Debt Relief and Democracy

Do debt relief programs have different impact on democratic and autocratic poor countries?

An empirical investigation of the effects of debt relief on Heavily Indebted Poor Countries

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Abstract

Since 1996, multiple initiatives have been carried out by the international community in order to help the alleviation of poverty in a set of poor countries that were classified as heavily indebted. Significant amounts of debt relief have been provided to these countries with the aim of bringing their external debt levels to a sustainable level and therefore promote improvement of life of the poor societies. The narrative arguments in favour of these relief programs are thoroughly outlined, but they need to be tested against real data in order to assess the true effects. In order to do so, this study uses data on 36 poor countries, and looks at the effects debt relief has on the educational and health public sectors, which are argued to have the means to improve the life standards. The study uses panel data for the period 1990-2012 and finds that debt relief has a positive and significant impact on the resource allocation of countries' education and health sectors. Furthermore, it is revealed that democratic countries benefit more from the provision of debt relief compared to more autocratic governments.

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1. Introduction

Over more than six decades, developed industrial countries have undertaken the ambitious quest to end world poverty. The international community has made numerous attempts to the poorest countries in escaping extreme poverty by trying to promote their economic advancement. Some of the underlying reasons are moral and based on premises such as the fact that roughly 20% of the World population still lives in absolute poverty[1]. Others are of a self-interest nature and are based on the concerns of developed countries regarding security (terrorism, spread of diseases, etc.), migration control and, of course, trade enhancements though the establishment of new export opportunities in these poorer countries. The list of remaining reasons is endless, but as they are not central to the arguments of this study there would be no further elaboration.

In the second half of the twentieth century, concurring with the establishment of the United Nations Organization, there seemed to be an international commitment from the side of developed countries to help the lowest income countries (LICs) get on a path of sustained development by providing them with assistance in various forms. Since the year 2000, the Millennium Development Goals (MDG) have been established to serve as a benchmark and a tool for alleviating poverty until 2015.[2] Some of these goals are also focusing the attention to a group of 39 countries that have been classified as heavily indebted poor countries (HIPCs). The HIPCs' external debt levels had already become enormous around the 1980s and have continued to rise ever since. The case of Sao Tome can serve as an illustrative example, as its levels of indebtedness reached magnitudes of 680% of its Gross National Product (GNP) in 1998.[3] One of the responses of the international community to these extreme amounts of debt was to start forgiving parts of this debt in order to try and sustain its future value to a manageable level. The rationale behind the provision of relief is revolving around the idea that high levels of indebtedness are preventing poor economies from engaging in growth enhancing actions and reforms, because of the high debt service obligations, referred to as 'debt-overhangs' (Krugman 1988). Thus, by forgiving the external debt, this impediment for development is supposedly removed, and the poor countries are expected to remain with more available resources, formally defined as "fiscal space" (Heller (2005)), that would be used for engaging in pro-growth actions.

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[1] Source: World Bank. 2013.
[2] See Appendix 1 for an official list of the Millennium Development Goals.
[3] Source: Word Bank 2000

The aim of this thesis is to analyze the effectiveness of the provision of debt relief by developed countries in response to the extreme levels of debt that have been accumulated. The analysis is focusing on the series of initiatives carried out by the IMF, the International Development Association (IDA) of the World Bank, and the African Development Fund (AfDF). These initiatives are the HIPC Initiative launched in 1996, the Enhanced HIPC Initiative in 1999, and the Multilateral Debt Relief Initiative (MDRI) launched in 2006. Even though the former two initiatives have been judged to impose harsh requirements for qualification, over the years they managed to provide substantial debt relief to a number of the heavily indebted poor countries.[4] The total amount of debt relief has been estimated to be approximately US$74.3 billion (end of 2012 present value (PV) terms) [5]. Additionally, by providing a 100 percent debt cancellation of the multilateral debt outstanding by the end of 2004 for the qualifying HIPCs (so far 36 out of all 39 countries) the MDRI provides additional US$39.7 billion (end of 2012 present value (PV) terms). Even though only US$96 billion have been allocated to this moment, the residual amount up to US$114 billion of debt relief is scheduled for provision in the following years, and is equal to roughly 90 percent of the external debt stock owed by the HIPCs. Table 1 is presents an overview of the debt forgiven by the multilateral organizations' initiatives.

Initiative	Year of Launch	Total Debt Relief Provided
HIPC	1996	74.3
MDRI	2006	39.7
HIPC and MDRI	1996-1999	114.0

Table 1. Total amounts of Debt Relief provided billions of dollars end-2012 PV terms

Despite these seemingly impressive numbers, debt relief programs have been receiving a lot of public attention (e.g. Balls (2005)), with many concerns raised by the critics when it comes to the expectations about their effects. One of the main concerns is surrounding the idea that there may be some moral hazard issues with the newly debt-cleaned countries and that these initiatives would prove to be useless unless the governments change their politics and manage to allocate the newly freed resources to improve the well-being of the predominantly poor societies. This study is focusing on the challenging task to try and assess whether debt-recipient countries

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[4] For an elaborate description of the initiatives and the historical background of LIC's indebtedness please refer to Appendix 2.

[5] The HIPC Initiatives and MDRI debt relief amounts that follow are taken from HIPC documents and World Bank and IMF staff estimates. For more details see the latest report of the multilateral organizations providing the relief: http://www.worldbank.org/content/dam/Worldbank/document/Poverty%20documents/HIPC_Fall2013_EN_web.pdf

manage to take effective advantage of the opportunities that the debt relief offers. This research is not focusing as much on the new levels of debt accumulated after the provision of debt (Arnone et al (2008) and Birdsall (2004)). These studies are rather investigating whether there was a significant change in the resources allocated to main government sectors, such as Health and Education, that are believed to have impact on the quality of life. Unfortunately, the measurement of these resources is not always straightforward (due to, for example, lack of enough expenditure data). The sectors where such data is not available, certain proxies are used which are in turn arguably indicative of the quality of life of the poor societies. The sectors which are considered in this paper include: the education sector and the health sector. Important to note here is that the link between these different sectors and the provision of debt relief is expected to be positive. The choice is based on one of the main assumptions of this thesis, namely that one of the best ways to impede the conditions of the poor people in a country is to nurture economic development in a way that will provide the means for them to make their own living. Therefore, the main logic of the study lies behind the causal link between the decreased debt burden, its effect on the allocation of investment resources in the different social sectors, and the impact of the allocation on the quality of life of the poor layers of society. The assumed links behind this logical sequence are direct and indirect and cover both the short and the long terms. On one hand, increased spending on governmental sectors can have a direct effect on the job creation in the short term, thus providing better means for self-sufficiency. On the other hand, increased governmental spending is assumed to have a positive impact on the economic growth of a country in the longer run. Further, in order to account for these short and long term effects, this study is assuming that the effect of debt relief is becoming apparent after certain amount of time has passed. The diagram below is outlining the causal direction which is serves as a basis for the formation of the research question, and which determines the constructed model.
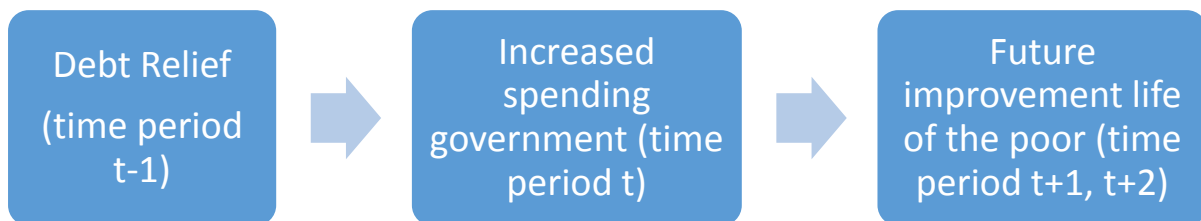
Debt Relief (time period t-1) → Increased spending government (time period t) → Future improvement life of the poor (time period t+1, t+2)

Diagram 1. Timeline of causal effects

Ideally, the problem in question could have been defined as: Does a decreased external debt burden effectively translates into increase in the quality of life for the poor? However, quality of the life is a complex, abstract concept and as such measuring it possesses various impediments and would require value judgments which would shift the focus of the main study. Instead this thesis will look at the allocation of the freed resources that result from the provision of debt relief assuming that increased spending in certain social areas will have a future effect on the improvement of life. The level of democracy for each country is included in the analysis in order to determine whether countries with more democratic governments benefit more from the provision of debt relief. Therefore, the main research question can be defined as:

Does debt relief lead to increased spending on public education and health care in poor countries with higher degree of democracy?

In the pursuit of its answer, the the main question is broken down into sub-questions that will ease the building of the argumentation logically and consistently:

- Does debt relief have a positive impact on the future public spending on education and health?
- Do countries with higher level of democracy benefit more from the provision of debt relief compared to countries with more pronounced authoritarian regimes?

For the sake of finding the answer of the main question addressed two hypotheses were outlined:

Hypothesis 1 (H1): Debt relief leads to increased public spending on health and education.

Hypothesis 2 (H2): The effect of debt relief on education and health spending is larger for countries that have a higher degree of democracy.

It is important to note that a central premise on which this paper builds its argumentation is that high levels of debt are detrimental to economic development. (Pattillo et al. (2002), (2011)). This assumption is based on the grounds that high indebtedness invokes economy inefficiencies such as budget imbalances, decrease of the volume of foreign direct investments, and, as already mentioned, decrease in the resources potentially used for pro-growth investments. This claim is made strictly for poor countries as they have little or no access to financial markets and, therefore, have completely different prospects when it comes to self-reliance on promoting future growth.

The thesis is organized as follows: Section 2: Theoretical background and related literature, Section 3: Data description and Methodology, Section 4: Analysis and Robustness, Section 5: Conclusion and further research.

2. Theoretical Background and Related Literature

As a starting point, it is important to outline all the central concepts that serve as a base for the current study. A lot has been written on the topic of debt relief and its effectiveness, but the ambiguity of the results is calling for further research. The following section provides an exposition of the literature that surrounds the matter of debt relief, by outlining the main expected effects at play as a consequence of the provision of debt relief. Therefore, the clear aim of this chapter is to build a solid argumentative and theoretical framework, providing justification for the previously established research questions. It starts with subsection 2.1 which examines the impact of high indebtedness on the development of the economy as it is of great importance for the proper understanding of the rationale behind the forgiveness of debt. Subsection 2.2 follows with the logic behind the provision of debt relief used by the international community to justify its actions. Subsection 2.3 provides an overview of the literature on the effectiveness of debt relief.

2.1 What is the impact of high indebtedness on the economy?

The relationship between debt and growth is very complex and as such it is important to bear in mind that not taking proper measures to account for its hazards may easily lead to invalid conclusions. One of the main dangers comes from the fact that high levels of external debt can be caused by low growth, but the causal link may as well be going in the opposite direction (reverse causation). Furthermore, there might be many components that affect both growth and debt simultaneously. These are serious endogeneity threats, which the study of Panizza and Presbitero (2012) proves to be essential when it comes to inferring the effects that debt has on growth. They use an instrumental variable (IV) approach to account for both reverse causality and omitted variables bias. When the results of the IV estimation are compared to these of the standard regression analysis, it appears that the negative relationship between debt and growth that becomes apparent using ordinary least squares (OLS) approach and disappears once debt is instrumented. It is important to note that the authors do not dismiss the existence of such a causal link, but rather they just do not manage to find strong support for it. Despite the fact that the study was conducted for the developed and emerging economies, it can be used as a good exposition of the pitfalls which research on growth encounters. The study of Hansen (2001),

which is focusing on 54 poor economies, also obtains inconclusive results of the effect of debt on growth. In a more recent study, Pattillo et al. (2011) find significant results showing that the relationship between the two is nonlinear, and that it becomes negative after a certain threshold of debt reaches 160-170 % of exports. Their findings hold strong even after using alternative methodologies. In the case of the HIPCs this threshold is clearly exceeded as one of the conditions for being eligible for debt relief is a ratio of debt-to-export greater than 200. Therefore, for the purpose of this investigation, the effect of high debt burden on growth is expected to be negative because the magnitude of indebtedness of HIPCs is undoubtedly extreme. When turning to the more indirect link between high external debt burden on economic development, such as the effects on public spending/investments, Clements et all. (2003) show that the high debt burden reduces public investment. Furthermore, they find that there is a negative relationship between total public investment (as a share of GDP) and the external debt service (as a share of GDP). Overall, the main findings in the literature indicate that for poor countries, the large debt burden affects public expenditures and investments (Lora and Olivera (2007); Bird and Milne (2003); Mahdavi (2004);). Lora and Olivera (2007) find robust results indicating that total public debt has a negative impact on social expenditures for 50 low income countries using an unbalanced panel for the period 1985-2003. Interestingly, they conclude that this impact is a consequence of the size of the stock of external debt and not of the actual service payments. This finding is logical in the case where many of the low income countries are not servicing all their debts, and thus suffer from decrease in the social service provision. In addition, Dessy and Vencatachellum (2007), manifest the need to take into account the fact that high debt levels reduce the room for further indebtedness.

