Does Debt Relief Lead to Economic Growth?

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Abstract:
Despite various measures of reducing poverty in the world, was more than 25 percent of the world’s population living on less than $1.25 a day in 2005. There is a mutual ambition of accelerating development and economic growth, the issue is only how to achieve this goal. The Highly Indebted Poor Countries (HIPC) Initiative was launched in 1996 to release the poorest and most indebted countries of their debt burden. Despite the long record of debt relief are many of the developing countries still poor and debt burdened, and the effect of debt relief can be questioned. Most development economists agree that functioning institutions combined with debt relief promote economic growth, but it is still questionable if the debt relief effect is positive in less developed institutional environments. This study evaluates the effect of debt relief on growth in low and lower middle income countries conditional on the institutional quality in the economy.

Low levels of debt affect growth positively, but very high debt levels have negative effects on growth. Some development economists believe that the HIPC countries are burdened by a debt overhang which reduces investments and hampers growth. Debt relief reduces the debt ratios to sustainable levels, which has positive effects on investments and thus growth. The effect is likely to be greater in countries with high quality institutions, as the investment quality is likely to be higher. The downside of debt relief is the potential increase in moral hazard.

This study uses a pooled OLS panel data model to estimate the effect of debt relief in 85 low and lower middle income countries between the years 1995-2008. Debt relief seems to have no or even a negative effect on growth in all institutional environments, whereas the effect is significantly positive in economies with good quality institutions. The positive effect occurs through the new inflow of capital and restored investor incentives, which thus increases investment. If the institutional quality is poor, the investment quality and productivity is likely to remain low and thus not have a big impact on GDP growth. Debt relief to economies with poor institutions could furthermore increase moral hazard and help finance irresponsible governments bad economic policies. This could be detrimental for growth.

As debt relief to countries with non-functioning institutions does not promote economic development, the HIPC Initiative should be reformed to only grant debt relief to countries after they reach a certain level of institutional functionality. Considering that the poorest countries usually do not have the most developed institutions, is debt relief not the most efficient mechanism for promoting development and reduce poverty in the HIPC countries.

Keywords: Debt relief, GDP growth, institutional quality, debt overhang, panel data
# Contents

1. Introduction ................................................................................................................ 6
   1.1 Aim and introduction ........................................................................................... 6
   1.2 Outline ................................................................................................................. 7
2. History of debt relief .................................................................................................. 8
   2.1 Criteria for debt relief under the HIPC Initiative .................................................. 9
3. Theory ...................................................................................................................... 11
   3.4 Growth in LDCs ................................................................................................ 11
   3.2 The effect of debt on growth .............................................................................. 12
   3.3 Debt overhang ................................................................................................... 14
4. Potential effects of debt relief ................................................................................... 16
   3.2 Positive effects of debt relief .............................................................................. 16
   4.2 Negative effects of debt relief ............................................................................ 20
   4.3 Short and long run effects .................................................................................. 24
   4.4 Policy and Institutional quality ........................................................................... 24
   4.5 Debt relief versus Foreign Aid ........................................................................... 26
5. Previous research ..................................................................................................... 28
   5.1 The effect of debt on growth .............................................................................. 28
   5.2 Effect of debt relief ............................................................................................ 32
   5.3 Factors undermining the growth effect of debt relief .......................................... 37
   5.4 Institutions ......................................................................................................... 40
6. Data ......................................................................................................................... 42
   6.1 Choice of variables ............................................................................................ 42
   6.2 Descriptive statistic ............................................................................................ 47
   6.3 Data validity problems ....................................................................................... 53
7. Methodology ............................................................................................................ 54
   7.1 Panel data models .............................................................................................. 55
   7.2 The econometric model ...................................................................................... 57
8. Results ..................................................................................................................... 59
   8.1 Results ............................................................................................................... 59
8.2 Robustness tests ................................................................. 68
8.3 Autocorrelation ................................................................. 70
8.4 Discussion ................................................................. 73
9. Summary and conclusion ........................................... 75
  9.1 Shortcomings of the study and suggestions for further research .... 76
10. Svensk sammanfattning ................................................ 77
  10.1 Introduktion ................................................................. 77
  10.2 Bakgrund till skuldavskrivningar ........................................ 77
  10.3 Teori ................................................................. 78
  10.4 Tidigare forskning ......................................................... 81
  10.5 Presentation av datamaterialet ........................................ 83
  10.6 Metodik och den ekonometriska modellen ......................... 85
  10.7 Resultatreдовисning .......................................................... 86
  10.8 Avslutning ................................................................. 90
Bibliography ........................................................................... 91
Appendix 1. List of countries included in the study ......................... 95
Appendix 2. Graphical representations of the control variables .......... 96
List of figures

