	2,052	1,852	1,846
R-squared	0.943	0.943	0.953	0.953
Number of country	113	113	109	109
F-Statistic (p.value)	0.000	0.000	0.000	0.000

All equations are estimated using PCSE estimators with panel specific correlation coefficients and with country and time fixed effects. Their related robust z-statistics are exposed in parentheses. Results with standard fixed effects estimators leads to the same results with close but different coefficients. However, estimates with LSDV estimators expose positive and statistically significant coefficients for the population density (in log) and the AMLAT dummy. Finally, clustering the standard errors at the country level logically does not change the value of coefficients but inflate standard errors what makes the demographic variables not statistically significant. Estimates with lagged values of GDP per capita and openness rate (with both PCSE and LSDV estimators) also lead to similar results but with larger coefficients for lagged explanatory variables. Results are not reported here by save of space but are available on request to the author. Note that LSDV estimators have been preferred to WITHIN estimators which prevent to estimate coefficients for regional dummies. $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

explanatory variables) are also considered as our benchmark estimators since they controls for both heteroskedasticity, serial auto-correlation and does not account for potential endogeneity which, as previously exposed, would contribute to partially erase the government's willingness to tax from the residuals. By consequence, using results from model (1), we can now compute tax effort for each country and for each period since our panel is almost perfectly balanced and has really few missing values. We thus divide the actual tax ratio of a country i in period t by the predicted value of this tax ratio which comes from our tax effort equation (the model (1) for example). The tax effort ratio can hence be written as:

$$TE_{i,t} = \frac{Tax_{i,t}}{\hat{Tax}_{i,t}} = \frac{\alpha + \mu_i + \gamma_t + \beta X_{i,t} + \phi Z_{i,t} + \epsilon_{i,t}}{\hat{\alpha} + \hat{\mu}_i + \hat{\gamma}_t + \hat{\beta} X_{i,t} + \hat{\phi} Z_{i,t}} = 1 + \frac{\epsilon_{i,t}}{\hat{\alpha} + \hat{\mu}_i + \hat{\gamma}_t + \hat{\beta} X_{i,t} + \hat{\phi} Z_{i,t}} \tag{4}$$

Tax effort indexes obtained from other specifications[22] would be then used to test the robustness of the relationship between debt relief and tax effort. But looking at the pairwise correlation matrix in appendix (Cf. Table 16), one can see that tax effort estimates are quite similar regardless the specification or the estimators[23] we use.

4.3.2 Tax Effort Evolution and Graphic Analysis

Before turning to the event-study models, analysis of Figure 3 and 4, which respectively represents the evolution of tax revenues (in % of GDP) and of tax effort around different debt relief points can give some intuitions about the debt relief effects. In Figure 3, graph (a) denotes the average evolution of the tax ratio for 22 HIPCs that have all reached their decision point in 2000. One can clearly see that the difference in tax share between the post- and pre-decision point is positive, what confirms findings of Cassimon et al. [2015].

However, if we now look at the average tax share's evolution for the "narrow" control group (graph (b)), it appears that the difference between the pre- and the post-decision point (or between the pre- and post-2000 year) is also positive. The same is true for the "extended" control group and the "African" control group, though less obvious for the latter. Turning to graphs (c) and (d) that now pool different HIPCs' cohorts according to the event-year[24], confirms that although the post-debt relief period seems to be associated with higher tax ratios, this increase is probably due to a positive tendency among low-income countries in domestic resource mobilization. Nevertheless, looking closely to these graphs, we can isolate certain fluctuations in tax share which seem to be observed only for HIPCs. Focusing on the decision point, we can notice an acceleration in tax ratio for HIPCs countries over the 4-5 years before they reach their decision point. This improvement in tax ratio is not observed for the other control group which are more on a downward path as we come close to the decision point. This increase might reflects the adjustment effort of potentially eligible countries in prospect of debt relief under the Enhanced HIPC initiative as graphs a), (b), (d), (e) and (f) exposing tax effort evolution around the decision point seem to suggest.

In addition, there seems to be a common trend[25] for the HIPCs and the "narrow" control group over the years running from -10 to -5/-4, with then a sharp acceleration of HIPCs to reach the decision point. As previously explained, the first HIPC initiative has been launched in 1996, and even if the Enhanced HIPC initiative of 1999 differs in terms of indebtedness threshold and debt relief delivery speed, conditions on structural reforms were already part of requirements to benefit from the original HIPC initiative. So one can see that the increase for HIPCs, which accelerates 4 years before the decision point (2000 if we

[22] Models (2) to (4) for instance, or model (1) to (4) with LSDV estimators with and without lagged values of endogenous variables.

[23] Pairwise correlations between tax effort models estimated with PCSE and LSDV estimators with lagged values of endogenous variables are not reported but are all superior to 70% and are all statistically significant.

[24] The average tax share for control group is computed over the different control groups' average value with respect to their associated HIPCs' cohort (cf. Table 2).

[25] Test for parallel trends between HIPCs and the "narrow" control group are exposed in Table 17 in appendix.

look at graph (a)), coincides with the year of the first HIPC initiative's launch (1996). By consequence, this sharp improvement in tax effort recorded from -4 to 0 could reflect the willingness of potential eligible government to get debt relief under the Enhanced HIPC and therefore the desire of fulfilling the required eligibility criteria such as structural reforms' implementation. Nevertheless, according to the same graphs, HIPCs also seem to loosen their effort once they have reached the decision point, reflecting hence potential moral hazard effects. In addition if we take a look at the evolution of tax effort in graph (c) and (d) we also observe this decrease after the HIPC process and even a quite worrying fall at the end of the period of study.

5 Debt Relief Impacts on Government's Tax Effort

5.1 Benchmark Results

Table 4 exposes results of equation (1)[26] where estimates have been obtained using Bootstrap procedure which is based on intensive re-sampling and hence provides reliable estimates given the feature of our dependent variable. Since tax effort is obtained through first-stage estimate, the risk of measurement errors is non-negligible and can therefore be reduced using this re-sampling methodology. Note that tax effort estimates used in results reported in Table 4 are obtained using our first-stage preferred model; the model (1) in Table 3 using Panel Corrected Standard Errors (PCSE) estimators, time and country fixed effects.

Looking at results in columns (I) to (IV) for our sample of 29 HIPCs over the [-6; +6] debt relief calendar and for our sample of 26 HIPCs over the expanded debt relief calendar [-10; +10], we observe that there is an average positive impact of having reached the decision point on government willingness to tax, supporting thus the debt overhang theory's predictions as well as our "graphical intuitions". Moreover, if in absolute value the impact of having reached the decision point is positive, the "real" impact of the program as compared with the "narrow" control group is even higher given the negative difference recorded by the counter-factual between the pre- and post-decision point period. According to those results, we can say that, in average, having reached the decision point leads to levy 10% more of the country tax base or "Tax Capacity", as compared with the situation where country would not benefit from debt relief under the decision point of the Enhanced HIPC initiative. Table 4 also shows that this higher level of tax effort after the decision point is not due to global or even regional trends, since coefficients for comparison with both the "extended" and the "African" control groups are also positive and statistically significant.

Focusing then on the magnitude of these coefficients it even seems that the post-decision point period is characterized by a decrease in tax effort for each control groups (since the coefficient is higher than the absolute variation for HIPCs). One could therefore say that debt relief provided at the decision point has contributed to improve HIPCs willingness to tax, in a context of global decreasing tax effort. So going back to Figure (1) and graphs with tax ratios, results suggest that even if control groups record increase in domestic tax revenues during the post-decision point period, this increase is probably due to structural factors (such as increasing imports, significant per capita GDP growth), contrary to HIPCs which seem to drag their additional tax revenues from larger government's endeavors to mobilize domestic resources.

Columns (V) to (VIII) in Table 4 then show results for the tax effort reaction to completion point and the whole HIPC process. As expected looking at graphs in Figure (2), having reached the completion point seems to reduced the willingness to tax in HIPCs. Results in column (V) include over-estimated coefficients for Niger which explains why coefficients for the post-completion point are not statistically significant. However if we look at results in column (VI) relatively to the "narrow" control group, the impact of having reached the completion point seems to be a little bit less robust. But one could expect to observe such effect in HIPC countries since the completion point marks the end of the Enhanced HIPC process and

[26] Using absolute and relative values of the dependent variable in order to account for the counter-factual evolution, as exposed in equation (2).

therefore the end of the conditionality linked to debt relief provision. Now the government has received debt forgiveness and is not under the IMF and World Bank "supervision" anymore, it could basically decide to loosen domestic resource mobilization and look for new financing sources abroad, reinforcing moral hazard suspicions. Nevertheless, looking at coefficients relative to the "African" control group, one can think that the decrease in government willingness to tax follows a regional trend and is not wholly due to the end of the Enhanced HIPC program.

According to Table 4, we can reasonably think that HIPCs develop higher tax effort after the decision point but that this effort is gradually reducing. But, although the level of tax effort during the interim period is larger than the one prior the decision point, the gradual reduction during this period associated with the slight drop observed after the completion point, finally leads to an average level over the period after the HIPC process that is equal to the one recorded before (as exposed in column (VIII)).

5.2 Validity of Benchmark Estimators and Control Groups

5.2.1 Event-Study versus Difference-in-Differences

In a way, the equation (1) we estimate is rather close to the difference-in-differences approach. However, even if this model allows to test the variation before and after, relatively to a given control group, the specification does not lead to an exact difference-in-differences estimate. If the difference-in-differences model was correctly specified, we would be able to compare HIPCs that have reached their decision point with HIPCs that did not reach their decision point yet. In order to do that, one must exit from the debt relief-calendar previously defined and test the following model:

$$TE_{i,t} = \alpha + \delta HIPC_i + \phi Post_{i,t} + \beta HIPC_i * Post_{i,t} + \epsilon_{i,t} (5)$$

Where t is now the year expressed in regular time-calendar (not in debt relief-calendar), $HIPC_i$ is a dummy variable that takes 1 if the country i is an HIPCs and 0 otherwise, $Post_{i,t}$ is a dummy variable that takes 1 for the year the HIPC i reaches its decision point and for all the subsequent years (the dummy is thus equal to 0 in all years prior the decision point), and $HIPC_i * Post_{i,t}$ is an interaction term that takes only 1 for the HIPC i that, in t, are in its post-decision point period.

Such methodology leads to proper difference-in-differences estimates (Angrist and Pischke [2008]), and in addition allows to "inflate" the number of countries in the control group which now represents a counterfactual even closer from the treated group since some control group countries will become eligible for the Enhanced HIPC initiative one, two, three, or five years after first HIPCs had reached their decision point. However, one problem remains: what is the $Post$ period for control group countries which do not benefit from the Enhanced HIPC initiative at all? Given that these countries did not reach any debt relief-point and that countries which did, did it at different dates, it is impossible to define a specific post-debt relief period for non-HIPC control group countries. Therefore we use another widely-used specification of this model which replaces the $HIPC$ dummy by country fixed effects, and the $Post$ variable by time fixed effects. This model is therefore expressed as:

$$TE_{i,t} = \alpha + \nu_i + \delta_t + \beta HIPC_i * Post_{i,t} + \epsilon_{i,t} \quad (6)$$

Where ν_i and δ_t denote respectively the n-1 country and t-1 time fixed effects. Nevertheless this model is not suitable for the analysis of every "debt relief point".