2.2 Debt relief: The rationale

In the 1980s the debt crisis in poor countries became undeniable.[6] It became apparent that at the time re-scheduling of the extreme debts accumulated is not an effective option. The main reason for this was that despite the common interventions by the creditors, mainly in the form of debt re-scheduling, the problematic countries continued to be unable to repay their debts. In the end, this resulted in the accumulation of even higher interest rates, and therefore increased value of the same debts. The next step was the provision of debt relief. It seemed an appealing option that would hypothetically get rid of the apparent ineffective actions of re-scheduling. The main idea

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[6] For a more extensive overview of the historical background of the emergence of this debt crisis, as well as description of the debt relief initiatives by the multilateral organizations please refer to the Appendix 2.

follows the notion that debt relief reduces the present value of the future debt obligations of the recipient country. The initiators of multilateral debt relief programs for poor and developing countries (including the IMF, the World Bank, the African Development Bank, as well as some private creditors) state that it can benefit the recipient country through its effects on public finances, and through improved incentives for public policy and private activity. The main efficiency arguments that have been provided to justify the utilization of debt relief follow the idea that it would help overcoming the 'debt overhang' through the creation of 'fiscal space'. These concepts are examined in detail in the following subsections.

Debt Overhang

The idea to write-off external debt to the point where the highly burdened countries would be able to self-contain their future sovereign debt[7] is triggered mainly by the debt overhang theory that was established by the seminal work on the determinants of corporate borrowing by Myers (1977). The general argument is that large stock of debt is detrimental for the creditworthiness of the debtor entity and its investment behavior because the expected return of any additional investment becomes very small as a result of the debt obligations. Therefore, this would have a negative effect on its performance and incentives for development. The theory, despite being developed in the context of a corporate environment, became one of the main premises behind the provision of debt relief by the multilateral organizations. Of course, it was later adjusted to fit the macroeconomic domain, and the term 'debt-overhang' was formally defined first by Krugman (1988), followed by Sachs (1989) as the situation where countries with large stock of external debt suffer from low levels of both internal and external investments, and lack productivity enhancing efforts. It is considered that any future output of the country would be taxed away by external creditors for the purpose of repayment of the debt. This serves as a disincentive for the governments to undertake any structural reforms, and as such harm economic performance.

Krugman (1989) proceeds with elaborating on the debt overhang theory by developing a visual representation of the concept, calling it Debt Laffer curve (Graph 1.). The graph represents the relationship between the face and market values of external debt as a one to one up to the point A. As the face value of debt keeps increasing, however, the increase of market value starts diminishing up to point B. This point signifies the maximum market value of debt that a country can achieve for a given amount of debt accumulated. After this point the face value of debt,

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[7] Or else put to lower it to a certain pre-defined sustainable level.

despite increasing, becomes unable to compensate the marginal decrease of the market value. According to Krugman (1988) this is the threshold point after which debt-overhang becomes existent. Point B is also argued to be the best moment to start forgiving debt as then it will come at the lowest cost for creditor. This happens in such a way because the relief will decrease the chances of default while not resulting in a decrease of the expected value of the debt service by the debtors.

In their study Arslanalp and Henry (2006), the euthors are being skeptical towards the effectiveness of debt relief as a tool for overcoming poverty due to insufficient amount of evidence However, they argue that the existence of debt-overhang should be considered a necessary condition for the accrual of economic rewards from the provision of relief. The argument follows the line that in a situation where debt-overhang is present, countries that are characterized with severely high levels of external debt are using large fraction of their resources to finance their current debts, and therefore gain little from investments that would otherwise bring future economic gains to the debtor country. In addition, high levels of outstanding debt depresses human capital investments such as health and education expenditure, which further translates to impediments for economic growth.

Graph 1. Debt Laffer Curve
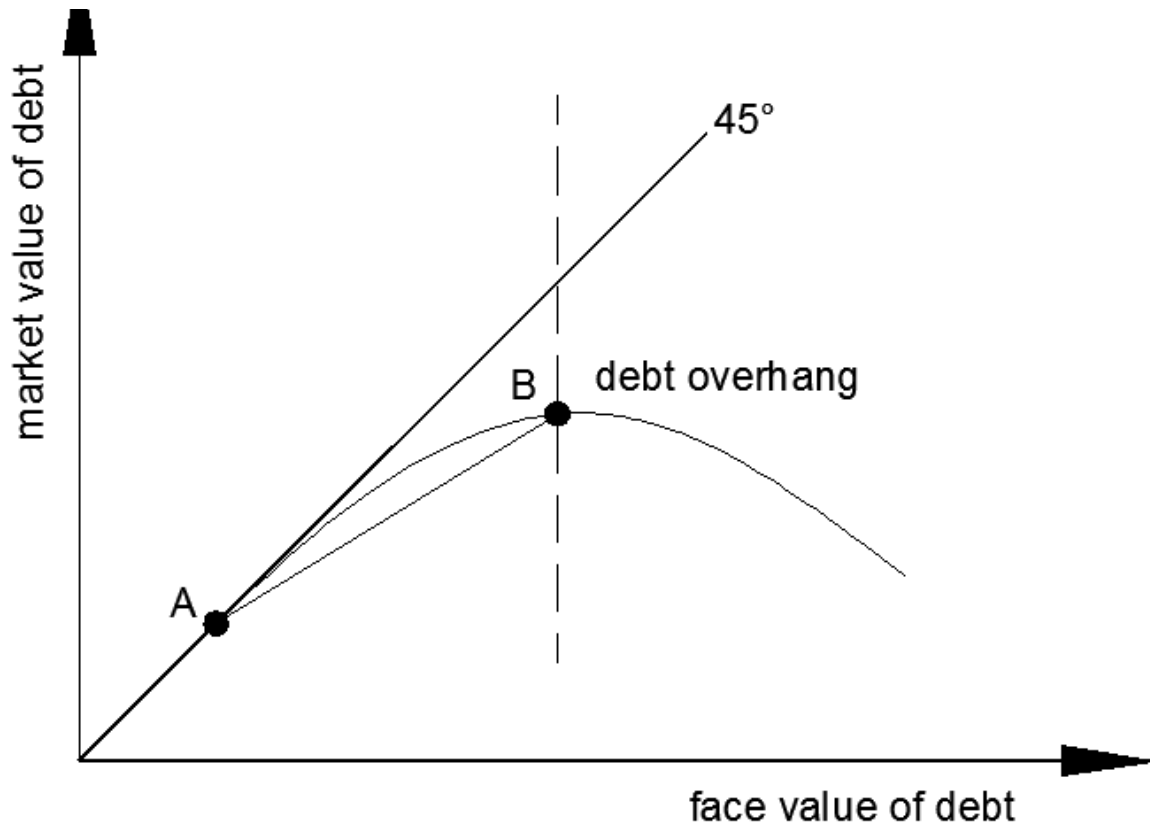
Ever since the birth of the debt-overhang theory, scholars have been questioning its validity in various ways, using different techniques and methods. The empirical literature is extensive, alas overall inconclusive. One group of studies supports the existence of negative relationship between the level of indebtedness and economic development (Elbadawi *et al*., (1997), Clements et al. (2003), Presbitero (2008)). A strong support for the presence of the overhang effect is found in the paper of Deshpande (1997), who confirms the theory by investigating 13 countries for the period 1971-1991. In another more recent study, Cordella et al. (2005) also finds support for the debt overhang hypothesis. However, he introduces an adjustment of the standard Debt Laffer curve, calling it the 'modified Debt-Laffer curve', suggesting that there is a certain point after which the value of external debt becomes irrelevant. This finding does not invalidate the existence of debt overhang, it simply casts some doubt on its relevance for countries such as HIPCs.[8]

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[8] Arnone et al. (2008) provides a detailed overview on this strand of the literature.

Bird and Milne (2003), claim that even though debt relief is assumed to be the best response to the extreme levels of indebtedness suggested by the Debt Laffer curve, in reality creditors do not act accordingly. After anticipating the inability of heavily indebted countries to repay their debt, they tend to initiate defensive lending instead, with the desire that at least some degree of repayment of debts will occur (Bulow and Rogoff (2005)). If this is the case, it would imply that there is a positive relationship between net resource transfers and level of indebtedness (Bird and Milne (2003)). If this is true as well, it would come as a clear contradiction of the debt overhang hypothesis because it suggests that raising the ability and the willingness to repay future debt is resulting in a decrease in the net resource transfers from creditors instead of increasing it. However, despite this possible contradiction, this study is focusing on the effects of the debt relief that has been already provided, and is therefore bypassing the implications of such actions by the external creditor entities.

In another, more recent paper on the validity of the debt-overhang hypothesis, Knoll (2013) uses a quasi-experimental setting to compare the levels of economic growth and the returns on public investments between the countries that have benefited from the HIPC and MDRI initiatives, and the ones that have not qualified for them. After a difference-in-difference estimation, in order to eliminate cross-country differences, Knoll finds that the overhang hypothesis does not hold for the set of predominantly sub-Saharan countries he examined. These findings are once again casting doubts on the validity of the debt overhang hypothesis. Knoll argues that one of the main reasons for this is the fact that the concept was developed as a consequence of the Latin America debt crisis in the 1980s. Nowadays, the highly indebted countries are mainly in the sub-Saharan region, and as such they are characterized by some significant differences from Latin American countries. These include the lack of access to financial markets, and high dependency on external financing.

In general, the results and opinions on the issue of the debt-overhang existence differ a lot making it hard to draw any general conclusions. The main differences come from the choice of data and econometric approaches used. Despite these diverse results, for the purpose of answering the questions of this thesis, the possibility of the existence of debt overhang is not excluded. By investigating the effects of debt relief on quality of life, even though indirectly (by

the use of proxies), this study may be able to shed some light on the possible existence of the debt-overhang matter.

Public Finance Effects

The following subsection presents the channels through which debt relief is supposed to have an impact on public finances. One of the direct effects that debt forgiveness is projected to have on the public spending is to ease the government's intertemporal budget constraint through the expansion of the government's fiscal space. The term fiscal space was developed by Heller (2005) who defined it as the additional budgetary room that is made available to a government to increase public expenditure without having any negative consequences on its financial position. In the context of debt relief, the fiscal space is a result of the elimination of current and future repayments of external debt. Heller (2005) stresses on the fact that the freed resources from debt relief, future government borrowing, or any other action would not be threatening to the fiscal sustainability of the recipient country. This link between fiscal space and fiscal stability, by definition, is reassuring the ability of the country to manage financing its current expenditure, which is apparently crucial for the heavily indebted countries that are in strong need of resources in the short and immediate term.

Despite the appealing nature of this fiscal space theory, it is important to examine more closely its link to debt relief and the possible points that, if remain neglected, may affect the validity of any study on the effects of debt relief. First of all, the magnitude of this fiscal space is not as apparent as one may wish it to be. The main reason for this is the fact that the effects of debt relief are not expected to become present immediately. In the context of this study the magnitude of the immediate cash flow gains is expected to be miniscule. The benefits appear over time, and their extent depends on the schedule and the terms of the original debt.