Figure 1. The relationship between debt and growth ......................................................... 13
Figure 2. The Debt Laffer Curve ...................................................................................... 18
Figure 3. Foreign aid and debt relief ................................................................................. 27
Figure 4. External Debt as % of GDP ............................................................................... 31
Figure 5. GDP Growth ..................................................................................................... 48
Figure 6. The difference in growth ................................................................................... 48
Figure 7. Debt relief in current US$ ................................................................................. 49
Figure 8. Debt relief as % of GDP .................................................................................... 50
Figure 9. Worldwide Governance Indicators .................................................................... 50
Figure 10. Index of Economic Freedom ........................................................................... 51
Figure 11. Changes in the terms of trade .......................................................................... 96
Figure 12. Investment ...................................................................................................... 96
Figure 13. Population Growth .......................................................................................... 97
Figure 14. Foreign Aid..................................................................................................... 97

List of tables

Table 1. Descriptive statistics ........................................................................................... 47
Table 2. ADF test for stationarity ..................................................................................... 52
Table 3. Correlation coefficients ...................................................................................... 53
Table 4. Annual GDP growth 1995-2008 ......................................................................... 60
Table 5. Annual change in GDP growth 1996-2008 ......................................................... 63
Table 6. Annual GDP growth with lags included, 1995-2008 ........................................... 66
Table 7. GDP growth and change in growth using IEF index, 1995-2008 ......................... 68
Table 8. Autocorrelation tests ........................................................................................... 70
Table 9. GDP growth and change in GDP using GLS, 1995-2008 ................................. 71
Table 10. Deskriptiv statistik ............................................................................................ 84
Table 11. Resultat ............................................................................................................ 87
1. Introduction

1.1 Aim and introduction

Despite various measures of reducing poverty in the world, was more than 25 per cent of the world population living on less than $1.25 a day in 2005. (The World Bank Group, 2010) There is a mutual ambition of accelerating development and economic growth, the issue is only how to achieve this goal. The 1990’s heavy pressure from non-governmental organizations, institutions and celebrities to write-off poor country debts led to the launch of the Highly Indebted Poor Countries (HIPC) Initiative in 1996, to release the poorest and most indebted countries from their debt burden. The Multilateral Debt Relief Initiative (MDRI) was launched in 2006 to provide additional debt relief to these countries.

However, despite decades of debt relief, many poor countries today are still heavily debt burdened and there is an ongoing debate on whether debt relief has a positive or negative effect on economic growth. This raises the issue if debt relief does lead to economic growth or whether these resources could be used more efficiently elsewhere. Most development economists agree that functioning institutions combined with debt relief promote economic growth, but it is still questionable if the debt relief effect is positive in less developed institutional environments. The most important institutional factors undermining growth are a weak rule of law, political instability, poor accountability, government ineffectiveness, poor regulatory quality and corruption.

The purpose of aid, debt relief and development projects is to help the developing countries out of poverty, and debt relief granted to low-income countries, the so called “financing for development” is an instrument for donor intervention. As the providers of debt relief are the same as for aid, debt relief has to be more efficient than traditional aid in order to be justified. The aim of this study is to determine whether debt relief in low and lower middle income countries has had any effect on economic growth and if the effect is conditional on the institutional quality in the country. If debt relief to countries with non-functioning institutions does not promote economic development, then the HIPC and MDRI Initiatives
would need reform, and more effort should be concentrated on improving policies and institutions before granting debt relief to countries unable to efficiently use it.

1.2 Outline

This paper is divided into two parts, which are then divided into chapters. Part I includes the theory part and an overview of the previous research done on debt relief, and Part II consists of the empirical part. I start Part I by providing a short history of debt relief and briefly preset the current criteria for debt relief under the HIPC Initiative, as most of the debt relief today is channelled through the HIPC program. Chapter 3 presents some development and growth theories and describes the relationship between debt and growth. Chapter 4 presents the main arguments for and against debt relief and evaluates the importance of a high quality of institutions for debt relief to be efficient and Chapter 5 presents some of the previous research done on debt relief. Part II begins with Chapter 6 describing the data, Chapter 7 presents the method and model, Chapter 8 presents and discusses the results and Chapter 9 concludes. This paper is furthermore delimited to focuses only on the debtor side of debt relief, and not on the creditor perspective.
2. History of debt relief

There is a global ambition of accelerating development and economic growth in the developing countries, the question is only how to achieve this goal. There is an ongoing debate about whether debt relief is the key to economic growth for the Least Developed Countries (LDCs) or not. Some development economists argue that the developing countries, especially the HIPCs, are held back by their huge debt burden. By forgiving their debt incentives to invest would be restored and the countries could take off from their poverty slump. Other development economists argue that it is poor government and bad incentives that are to blame for the poor growth, and believe that debt will be accumulated again if expenditures continue to be higher than income. (Arslanalp & Henry, 2003) The debt stock of the developing nations has steadily increased since the 1970’s with the Sub-Saharan African debt stock peaking in 1994 at 125 % of GNI. Nevertheless, these countries have managed to reduce the average debt stock to only 75 % by 2003, possibly with help of debt relief programs.