Table 4: Tax Effort - Reaction to the Decision-Point - Bootstrap Estimates

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Debt Relief Point:	**D.P.** [-6; +6]		**D.P.** [-10; +10]		**C.P.** [-6; +6]		**HIPC P.** [-6; +6]	
Tax Effort Estimators	PCSE		PCSE		PCSE		PCSE	
Absolute variation								
Post-Debt Relief Point	0.068***	0.050***	0.099***	0.064***	-0.027	-0.054***	0.056**	0.008
	(4.463)	(2.767)	(5.349)	(4.686)	(-1.414)	(-3.047)	(-3.261)	(2.010)
F-Statistics (p-value)	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Narrow Control Group								
Post-Debt Relief Point	0.118***	0.099***	0.150***	0.115***	-0.004	-0.032*	0.074**	0.025
	(7.708)	(5.391)	(8.053)	(6.602)	(-0.233)	(-1.728)	(2.282)	(1.279)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Extended Control Group								
Post-Debt Relief Point	0.081***	0.063***	0.120***	0.085***	-0.010	-0.038**	0.076**	0.027
	(3.817)	(3.604)	(6.536)	(4.111)	(-0.483)	(-2.151)	(3.053)	(1.505)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
African Control Group								
Post-Debt Relief Point	0.109***	0.090***	0.138***	0.103***	0.009	-0.018	0.117***	0.068***
	(5.297)	(5.111)	(6.168)	(5.465)	(0.559)	(-1.037)	(4.456)	(3.368)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outliers (Niger)	Yes	No	Yes	No	Yes	No	Yes	No
Observations	362	349	507	486	266	253	245	233
HIPC Countries	29	28	26	25	21	20	21	20

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA 13. Columns (I) and (II) expose results for a sample of 29 HIPCs that have reached their decision point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Columns (III) to (IV) expose results for a sample of 26 HIPCs that have reached their decision point no later than 2002 which allows to have a longer insight on the tax effort's reaction to debt relief provided under the decision point. The relative debt relief calendar runs indeed from -10 to +10. Columns (V) to (VIII) expose results for a sample of 21 HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Finally some estimates intentionally omit tax effort figures for Niger which when estimated with PCSE estimators are over-estimated (gives tax effort indexes above 2 for the 2000s). Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

Though appropriate for the review of the decision point and the whole interim period effects, equation (7) cannot be used for an analysis of the completion point's impact. Indeed, if one defines the $Post_{i,t}$ variable as a dummy taking 1 for the year the HIPC i reaches its completion point and for all the subsequent years, some HIPCs that have reached their decision point but not their completion point yet will be included in the control group. Therefore, the control group will include countries that have benefited from debt relief between the decision and the completion point and that are by consequent defined as treated. Moreover, running model (7) with the extended and the African control groups to control for global and regional trend would also lead to include some HIPCs in these control groups what would therefore prevent to accurately test the role played by these potential global and regional trends.

Equation (7) is therefore only estimated for the decision point, both on the HIPCs sample that have entered the initiative no later than 2006, and on the one where HIPCs have reached their decision point no later than 2002 (in order to have a longer post-decision point period). We also estimate this model for the whole HIPC process. Table 5 hence reports coefficients of interest (β in equation (7) i.e. coefficients associated to the interaction term $HIPC_i * Post_{i,t}$), so respectively for tax effort reaction to the decision point and to the interim period. Looking at this table, we can see that the positive impact following the achievement of the decision point and relative to the "narrow" control group is robust to the classic diff-in-diff specification. Coefficients are indeed really similar to those from the event-study model, though a little bit lower, ranging now between 7.8 and 9.6% of additional share of the tax capacity collected relatively to the narrow control group. Results are here also robust to potential global or regional trends, since the difference between the "extended" and the "African" control groups is also positive and statistically significant. In addition, since we do not define an observation as the difference in value between the HIPC and the average of its related control group, the number of observations is now significantly larger, what tends to provide even more reliable estimates.

Finally one can also note that, as for estimates with the event-study procedure, the HIPC process taken as a whole does not seem to have any impact on the government's willingness to tax. Coefficients are only statistically significant when we compare HIPCs to the "extended" and the "African" control groups, which, as already explained, are just used to control for potential trend effects within the developing world and the African continent. So in overall, our intuition that tax effort increases only at the decision point and then reduces gradually alongside debt relief provision seems confirmed by these robustness checks.

5.2.2 Alternative Control Groups

Up to this point, the comparison with the "extended" and the "African" control groups shows that the debt relief impacts are not driven by a common tendency among developing countries as well as among African countries. However, since the "narrow" control group represents our benchmark control group, one might have some doubts about the level of the cutoffs we use in order to identify the "narrow" control group countries. As explained in section 3.2, we include in this control group countries which, over the five years preceding the decision-point date of each HIPCs' cohorts, had an average debt-to-exports ratio superior to 170% and which have been classified, at least 3 years over these 5, as a low-income country by the World Bank. But what happen if we change these criteria? Do we get a really different control group? Do the results still hold? In order to test the robustness of our results to these selection criteria, we identify four other potential "narrow" control groups that have been obtained using different cutoffs in terms of indebtedness ratio and income classification.

First and as exposed in section 2, the required indebtedness ratio in order to be eligible for the Enhanced HIPC Initiative was set to 150% of the exports (in NPV). However, the IMF and the World Bank were able to make some exceptions for countries which recorded a large openness rate and were not satisfying the 150% ratio, although their external public debt was burdensome.[27] For this particular type of country, the

[27] Countries like Senegal or Cameroon for instance

Table 5: Tax Effort - DiD Coefficients - Bootstrap Estimates

	(I)	(II)	(III)	(IV)	(V)
Debt Relief Point	**D.P.**		**D.P. Ext.**		**HIPC P.**
Tax Effort Estimators	PCSE		PCSE		PCSE
Narrow Control Group					
HIPC*Post-Debt Relief Point	0.103***	0.078***	0.133***	0.096***	0.048
	(3.411)	(2.627)	(3.899)	(3.166)	(1.542)
Outliers (Niger)	Yes	No	Yes	No	No
Observations	843	823	896	873	609
Extended Control Group					
HIPC*Post-Debt Relief Point	0.107***	0.077***	0.130***	0.090***	0.045**
	(5.832)	(4.037)	(5.512)	(4.372)	(2.388)
Outliers (Niger)	Yes	No	Yes	No	No
Observations	1,961	1,941	2,138	2,115	1,727
African Control Group					
HIPC*Post-Debt Relief Point	0.122***	0.097***	0.136***	0.099***	0.074**
	(3.837)	(3.520)	(5.250)	(3.348)	(2.523)
Outliers (Niger)	Yes	No	Yes	No	No
Observations	857	837	919	896	623

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA. Columns (I) to (II) expose results for a sample of 29 HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Equations (III) to (IV) expose results for a sample of 26 HIPCs that have reached their completion point no later than 2002. The debt relief calendar for this second sample goes from -10 to +10. Column (V) finally exposes results for a sample of 21 HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. All estimates are obtained from equation (6) and thus include both country and time fixed effects. Some estimates intentionally omit tax effort figures for Niger which when estimated with PCSE estimators are over-estimated (gives tax effort indexes above 2 for the 2000s). F-statistics p-values are not reported here but are all significant at the 5% level. Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

required ratio was not defined in balance of payments terms but in fiscal terms with a required indebtedness threshold equal to 250% of their domestic revenues (in NPV). By consequence, we first define a new control group called "Panel A" including countries which, over the five years preceding the decision-point date of each HIPCs' cohorts, had an average debt-to-domestic revenues ratio superior to 300%[28] and which have been classified, at least 3 years over these 5, as a low-income country by the World Bank. We then declare as "Panel B" countries that meet the same indebtedness criteria but which were classified as a low-income country all along the pre-decision point period of each HIPCs' cohort (so 5 years over 5). Then, the third control group called "Panel C" includes countries with an average debt-to-exports ratio superior to 175% but which were also classified each year of the pre-decision point period as a low-income country. Finally, as regards the last control group named "Panel D", we gather countries which recorded an average indebtedness ratio superior to 200% of their exports, and which have been classified at least 3 years over the 5[29] preceding

[28] In order to allow for a certain degree of concessionality.

[29] If we had considered countries which were always low-income countries over the 5 years, we would have end with a too small control group.

the decision point of each HIPCs' cohort. Table 18 in appendix exposes the different control groups.

Table 6 exposes results with the event-study procedure and the several alternative control groups. Looking first at columns (I) to (IV) and the impact of having reached the decision point, we can see that whatever the control group we consider, results are positive and highly statistically significant hence supporting previous findings with our reference control group. Moreover, looking at the magnitude of this impact, we note that the positive effect of having reached the decision point is higher when we consider in the control group, countries close to the HIPCs in term of income level. Panel B and Panel C indeed include control group countries which were classified as low-income countries every year over the five years preceding the decision point of each HIPCs' cohort. Then looking at column (V), results seem to indicate different effects of having reached the completion point according to the control group we consider. If one compare the evolution of HIPCs' tax effort around the completion point relative to Panel A and D, results indicate that the impact is negative. However, considering now Panel C, one can think that the impact is positive. The same is however not true if one look at the impact of having benefited from the whole Enhanced HIPC initiative. Results from column (VI) indeed suggest that the positive impact is larger when control group includes countries which are highly indebted and always classified as low-income country prior to the decision point. In overall, this table mostly exposes that contrary to the decision point, the impact of the having reached the completion point although likely negative, is not evident. Finally, we also run difference-in-differences estimates using these several control groups.[30] Results are in line with those just exposed. The magnitude of the coefficients is however slightly lower, but results clearly support a positive effect of having benefited from debt relief under the decision point, and an undefined impact of having reached the completion point.

5.2.3 Selection Issue

Across all these estimates, we have compared the evolution of HIPCs' tax effort around different debt relief points, and relatively to several control groups. Comparisons with the "narrow" control group have led to measure the potential treatment effect, with the treatment being debt relief provided under the debt relief points and over the years following these points. The robustness of these control groups has been tested using different cutoffs for the criteria that decide the inclusion in the "narrow" control group. And finally, we have also compared the evolution of HIPCs' tax effort to the average evolution of this variable within both the "developing world", and the non-HIPC Africa, in order to control for potential global and regional tendencies.

However, although these multiple comparisons can lead to think that debt relief granted under the Enhanced HIPC initiative has indeed impacted tax effort in benefiting countries, we still could have some suspicions as regards the real impact of this debt relief program since, as described in section 3, the "narrow" control group is not totally satisfying. Indeed, we explained above that even if countries included into the "narrow" control group recorded similar economic characteristics over the years preceding the implementation of the Enhanced HIPC initiative (what made them eligible for debt relief under this program), the simple fact that they did not benefit from the initiative make them different from the HIPCs. In that sense, although the "narrow" control group provides certain external validity to our results, findings are still slightly sullied with selection bias.

A final attempt to control for potential selection bias would be to define a control group only composed of "future HIPCs", i.e. countries that entered late into the Enhanced HIPC process and which, although eligible for the initiative in the early and mid-2000s, only benefited from it after 2006. Using this control group would lead to use a kind of pipeline approach commonly applied in experimental economics where control group is composed of individuals who are eligible for the treatment but who have not been randomly chosen to benefit from the treatment in the first stage, and will benefit from it later on. We can see the

[30] Results are not reported here in order to save space.