Second, a serious doubt on the fiscal space efficiency argument is cast by Cassimon et al. (2013) who raise the concern that fiscal space would only be created in the case where, in the absence of the forgiveness, the debt would actually be repaid by the debtor country. As the level of repayment differs across countries, the argument goes, the immediate cash flows from debt relief will be conditional on this repayment level.

Third important consideration is the change of the quantity of other forms of aid delivered by donor countries in response to the debt relief granted and the subsequent effects on public expenditure. If debt relief comes as a substitute for aid such as project and program aid, this may

hinder any possible effects of the creation of fiscal space, and thus invalidate the efficiency arguments of debt relief. Gunter, and Rahman (2007) investigate the distributional implications of aid allocation, and outline two main points of consideration. First is the level of additionallity of debt relief to traditional aid, and second is the level of reallocation of the current aid. The other forms of aid i.e. program and project aid, are aiming at improving the quality of life through direct investments in public sectors such as health and education. This concern arises because in most cases the countries that provide debt relief are the same ones that provide other forms of aid, and their aid budgets are usually fixed. Therefore, the increase of the provision of one type of aid may result in the decrease in the provision of other. Bird and Milne (2003) provide an extensive discussion on this aspect of aid additionally. They investigate the relationship between the two and conclude that it has changed over years, thus making it hard to draw general conclusions. However, they claim that if debt relief comes as an addition to other forms of aid, then logically the probability of it having positive impact on the economy and the ability of a government to finance its expenditures undoubtedly increases. Nonetheless, this seems to be extremely dependent on the economic, and political circumstances of both donor and recipient countries. The literature on the topic of the relationship between debt and aid seems to be extensive, but inconclusive. Powell and Bird (2010) come to the same conclusion as Bird and Milne (2003). They investigate the allocation of debt relief and aid in 48 sub-Saharan African countries for the period 1988-2006 and find that there is a dynamic relationship between debt relief, conventional aid, and resource transfers. They infer that donor countries are usually substituting one form of aid with another. There are other studies on the topic such as these of Powell (2003), as well as Hepp (2004) that provide empirical evidence that debt relief in reality does not crowd out other forms of aid.

Another important point of consideration is the conditionality attached to provision. The main aim of these conditions is to ensure the proper utilization of the resources that are expected to arise from the provision of debt relief, and further focusing them on poverty reduction expenditures and actions. The conditions are focused on pro-development spending and public investments that would lead to strengthening of the economic situation and the quality of institutions in the impoverished countries, thus aiming at indirectly stimulating the pro-development actions of the recipient countries. In addition, another justification of this conditionality is the desire of donors to take care of the moral hazard problem that may arise.

Specifically, minimizing the room for recipient countries to engage in economically detrimental activities, or excessive military expenditure. These conditions attached to debt relief, though reasonable, have been challenged by some scholars. For example, Depetris Chauvin, and Kraay (2005) claim that the mere replacement of one form of expenditure with another, in this case debt servicing and development expenses, as a consequence of the constraints imposed on the governments after receiving debt relief, does not solve the problem of high budget deficits of the recipient countries. The authors built this argument on the one raised in the study of Burnside and Fanizza (2004) arguing that this poverty reduction spending imposed on recipient governments would lead to the level of debt accumulation actually unchanged, and thus undermine the sustainability objective of debt relief. However, Johansson (2009) brings this argument a step further, claiming that in a situation such as the one that Burnside and Fannizza (2004) describe, the debt levels would remain unchanged only in the case where the country is actually servicing its debt, which is not always the case judging from the reality in the last couple of decades.

Democracy vs. Autocracy

A central point of attention of this thesis is the distinction between democratic and autocratic countries. Very few studies dealing with debt relief take into consideration whether a country is more democratic or more autocratic. Dessy and Vencatachellum (2007) use a democracy index for a proxy for institutional quality. This thesis is using the same data, however[9] looking at Democracy in a little different way. The main differences relate to the methodology used and the way the research questions are defined. They do not consider the differences between democratic and autocratic countries, but rather estimate what is the impact in case countries improve their institutional quality.

There are some studies related generally to aid and democracy, but the causal direction is quite different. For example, the Gibson, Hoffman and Jablonski (2015) recently published a study on the democratization of African countries in the last decades. They look into what was the effect of the provision of aid on the political governance structures, and whether the provision of this assistance changed these structures. In contrast, this thesis is taking the opposite direction. The current study is taking the autocracy democracy status as given, and is looking whether there is an interaction in that would impact the public services resource allocation.

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[9] POLITY2 index; for details see Data description section

To my best knowledge, there is no study which is taking into account the status of a country and using it in the sense that this status may have an impact on the allocation of freed resources as a consequence of the receiving debt relief.

2.3 How effective Debt Relief is found to be?

The following subsection provides an overview of the literature that has been dealing with the effectiveness of debt relief.

Even though this paper is not investigating the direct link between debt relief and economic growth, changes in the quality of life can be strongly considered consequences of changes in economic growth. Therefore, in combination with the fact that the majority of the literature on the topic of debt forgiveness is focusing on its effects on growth, a brief review of the related studies is called for.

Many of the studies on debt relief-growth nexus are investigating the relationship based on the crowding out theory developed by Cohen (1993) which proposes that there is a resource mechanism at play,. This means that high indebtedness is acting as a displacement of investments in key public areas such as education, health and infrastructure, and is thus resulting in depressed economic growth. Based on this resource mechanism, in their study Depetris Chauvin and Kraay (2005) use difference-in-difference empirical strategy to investigate the impact that debt forgiveness has on the economy. Using the time period 1989-2003 they find no evidence of an improved economic performance in 62 low income countries. By extending the period to 2007, and by adding more control variables to the equation, the study of Presbitero (2009), investigates what is the effect of debt relief on economic growth, inflows of external, plus domestic investments. Using fixed effects estimation, he finds little support for the claim that debt relief has a positive impact on economic growth in the periods following its provision. In another study on the topic, Johansson (2009), using a dataset on 118 low and middle income countries for the period 1989 to 2004, and building a model based on standard growth theory finds no support for the hypothesis that debt relief has a direct and enhancing effect on economic development, despite controlling for various factors that may be biasing the results, and which are usually unaccounted for in the previous studies.

In addition to investigating the effects of debt relief on overall growth of 62 poor countries mentioned in the previous paragraph, Depetris Chauvin and Kraay (2005) study the impact of debt relief on multiple other economic variables, including public spending. They appear to be

the first to empirically examine to what extent debt relief manages to increase the level of public expenditure. A great contribution that they make is the data calculations of the present value of debt reductions as a result of debt relief. The advantage of this data is that they take away some of the cross-country differences which the crude data on nominal quantities of debt relief have, and which are a source of heterogeneity issues that may further lead to erroneous empirical inferences. Despite being considered as a seminal work on the topic, the authors do not discriminate between African and non-African countries which is a reason for some doubts on the reliability of their findings. The results are again inconclusive.

As summarized by Presbitero (2009), the findings that debt relief does not have any significant positive effect on the recipient country does not necessarily mean that relief is ineffective. Here, it is important to acknowledge the fact the MDRI initiative carried out by the IMF, World Bank and other multilateral institutions is a relatively recent event and as such its effects may need some time to become visible. This is a reason why timely new investigations, such as this thesis is providing, are needed in order to account for any developments that may have occurred in the meantime.

Nonetheless, there are some studies conducted that managed to establish a positive link between debt relief and social expenditure. An example is the work of Dessy and Vencatachellum (2007). They investigate to what extent past debt relief provided to African countries has an impact on subsequent periods' public expenditure shares. They use a seemingly unrelated regression estimator (SURE) strategy for the period 1989-2003 and find that, conditional on improved institutional quality, debt relief has had a positive impact on the share of resources that a country allocates to sectors such as health and education. Despite searching the answers of relatively similar questions, the current investigation seriously differs from theirs with respect to the time span and empirical strategy. In addition, the level of institutional quality is controlled for in the attempt to try and account for the heterogeneity concern which was already raised in the overview of the growth literature.

In a series of papers Cassimon and Van Campenhout (2007, 2008) and Cassimon et al (2013) examine the fiscal response of African HIPCs to debt relief provision. In their study from 2007, they investigate the effects of debt forgiveness (including HIPC initiative) compared to these of other forms of aid in a panel of 28 countries, using vector autoregressive strategy (VAR). The main finding is that debt relief initially reduces public investment, but this effect is offset and

becomes positive after the initial two year period, and as such it outperforms other types of aid. In the extension of this study Cassimon and Van Campenhout (2008), using similar econometric framework, but including the MDRI initiative, manage to confirm their previous finding that debt relief provokes desired fiscal responses in the recipient countries compared to other grants provided by the donor countries. In Cassimon et al (2013), with a prolonged timespan they continue investigating the creation of fiscal space in response to debt relief provision. By using a panel of 24 HIPC countries, for the period 1996-2011, and by focusing on dealing with previous methodological problems such as endogeneity and heterogeneity, the authors find evidence that the public revenues and investments have actually expanded as a consequence of the forgiven debt. The main implication of all these finding is that there are opportunities for development that arise from the provision of debt relief. However, it is crucial that the recipient countries manage to seize them by engaging in development expenditures. In contrast to these studies, the current research is trying to further asses to what extent, and for which public sectors, the governments manage to take advantage of the opportunities that have arisen as a result of the decreased value of external debt.

The literature that has emerged on the topic of debt, debt relief, public expenditure, and further on quality of life yields mixed results. The studies differ greatly with respect to the way they define the problems at hand. In an attempt to clarify the matter, and shift the focus more to the people that benefit from these costly initiatives, this paper is focusing on a larger timespan, unaddressed empirical problems and as such is trying to provide a more up to date assessment of the effect of debt relief on public sector areas such as education and health that serve as a proxies for the quality of life of the poor. The thesis is lying on macroeconomic level, but with a focus on the social welfare implications for poor societies.

3. Data Description and Methodology

The following section is dealing with the data collection process as well as the construction of the model that is estimated.

3.1 Data Description

In general, the use of panel data increases the efficiency of the estimated population coefficients compared to the use of cross-section data. Its main benefit is that its utilization permits parameter identification while requiring less restrictive assumptions than other methods such as time series, and standard regression analysis. In addition, it allows to exploit more dynamic relationships

across individuals and over time (between-within variation). However, the main reason why this study is using panel data is the fact that debt relief is a type of aid that can be easily argued to be a relatively recent occurrence. Despite originating long back in time, it has become centralized only since the start of the HIPC Initiatives. It can be easily assumed that it has affected countries differently because of differences in size, regulations, ability to overtake economic reforms, etc. As a consequence, restricting the attention to one country not provide a valid conclusion base because of the narrow focus and subjectivity of the data. In addition, a pooled sample would raise a lot of econometric issues, such as countries heterogeneity which can only be properly addressed by the use of panel data techniques.

Data was collected on a set of 36[10] countries in total for the period 1990-2012. 35 of these countries have reached completion point meaning that they have met the criteria of HIPC initiative and the Enhanced HIPC and are subject to irrevocable debt relief under them. Chad is the 36th included country, and is in an interim phase, meaning that it has passed decision point and has started receiving debt relief, but is still to satisfy some criteria in order to receive the total amount of the debt relief that it is entitled to. The resulting panel is unbalanced. Ideally, a balanced panel would have been the preferred option. However, there are insufficient data for such a long uninterrupted period which is making it unfeasible. Despite some pitfalls, I prefer to use unbalanced panel in order to obtain and exploit as much variation as possible. Each variable used is described below. .

Dependent Variables
Education proxy:

Education measure (*EDU*): The government spending on education is the total amount spent expressed as percentage of Gross Domestic Product (GDP). The reason to express some of the dependent and control variables as percentage of GDP is the fact that it can be considered as a good measure of the economy's capability to provide for the well-being of its people. In addition, any nominal measure expressed as a percentage of GDP is therefore controlling for the differences in the size of the economies, as well as any exchange rate discrepancies and inflation.

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[10] Afghanistan, Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Dem. Rep. of Congo, Republic of Congo, Côte d'Ivoire, Ethiopia, The Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Tanzania, Togo, Uganda, Zambia.