Table 6: Alternative Control Groups - Sensitivity to Selection Criteria - Bootstrap Estimates

	(I)	(II)	(III)	(IV)	(V)	(VI)
Debt Relief Point:	**D.P.** [-6; +6]		**D.P.** [-10; +10]		**C.P.**	**HIPC P.**
Tax Effort Estimators	PCSE		PCSE		PCSE	
Panel A						
Post-Debt Relief Point	0.067***	0.049***	0.126***	0.091***	-0.055***	0.013
	(3.331)	(3.030)	(6.179)	(6.354)	(-3.349)	(0.663)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.019
Panel B						
Post-Debt Relief Point	0.156***	0.137***	0.223***	0.188***	0.018	0.130***
	(7.885)	(7.927)	(10.33)	(10.06)	(1.031)	(5.996)
F-Statistics (p-value)	0.000	0.000	0.001	0.000	0.000	0.000
Panel C						
Post-Debt Relief Point	0.213***	0.194***	0.263***	0.228***	0.038*	0.148***
	(9.530)	(11.78)	(11.75)	(11.21)	(1.916)	(6.576)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Panel D						
Post-Debt Relief Point	0.085***	0.067***	0.129***	0.093***	-0.042**	0.042*
	(5.058)	(3.669)	(5.882)	(5.016)	(-2.168)	(1.897)
F-Statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Outliers (Niger)	Yes	No	Yes	No	No	No
Observations	362	349	507	486	253	253
HIPC Countries	29	28	26	25	20	20

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA. Columns (I) to (II) expose results for a sample of 29 HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Columns (III) to (IV) expose results for a sample of 26 HIPCs that have reached their completion point no later than 2002. The debt relief calendar for this second sample goes from -10 to +10. Columns (V) and (VI) expose results for a sample of 21 HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Some estimates intentionally omit tax effort figures for Niger which when estimated with PCSE estimators are over-estimated (gives tax effort indexes above 2 for the 2000s). **Panel A**: Debt/Revenues sup. **300%** and LIC status **(3/5)**, **30** control group countries; **Panel B**: Debt/Revenues sup. **300%** and LIC status **(5/5)**, **23** control group countries; **Panel C**: Debt/Exports sup. **175%** and LIC status **(5/5)**, **15** control group countries; **Panel D**: Debt/Exports sup. **200%** and LIC status **(3/5)**, **12** control group countries. Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

parallel with a control group made of future HIPCs, though the random feature is completely unlikely in our case. By consequence, using model (7) with only HIPCs in the sample, regardless their decision or completion point date (i.e. considering all HIPCs), leads to define a moving control group made of future HIPCs. However, the moving feature of this control group leads to some problems. Since HIPCs are entering the Enhanced HIPC initiative at different dates, one by one or by clusters of countries, the control group reduces as we move away from the debt relief point. For instance, as regards the decision point, in 2000,

the control group is composed of 15 future HIPCs (Cf. Table 1 above).[31] But in 2006, the control group is only composed of 8 HIPCs that did not reach their completion point in 2006, and this number even falls to 4 in 2008. Therefore, results must not be taken too seriously but can nevertheless give additional intuitions about the impact of the Enhanced HIPC initiative on benefiting countries' tax effort.

Table 7 exposes estimates of model (7) where 37 countries defined as HIPCs are included into the sample. Results confirm that having reached the decision point leads to higher tax effort level. Coefficients associated with the interaction term between HIPC and the post-decision point period are statistically significant at the 1% level and range between 8 and 11.5 percentage point when we compare to the "narrow" control group. This means that the country which would collect 80% of what its economy offers during the pre-decision point would, once the decision point reached, collect between 88 and 91.5% of its tax base. Results also seem to confirm moral hazard effects at the completion point. According to the Table, attaining the post-Completion point leads to a significant decrease in tax effort that totally offsets the positive impact of having met the decision point. Therefore, it is not surprising to find, as before, an absence of debt relief effects when we look at the impact of the whole HIPC process.

Table 7: Tax Effort Evolution among Current and Future HIPCs - Bootstrap Estimates

	(I)	(II)	(III)	(IV)	(V)	(VI)
Debt Relief Point:	**D.P.**		**D.P. Ext.**		**C.P.**	**HIPC P.**
Tax Effort Estimators	PCSE		PCSE		PCSE	
Future HIPCs						
HIPC*Post-Debt Relief Point	0.086***	0.082***	0.097***	0.089***	-0.089***	-0.033
	(2.901)	(2.829)	(3.808)	(2.699)	(-3.120)	(-1.183)
Observations	668	648	762	739	648	502
Outliers (Niger)	Yes	No	Yes	No	No	No
Number of HIPCs	37	36	37	36	37	36

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA. Columns (II) and (IV) intentionally omit tax effort figures for Niger which are over-estimated (gives unreliable tax effort indexes). F-statistics p-values are not reported here but are all significant at the 1% level (except for the "HIPC process" equation). Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

5.3 Validity of the Tax Effort's Measure

5.3.1 Testing for Different Tax Effort Estimates

We now test the results by estimating equation (1) relatively to our different control groups, but using alternative dependent variable estimates. As explained in section 4, our preferred tax effort measure is the one obtained using the model (1) and the PCSE estimators which both take in account heteroskedasticity and serial auto-correlation issues. But since we find that having reached the decision point leads to a positive impact on HIPCs governments' tax effort with our preferred estimate of tax effort, it would be now interesting to test whether these effects hold when we replace tax effort obtained with PCSE estimators by tax effort obtained using alternative first-stage specification and estimators.

Consequently, Table 8 shows results of equation (1) with now different measures of tax effort (that is still expressed relatively to the "narrow", the "extended", the "African", the Panel B, C, and the "HIPCs-to-be"

[31] Haiti is excluded for the reasons previously exposed. However we include Eritrea and Sudan that are defined as HIPCs in pre-decision point phase. We do not include Somalia which has the same status, because of lack of data.

control groups) obtained from tax effort models (3) and (4) exposed in Table 3.[32] Table 9 reports results with now the tax effort measure obtained through model (1) but with different estimators. Columns (I), (III), (V) and (VII) describe results when tax effort is estimated using the OLS estimators with country fixed effects (LSDV estimators). These estimates are the closest from these of Table 4, since like PCSE estimators, tax effort model with LSDV estimators does not account for potential endogeneity issue. Columns (II), (IV), (VI), (VI) and (VIII) then show results for model (1), when we try to control for potential endogeneity within the first-step estimate in a ad-hoc way. Tax effort is indeed obtained from specifications where potential endogenous variables are one year-lagged. This treatment of reverse causality is not optimal since expectations of future tax policies is likely to shape actual economic outcomes. Nevertheless, we suppose that it can slightly accounts for simultaneous endogeneity issues such as exogenous shocks that can bias coefficients' magnitude and significance. Tax effort measures for these columns are therefore obtained with PCSE estimators. Results of Table 8 and 9 suggest that having reached the decision point has a positive impact on benefiting countries regardless the estimators or the tax effort model we consider in the first-stage estimate.[33]

Furthermore we also notice that, as with the benchmark specification, average tax effort seems to reduce once HIPCs have reached their completion point. However, the effect is now only significant when we compare HIPCs' tax effort evolution relatively to the "narrow", the "extended" and the "Future HIPCs" control groups. The effect of having reached the completion point is indeed not significant when we compare the evolution of tax effort between the treated group and the "African", and Panel B and C control groups. Therefore, although there seems to be a fall in tax effort around the completion point, it is likely that this fall is due to a downward regional or global-LICs trend, rather than a disincentive effect of having reached the completion point.

Finally, as regards the effect of the whole HIPC process, we can see that having benefited from debt relief during the interim period does not lead in average to higher level of tax effort relatively to the "narrow",the "extended" and the "Future HIPCs" control groups which is quite logical since the impact of having reached the completion point is significantly negative relatively to these three countries groups. On the contrary, we can note an average improvement as compared with the "African", Panel B and C control groups. But this effect is not robust enough to conclude to an overall positive effect as regards the whole HIPC process.

5.3.2 Non-Estimated Tax Effort Variables

So far, we have used a first-stage estimated tax effort variable which according to us and the fiscal data availability in developing countries represents the best proxy for the government's willingness to tax. However, as we have already explained, this variable is subject to measurement errors that can still fuel some doubts about the real reaction of HIPC government's tax effort to debt relief provision. Therefore, we finally suggest to use disaggregated tax variables using the ICTD (International Center for Tax and Development) dataset of April 2014 (Prichard et al. [2014]) which gathers tax data for many developing countries with breakdown between direct and indirect taxes. This dataset basically builds on the same sources than ours. The pairwise correlation between our variable of tax revenues excluding natural resources revenues and the one from the ICTD dataset is superior to 75% supporting hence the reliability of our own dataset. Using Article IV, Staff Report and the Government Finance Statistics (GFS) dataset of the IMF, the ICTD dataset manages to gather lot of information about disaggregated taxes in the developing world. However, this dataset presents the inconvenient of still having a sizable amount of missing values as compare to ours (Cf. Table 19 in appendix). More than a fourth of the information is lacking, especially for HIPCs which therefore prevents us to use this dataset for our benchmark estimates. Nevertheless, looking at the impact

[32] Results with tax effort obtained with the model (2) are not reported by save of space but are similar to those of Table 8.

[33] Note that results with other combinations of tax effort models and estimators are not reported here but also support these robustness checks. They are available on request to the author.

of debt relief points on disaggregated tax variables can provide interesting additional robustness checks and definitely validate results found with our estimated tax effort measure.

Therefore, we decide to look at two types of disaggregated taxes that can reflects the government's willingness to tax: the indirect and the direct taxes (both excluding natural resource revenues). Among indirect taxes which mainly comprise taxes on goods and services (value-added taxes (VAT), sales and excise taxes) and international trade taxes, we consider taxes on goods and services as the best proxy for government willingness to tax since increases in VAT and sales taxes is partly related to economic performances but also depends largely on the quality of the tax administration's follow-up on self-assessed tax declarations. As regards direct taxes that includes taxes on incomes, profits and capital gains, we consider the aggregated direct taxes variable as a good proxy for this government's willingness to tax since collecting taxes on incomes[34] and profits in developing countries also requires strong involvement from the tax administration. However, according to the Decision-Point Documents, we expect to find positive impact of the Enhanced HIPC initiative mainly on goods and services taxes since macroeconomic reforms required to be eligible for the debt relief initiative, especially the ones focused on taxation, mainly concern indirect taxes rather than direct taxes. Indeed, looking back at the Decision-Point Document for Mali, IFIs were calling for a "*[...] unification of the value-added tax at a single rate of 18 percent, and improving the efficiency of tax-collection agencies.*".

We therefore run event-study models (the equation (1)) with these disaggregated taxes as dependent variable and still as compared with our different control groups. But following Mahdavi [2008], we believe that disaggregated taxes such as direct of indirect taxes fluctuate according to the economic environment. Therefore, in order to control for structural factors evolution that might explain in place of debt relief these increases in disaggregated taxes, we run models with disaggregated tax variables including the same control variables as the ones present within the tax effort specification (model (1)) in section 3. We also switch from the event-study to the difference-in-differences approach in order to consider more observations and to make easier the definition of the control variables (not expressed as the difference between the HIPC observation and the average value in its corresponding control group). Table 10 shows the results for the decision point and the whole HIPC process but not for the completion point since, in diff-in-diff, control groups include HIPCs that have not reached their completion point yet (cf. above). Results indicate that positive effects of debt relief under the decision point on indirect taxes and especially goods and services taxes is significant and robust across almost all the control groups (except for the "extended" and "future HIPCs" control groups). Moreover, looking at columns (IV) to (VI) it seems that having benefited from the HIPC initiative as a whole is positively correlated with taxes on goods and services. However, since results for taxes on goods and services are positive and significant, the non significance of indirect taxes might be therefore driven by a lower level of trade taxes after the post-HIPC process period what could be possible given the trade-oriented macroeconomic reforms defined within the PRGF.[35]

These robustness checks allow us to think that additional governments' tax efforts have probably been focused on indirect taxes improvements such as the VAT taxes, what is also in line with recommendations defined into the Decision-Point documents. So in order to finally verify whether this increase depends on the conditionality set into these documents or on the opportunity of enjoying domestic revenues following debt cancellation, we next tries to observe the timing reaction of government's tax effort to debt relief provision.

[34] Taxes on income represents more than 93% of the direct taxes

[35] Running these estimates without control variables leads to similar results, except that the impact of having reached the decision point on direct taxes is positive and statistically significant when we do not control for the economic environment.

Table 8: Sensitivity to Tax Effort Models - Bootstrap Estimates

Tax Effort Estimators: PCSE	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Debt Relief Point	**D.P.** [-6; +6]		**D.P.** [-10; +10]		**C.P.** [-6; +6]		**HIPC P.** [-6; +6]	
Tax Effort Model	model 3	model 4	model 3	model 4	model 3	model 4	model 3	model 4
Narrow Control Group								
HIPC*Post-Debt Relief Point	0.086***	0.093***	0.095***	0.102***	-0.046***	-0.046***	0.004	0.005
	(3.980)	(4.945)	(4.804)	(7.096)	(-2.688)	(-2.594)	(0.141)	(0.192)
Extended Control Group								
HIPC*Post-Debt Relief Point	0.044**	0.049***	0.066***	0.075***	-0.056***	-0.054***	0.001	0.006
	(2.350)	(2.702)	(3.580)	(5.477)	(-2.878)	(-2.726)	(0.064)	(0.272)
African Control Group								
HIPC*Post-Debt Relief Point	0.078***	0.075***	0.083***	0.085***	-0.035**	-0.036*	0.044*	0.040**
	(3.558)	(3.839)	(4.181)	(4.328)	(-2.055)	(-1.823)	(1.920)	(2.033)
Panel B								
HIPC*Post-Debt Relief Point	0.115***	0.119***	0.151***	0.154***	-0.006	-0.006	0.093***	0.095***
	(5.925)	(6.053)	(7.243)	(7.259)	(-0.337)	(-0.275)	(4.735)	(4.629)
Panel C								
HIPC*Post-Debt Relief Point	0.171***	0.178***	0.207***	0.214***	0.026	0.024	0.134***	0.130***
	(8.514)	(8.276)	(10.634)	(13.742)	(1.281)	(1.373)	(6.563)	(5.043)
Observations	323	322	444	443	246	245	221	221
HIPC Countries	28	28	25	25	20	20	20	20
Future HIPCs								
HIPC*Post-Debt Relief Point	0.103***	0.095**	0.118***	0.113***	-0.048*	-0.064**	0.015	-0.012
	(3.361)	(2.569)	(3.245)	(3.907)	(-1.667)	(-2.488)	(0.396)	(-0.291)
Observations	581	579	656	654	581	579	443	443
HIPC Countries	36	36	36	36	36	36	36	36

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA. Columns (I) and (II) expose results for a sample of 29 HIPCs that have reached their decision point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Columns (III) to (VI) expose results for a sample of 26 HIPCs that have reached their decision point no later than 2002 which allows to have a longer insight on the tax effort's reaction to debt relief provided under the decision point. The relative debt relief calendar runs indeed from -10 to +10. Columns (I), (III), (V) and (VII) report results for estimates using tax effort obtained through model (3) exposed in Table 3. The remaining columns show results when the tax effort measure comes from the model (4). Estimates do not include figures for Niger that are overestimated when we use the PCSE estimators. F-statistics p-values are not reported here but are all significant at the 5% level when the coefficient is statistically significant. Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

Table 9: Sensitivity to Tax Effort Estimators - Bootstrap Estimates

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Debt Relief Point:	**D.P.** [-6; +6]		**D.P.** [-10; +10]		**C.P.** [-6; +6]		**HIPC P.** [-6; +6]	
Tax Effort Estimators	LSDV	PCSE.L	LSDV	PCSE.L	LSDV	PCSE.L	LSDV	PCSE.L
Narrow Control Group								
HIPC*Post-Debt Relief Point	0.084***	0.090***	0.061***	0.099***	-0.040**	-0.028	0.010	0.028
	(4.348)	(6.090)	(3.839)	(6.068)	(-2.004)	(-1.451)	(0.382)	(1.176)
Extended Control Group								
HIPC*Post-Debt Relief Point	0.032**	0.030	0.033**	0.026	-0.051***	-0.051***	0.001	0.001
	(2.103)	(1.604)	(2.133)	(1.572)	(-3.041)	(-2.763)	(0.090)	(0.064)
African Control Group								
HIPC*Post-Debt Relief Point	0.065***	0.071***	0.064***	0.076***	-0.022	-0.019	0.054***	0.062***
	(3.447)	(4.525)	(4.356)	(3.694)	(-1.407)	(-1.100)	(2.738)	(2.677)
Panel B								
HIPC*Post-Debt Relief Point	0.110***	0.118***	0.127***	0.156***	-0.001	0.013	0.101***	0.123***
	(5.479)	(6.028)	(6.689)	(8.417)	(-0.104)	(0.743)	(3.446)	(4.873)
Panel C								
HIPC*Post-Debt Relief Point	0.182***	0.189***	0.179**	0.223***	0.028	0.043**	0.120***	0.152***
	(8.595)	(12.63)	(9.818)	(12.14)	(1.446)	(2.286)	(5.175)	(6.693)
Observations	362	362	507	468	266	267	245	246
HIPC Countries	29	29	29	28	21	21	21	21
Future HIPCs								
HIPC*Post-Debt Relief Point	0.078***	0.089***	0.096***	0.106***	-0.079***	-0.052*	-0.011	0.009
	(2.841)	(3.358)	(3.595)	(3.678)	(-2.650)	(-1.783)	(-0.317)	(0.269)
Observations	668	636	762	709	668	636	517	485
Number of HIPCs	37	36	37	36	37	37	37	37

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA. Columns (I) and (II) expose results for a sample of 29 HIPCs that have reached their decision point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Columns (III) to (VI) expose results for a sample of 26 HIPCs that have reached their decision point no later than 2002 which allows to have a longer insight on the tax effort's reaction to debt relief provided under the decision point. The relative debt relief calendar runs indeed from -10 to +10. Columns (I), (III), (V)and (VII) report results when tax effort is estimated with LSDV estimators. Columns (II), (IV), (VI) and (VIII) report results when tax effort is estimated using PCSE estimators with lagged endogenous variables. Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01$, $^{**}p \leq 0.05$, $^{*}p \leq 0.1$.

Table 10: Disaggregated Taxes - Reaction to Debt Relief - Control for Economic Environment

	(I)	(II)	(III)	(IV)	(V)	(VI)
Debt Relief Point:	**D.P.** [-10; +10]			**HIPC P.** [-6; +6]		
Dep. variable: Taxes of which	Direct	Indirect	G&S	Direct	Indirect	G&S
Diff-in-Diff methodology						
Narrow Control Group						
Post-Debt Relief Point	-0.071	0.693**	1.149***	0.190	0.208	1.275***
	(-0.212)	(2.097)	(3.762)	(0.372)	(0.394)	(3.943)
Observations	664	661	639	449	450	425
Extended Control Group						
Post-Debt Relief Point	-0.189	1.028***	0.456	-0.352	0.811*	0.556
	(-0.712)	(2.664)	(1.116)	(-0.814)	(1.762)	(1.096)
Observations	1,617	1,619	1,579	1,306	1,310	1,273
African Control Group						
Post-Debt Relief Point	0.186	0.815*	0.859**	0.162	0.292	0.808**
	(0.567)	(1.914)	(2.310)	(0.330)	(0.374)	(1.998)
Observations	741	735	679	516	514	458
Panel B						
Post-Debt Relief Point	0.186	1.096**	1.234***	0.340	0.849	1.637***
	(0.483)	(2.482)	(3.708)	(0.690)	(1.500)	(4.705)
Observations	727	721	711	508	506	493
Panel C						
Post-Debt Relief Point	-0.141	0.681**	1.143***	0.131	0.210	1.274***
	(-0.416)	(2.145)	(0.284)	(0.518)	(0.529)	(0.255)
Observations	653	649	627	438	438	413
Future HIPCs						
Post-Debt Relief Point	0.333	0.549	0.450	0.268	-0.024	0.966**
	(1.542)	(1.147)	(1.211)	(0.767)	(-0.038)	(2.217)
Observations	623	611	589	418	410	386

All equations are estimated using WITHIN estimators with years dummy in order to control for both country and time fixed effects. In order to save space, we only report coefficients for the Post-Debt Relief point variable, and therefore do not expose those associated to control variables. As explained above, control variables are the same as the ones used for model (1) in tax effort estimates, naming; **the log per capita GDP**, **the openness rate**, **the agriculture and resources shares**, **the log of the population density**, **the age dependency rate** and **the share of urban population** (Cf. Section 4). The equation (6) has been tested for our three different measures of taxes (direct taxes, indirect taxes and goods and services (G&S) taxes, and with respect to our six different control groups (the narrow control group, the extended control group, the African control group, the future HIPCs control group (F.HIPCs), and the panel B and panel C control groups. F-statistics p-values are not reported here but are all significant at the 1% level. Robust t-statistics based on clustered standard errors (at the country level) are exposed in parentheses. $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

5.4 Timing Effects of Debt Relief

Going back to our graphs, one thing remains to explain; the occurrence of the government's tax effort as regards decision point's achievement. Do HIPCs deploy tax efforts once debt relief has been provided, or do they display adjustment efforts before the decision point just to well-behave in front of international institutions in order to be selected for the Enhanced HIPC initiative?
We have seen that the tax effort level is significantly higher in the post-decision point period rather than in the pre-decision point period. However, according to the visual analysis, it looks like the higher level of tax effort in the post-decision point period is mostly due to the sharp increase during the 3 or 4 years preceding the decision point. This anticipatory effect is highly plausible in a setting like the HIPC process. Indeed as explained above, potential eligible countries have to satisfy some criteria before reaching the decision point and benefiting from debt relief such as implementing a macro-stabilizing program or at least showing significant improvements, in particular in their tax systems as underlined in section 2. By consequent, it is likely that the perspective of debt relief under the decision point fosters future HIPCs to deploy more than regular tax effort. Moreover, these graphs and our estimates for the completion point and the HIPC process' impacts let us think that once the country reaches the decision point, what secures future debt cancellations, the government stabilizes or diminishes its tax effort, revealing the moral hazard feature of these debt relief initiatives.

In order to observe such evolution we use a different model where, following the study of Papaioannou and Siourounis [2008] which focuses on the anticipatory and transitional effects of democratic transition on economic growth, we divide the whole period in different sub-periods in order to account for timing effects of debt relief under the decision point. We therefore keep 26 HIPCs for which we can have the longer post-decision point period (+10 years). This larger time span allows the division of the event calendar in four sub-periods.

The baseline period runs from -10 to -5 (so over the first 6 years of the "debt relief-calendar"). The short pre-decision point period that enables to observe potential anticipatory effects goes from -4 to -1 (so 4 years). The short-run post-decision point period that just follows the decision point [0; +3] represents the immediate reaction of the government after having reached the decision point. And finally the medium/long-run post-decision point period that runs from +4 to +10, denotes the level of tax effort at the end of the process and beyond (until available data).
The period of 4 years before the decision point has been chosen according to the time horizon of the PRGF, which is a short/medium-term program. Moreover, -4 also corresponds for a large share of HIPCs that composed this sample, to 1996[36] which is the date where the international community committed for the very first time to cancel multilateral debt for low income countries through the initial HIPC initiative. Therefore these 4 years also cover the period over which some signal effects induced by changes in IFIs' dogma, through the launch of the 1996's HIPC initiative, might had led HIPCs to improve their fiscal position in order to join the program later on.