The data on GDP are taken from the World Bank databases and are available annually, alas not for each country.

The measure Education measure (*EDU2*), is used explicitly as a robustness check in a separate regression than the *EDU* measure described above is the primary school pupil-teacher ratio which is obtained by dividing the number of students enrolled in primary school by the number of primary school teachers employed in any given year. The reason for the utilization of this data is that it can be easily assumed that the amount of teachers employed is directly related and constrained by the amount of public investment on education by the government. In addition, they have less missing observations that the first educational measure. Furthermore, important to note is that the expected effect is in the opposite direction. Debt relief should have a decreasing effect on the pupil-teacher ratio as the group of students per teacher is logically implying improvement of the quality of education as more time could be devoted to each child.

Health proxy:

The first health measure (*HEALTH1*) is the annual total public expenditure expressed per capita and further as percentage of GDP per capita. By the definition provided by the World Bank it: covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.' The data on population used to convert it into per capita was taken from the World Bank database. The second health measure (*HEALTH2*), used as a robustness check, is health expenditure as percentage of total government expenditure in a given year. It is comprised of government health budgets as well as external borrowings and grants and public health funds. When this measure is used, the estimation is omitting the control variable of Official Development Assistance (ODA) as the external grants include health related donations from international agencies. This is done in order to avoid possible estimates from a biased estimator as a consequence of the overlap in the dependent and independent variables.

Independent Variables (Debt Relief)

The aggregate measure of the debt relief provided through the debt relief programs is named *HIPCMDRI*. The variable represents the net service savings from debt relief. This reason behind the decision on using the service savings instead of the nominal amounts of debt relief is that it is expected that the amount of money that countries would have spent on the repayments and interest on their external debt is a better measure of the amounts of resources which are now

available for other purposes than these repayments. The details behind the calculation of this variable are elaborated in detail in Section 3.2. It is further transformed and presented as a percentage of the GDP in order to scale it and ease the interpretation of results. The source of the data is the IMF and the World Bank country documents released every year and the numbers represent their staff estimates of the amounts of debt service due before and after the delivery of debt relief if each initiative. The final series used in this study are following the computational logic of Cassimon (2008). The actual debt service saving from a certain program was obtained by subtracting the amount due after the provision of the relief from the amount due before its provision. The aggregate measure is the sum of the two disaggregate values of debt relief from the HIPC Initiatives and the MDRI initiative in any given year. The HIPC abbreviation includes both the first HIPC and the Enhanced HIPC programs. The two programs are presented together. The main reason for this is the fact that the first HIPC initiative covered very few countries from the sample, and effectively the start of the delivery of its debt relief overlapped with the Enhanced initiative. This relates to the harsher criteria for eligibility of the program. In addition, the Enhanced HIPC is considered as an extension of the first initiative which makes it reasonable to combine the two measures into one. In addition, the debt relief coming from the HIPC and MDRI initiatives is aggregated and presented as the same series as the aim of this study is to evaluate the overall effects of forgiving the debt of poor countries, and not to evaluate which one was the most effective. The data on MDRI debt service savings are covering the period 2006-2012 and are available for all countries in the sample.

Debt Forgiveness Grants *(DFGrants)* is a measure of the total debt relief, both bilateral and multilateral, that excludes the amount provided by the Debt Relief programs (HIPC and MDRI) and other forms of official development assistance (ODA). The definition provided by the World Bank is that the data 'cover both debt cancelled by agreement between debtor and creditor and a reduction in the net present value of non-ODA debt achieved by concessional rescheduling or refinancing.' The original data is in nominal terms in current US dollars, but to account for differences of the size of the economy they are expressed as percentage of GDP for a given year.

Last, but definitely not least is the measure of the quality of institutions is constructed by Marshall and Jaggers (2002). It was named the revised Polity index (*POLITY2)*, or else called the combined Polity II score, which ranges from −10 implying high autocracy to +10 meaning high

democracy[11]. In order to ease defining the hypothesized effects and the interpretation of the results the measure is transformed to vary from 0 up to 10 (intervals of 0.5). 0 indicates high autocracy, while 10 indicates full democracy. Polity index covers thoroughly African countries and covers the whole period of interest as well as the whole sample of countries. The combined polity score is an aggregate measure that can be considered as four-faceted which are:

- Competitiveness of executive recruitment,
- Openness of executive recruitment
- Constraints on the chief executive
- Competitiveness of political participation

Such measure provides an elaborate representation of the state of the current political and social situation in a given country. Therefore its use provides interesting opportunity to address one of the main questions of this study, namely whether debt relief has more effect in countries whose political environment is more democratic, implying less corruption, higher competitiveness, better legislation and protection of rights, etc. as compared to the opposite case where a more centralized and autocratic regimes are present. Intuitionally, the former case is expected to provide better environment for the proper utilization of the resources that are supposedly freed by the provision of debt relief.

Controls

The measure ODA, is a measure of the Official development assistance (ODA) received in a given year and presented as percentage of gross domestic product (GDP). Important to note is that these data exclude the HIPC debt relief received. Therefore it can be considered independent from the main explanatory variables, thus satisfying the exogeneity restriction imposed by the specification described in the following subsection. The idea behind the inclusion of this variable is that official development assistance (sometime in the form of project aid) is expected to have a positive impact on the dependent variables. As the main aim of ODA is to promote economic development and some requirements for its provision are imposed on the governments, it is assumed that the resource allocation decisions will be affected by the amount of ODA provided to the country.

Foreign Direct Investment inflows are also presented as a percentage of gross domestic product. These investments may be seen as representing the state of the economic environment in a

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[11] The data and more information on the project are available at http://www.cidcm.umd.edu/inscr/polity/.

country. The inflows may have a negative sign which indicates that there has actually been disinvestment in a given year. For the purpose of this study, foreign direct investments are considered to be a signal for the presence of absorptive capacity of a country because the efficient exploitation of FDI is reasonably assumed to attract more FDI in the future periods (years). It is also expressed as percentage of GDP.

Two other control variables are added in order to help defining the factors that affect health and education spending in a country. First, the rate of change from one year to another is added (*GDPgr*). It is calculated by using data on GDP and transforming it to the rate of change using the following formula: $(GDP_t - GDP_{t-1})/ GDP_{t-1}$. Second, gross domestic product per capita (*GDPcap*) is included as well. The assumption that they are affecting the educational and health expenditure is based findings in the literature on determinants of public spending. For example, in the paper from 2007 Busemeyer finds both GDP per capita and GDP growth to be significant determinants of education spending. In addition, Hitiris and Postnet (1992) find similar finding for the health spending. The main aim of the inclusion of these control variables is increasing the explanatory power of the model, and thus arriving at more refined results.

Table 2 below contains all the aforementioned variables and the way they were computed or transformed, as well as the source of the data.

Table 2. Data source, notation and scaling

Abbreviation	Computation	Source
HIPCMDRI	*MDRI and HIPC Debt Relief (% of GDP)*	*World Bank and IMF estimates*
HIPC	*HIPC Debt Relief*	*World Bank and IMF estimates*
MDRI	*MDRI Debt Relief*	*World Bank and IMF estimates*
DFGrants	*Debt Forgiveness Grant (% of total GDP)*	*Development Assistance Committee of the Organization for Economic Co-operation and Development.*
EDU	*Public spending on education, total (% of GDP)*	*United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.*
EDU1	*Pupil-teacher ratio, primary education*	*United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.*
HEALTH	*Health expenditure per capita (as % of GDP per capita)*	*World Health Organization National Health Account database*
HEALTH2	*Health expenditure, public (% of government expenditure)*	*World Health Organization National Health Account database*
ODA	*Net Official Development Assistance(ODA) received (% of GDP)*	*Development Assistance Committee of the Organization for Economic Co-operation and Development, Geographical Distribution of Financial Flows to Developing Countries, Development Co-operation Report, and International Development Statistics database.*
FDI	*Foreign Direct Investment as % of GDP*	*International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates.*
POLITY2	*Institutional Quality (Polity 2 index)*	*Marshall, M., and K. Jaggers (2002) (http://www.systemicpeace.org/polity/polity4.htm)*
GDP	*Used to compute GDP per capita and GDP growth (GDPcap GDPgr)*	*World Bank national accounts data, and OECD National Accounts data files.*

Following this, Table 3 below contains descriptive statistics.

Table 3. Descriptive statistics

	Mean	Minimum	Maximum	Std. Dev.	Observations
EDU	3.730	1.035	10.208	1.563	359
EDU1	46.437	23.165	100.236	13.173	609
HEALTH	2.406	0.045	6.596	1.123	638
HEALTH1	10.562	1.123	74.776	4.989	638
MDRIHIPC	0.0171	0	2.460	0.116	828
DFGRANTS	10.633	-0.003	1512.465	69.095	762
ODA	15.653	0.534	147.168	13.701	806
FDI	14.983	-28.344	1209.604	68.854	806
POLITY2	1.245	0.5	9,5	2.551	792
GDPgr	3.116	-0.966	77.22	10.295	750
GDPcap	2956.56	2.461	140484.1	433.41	805

Data Testing

Before running the regressions the data is tested for multicollinearity. This is done in order to detect if there are explanatory variables which are highly correlated. If there are such, the estimation of the coefficients may be inaccurate. One of the main consequences of multicollinearity is that if two or more of the variables are collinear they would generally convey the same information. One of the most obvious consequences of the presence of multicollinearity are large standard errors. In order to test the data for multicollinearity, a Pearson correlation test is performed. The tables below (Table 4) present the correlations among the independent variables. The Pearson correlation values from the test are interpreted using the following guideline boundaries:

- High correlation: 0.5 to 1.0 or -0.5 to -1.0
- Medium correlation: 0.3 to 0.5 or -0.3 to -0.5
- Low correlation: 0.1 to 0.3 or -0.1 to -0.3

From the table below it becomes apparent that there are no alarming indications of multicollinearity as none of the significant correlations exceed the low correlation boundary.

Variable		MDRIHIPC	DFGrants	ODA	FDI	Polity2	GDPgr	GDPcap
MDRIHIPC	Pearson correlation	1						
	P-value							
	Observations							
DFGrants	Pearson correlation	0.176*	1					
	P-value	0.0896						
	Observations	368						
ODA	Pearson correlation	0.0363	0.0168	1				
	P-value	0.4806	0.6474					
	Observations	380	748					
FDI	Pearson correlation	0.421	0.1844**	-0.0943***	1			
	P-value	0.2003	0.0000	0.0082				
	Observations	380	761	784				
Polity2	Pearson correlation	0.0188	0.0491	0.0176	0.1148*	1		
	P-value	0.2073	0.1828	0.6241	0.0014			
	Observations	363	737	780	771			
GDPgr	Pearson correlation	0.071*	0.0518*	0.0248	0.0675*	-0.0258	1	
	P-value	0.1001	0.0681	0.5029	0.0648	0.4899		
	Observations	371	709	732	750	718		
GDPcap	Pearson correlation	0.0458	0.0337*	0.1236*	0.0490	0.0256	0.0922**	1
	P-value	0.3734	0.0536	0.0005	0.1653	0.4783	0.0115	
	Observations	380	761	784	805	771	750	

*Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level*

Furthermore, the data needs to be tested for the presence of unit root (or serial correlation). This is done by using the Phillips and Perron's test statistics (Phillips and Perron (1988). This statistic is used instead of the popular Augmented Dickey-Fuller (1979) statistic, as the former one is considered more robust in respect to serial correlation. This robustness comes from the fact that the covariance matrix estimator is accounting for autocorrelation and heteroskedasticity by using the Newey-West (1987) estimator. The results do not indicate the existence of unit root in the data. The null hypothesis tested here is that all panels contain unit root. Most of the p-values are significant, thus null hypothesis is rejected and can be safely stated that the data is stationary and can be used as intended so far. The only insignificant statistic is the one obtained for the HEALTH indicator, but the value if close to the 10% significance interval and is not considered as a high concern. However, it is important to be kept in mind when interpreting the results. The output of the test is presented in Table 5 below.

Variable	Test Statistic	Critical values	Number of panels
EDU	170.599**	0.0451	35
HEALTH	159.31	0.106	36
MDRIHIPC	448.861***	0.000	36
DFGRANTS	515.893***	0.000	36
POLITY2	293.239***	0.000	36
ODA	173.394***	0.000	36
FDI	490.624***	0.000	36
GDPgr	812.708***	0.001	36
GDPcap	1066.895***	0.002	36

Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level

The following section will present the empirical strategy which will be employed in the Analysis section.

3.2 Methodology

On measuring Debt Relief

The question of measuring debt relief is of great importance for the methodology of this research. Since debt relief is, simply put, scratching off the external debt of a country, it can be actually seen as the relieving of a government from servicing its debt. The World Bank definition of debt service is: 'The cash that is required for a particular time period to cover the repayment of interest and principal on a debt'. Therefore, the following strategy is applied when it comes to constructing the measure of debt relief. Instead of using the nominal amounts of debt relief, the actual service saving from debt relief is calculated. This is done by subtracting the reported amount of debt service saving/reduction that resulted from the provision of either HIPC, MDRI, or both, from the debt service (including interest rate) that was due to be paid by any country before the provision of relief . The formula below visualizes the actual calculation:

$$HIPC_{it} = (DSDbefore - DSDafter)_{it} \quad (1)$$

$$MDRI_{it} = (DSDbefore - DSDafter)_{it} \quad (2)$$

Where $HIPC_{it}$ (1) is the debt service savings from the HIPC initiative for country i in period t, $DSDbefore_{it}$ represents the debt service that was due for repayment before the HIPC provision took place, and $DSDafter_{it}$ is the debt service due after. The same logic is applied when obtaining the debt service savings from $MDRI_{it}$ (2). Further, the two measures are summed in order to arrive at a final figure, expressed by $HIPCMDRI_{it}$ for a given year for any country. To

my best knowledge, this has been done only by Cassimon and Van Campenhout (2008). Another important reason for this choice of measuring debt relief is the fact that the staff of the World Bank and other multilateral organizations involved in the provision of this DR are reporting figures based on their calculations/estimates, expressing the figures expressed as a debt service. This is because of the fact that different countries use different ways to account for the debt relief in their budgetary reports. Finally, by expressing debt relief in such a way, this study circumvents the common criticism that Debt relief creates fiscal space only in the case that the debt would have been actually repaid. This is so because it can be argued that fiscal space is better represented by the fact that the interest repayments on debt become smaller.

A possible concern may arise from the fact that there are separate measures for total debt relief (DFGrants) and the debt relief relating to the HIPC-MDRI initiatives. It may be argued that it is wise to subtract initiatives' relief (HIPCMDRI) from the total relief figures (DFGrants) for the years when the former was provided in order to avoid double counting. This however, is unnecessary for the data at hand as the latter measure consists only of non-ODA relief, which eliminates the need for the transformation. As such it can be safely assumed that it is an independent measure of the rest of the debt relief variables which is an important assumption for the justification of the estimation.

Another point for the construction of the debt relief measure (HIPCMDRI) is that the years from 1990 until the actual delivery of the debt relief are considered to have the value 0. It is not treated as missing observation because it is not the case of data being unavailable, but rather that in these years debt relief from the HIPC and MDRI initiatives was simply not provided.

Specification

One of the main advantages of panel data is that it allows the researcher the flexibility to choose from many different specifications with varying restrictions, and thus providing the opportunity to pick the estimator whose assumptions fit the data and the relationship between them the best.

It seems appropriate to start with discussing the possible utilization of a pooled Ordinary Least Squares (OLS) estimation. One of the crucial identifying assumptions underlying this estimator is the exogeneity of the error term from the rest of the explanatory variables. The value of the error term cannot be correlated with any of their past, current and future values. This condition can be formerly expressed as:

$$E[\varepsilon|X] = 0$$

Where X represents any explanatory variable and ε is the error term. However, in reality this exogeneity assumption can be violated in many ways, although they may be classified into three main categories. First, if there are variables that are not included in the controls' vector C', but are correlated with the dependent variable the estimation would suffer from endogeneity. The variation of such unaccounted terms would then be absorbed by ε and therefore making it endogenously determined. This violation would cause an omitted variables bias. The second one comes from the possible presence of reverse causality, which implies that the causal link is going in the opposite direction than the constructed model is predicting. The third violation is present when the data is erroneously measured. Results obtained from an OLS estimation would be seriously biased an unreliable if any of the aforementioned violations are present, and therefore a more sophisticated estimation method needs to be considered and used in order to avoid erroneous inference. Luckily, there are various other estimators available that manage to take care of these threats.

There are two main models of panel data analysis that are applicable for the current set up and which, if properly specified, have the potential to yield a reliable estimation and avoiding any of the endogeneity problems outlined above. The first one is the Fixed effects (FE), or else called "within estimator", and the second is the Random Effects (RE) also called the "between estimator". Both of them are acknowledging the presence of unobserved, time-invariant differences among the individual units. However, despite this similarity they differ greatly with respect to the way they treat these individual heterogeneities. It is important to consider the identifying assumption behind each of them. For Fixed effects models the individual-specific effects that do not vary in time are allowed to be freely correlated with the explanatory variables (FE1), while for Random effects the time invariant individual-specific effects are assumed to be uncorrelated with the independent variables. In the context of this thesis, these assumptions can be translated as: FE1 - All countries react to debt relief in the same way, as opposed to the RE1 which requires that countries react differently to debt relief. The FE assumption is far less strong and more easily supported by intuition than the RE one. The main narrative argument behind the use of FE is that the aim of the debt relief initiatives is to provide debt forgiveness to all countries using the same eligibility criteria. Even though the criteria was updated with each launch of a new initiative, at any specific point in time the countries were subject to equal conditions and requirements. Another consideration when it comes to FE estimator is that it restricts the

predicted effects only to identical populations (HIPCs) and falls short when transferring the estimated effects to different groups (i.e. income groups). Fortunately, this is not a problem in the current study as it is concerned with assessing the effectiveness on the poorest countries represented by the HIPC classification, and is not aiming to draw conclusions about any possible effects of debt relief on, for example, emerging market economies or other income groups. In contrast, the RE model necessitates the assumption that there is no common effect of debt relief to the subjects. In addition, random effects models are demanding larger samples in order to be rendered precise.

A formal way of justifying the choice between the Random and Fixed effects estimator is to run a Hausman test. It is known that the RE is more efficient estimator than the FE. However, if the coefficients obtained from both estimators differ significantly from each other, a researcher is believed to have the grounds for employing the FE one. The test was run on regressions including all the variables described in the previous section and the results can be seen in Table 7 below. The null hypothesis tested is that the difference in the coefficients is not systematic (H0). In case H0 is rejected the Random effects are deemed more suitable.

Table 4 Hausman Test Fixed-Random effects

Variable	EDU	HEALTH
P-value>Chi2	0.382	0.412

As it can be seen for both variables of interest, the resulting critical values exceed even 10% significance level, and therefore the null hypothesis that the estimated coefficients differ significantly can be rejected. Despite this finding, there are numerous logical arguments in favour of FE estimator for the current set up, and therefore the models will be estimated using both estimators with the aim of finding the most reliable results given the data at hand.

The dependent variable (or social proxy) is assumed to be independent of its own past and future values, and therefore there is no need to consider dynamic panel estimators. Also, the fixed effects' identifying assumption that the individual specific effects have to be correlated with the independent variables, can be argued true because of the amount of debt relief provided being the result of high indebtedness of a country (which in turn may be the result of many unobserved factors such as low natural resource endowments, climate, etc.). This high indebtedness would be absorbed by the individual fixed effect of each country, thus correlating it with the measure of debt relief. Despite presenting a simple situation, this serves as a good example to support the

main idea of the assumption. Even more so, it would be quite hard to disprove the existence of such relationship and therefore, it is again safe to claim that the assumption is satisfied.

On another point, the fixed effects estimation is preferred if the individual units are considered unique as this type of estimation focuses on the differences within each individual in the sample in order to account of all the heterogeneity between countries. Here, this is desired as the sample consists of 36 countries which despite falling into the same income group classification are argued to differ significantly from each other in almost any other aspect which does not vary with time (endowments, climate, etc.). If this is the case, and the Ordinary Least Squares method, rather than the one which includes fixed or random effects is used, the error term would absorb these differences, making it related to the explanatory variables, and thus endogenous. Consequently, the utilization of fixed or random effects would validate the model not only despite these obvious heterogeneities, but also because of them. In reality, addressing unobservables is challenging and any researcher is facing an almost impossible mission to include all relevant controls. The reason for this lies in their name, they are unobserved and as such it is hard to be certain about their non-existence. Fixed and random effects models are an effective way to eliminate this threat. However, fixed effects models are able to do this for time-invariant unobserved variables. All other time-varying variables correlated with the rest of the elements of the model, would not be accounted for by FE estimator. This is the reason for including the control variables described in the data section. Nevertheless, it is hard to prove that there are no other such variables, but the use of FE estimator and including all relevant variables that have available data is deemed enough to validate the specification. Still, this discussion is important as unobserved heterogeneity is known to be one of the three major pitfalls of all regression macroeconomic estimations (as briefly mentioned in the beginning of this subsection, the other two being reverse causality and measurement error). Even though fixed and random estimators are of the most effective ways of overcoming the endogeneity problems from which standard regression analysis often suffers, they do not eliminate the need to consider these threats.

Having covered the omitted variables bias, the next endogeneity threat is the reverse causality. It is argued to be irrelevant in this study's case on the premises that the level of debt relief is a consequence of a country's government actions regarding sustaining the financial stability rather

than its inability to allocate the resources that are supposedly gained from the relief[12] fairly among its social structures.

The last endogeneity concern, that is measurement error, is in theory present when one or more of the variables of interest are imprecisely measured, or in the current case reported by each government. Unfortunately, as for most macroeconomic data, the data collected for the current study may suffer from measurement error in both the explanatory and the dependent variables. As discussed in the subsection, measuring debt relief is not as straightforward as one may wish, and therefore it is important to discuss and show awareness of what the possible consequences of imprecise measurement may be. Luckily, this is the least problematic of the endogeneity threats as the main implication of measurement error in the independent variables is that, if present, it would drive the results toward zero. Therefore, the possible presence of measurement error in the independent variables, or the rights-hand side of the equation is in a way rendering the results somewhat more conservative, or else said, underestimating the positive effects and overestimating the negative ones. Such error in the dependent variables (or the left side of the equation), though possible, would not bias the results in a detrimental and misleading way as the difference between the true and the measured value would be absorbed by the error term without affecting the relationship between the independent variables and the error term which is what the researcher should be more concerned with.

Following the choice of estimation, the main model that will be tested using Fixed and Random effects is constructed that is of the following linear multiple regression form:

$$Y_{it} = \alpha_i + \beta HIPCMDRI_{it-1} + \gamma DFGrants_{it-1} + \Omega Polity2_{it-1} + \delta C'_{it} + \varepsilon_{it} \qquad (3)$$

where Y_{it} represents the social proxies for each country $i=1,...,36$ observed in the time span t=1990-2012. Here again the $MDRIHIPC$ is the aggregate measure of the initiatives' debt relief and $DFGrants_{it}$ is the aggregate measure of the rest of the debt relied received in a given year t by any country from the sample. $Polity2_{it-1}$ is the democracy measure and C' is again a row vector containing all time variant control variables described in the data section. As it can be seen, the independent variables are taken from one lagged time period. The reason for this is that it is assumed that at the effects of debt relief may not become apparent in the current period, but instead may come to the surface only after certain amount of time. First, this may be because it

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[12] This relates to the discussion on debt-overhang in the section covering the rationale behind debt relief. Even though debt-overhang existence is questionable, this thesis does not excludes the possibility of its presence.

would be technically impossible to update the government budget in an ongoing year, as one government is usually voted on by the government in the preceding year. As for the rest of the independent variables, similar arguments hold. Structural changes on macroeconomic level are considered delayed, and therefore taking the lagged terms is sensible.