Accounting for these different periods leads to estimate the following model:

$$TE_{i,t} = \alpha_i + \nu_t + \beta_1 HIPC_i * D1_{i,t} + \beta_2 HIPC_i * D2_{i,t} + \beta_3 HIPC_i * D3_{i,t} + \epsilon_{i,t} \quad (7)$$

Where $D1_{i,t}$ is a dummy variable that takes 1 in the first, second, third and fourth years preceding the decision-point [-4, -3, -2, -1]; $D2_{i,t}$ a dummy variable that takes 1 in the decision-point year [0] as well as in the three subsequent years [+1, +2, +3] and $D3_{i,t}$ is a dummy variable taking 1 in all years beyond +4 (with +4 included) relative to the decision point. $HIPC_i$ is, as before, a dummy variable equal to 1 for HIPC countries considered under this setting (26) and 0 otherwise. Therefore, under such econometric

[36] 22 countries have indeed reached their decision point in 2000

setting β_1 denotes the relative anticipatory effect (or fiscal incentives) of the decision point, β_2 represents the relative reaction of HIPCs just after they have reached their decision point, and β_3 exposes the relative impact of debt relief on long term level of tax effort.

Table 11 exposes the results. One can clearly see that the bulk of the tax effort deployed by HIPCs is done before the decision point. Indeed, although coefficients seems to be larger over the period after the decision point, looking at the z-statistics and recalculating the standard errors, we can easily demonstrate that coefficients respectively associated with D2 and D3 are not statistically different from the one obtained for D1. In other words, the difference between the baseline period and the two post-decision point periods is not statistically different from the difference between the baseline period and the period that captures the anticipatory effects. This non-significance of coefficients for D2 and D3 as compare to the one for D1 holds regardless the control group we consider and the estimated tax effort measure we use.[37]

Results therefore strongly suggest that higher tax efforts after the decision point is *de facto* a legacy from endeavors deployed over the 4 years preceding the decision point attainment. The same is also true (for most of the equations) for results on indirect and goods and services taxes. The bulk of the effort in indirect taxes collection is observed during the anticipatory period. Nevertheless, thanks to this legacy effect, benefiting countries manage to keep a level in the post-debt relief period that is higher than the one recorded in the baseline period.

Considering all the results obtained so far, it is now quite easy to draw the HIPCs' government progression along the debt relief process in terms of tax effort. Before the decision point the government deploys enough tax effort to become eligible for debt relief. Once obtained, it keeps moving forward (all along the interim period) in order to get the rest of conditional debt relief. But, when the government achieves the interim period and meets its completion point, it receives irrevocable and significant debt stock cancellations. So after the completion point, there is no more debt relief to get (and actually no need to), and the government can basically stop and even in some cases loosen its tax effort. This final behavior can therefore be reflected in the tax effort convergence toward the pre-debt relief level. Therefore, reasons for non-significance of debt relief delivered under the whole HIPC process on HIPCs' tax effort are twofold. First the pre-HIPC process level of tax effort is strongly boosted by anticipatory effects. And second, the slight fall recorded after the completion point leads to reduce the average post-HIPC process level.These two opposite effects *in fine* contribute to equalize the average pre-HIPC process level of tax effort with the average post-HIPC process level of tax effort.

Nevertheless, if we compare the post-HIPC process tax effort level with the level observed in the baseline period, i.e. from -10 to -5, we definitively find an average level of tax effort which is significantly higher in the post-HIPC process period. This suggests that pre-decision point conditionality and prospect of debt relief have significantly helped to improve tax effort in benefiting countries.

[37] We have replicated these estimates with other tax effort estimators and models. Results hold no matter the tax effort measure we use as dependent variable.

Table 11: Timing Effects of Debt Relief on Tax Effort around the Decision Point

	(I)	(II)	(III)	(IV)	(V)
Dep. variable:	Tax Effort index			ICTD Taxes	
	model 1	model 3	model 4	Indirect	G & S
Narrow Control Group					
HIPC*D1 : (Anticipatory Effect)	0.113***	0.095**	0.095**	1.065**	1.244***
	(2.933)	(2.178)	(2.061)	(2.361)	(3.277)
HIPC*D2 : (Short-Term Pulse)	0.117***	0.126***	0.138***	1.587**	1.702***
	(3.151)	(2.606)	(3.032)	(2.246)	(3.286)
HIPC*D3 : (Long-Term Effect)	0.135***	0.097**	0.106***	0.629	1.866***
	(3.806)	(2.325)	(2.701)	(1.062)	(4.443)
Observations	873	787	785	661	639
Extended Control Group					
HIPC*D1 : (Anticipatory Effect)	0.129***	0.125**	0.128***	1.009***	0.767**
	(4.329)	(2.003)	(5.085)	(2.838)	(2.360)
HIPC*D2 : (Short-Term Pulse)	0.127***	0.137***	0.145***	1.562***	0.861*
	(4.709)	(3.558)	(5.500)	(2.937)	(1.686)
HIPC*D3 : (Long-Term Effect)	0.136***	0.108***	0.125***	1.331**	0.964*
	(5.014)	(2.731)	(5.073)	(2.228)	(1.753)
Observations	2,115	1,877	1,871	1,619	1,579
African Control Group					
HIPC*D1 : (Anticipatory Effect)	0.109**	0.080*	0.085**	1.115***	1.279***
	(0.0374)	(1.784)	(2.170)	(2.952)	(3.163)
HIPC*D2 : (Short-Term Pulse)	0.114**	0.126**	0.128***	1.716***	1.613**
	(0.0377)	(2.437)	(3.035)	(2.774)	(2.671)
HIPC*D3 : (Long-Term Effect)	0.138**	0.106**	0.115***	0.654	1.442***
	(0.0394)	(2.341)	(3.068)	(0.874)	(2.858)
Observations	896	809	803	735	679
Panel B:					
HIPC*D1 : (Anticipatory Effect)	0.153***	0.121***	0.121***	0.854*	0.905**
	(3.840)	(3.342)	(3.305)	(1.917)	(2.520)
HIPC*D2 : (Short-Term Pulse)	0.155***	0.140***	0.142***	1.564**	1.424***
	(3.035)	(2.959)	(3.653)	(2.285)	(2.729)
HIPC*D3 : (Long-Term Effect)	0.176***	0.101***	0.107***	1.108	2.019***
	(3.913)	(2.672)	(2.659)	(1.626)	(4.385)
Observations	1,004	878	872	721	711
Panel C					
HIPC*D1 : (Anticipatory Effect)	0.119***	0.096**	0.095**	0.945**	1.072***
	(2.930)	(2.468)	(2.150)	(2.172)	(3.148)
HIPC*D2 : (Short-Term Pulse)	0.137***	0.146***	0.160***	1.428**	1.474***
	(3.161)	(3.160)	(3.492)	(2.028)	(3.267)
HIPC*D3 : (Long-Term Effect)	0.177***	0.147***	0.156***	0.647	1.889***
	(4.215)	(4.105)	(4.012)	(1.087)	(4.612)
Observations	851	768	766	649	627
Future HIPCs					
HIPC*D1 : (Anticipatory Effect)	0.113***	0.094**	0.075**	0.563	0.647
	(4.374)	(2.407)	(2.042)	(1.411)	(1.500)
HIPC*D2 : (Short-Term Pulse)	0.172***	0.189***	0.170***	1.084	1.008
	(4.344)	(4.061)	(3.703)	(1.449)	(1.448)
HIPC*D3 : (Long-Term Effect)	0.211***	0.225***	0.197***	0.664	1.673**
	(4.327)	(3.512)	(3.105)	(0.651)	(2.039)
Observations	739	656	654	611	589

Results of columns (I) to (III) are estimated using sing the bootstrap procedure whereas those of columns (IV) and (V) are estimated using WITHIN estimators with years dummy. Control variables are included for columns (IV) and (V). F-statistics p-values are not reported here but are all significant at the 1% level. Robust t-statistics (clustered at the country level for columns (IV) and (V)) are exposed in parentheses. $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

5.5 Is Moral Hazard Behavior Fueled by Weak Institutions-Countries?

We finally suggest to focus on the tax effort reaction around the completion point by decomposing our sample in two sub-samples: the relatively "weak institutions" countries, and the relatively "good institutions" countries. Differentiation in the institutional quality aims to observe if the dropping in tax effort recorded at the completion point is fueled by countries which, before this debt relief point, were considered as having weak public management. In order to make such decomposition, we use the *Worldwide Governance Indicators (WGI)* indexes on regulatory quality and government effectiveness. We choose these two indexes, because they both take into account the involvement of the government in its tax system. The **Regulatory Quality** aims, according to the *WGI* at capturing "*perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector*". Among all the sources and indicators that composed this index, a specific emphasis is put on the effectiveness of the tax system which is why we consider this index as the most representative for the public management quality. Looking at the **Government Effectiveness** index also helps to have an idea of the public administration's quality but is however less focused on the tax system efficiency than the regulatory quality index. Such distinction between weak and good public finance management could be seen as useless since tax effort indexes already represent in a way the effectiveness of the public sector, but a weak regulatory quality government can easily show off in term of tax collection in order to get debt relief at the decision point and then loosen this effort while its institutional quality remains fundamentally unchanged. The global idea of this final section is therefore to check if, although HIPCs' governments have improved their tax effort at the decision point, relatively weak institutions-HIPCs are more likely to adopt moral hazard behavior and loosen their tax effort at the completion point.

We therefore define relatively weak regulatory quality-countries as countries which, over the 3 years prior to the completion point, recorded an average level of regulatory quality below the HIPCs' median.[38] Countries above this median are thus the relatively good regulatory quality-countries. We do the same with the government effectiveness index, and we finally create a group of relatively weak public management-countries which includes HIPCs that are below the median for both the regulatory quality and the government effectiveness index. Table 20 exposes the sub-samples.

We then run our even-study models relative to all the control groups tested so far and with respect to the completion point that marks the end of the conditionality attached to debt relief provision. In addition, we also look at the drop in tax effort considering the different tax effort estimators and models which we already used as robustness checks in section 5.3.1. Table 12 exposes the results when we define our two sub-samples using the median of the regulatory quality index.[39]

According to our results, it seems that the dropping previously recorded at the completion point is mainly driven by weak public institutions-countries. Coefficient for relatively good public institutions-countries are not significant in overall (or positive). But when they are, they remain lower than those for relatively weak public institutions-countries. In terms of policy implications, these results stress the need for continuous monitoring on weak institutions-countries, even after the completion point in order to sustain tax effort deployed around the decision point[40] and over the long-term. One possibility would be to extend the conditionality feature of the HIPC initiative to the MDRI by providing debt relief on the remaining multilateral debt conditionally to sustained improvements in tax mobilization.

[38] The median is computed over the 21 HIPCs which reached their completion point not later than 2006

[39] Results where weak public institutions-countries are those which where below the median of both the regulatory quality and the government effectiveness index are not reported here by save of space. However coefficients and significance are extremely similar to those of Table 12. We also ran models with alternative tax effort estimators and models (such as model(2)) and here also results are not reported but support conclusions of Table 12.

[40] Note that running these models with respect to the decision point leads to find a positive and significant effect of having reached the decision point for both HIPC sub-samples.

Table 12: Weak versus Good Regulatory Quality - Moral Hazard Effects at the Completion Point

	(I)	(II)	(III)	(IV)	(V)	(VI)
Debt Relief Point:	**C.P.** [-6; +6]					
Sub-samples	**Relative Weak Reg_Qual**			**Relative Good Reg_Qual**		
Tax Effort Estimators	model 1	model 3	model 4	model 1	model 3	model 4
Event-Study methodology						
Absolute Variation						
Post-Debt Relief Point	-0.104***	-0.110***	-0.110***	-0.013	-0.028	-0.025
	(-3.608)	(-3.578)	(-3.924)	(-0.605)	(-1.317)	(-0.983)
Narrow Control Group						
Post-Debt Relief Point	-0.096***	-0.105***	-0.109***	0.016	-0.002	0.001
	(-3.334)	(-3.601)	(-3.334)	(0.724)	(-0.074)	(0.033)
Extended Control Group						
post	-0.091***	-0.106***	-0.106***	0.005	-0.019	-0.016
	(-3.797)	(-3.623)	(-3.089)	(0.189)	(-0.907)	(-0.733)
African Control Group						
Post-Debt Relief Point	-0.063**	-0.080***	-0.080***	0.019	-0.001	-0.003
	(-1.973)	(-3.038)	(-2.584)	(0.826)	(-0.038)	(-0.144)
Panel B						
Post-Debt Relief Point	-0.052**	-0.078***	-0.081***	-0.078***	0.048**	0.049**
	(-2.292)	(-2.724)	(-2.673)	(2.973)	(1.978)	(2.058)
Panel C						
Post-Debt Relief Point	-0.043*	-0.050*	-0.051**	0.107***	0.111***	0.083***
	(-1.737)	(-1.816)	(-2.102)	(4.315)	(4.365)	(3.307)
Observations	115	108	107	138	138	138
HIPC Countries	9	10	10	11	11	11
Diff-in-Diff methodology						
Future HIPCs						
Post-Debt Relief Point	-0.131***	-0.079*	-0.107**	-0.061**	-0.022	-0.039
	(-3.780)	(-1.755)	(-2.449)	(-2.145)	(-0.729)	(-1.022)
Observations	440	376	374	472	425	424
HIPC Countries	25	26	26	27	27	27
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

All equations are estimated using the bootstrap procedure applied with the option *vce(bootstrap)* under STATA 13. Columns (I) to (VI) expose results for HIPCs that have reached their completion point no later than 2006. The debt relief calendar for this sample therefore runs from -6 to +6. Columns (I) to (III) report results for weak regulatory quality-countries whereas equations (IV) to (VI) report results for good regulatory quality-countries. Estimates of column (I) intentionally omit tax effort figures for Niger which when estimated with PCSE estimators are over-estimated (gives tax effort indexes above 2 for the 2000s). Finally, F-statistics are not reported here but are all statistically significant at the 1% level. Robust z-statistics are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

6 Conclusion

Using various measures of the government's willingness to tax, this study shows that the expectation of debt relief under the Enhanced HIPC initiative leads HIPCs' governments to deploy substantial endeavors in terms of taxation. According to our results, they indeed seem to judge potential future debt relief as attractive enough to undertake significant reforms, what helps them to levy a relative larger share of their "Tax Capacity" (as compared with the average tax effort level among developing countries). These additional endeavors, that appear of having started around 1996 when IFIs announced for the very first time further cancellations on multilateral debt, have encouraged HIPCs to reach a higher average level of tax effort after the decision point as compared with the one recorded 6 years before. Furthermore, using the more recent dataset on disaggregated taxes in developing countries to date, it appears that this tax effort has been mainly focused on improving indirect taxes collection such as taxes on goods and services.

However, our study also reveals that as soon as HIPCs become qualified for debt relief under the decision point they stop improving their tax effort. This stagnation along the interim period is not completely detrimental for HIPCs' government, since the average level of tax effort is still higher than its level 6 years earlier. However, having reached the completion point seems to be accompanied with a relative fall in tax effort that is mainly fueled by countries recording weak public management quality before this debt relief point. Indubitably, this leads us to find at the end of the Enhanced HIPC process, an average tax effort level among HIPCs that is at the same level as before the initiative starts. How can we explain that? First, given that the completion point marks the end of the HIPC process, and thus of the conditional debt relief provision, HIPCs do not need to exhibit large efforts to IFIs, except for themselves. In other words, there is no fiscal incentive to well-behave for HIPCs, except the perspective of having a performing and inclusive tax system which would be able to finance the country's development over the coming years.

This first interpretation of our results refers, in a way, to the classic idiom of the donkey and the carrot where HIPCs deploy substantial efforts as long as there is enough debt relief to get. Once the whole debt relief package has been provided, incentives to move forward vanish and HIPCs stop their effort and even reduce it in the case of weak-institutions' governments. This study therefore emphasizes for the very first time the realization of moral hazard effects due to the debt relief initiative design, that unfortunately leads to lose a share of the benefits gained (in terms of tax effort) throughout the process.

Nevertheless, one must keep in mind that although the fall in tax effort recorded at the completion point leads to an average tax effort in the post-HIPC process similar to the one recorded in the pre-decision point phase, the combination of anticipatory effects with sustained tax effort during the interim period largely offsets the negative impact of the completion point. Strictly speaking, this means that tax effort in post-HIPC process is significantly larger than tax effort level recorded over the years preceding the anticipation phase. This finally leads to say that, in overall, the Enhanced HIPC initiative has helped, mostly through conditionality, to increase tax effort in recipient countries relatively to countries that did not benefit from such debt treatment.

Finally, an alternative explanation for the slackening in tax effort after the HIPC process (and so the completion point) can also be found in the new potential sources of financing that HIPCs' governments are now facing. These states which were indeed previously excluded from international markets due to their heavy debt burden, can now access to broader and more diversified financing sources. As a matter of fact, some studies underlines that now indebtedness in HIPCs has drastically reduced, new financing opportunities such as borrowing on international and domestic markets have been increasingly (Dömeland and Kharas [2009], Presbitero [2009]) used or must be even more solicited in order to finance the development process and reach the MDGs (Addison et al. [2005]) or now the SDGs. However, even if these governments can resort on these new financial possibilities, it should not be left aside that newly contracted debts on international or domestic markets, which are often associated with higher interest rates and shorter maturity periods than those provided by the IFIs, would inevitably must be reimbursed. By consequence, in order to pay

these debts back, countries will have to mobilize domestic resources if they do not want reproduce the same scheme that led them to the debt overhang situation. Such improvements in domestic revenues mobilization can only goes through larger governments' efforts in the design of their tax system and in the enforcement of inclusive and rightly defined tax payments.

This study shows that HIPCs were able to undertake substantial and precious fiscal improvements when they wanted (or needed) to do so. Future cooperation between HIPCs and IFIs should therefore continue to focus on tax effort improvements in order to get sustainable tax systems, which would provide substantial domestic resources, helping thus HIPCs to break free from IFIs' financial assistance, and ultimately, to reinforce their sovereignty.

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Appendix

Figure 1: Debt Treatments under the Paris Club and Debt stockpiling (IDS database)