As already mentioned both fixed and random effects methods are used to obtain coefficients model developed above. As it can be seen any time-invariant independent variables are not present in the model and the main reason for this is that if included they would be perfectly collinear with the coefficients of country dummies in the fixed effects which would make the estimation impossible. A constant of the standard form is not included in the model because the independent variables are allowed to vary over time and therefore a constant would render the estimation unreliable. Instead the term α_i is included and represents the country specific effect that absorbs the unobserved heterogeneities.

Next, after estimating the model described by the specification in (3), this study will shift the focus further to the possible interaction effect between the amounts of debt relief (*MDRIMDRI)* and *DFgrants*) and the institutional quality (*POLITY2*). The interaction term is expressed as *DRxPolity2* and *DFGrantsxPolity2* (4) for 1 lagged period in order to account for the argued delayed effects of debt relief. This is done in order to answer the final research question of whether countries with higher level of democracy are managing to reap greater benefits from the decreased levels of external debt. Having said this the final model can be expressed as:

$$Y_{it} = \alpha_i + \beta MDRIHIPC_{it-1} + \gamma DFGrants_{it-1} + \Omega Polity2_{it-1} + \upsilon(DRxPOLITY2)_{it-1} +$$
$$\mu(DFgrantsxPOLITY2)_{t-1} + \delta C'_{it-1} + \varepsilon_{it} \qquad (4)$$

The hypotheses that are being tested can be found in Table 8. The signs represent the hypothesized effects that are being tested with a null hypothesis that the effect is zero, or nonexistent (H0), and alternative hypothesis that the effect is such as the sign indicates (Ha).

Table 8. Hypothesized signs

Independent/Dependent	Education (EDU1)	Health
Total DR(MDRI+HIPC)	+	+
Debt Forgiveness Grants	+	+
FDI	+	+
ODA	+	+
POLITY2 (democratic/autocratic)	+	+
DRxPOLITY2	+	+
DFGrantsxPOLITY2	+	+
GDPgr	+	+
GDPcap	+	+

The signs in the table are straightforward except the ones relating to the index of the institutional quality (POLITY2). For democratic countries (which are the ones whose index has a positive sign) a positive and significant coefficient will be expected to have a positive effect on the dependent variable (social proxy). For autocratic countries a positive sign of the coefficient would imply a decrease in the level of expenditure relating to the all of the social indicators.

One last remark on the empirical strategy, a very important consideration for arriving at robust results is the matter of obtaining correct standard errors. Despite all the assumptions made so far, if in reality any one of them is violated, and there are inter country temporal dependencies, the standard errors of the regression would be inconsistently estimated which could lead to biased coefficient estimates. This is explained by the fact that the standard errors provide information regarding the spread of the values within an estimation. As such, they are used to construct a confidence interval which would indicate the space within which the true population effect is falling. It is therefore straightforward that the smaller the standard errors, the more precise the estimation coefficient is, conditional on the accuracy of these obtained standard errors. From here, it follows that inaccurately obtained standard error may make a coefficient fall within a confidence interval, and thus presenting it as significant, while in reality it is not. All the model results are estimated and reported with the cluster-robust standard errors.

In addition, each estimation is run again excluding the case of Afghanistan. The reason being the fact that during the whole time period the country has had little time without being in a military conflict. The main problem with this is not what the conflicts may have caused, as almost any of the other countries that are included in the sample have been through a conflict, but the fact that the reporting of the Afghani government during these years is almost nonexistent. The disadvantage of doing this is that it is decreasing the sample size. However, I have the strong belief that Afghanistan, though one of the countries subject to debt relief may be an outlier and distorting the accuracy of the obtained coefficients. The second serious concern is that because of the political instability of the country the data may be untrustworthy data, thus serving as a second argument in favor of the exclusion.

Robustness

In addition to the specification outlined so far, it is important to note some additional considerations in order to ensure the robustness of the specification outlined so far. This is done by running the regressions that yielded the most conclusive results using the alternative measures *EDU1* and *HELATH1* described in Subsection 3.1. Ideally, other alternatives would have been used, but due to lack of thorough data, this is not possible.

The exclusion of an outlier individual from the sample, such as excluding Afghanistan may find its way in the robustness section. However, for the sake of better organizing the presentation of results it is being part of the main analysis.

Next section will present the results obtained from the estimation of the model described so far and their discussion.

4. Analysis and Robustness Check

4.1 Analysis

The following section is dealing with the results obtained from the analysis described in section 3.2. It is organized in such a way that the results for the education and health sectors are looked at independently and each is presented in a separate subsection. At the end of each subsection, the full model (4) is run again but excluding Afghanistan from the sample. The reasons for this have been mentioned multiple times in the previous sections, but it can be said that in a relatively small sample such as the one at hand a single individual may be decreasing the strength of the results.

It is important to mention that in the estimations of all models and robustness checks all the predictor variables are lagged for one period on the premise that it is unlikely that any aid, relief, or financial inflow would have an immediate effect on the economy.

Education

First let's turn to the case of educational spending. Table 8 presents the results for both models developed in the previous section ((3) and (4)).

Model (3) is estimating the impact of all the variables included on the change in educational spending from one year to another. It is run for both fixed and random effects.

Table 8. Education expenditure dependent variable: EDU (Full Sample)

Variable	(3) FE	(3) RE	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC$_{(t-1)}$	1.151**	1.301**	1.045*	1.295*	1.144*	1.341**
	(0.514)	(0.531)	(0.858)	(0.896)	(1.086)	(0.947)
DFGrants$_{(t-1)}$	0.0015*	0.0016**	0.0067*	0.0004	0.0033*	0.0025*
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.0023)
(MDRIHIPCxPOLITY2)$_{(t-1)}$			0.222*	0.365*	0.0272*	0.2059*
			(0.066)	(0.442)	(0.405)	(0.093)
(DFGrantsxPOLITY2)$_{(t-1)}$			0.0001	0.0001	0.0002	0.0032
			(0.0003)	(0.0003)	(0.0003)	(0.0003)
FDI$_{(t-1)}$	0.0002*	0.0023 *	0.0013	0.0003	0.0005	0.0073
	(0.001)	(0.001)	(0.0008)	(0.0007)	(0.0008)	(0.0008)
ODA$_{(t-1)}$	0.0179	0.0147*	0.0164*	0.0102	0.0585**	0.0334*
	(0.019)	(0.006)	(0.019)	(0.018)	(0.0286)	(0.0226)
POLITY2$_{(t-1)}$	0.0581*	0.114*	0.0560*	0.1229**	0.1439**	0.1596***
	(0.008)	(0.005)	(0.081)	(0.059)	(0.077)	(0.0623)
GDPgr$_{(t-1)}$	0.0037	0.0028	0.0038*	0.0028*	0.0011*	0.00159
	(0.005)	(0.005)	(0.006)	(0.005)	(0.0055)	(0.0054)
GDPcap$_{(t-1)}$	0.0305*	0.0276*	0.0263**	0.0137	0.0529**	0.046
	(0.000)	(0.000)	(0.059)	(0.051)	(0.0841)	(0.006)
Country Effects	Yes	Yes	Yes	Yes	No	No
Time Effects	No	No	No	No	Yes	Yes
Observations	295	295	295	295	295	295
Adj. R-squared	0.484	0.428	0.365	0.412	0.436	0.398
# of Countries	29	29	29	29	29	29

Note: 1: *** - 1% significance level; ** - 5% significance level; * - 10% significance level
Robust standard error reported in brackets

Looking at the variable for debt relief provided by the World Bank and IMF initiatives (*MDRIHIPC)*, it appears to be significantly and positively affecting educational spending in both

fixed and random effects estimations of model (3). The size of the effect can be translated as 1.151% for FE and 1.301% for random effect. This coefficient represents the percentage change that will result in the ratio of educational spending to GDP of a country in the time period following the provision of relief. The r-squared of the FE model ((3) FE) is higher than the one in the RE one ((3) RE). 48% of the data in the FE model fits the regression line against 42% of the RE estimation. The second measure of relief granted as forgiveness *(DFGrants)* shows a positive and significant sign as well. However, the effect is really small fraction of percentage change in the education spending. The democracy index (*Polity2)* is also positively related to the educational spending. The magnitude of the coefficient in the RE estimation is bigger, and has smaller standard error. It can be translated as a 1 unit increase in the index would lead to a 0.114 percent change in the educational spending, thus indicating that the more democratic the country, the more resources it would allocate to public education. As for the rest of the control variables, FDI and GDP per capita appear significant and positive, however, their magnitude is also relatively small (the FDI one even more so). It has to be stated that the results from both FE and RE estimations of the model do not differ greatly in both the significance and the magnitude of standard errors.

Second, let move to the estimations of model (4) presented in the last 4 columns of Table 8 above. Here, the difference with the previous model is that there are interaction terms included between each of the debt relief measures and the democracy index. The first two models include country effects, while the second two include year dummies.

In line with the expectations, the *MDRIHIPC* coefficient is positive, and the magnitude does not differ greatly among the different estimations. However, the coefficients in both country and time estimations are higher for the RE than FE. As in model 3, the resulting change from increase in the provision of this type of debt relief varies between 1.045% ((4) FE) and 1.341% ((4) Time RE). The coefficients of the second debt relief measure remain small, though in most cases significant. The democracy index is again highly significant. In the estimations where time dummies are included it has a higher magnitude. For a unit change in the democracy status of a country a 0.15% increase in the education spending as part of GDP is predicted.

Moving on to the interaction effects, in all four estimations of model 4 the interaction between *MDRIHIPC* and the democracy index is significant. However, the magnitude is relatively small compared to the coefficients of debt relief and the democracy index on their own. Also, it has to

be noted that the standard errors of all four coefficients appear to be higher than the ones of the separate parameters. The second interaction effect between *DFGrants* and democracy appear to be positive as expected, but alas insignificant. Looking in the control variables, both the FE estimations ((4) FE and (4) Time FE) find GDP per capita to be positive and significant of the magnitude between 0.026% and 0.053% as expected change in the public spending on education. The GDP growth appears significant only in two of the estimations, but the size of the effect is small related to the other significant parameters. Official development assistance (*ODA*) has also a small, though significant and positive effect in the (4) RE and the (4) Time FE models. Foreign direct investments do not appear to have any significant effect on public education spending.

From the results obtained so far, it appears that that the World Bank and IMF initiatives' debt relief appears to be more effective type of debt relief in freeing resources that would result in increased public spending on education. Also, from the significant interaction effect it can be stated that the more democratic the country, the greater benefits there are from the provision of debt relief. This is in line with the expectations outlined previously in the paper.

Table 9 below, displays the results obtained once Afghanistan is removed from the sample.

The main purpose of the exclusion of Afghanistan form the sample was to try and see if it is an outlier as expected, thus this exclusion was expected to render the results more precise. All in all it appears that this is the case. For the debt relief variable *MDRIHIPC* the coefficient of all the estimations is significant and positive. In addition, the standard errors have decreased and the magnitude of the parameters has increased. In the last estimation ((4) Time RE), the percentage change in public spending on education is 3.15% which is an increase of almost 2% compared to the same estimation in table 8. The r squared values for all the estimations are higher as well. Again in the case of the last estimation, the percentage of the variation explained by the model has gone up to 52% compared to 39% in the full sample analysis. The coefficient of the interaction effect between democracy and the initiatives' debt relief is again positive and has the roughly the same magnitude as before. The interaction of DFGrants and the *Polity2* index is insignificant. Being a democratic country still matters, as increases the resources allocated on spending as shown by the *Polity2* coefficient. The effect of the GDP growth has disappeared once Afghanistan is excluded which can be explained by the suspicion of misreported information by the government. GDP per capita has also significant effect, though the magnitude remains small. ODA coefficients remained unchanged, though the standard error has decreased in the last two

models where time dummies were included. The FDI coefficient appears to have some, though small effect on education only in the case with country fixed effects.