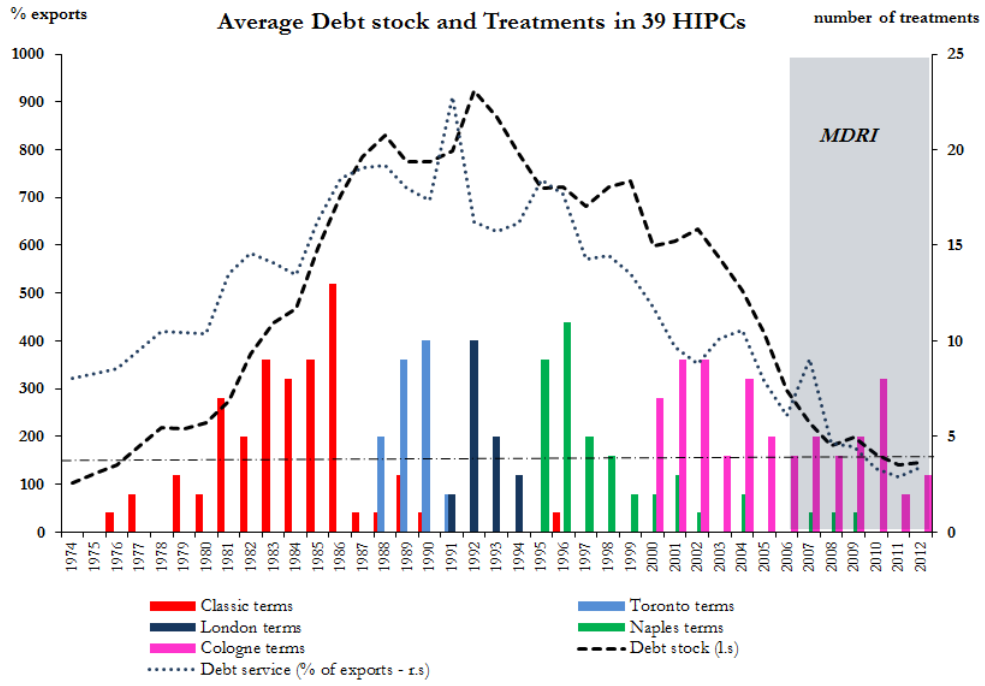


Figure 2: Domestic Tax Revenues Persistence

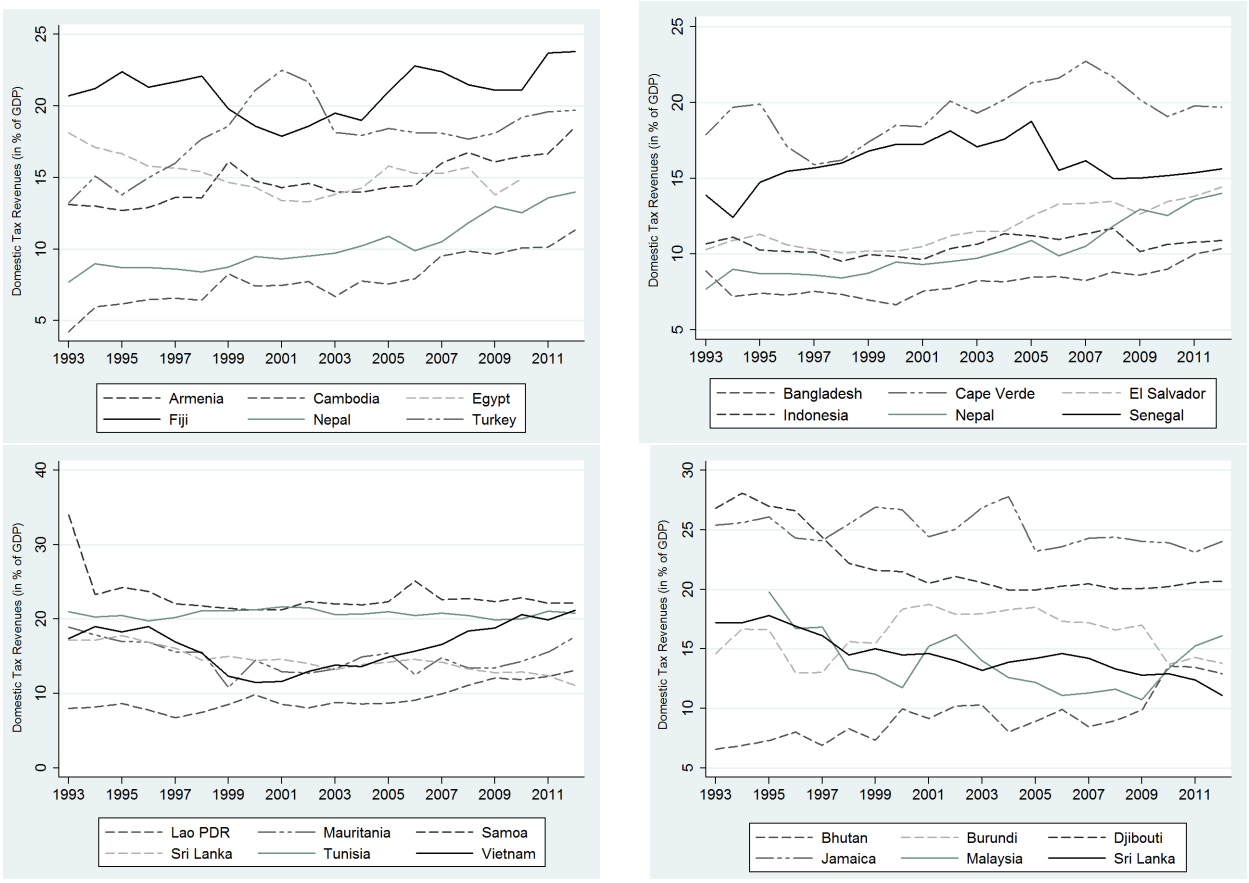
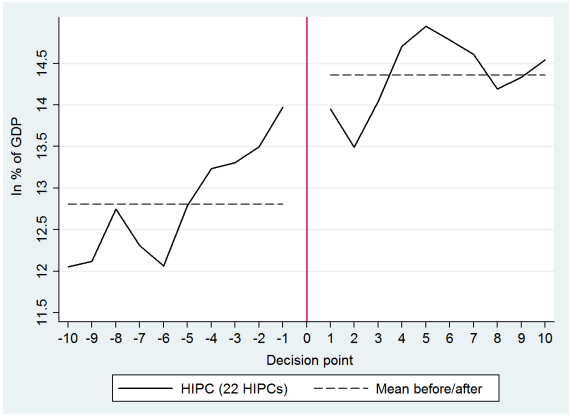
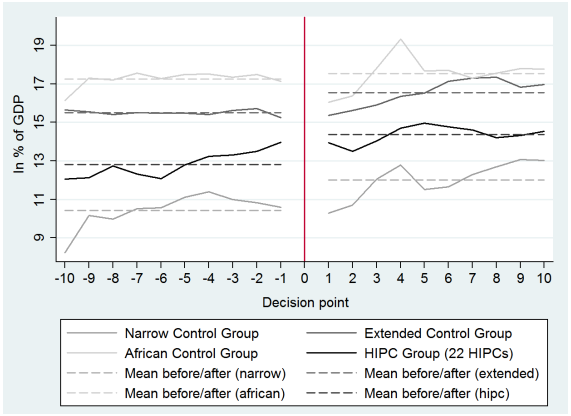


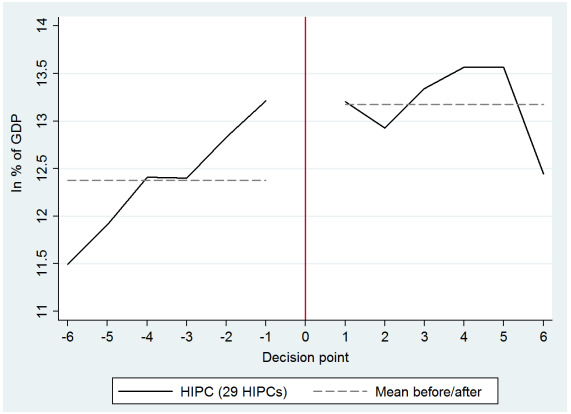
Figure 3: Average Tax Revenues - Evolution around "Debt Relief Points"



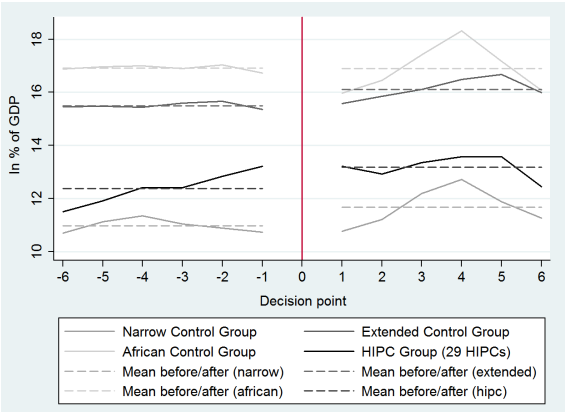
(a) 2000 HIPCs only



(b) 2000 HIPCs only

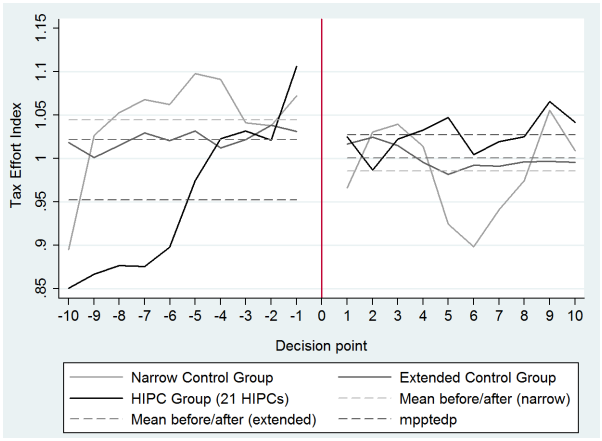


(c) All HIPCs [-6/+6]

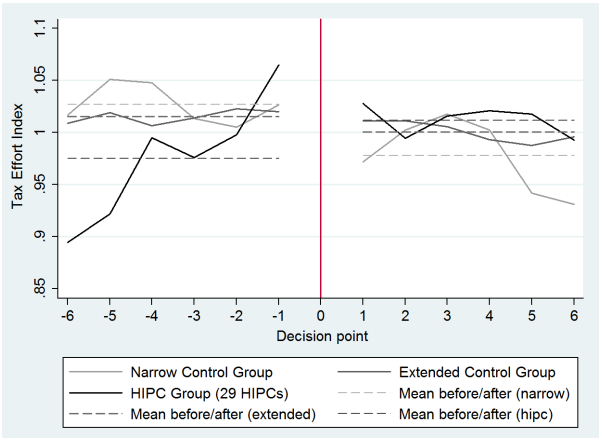


(d) All HIPCs [-6/+6]

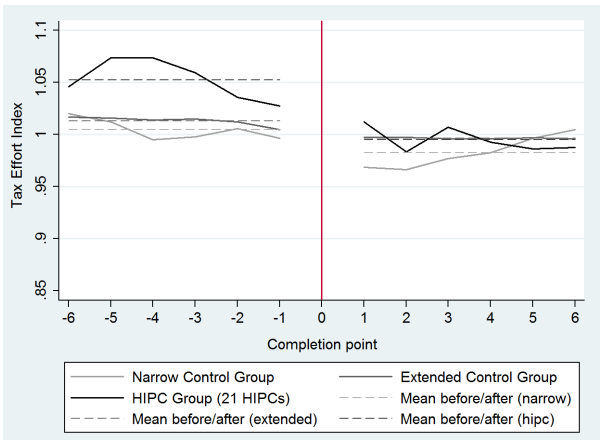
Figure 4: Average Tax Effort - Evolution around "Debt Relief Points"



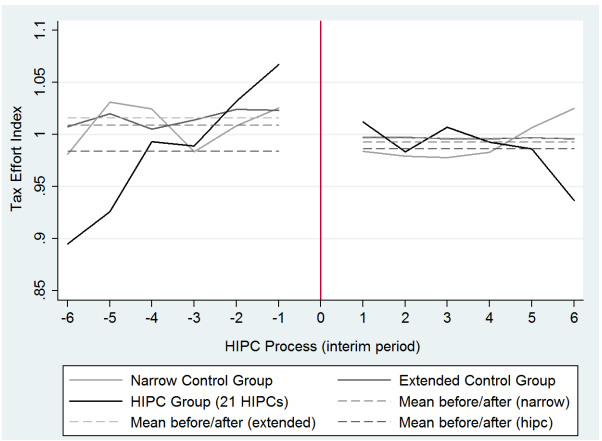
(a) PCSE estimates - 2000 HIPCs only



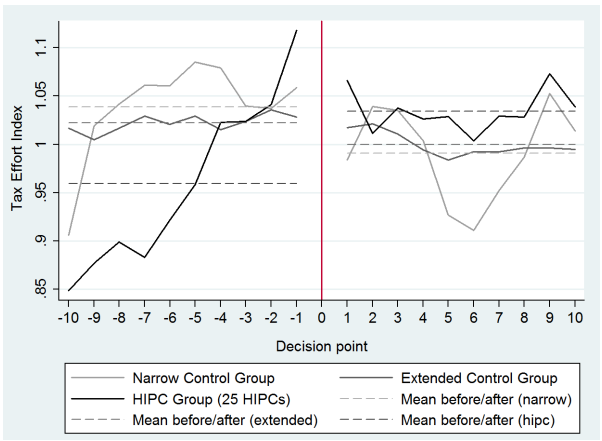
(b) PCSE estimates - All HIPCs [-6/+6]



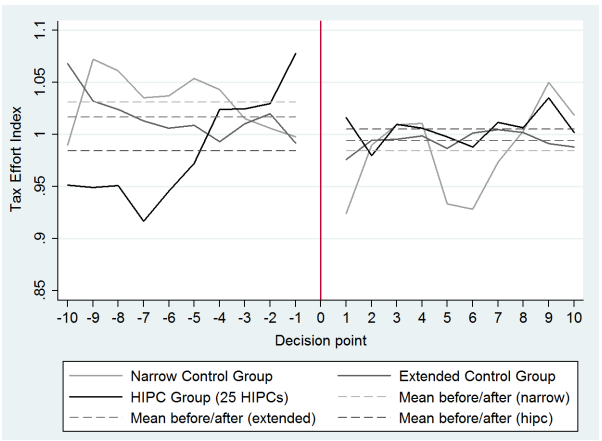
(c) PCSE estimates - All HIPCs [-6/+6]



(d) PCSE estimates - All HIPCs [-6/+6]



(e) PCSE estimates - All HIPCs [-10/+10]



(f) Fixed Effects estimates - All HIPCs [-10/+10]

Table 13: Sample of 117 Developing Countries

Afghanistan	**Cote d'Ivoire**	Lesotho	**Senegal**
Albania	Djibouti	**Liberia**	Serbia
Algeria	Dominica	Libya	**Sierra Leone**
Angola	Dominican Republic	Macedonia	South Africa
Argentina	Ecuador	**Madagascar**	Sri Lanka
Armenia	Egypt	**Malawi**	St. Lucia
Azerbaijan	El Salvador	Malaysia	St. Vincent
Bangladesh	Equatorial Guinea	Maldives	*Sudan*
Belarus	*Eritrea*	**Mali**	Swaziland
Belize	**Ethiopia**	**Mauritania**	Syria
Benin	Fiji	Mauritius	Tajikistan
Bhutan	**Gambia. The**	Moldova	**Tanzania**
Bolivia	Georgia	Mongolia	Thailand
Bosnia and Herzegovina	**Ghana**	Morocco	**Togo**
Botswana	Grenada	**Mozambique**	Tonga
Brazil	Guatemala	Myanmar	Tunisia
Bulgaria	**Guinea**	Nepal	Turkey
Burkina Faso	**Guinea-Bissau**	Nicaragua	Turkmenistan
Burundi	**Guyana**	**Niger**	**Uganda**
Cambodia	**Honduras**	Nigeria	Ukraine
Cameroon	India	Pakistan	Uzbekistan
Cape Verde	Indonesia	Panama	Vanuatu
Central African Republic	Iran. Islamic Rep.	Papua New Guinea	Venezuela
Chad	Jamaica	Paraguay	Vietnam
China	Jordan	Peru	Yemen
Colombia	Kazakhstan	Philippines	**Zambia**
Comoros	Kenya	Romania	Zimbabwe
Congo. Dem. Rep.	Kyrgyz Republic	**Rwanda**	
Congo. Rep.	Lao PDR	Samoa	
Costa Rica	Lebanon	**Sao Tome and Principe**	

HIPC (at least decision point)
HIPC eligible (but pre-decision point)
Non-HIPC
Libya and Equatorial Guinea are excluded from the sample because of lack of data.