Table 9. Education expenditure dependent variable: EDU (Excluding Afghanistan)

Variable	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC(t-1)	0.9613	2.815*	2.178**	3.1522**
	(0.7372)	(0.807)	(0.8134)	(0.8188)
DFGrants(t-1)	0.0053	0.0011*	0.0068*	0.0072*
	(0.0046)	(0.0004)	(0.0046)	(0.0005)
(MDRIHIPCxPOLITY2)(t-1)	0.1172*	0.3451*	0.0585*	0.2308*
	(0.7014)	(0.1787)	(0.6801)	(0.5746)
(DFGrantsxPOLITY2)(t-1)	0.00036	0.0059	0.00044	0.659*
	(0.0008)	(0.0007)	(0.0007)	(0.0007)
FDI(t-1)	0.00107*	0.00029	0.00084	0.0937
	(0.0001)	(0.0014)	(0.0013)	(0.0012)
ODA(t-1)	0.00599	0.0121*	0.0132*	0.0373**
	(0.0337)	(0.0101)	(0.0038)	(0.0214)
POLITY2(t-1)	0.1278*	0.0134*	0.1721**	0.1557*
	(0.0852)	(0.0067)	(0.0884)	(0.0918)
GDPgr(t-1)	0.0021	0.0031	0.0036 *	0.0063
	(0.0066)	(0.0009)	(0.0085)	(0.0009)
GDPcap(t-1)	0.0341*	0.0098	0.0911*	0.0497*
	(0.0044)	(0.0044)	(0.0101)	(0.0064)
Country Effects	Yes	Yes	No	No
Time Effects	No	No	Yes	Yes
Observations	289	289	289	289
Adj. R-squared	0.495	0.502	0.434	0.526
# of Countries	28	28	28	28

Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level
Robust standard errors reported in brackets

Health

Next, the focus shifts on the health expenditure as a dependent variable. Here, as in the *Education* subsection, the results are reported first including the full sample (Table 10), followed by discussion of the same estimations, but with the difference that Afghanistan is excluded (Table 11).

The FE and RE estimations of model 3 in Table 10 below reveal less strong dependence between the debt relief variable (*MDRIHIPC*) and public health spending as compared to the case of education. The coefficient is only significant for the FE regression at the 10% significance level. The magnitude is 0.386% which is translated as the percentage increase in health spending

resulting from 1 percent increase of the debt relief provided as part of GDP, ceteris paribus. The estimate of the forgiveness grants provided to a country is significant for both estimations at the 5% level, though the effect is far smaller than in the case of the *MDRIHIPC*. The democracy index is highly significant and positive in both estimation and its magnitude is roughly the same. The only other significant coefficient is the GDP per capita one, though very small and only in the case of RE.

Table 10. Health expenditure dependent variable: HEALTH (Full Sample)

Variable	(3) FE	(3) RE	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC(t-1)	0.3858*	0.2909	0.2638*	0.235*	0.9245	0.9126*
	(0.1505)	(0.1411)	(0.146)	(0.574)	(0.4786)	(0.392)
DFGrants(t-1)	0.0019**	0.0376**	0.0019*	0.0079*	0.0045	0.0152
	(0.0002)	(0.0003)	(0.001)	(0.0005)	(0.0009)	(0.0019)
(MDRIHIPCxPOLITY2)(t-1)			0.0354	0.0386	0.1594	0.1851
			(0.1838)	(0.131)	(0.1754)	(0.1776)
(DFGrantsxPOLITY2)(t-1)			0.0025	0.0001	0.0012	0.0016
			(0.0002)	(0.0001)	(0.0001)	(0.0002)
FDI(t-1)	0.0002	0.0002	0.0018	0.0046*	0.0001	0.0065
	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0004)	(0.00047)
ODA(t-1)	0.0051	0.0067**	0.0053*	0.0001	0.0137***	0.0131***
	(0.004)	(0.0034)	(0.0041)	(0.0021)	(0.0041)	(0.0043)
POLITY2(t-1)	0.1613**	0.1476***	0.1580**	0.0062	0.1604**	0.1397***
	(0.079)	(0.0550)	(0.0797)	(0.0124)	(0.0814)	(0.0582)
GDPgr(t-1)	0.0435	0.0001	0.0015	0.0028*	0.00127*	0.00128
	(0.0052)	(0.0053)	(0.0053)	(0.0057)	(0.005)	(0.0051)
GDPcap(t-1)	0.0054	0.0016**	0.0089*	0.0121*	0.0086	0.01141*
	(0.041)	(0.0388)	(0.0042)	(0.0086)	(0.0442)	(0.0417)
Country Effects	Yes	Yes	Yes	Yes	No	No
Time Effects	No	No	No	No	Yes	Yes
Observations	350	350	350	350	350	350
Adj. R-squared	0.345	0.298	0.401	0.368	0.429	0.435
# of Countries	34	34	34	34	34	34

Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level
Robust standard error reported in brackets

Turning to the second model (4) including the interaction effects, it can be observed that the initiatives' debt relief measure is again significant except for the case where time fixed effects are included ((4) Time FE). The size of the effect is greater in the models where year dummies are included, indicating that the effect between countries is greater than the effect within countries. In the last estimation, the coefficient of this debt relief indicates that a 1% increase in the relief

provided translates into 0.913% increase in public spending as of GDP. This is supporting the argumentation of the creation of fiscal space by the provision of relief and the resource reallocation of these freed resources by the recipient countries. Turning to the second measure of relief (*DFGrants)*, it can be seen that the effects, though significant in the models with country effects ((4) FE/RE) disappears once the time dummies are included ((4) Time FE/RE). This shows that there is an effect of this type of relief over time on each specific country, but that no effects are found once the problem is looked upon between countries within a year. Unlike, the results from tables 8 and 9 for educational spending, here none of the interaction effects resulted in a significant coefficient. This may be a little surprising seeing that the *Polity2* index is highly significant. This situation can be interpreted as: being a democratic country has an impact on the public spending on health decisions, as well as the existence of benefits from receiving debt relief. However, the two do not seem to be related. In other words, being a democratic country and receiving debt relief do necessitates a certain effect on the government's decision for resource allocation, but the two are independent of each other. From the control variables, only ODA and the two GDP indicators (per capita and growth) show significant relationship with the independent variable. ODA is highly significant in the models with year dummies and have small standard errors. However, the magnitude of the coefficients is very small compared to other significant estimates. GDP growth's effects show similar trend as ODA. They are as well positive, but disappear once time dummies and RE are used. Despite the small magnitude they contribute by increasing the explanatory power of the model.

Turning to the model as a whole, the r squared values are on average higher than the ones in model (3). The estimations explain on average 40% of the variation in the data.

Following the full sample estimation, the discussion turns to the case where Afghanistan is excluded from countries. The results are presented in table 11 below. It can be seen that the r squared values are higher once Afghanistan is left out. The increase is observed in all of the estimations. Starting with the main debt relief variable (*MDRIHIPC*), the coefficient remains significant only in the case where time effects are included. The magnitude and the size of these coefficients remains roughly the same. This indicates that there is a positive effect of debt relief on the health spending of each country over time. The results for the second releif measure (*DFGrants*) remain the same with small, but possitive effect.

Interestingly the interaction term between democracy and *MDRIHIPC* becomes significant in all estimations. The effect is higher in the case of time effects (last two columns). The magnitude is smaller than the ones of the coefficients of the regressors on their own, varying from 0.0754% to 0.1733% of expected change in health expenditure. Therefore, it can be stated that the more democratic countries benefit more from the initiative's debt relief than the more autocratic ones. As before, the interaction term of the second measure of debt relif with the democracy idnex remains insignificant (*DFGrantsxPolity2*). The *Polity2* coefficient is highly significant and positive as previously observed. From the control variables, FDI coefficient remains positive, but unsignificant. ODA and GDP per capita are significant, thus confirming the findings from the full smaple model. However, their effect is again small compared to the main regressors of the models.

Table 11. Health expenditure dependent variable: HEALTH (Excluding Afghanistan)

Variable	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC(t-1)	0.252	0.3461	0.9963*	1.4127*
	(0.0569)	(0.0552)	(0.3786)	(0.7923)
DFGrants(t-1)	0.0098*	0.0011*	0.0005	0.00015
	(0.0007)	(0.0008)	(0.0008)	(0.0000)
(MDRIHIPCxPOLITY2)(t-1)	0.0754*	0.0899*	0.1744*	0.1733**
	(0.1498)	(0.1855)	(0.1004)	(0.1076)
(DFGrantsxPOLITY2)(t-1)	0.00002	0.0037	0.00012	0.00019
	(0.0001)	(0.0002)	(0.0001)	(0.0001)
FDI(t-1)	0.0001	0.0019	0.00006	0.0001
	(0.0002)	(0.0004)	(0.0004)	(0.0004)
ODA(t-1)	0.5326	0.0675**	0.0254***	0.0159***
	(0.0061)	(0.00341)	(0.0040)	(0.0023)
POLITY2(t-1)	0.1581***	0.14452***	0.1604**	0.1397***
	(0.0797)	(0.05568)	(0.0814)	(0.0582)
GDPgr(t-1)	0.0156	0.0176	0.0012	0.0012
	(0.0053)	(0.00532)	(0.0050)	(0.0050)
GDPcap(t-1)	0.0089*	0.0029	0.0086*	0.01141*
	(0.0022)	(0.0041)	(0.0052)	(0.0048)
Country Effects	Yes	Yes	No	No
Time Effects	No	No	Yes	Yes
Observations	336	336	336	336
Adj. R-squared	0.417	0.394	0.489	0.526
# of Countries	33	33	33	33

*Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level*

To conclude the section, it has to be stated that the estimation for the educational expenditure revealed greater benefits for this public sector from debt relief compared to the education sector. This is a sign that debt relief affect the countries' budget allocation decisions when it comes to education expenditure more than to health expenditure. It has to be taken into account that the two sectors' dynamics differ greatly, and the other factors affecting the government's decisions matter more in the case of health, thus leaving less space for debt relief's effects.

4.2 Robustness

It is time to turn to the estimations where alternative measures of the responsive variables are used, and try to see if the results obtained in the previous section are robust. However, it has to be noted that the choice of alternative variables was limited and the best measures were chosen for the main estimation in section 4.1.

Table 12 below uses the pupil-teacher ratio as an educational proxy. The argument behind the use of this measure goes to the fact that, the lower the ratio, the smaller the school classes are, and therefore the efficiency of teaching is expected to be higher. Therefore in order for the coefficients to have positive effect on education, all the reported signs in Table 8 have to be negative, as an increased efficiency requires smaller amount of students in the classes.

The signs appear to be negative as expected, supporting the assumption that a positive effect of debt relief would be translated into decreased amount of student in schools. Here it is hard to compare the magnitude of the coefficients to the ones obtained in the Analysis section (4.1) because of the different nature of the data. However, the direction and significance can be considered robust. Important to notice is that the effect of the second debt relief measure (*DFGrants*) disappears when using an alternative variable. It should be recalled that the coefficients were relatively small, so the observed results here should not be startling. As becomes apparent form the interaction effect between the democracy index and *MDRIHIPC*, democratic countries do benefit more from relief than do the autocratic ones. The significance of the *Polity2* index confirms the previous finding that democratic countries do allocate more resources to educational spending than less democratic ones. Looking at the control variables, only the GDP growth appears to be significant in all the model ran. This was not the case in the main analysis. However, it is important to stress on the difference of the dependent variables, and the complication of the interpretation of the results. Important to note is that the r squared values

are smaller than before confirming that the more suitable measure was chosen for the main estimations in the previous section.