Table 14: Data Source and Availability - 115 Developing Countries [1993-2012]

Variables	Source	Mean	Std. Dev.	Obs.	% missings
Domestic Tax Revenues	*IMF Article IV and Staff Report*	15,34	6,94	2232	2.95
Log GDP pc	*World Development Indicator (2014)*	7.04	1.03	2225	3.26
Agriculture share	*World Development Indicator (2014)*	21.70	14.35	2175	5.43
Industry share	*World Development Indicator (2014)*	28.21	11.42	2169	5.69
Service share	*World Development Indicator (2014)*	50.07	13.09	2169	5.69
Resources share	*World Development Indicator (2014)*	10.43	13.86	2255	1.95
Openess rate	*World Development Indicator (2014)*	40.00	19.01	2212	3.82
Inflation rate	*World Development Indicator (2014)*	55.39	791.65	2046	11.04
ODA grants	*OECD-DAC donors database (2014)*	5.64	7.98	2255	1.95
Log pop. density	*World Development Indicator (2014)*	4.01	1.22	2300	0.00
Age dependency	*World Development Indicator (2014)*	72.76	18.41	2280	0.87
Urban population	*World Development Indicator (2014)*	43.52	19.11	2300	0.00

Table 15: Tax Effort Model and Natural Resources Receipts' Crowding out Effect

Model:	(1)	(2)	(3)	(4)
Dep. Variable:	Tax revenues			
Estimators:	PCSE			
Log GDP pc	2.723***	2.576***	1.690**	1.486*
	(3.274)	(2.984)	(2.041)	(1.723)
Openness rate	0.026***	0.024**	0.021*	0.020*
	(2.734)	(2.504)	(1.953)	(1.801)
Agriculture share	-0.070***		-0.055***	
	(-4.732)		(-3.466)	
Industry share		0.048***		0.039**
		(2.889)		(2.040)
Service share		0.058***		0.044**
		(3.463)		(2.456)
Tax natural res.	-0.083**	-0.079**	-0.074**	-0.073**
	(-2.480)	(-2.255)	(-2.166)	(-2.016)
Log Pop. density	-0.523	-1.622	0.251	-0.497
	(-0.455)	(-1.375)	(0.202)	(-0.375)
Age dependency	-0.053***	-0.062***	-0.033	-0.040*
	(-2.860)	(-3.302)	(-1.543)	(-1.810)
Urban population	0.046	0.054	0.043	0.045
	(1.064)	(1.198)	(0.996)	(0.982)
Inflation			-0.000**	-0.000**
			(-2.022)	(-2.551)
ODA (Grants)			0.009	0.005
			(0.446)	(0.230)
SSA			10.974***	-0.530
			(3.024)	(-0.096)
AMLAT			-2.357	17.333***
			(-0.645)	(4.418)
Country / Time FE	Yes	Yes	Yes	Yes
Observations	2,058	2,052	1,852	1,846
R-squared	0.943	0.943	0.953	0.953
Number of country	113	113	109	109
F-Statistic (p.value)	0.000	0.000	0.000	0.000

Tax natural res. represents direct receipts from natural resources (royalties, oil revenues and, when available, profits of natural resource exploitation firms). Figures have been collected from IMF Staff Report and Article IV. Specifications (1) to (4) have been estimated using PSCE estimators with panel specific correlation coefficients and with country and time fixed effects. Their related robust z-statistics are exposed in parentheses. Results are similar when we replace GDP per capita and the openness rate by their lagged value. However, we note that using LSDV or WITHIN estimators leads to find negative but not significant coefficients for natural resources taxes (with and without lagging the potentially endogenous variables). $^{***}p \leq 0.01$, $^{**}p \leq 0.05$, $^{*}p \leq 0.1$.

Table 16: Tax Effort Index - Pairwise Correlation Matrix

Estimators:	Models:	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
		PCSE				LSDV			
PCSE	(I)	1.0000							
	(II)	0.9721	1.0000						
	(III)	0.9511	0.8904	1.0000					
	(IV)	0.9080	0.8585	0.9835	1.0000				
LSDV	(I)	0.9051	0.9081	0.7705	0.7145	1.0000			
	(II)	0.9026	0.9113	0.7666	0.7151	0.9981	1.0000		
	(III)	0.8497	0.8440	0.7906	0.7622	0.9453	0.9390	1.0000	
	(IV)	0.8181	0.8209	0.7735	0.7737	0.9140	0.9130	0.9848	1.0000

Pairwise correlations are all statistically significant at the 1% level.

Table 17: Parallel Trends - HIPCs and the Narrow Control Group

Dep. var.: Tax Effort	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Tax Effort model (Table 3):	Model 1		Model 2		Model 3		Model 4	
Tax Effort Estimators								
PCSE	-0.047	-0.046	-0.053*	-0.050	-0.031	-0.027	-0.039	-0.035
	(-1.606)	(-1.543)	(-1.832)	(-1.285)	(-1.097)	(-0.795)	(-1.165)	(-1.047)
LSDV	-0.015	-0.012	-0.020	-0.017	-0.002	0.002	-0.017	-0.013
	(-0.444)	(-0.424)	(-0.730)	(-0.609)	(-0.052)	(0.067)	(-0.607)	(-0.319)
Observations	143	137	143	137	120	114	120	114
Niger	Yes	No	Yes	No	Yes	No	Yes	No
PCSE.L	1.837	0.004	0.452	0.002	0.034	0.037	0.024	0.028
	(1.329)	(0.111)	(1.508)	(0.053)	(0.844)	(1.008)	(0.530)	(0.686)
LSDV.L	0.023	0.025	0.017	0.019	0.056	0.059	0.040	0.043
	(0.682)	(0.619)	(0.436)	(0.571)	(1.591)	(1.469)	(0.965)	(0.879)
Observations	124	119	124	119	104	99	104	99
Niger	Yes	No	Yes	No	Yes	No	Yes	No

Trends comparisons are tested using an event-study methodology over the period [-10;-5]. We did not run the trend comparison over the entire pre-debt relief period because of potential incentive effects which might lead to significant increase in tax effort before debt relief is provided (as explained in part 2). We therefore split this 6 years-period in two ([-10;-8] and [-7;-5]) and test the average relative difference (before and after). In other words, we simply test the equation (1) exposed in part 3 over [-10; -5] and where the variable $Post_{i,t}$ is now a dummy variable that takes 1 for years superior or equal to -7, and 0 otherwise. Columns (I) and (II) estimate equation (1) with tax efforts coming from tax effort model (1) in Table 3 (each time with the PCSE and LSDV estimators). Column (III) and (IV) report results with tax effort obtained from model (2). Columns (V) and (VI) with tax effort from model (3) and finally columns (VII) and (VIII) with tax effort from model (4). Columns (II), (IV), (VI) and (VIII) expose results without figures for Niger (they are quite overestimated when we use PCSE estimators only). Results show that, whatever the model we use to estimate our tax effort measure, there is no robust significant difference in the evolution of tax effort between HIPCs and the "narrow" control group over [-10; -5] what supports the decision of having included these countries into our reference control group. Bootstrapped standard errors are exposed in parentheses $^{***}p \leq 0.01, ^{**}p \leq 0.05, ^{*}p \leq 0.1$.

Table 18: Alternative Selection Criteria, Alternative Control Groups

Panel A & Panel B		
Debt-to-Domestic Revenues Ratio sup. 300 %		
Albania	**India**	**Nigeria**
Armenia	Indonesia	**Pakistan**
Azerbaijan	**Kenya**	Papua New Guinea
Bangladesh	**Kyrgyz Republic**	**Sudan**
Bhutan	**Lao PDR**	**Tajikistan**
Bosnia and Herzegovina	**Lesotho**	Ukraine
Cambodia	**Moldova**	**Uzbekistan**
China	**Mongolia**	**Vietnam**
Eritrea	**Myanmar**	**Yemen**
Georgia	**Nepal**	**Zimbabwe**

Panel A: LIC average status at least (3/5)
Panel B: LIC average status at least (5/5)

Panel C		
Debt-to-Exports Ratio sup. 175 % & LIC average status 5/5		
Bangladesh	Kenya	Nigeria
Bhutan	Kyrgyz Republic	Pakistan
Cambodia	Lao PDR	Sudan
Eritrea	Lesotho	Vietnam
India	Nepal	Yemen

Panel D		
Debt-to-Exports Ratio sup. 200 % & LIC average status 3/5		
Bangladesh	Lao PDR	Sudan
Bhutan	Lesotho	Yemen
Eritrea	Nepal	
Georgia	Nigeria	
Kyrgyz Republic	Pakistan	

Table 19: ICTD Disaggregated taxes & data availability
115 Developing Countries [1993-2012]

Variables (in % of GDP)	Mean	Std. Dev.	Obs.	% missings
Indirect Taxes	9.46	4.65	1683	26.83
of which Taxes on goods and services	5.78	3.18	1629	29.17
of which Taxes on international trade	3.50	3.67	1627	29.26
Direct Taxes	4.30	2.77	1672	27.30
of which Taxes on income	3.99	2.62	1567	31.87
of which Taxes on profit gains	0.31	0.93	1050	54.35

Table 20: Public Management Quality among HIPCs

WGI - Average Index over CP(-1) and CP(-3)			
Gov_Effectiveness [-2.5; 2,5]		**Reg_Quality** [-2.5; 2,5]	
Relative Weak Public Institutions			
Sierra Leone	-1.23	**Ethiopia**	-1.20
Ethiopia	-0.90	**Sierra Leone**	-1.08
Niger	-0.81	**Cameroon**	-0.79
Zambia	-0.81	**Rwanda**	-0.71
Nicaragua	-0.75	**Niger**	-0.67
Cameroon	-0.74	**Zambia**	-0.55
Rwanda	-0.73	**Malawi**	-0.48
Mali	-0.73	Mauritania	-0.42
Malawi	-0.73	Honduras	-0.40
Burkina Faso	-0.62	**Nicaragua**	-0.38
Relative Good Public Institutions			
Honduras	-0.59	Ghana	-0.37
Madagascar	-0.46	Tanzania	-0.33
Mozambique	-0.41	Benin	-0.32
Tanzania	-0.41	Guyana	-0.29
Uganda	-0.38	Madagascar	-0.28
Benin	-0.32	Mali	-0.27
Guyana	-0.23	Mozambique	-0.22
Bolivia	-0.19	Senegal	-0.20
Mauritania	-0.18	Burkina Faso	-0.12
Ghana	-0.15	Bolivia	0.16
Senegal	-0.11	Uganda	0.24

Sources: Worldwide Governance Indicators 2014 - author's computations. In **bold font** are countries considered as having a relative weak public management because they are below the median as regards the two WGI indexes.