Table 12. Alternative educational dependent variable:EDU1

Variable	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC(t-1)	-0.806	-3.6883*	-5.333*	-4.282*
	(3.2038)	(0.837)	(2.924)	(4.932)
DFGrants(t-1)	-0.0008*	0.0045	0.0015	0.0021
	(0.0108)	(0.0009)	(0.0006)	(0.0011)
(MDRIHIPCxPOLITY2)(t-1)	-1.0829*	-0.0731*	-0.7502*	-0.993**
	(1.0019)	(0.0039)	(0.316)	(0.255)
(DFGrantsxPOLITY2)(t-1)	0.0074	0.0046	0.0005	0.0005
	(0.0020)	(0.001)	(0.0025)	(0.0002)
FDI(t-1)	0.0035	0.0043	0.0037	0.0056
	(0.0008)	(0.0009)	(0.0008)	(0.0029)
ODA(t-1)	0.0138**	0.0160*	0.0301	0.0574
	(0.0691)	(0.013)	(0.0163)	(0.0068
POLITY2(t-1)	0.0651*	-0.0946**	-1.1513**	-0.9619*
	(0.0281)	(0.1107)	(0.5222)	(0.4675)
GDPgr(t-1)	-0.01605*	-0.0216*	0.0341	0.04593
	(0.0033)	(0.0024)	(0.0049)	(0.0483)
GDPcap(t-1)	0.2312	-0.1728	-0.1097	0.23566
	(0.0005)	(0.0907)	(0.0492)	(0.0832)
Country Effects	Yes	Yes	No	No
Time Effects	No	No	Yes	Yes
Observations	286	286	286	286
Adj. R-squared	0.298	0.331	0.364	0.398
# of Countries	31	31	31	31

Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level
Robust standard error reported in brackets

Moving to the next social sector, table 13 contains the results obtained by the use of an alternative measure for the health spending, namely health expenditure as a percentage of total government expenditure of a country. Here, as opposed to the case of the alternative measure of education, the signs of the expected coefficients remain unchanged (as in table 8).

The main debt relief variable (*MDRIHIPC*) is significant only in the case of FE estimation. The magnitude of the coefficients is higher, and in the case of country effects it goes as high as 5.2% expected increase of health expenditure. The magnitude decreases once time effects are included, but remains higher than the main estimation (4.16%). To an extend this confirms the previous findings, although not as much as the education spending's alternative. The findings for

DFGrants are again inconclusive, with only miniscule significant effect observed In the case of (4) RE estimation. Out of the two interaction terms, only the one between the democracy index and *MDRIHIPC* turned out to be significant. However, this significance is only observed in the estimations including time effects. The coefficients of the political status of a country (*Polity2*) remain highly significant, and increase in magnitude. Looking at the control variables, the two GDP controls has switched, and now unlike in the main estimation the GDP growth appears to have significant effect rather than GDP per capita. However, the magnitude is relatively small compared to the rest of the significant effects in all models.

Table 13. Alternative health expenditure dependent variable: HEALTH1

Variable	(4) FE	(4) RE	(4) Time FE	(4) Time RE
MDRIHIPC(t-1)	5.2012*	2.423	4.1628*	1.511
	(2.008)	(1.4615)	(2.2203)	(0.874)
DFGrants(t-1)	0.0037	0.00413*	0.0001	0.0001
	(0.0005)	(0.0012)	(0.0051)	(0.0057)
(MDRIHIPCxPOLITY2)(t-1)	1.003	0.4608	0.73913*	0.259*
	(0.3687)	(0.3905)	(0.4715)	(0.0725)
(DFGrantsxPOLITY2)(t-1)	0.0003	0.0002	0.00034	0.0004
	(0.00009)	(0.00096)	(0.00084)	(0.0008)
FDI(t-1)	0.0013	0.0005	0.0007	0.0011
	(0.0002)	(0.00203)	(0.0019)	(0.0001)
ODA(t-1)	0.0409	0.0078	0.01526*	0.0077
	(0.0321)	(0.0411)	(0.0039)	(0.0313)
POLITY2(t-1)	0.7331**	0.546**	0.7149**	0.5224**
	(0.3689)	(0.2775)	(0.3559)	(0.2742)
GDPgr(t-1)	0.02348*	0.0203*	0.031*	0.02744*
	(0.0155)	(0.0145)	(0.0184)	(0.0174)
GDPcap(t-1)	0.1599	0.135	0.178	0.1447
	(0.2499)	(0.2382)	(0.2467)	(0.2314)
Country Effects	Yes	Yes	No	No
Time Effects	No	No	Yes	Yes
Observations	314	314	314	314
Adj. R-squared	0.423	0.465	0.462	0.474
# of Countries	34	34	34	34

*Note: *** - 1% significance level; ** - 5% significance level; * - 10% significance level*
Robust standard error reported in brackets

5. Conclusion and Further Research

The main aim of this study was to find answers of very important questions regarding the arguments outlined by the international institutions in support of the provision of debt relief to heavily indebted poor countries. The ultimate question from which the model developed was derived is: 'Will the life of the poor improve as a consequence of this provision of relief?'. This question however raised numerous sub questions such as 'How to measure quality of life?' and 'What are the channels through which debt relief can benefit the economies at hand?'. Various assumptions and decisions had to be made in order to build up an empirical strategy that would effectively evaluate the effectiveness of the debt relief provision. An important aspect that was made part of the problem was the democratic status of a country. In addition, the use of panel data covering as many of the countries subject to debt relief as possible was another such important decision.

The provision of debt relief do appear to increase the resources allocated on public education and healthcare. In addition, the interaction between democracy and debt relief showed up to have a positive and significant impact on the future investments in both public sectors. The significance of these coefficients points that the provision of debt relief affects countries differently depending on their level of democracy. Therefore, countries do react differently to debt relief depending on their democratic status. Overall, according to the available data, both the tested hypotheses (H1) and (H2)[13] turned out to be true. This can be translated as: within each country, the higher the degree of democracy the more effective the provision of debt relief will be. These outcomes point to an important policy implication, namely that encouragement the transition from autocratic to democratic political system may be able to help bringing heavily indebted countries out of the constant financial struggle they have been for decades.

Having outlined the general conclusion, it is wise to split the two sectors and look at them separately. The results revealed that the educational sector is more affected by the provision of debt relief compared to the health care one as the percentage expected increase from the same amount of debt relief is higher. However, in both situations there are indications of creation of fiscal space, based on the fact that there is an increase in public spending coming from the provision of debt relief.

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[13] (page 7)

It has to be pointed that the one for the main concerns when it comes to the assessment of the findings is the data that was utilized. Unfortunately, there are not many alternatives that can be used. There are many missing observations, and the nature of the data is such that mathematical interpolation for these missing observations is not an option. Despite this to my belief, the best available data at that moment of time has been collected and used.

Further research and recommendations.

There are multiple other points that should be considered. The fact that the debt relief measure turned out significantly affecting the social sector variables does not mean that that further research in this direction is not needed. The provision of debt relief occurred not too long ago and as such it is possible that the total effects are still to be revealed in the course of time. Therefore, a regular investigations are needed in order to track whether the impact does continue to be apparent, and possibly magnified as time passes. One of the issues that this researched faced was the size of the sample, due to lack of more countries involved in the initiatives. However, as the number of countries eligible for debt relief may increase, timely re-evaluations would be in order. Nevertheless, it is my belief that by using the best resources available at the current point of time, this study contributed to the current literature.

The finding that debt relief initiatives carried out since the middle of the 90s appeared to have significant effect on both educational and health sectors, does not imply that there are no other benefits to the recipient societies. This paper has built the ground for further research on the question of resource re-allocation as a consequence of decreased external debt levels due to international initiatives such as the ones from the World Bank and IMF. One very important question regarding which remains unanswered is whether these initiatives did not also increased the investments in public sectors which can be argued to affect the life of the poor in a detrimental way. Such an example is the defense sector. It is common knowledge that many countries in the Sub-Saharan African region were part of political disputes. This served as an argument to exclude Afghanistan from the sample which proved to increase the strength of the results obtained. However, it may be worth investigating the impact of this type of debt relief on other social areas.

To conclude with it has to be stated that there is certainly ground for the provision of debt relief in the form of scratching off debt as done by the World Bank and IMF. However, the problems the heavily indebted poor countries have are far from an end and the results of this thesis point

that the international community has the means to help, though the right strategy is still to be discovered and deployed.

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Appendices

Appendix 1

Millennium Development Goals as updated in 2013:

1. Eradicate extreme poverty and hunger

2. Achieve universal primary education

3. Promote gender equality and empower women

4. Reduce child mortality

5. Improve maternal health

6. Combat HIV/AIDS, malaria and other diseases

7. Ensure environmental sustainability

8. Develop a global partnership for development

Source: Millennium Development Goals Report: 2013. *United Nations* 01/07/2013

http://www.undp.org/content/undp/en/home/librarypage/mdg/the-millennium-development-goals-report-2013/

a. Historical Background of Low Income Countries' Indebtedness:

In order to help understand the mechanics behind attempts to achieve the Millennium Development Goals from Appendix 1 it is important to go a little back further in time and see how exactly did the heavily indebted poor countries earn their name in the first place? The accumulation of high sovereign debts by poor countries started gradually after World War II and culminated in the 1970s by the increased commercial lending despite the known high risk of repayments falling due. Daseking and Powell (1999) identify that it was triggered by the desire for stimulation of own exports by the creditor countries and the following economic, industrial and political benefits. In addition, as virtually all of the debtor countries were also receiving aid, the creditor countries saw that as a complementary to the grants and concessional loans.[14] This is why the provision of aid was commonly referred to be of "national interest". As a result of this increased and prolonged lending and borrowing at the end of the 1970s and the whole decade of the 1980s, a serious debt crisis broke out at the end of the 1980s as the debtor countries became systematically unable to repay their debts. As a response, the industrialized creditor countries began re-scheduling of the delayed debt payments. However, this was far from being the solution to the problem as the debt increased even further because of the additional interest accumulated as a consequence of the re-scheduling itself.

In mid 1980s it became clear that this re-scheduling is inefficient in the long run and the donor countries had to find other means for dealing with the high debt burden of poor countries. As a consequence, debt relief was introduced as an intervention method. Ever since, debt relief has been an integral part in the international economic agenda that deals with helping poor countries. One of the main arguments in favor of the use of debt relief has been that it helps to overcome the so-called "debt overhang" (Krugman, 1988) which is explained in detail in subSection 2.2.

b. Debt Initiatives by Multilateral Donors

After 1987 many aid agencies initiated various debt relief programs mostly in the form of program development and delivery. However, soon after they realized that the traditional debt mechanisms which used to keep the debt crisis in LICs under control were insufficient and there

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[14] For more detailed discussion on the complementarity and substitutability of debt relief and other types of aid refer to Powell and Bird (2010)

is a need for more sophisticated methods that will not only postpone the repayment, but will help decrease the present value of the outstanding debts to certain manageable levels. In 1996 in a multiparty collaboration, the IMF and the World Bank shifted the policy focus to the notion of sharing the debt burden between private, bilateral and a few multilateral agencies. Their efforts were incorporated in the creation of the Heavily Indebted Poor Countries (HIPC) Initiative. The program's main principle was to help countries improve their public debt management, by helping reduce the current debt, and thus promote the increase of the social service spending that is otherwise redirected to repaying the debt. This would ideally promote development by generating more resources available for public investments that would promote economic growth. Despite the comprehensive efforts of the two institutions, the initiative was received with a lot of criticism, mostly based on the lack of transparency. Another important censure of the program had been the notion that it still does not provide a lasting relief from indebtedness, but instead just ensures the future repayment of these debts. In 1999 after a lot of debates, international pressure and lobbying, the IMF and the World Bank amended the original initiative and launched a revised version under the name Enhanced HIPC Initiative. This revision was aiming at strengthening the connection between the debt relief initiatives and the Millennium Development Goals by providing the relief conditional on the progress on reduction of poverty made by the recipient countries. From the 40 potentially eligible low-income countries only 22 managed to qualify for irrevocable debt relief. The main critique of this enhanced initiative was exactly the aspect of eligibility for the countries. This eligibility is characterized by complex and not always clear conditionality on the macroeconomic performance of the countries, and therefore making it not as widely available to the targeted countries as intended.

The final debt relief program is Multilateral Debt Relief Initiative (MDRI) as already mentioned in the introduction. The eligibility of the countries is determined by a multiple stage process. The main criteria for entitlement of the debt relief are based on income and level of indebtedness. The countries' per capita income must be below a threshold of $380, external debt should exceed 150% of their exports, or 250% of their revenues. Addison and Rahman (2004) demonstrate that the probability of being eligible for debt relief is positively correlated with indicators of poor governance and large fiscal deficit. So far, there have been 36 countries approved for receiving debt relief.