The current debt relief initiative for developing countries started in 1956 when the Paris Club\(^1\) forgave Argentina’s debt after a debt crisis (Carvounis, 1984). The debt problem awareness increased during the following decade, and as a response official creditors forgave $6 billion in debt to 45 poor countries after the UNCTAD meetings 1977-1979. The debt problem of the developing nations was further highlighted during the run up to the turning to the new millennium. The Jubilee 2000, a global citizen’s movement supported by non-governmental organizations, various governments, the Pope, Dalai Lama and the rock band U2, put huge pressure on the creditors to forgive the debt of the developing countries, with the argument that it is unfair that the rich and developed countries demand the payback of debt from hopelessly poor and underdeveloped countries. (Easterly, 2002) As a result, the HIPC Initiative was launched in 1996 by the World Bank and the International Monetary Fund (IMF). The aim of the HIPC initiative is to “ensure that no poor country faces a debt burden it cannot manage” (IMF, 2010a) with the objective of ensuring “deep, broad and fast debt relief that would contribute toward growth, poverty reduction, and debt

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\(^1\) The Paris Club is an informal group of financial officials from the main OECD creditor nations.
The MDRI was launched in 2006 to provide additional support to the HIPCs to reach the Millennium Development Goals (MDG)\(^2\), and supplies 100% debt relief on the eligible debts. IMF, the World Bank and other multilateral institutions provide 50% of the funding, and bilateral creditors supplies funding for the remaining parts. (IMF, 2010a)

2.1 Criteria for debt relief under the HIPC Initiative
Most of the debt relief granted today is given through the HIPC and MDRI Initiatives. The path to full debt relief under the HIPC incentive consists of two steps; qualifying for the decision point after which the country receives interim debt relief, and reaching the completion point after which full debt relief is realized. Decision point qualification involves the fulfillment of four criteria. The country must first be eligible for borrowing from the World Bank’s International Development Agency and from the IMF’s Extended Credit Facility, which both provide loans to low-income countries at subsidized or completely interest-free rates. Second, the country must be struggling with an unsustainable debt burden that cannot be dealt with through traditional debt restructuring measures. Third, the country must have a long record of implemented reforms and responsible policies through IMF and World Bank programs, macroeconomic stability and finally, the country must have developed a Poverty Reduction Strategy Paper (PRSP). (IMF, 2010a)

When the decision point criteria are fulfilled, interim debt relief is granted until the completion point. The three criteria for the completion point are successful performance under the IMF and World Bank programs, satisfactory and successful implementation of the reforms decided upon at the decision point, and adoption and implementation of its PRSP during a minimum of one year. Once the completion point is achieved, the country qualifies for full debt relief for the amount agreed upon at the decision point. (IMF, 2010a)

The HIPC initiative criteria launched in 1996 were criticized for being too restrictive and too inflexible for the HIPC countries, as only four countries had qualified for debt relief during the three first years of the initiative. As a response, the initiative was enhanced in

\(^2\) The MDGs were signed by 189 countries and 23 international organizations in 2000 and consists of eight international development goals that focus on halving poverty by the end of 2015. (IMF, 2010)
1999. The debt burden thresholds were adjusted downward, which allowed a greater group of countries to be eligible for larger amounts of debt relief. Interim debt relief to the decision point countries was included, and a “floating completion point” was also introduced, to give the HIPC an incentive to speed up reforms. (The World Bank, 2009)

As of December 2010, 40 countries are currently eligible or potentially eligible for debt relief. Five countries have been identified as potential candidates for the HIPC Initiative but have not yet reached the decision point. Seven countries have attained the decision point and are receiving interim debt relief at the moment and 28 countries have already reached their completion point and have received full debt relief. (IMF, 2010a) A question of interest is now if the faster and greater debt relief resulted in a greater reduction in poverty in the HIPC countries.
3. Theory

In order to evaluate the growth effect of debt relief on a developing economy, it is necessary to establish the effect of debt on economic growth and development and whether a low level of debt is desirable for the developing nations. This is done in Section 3.1. Section 3.2 evaluates the relationship between debt and growth and Section 3.3 presents the negative impacts a debt overhang has on growth.

3.4 Growth in LDCs

The standard neoclassical growth model assumes that there are certain factors affecting real per capita income growth. The production is dependent on capital and labour, \( Y = F(K,L) \), and the model assumes constant returns to scale. Growth is affected by an increase in productivity, technological progress, capital accumulation and the savings rate. Higher capital accumulation results in investments which can improve productivity and thus improve growth. (Blanchard, 2009) The model was first developed by Solow and Swan and has later on been expanded to also include human capital, population growth and external shocks as trade or terms of trade. (Clements, Bhattacharya, & Nguyen, 2003)

There are numerous development theories trying to explain why the LDCs have not experienced economic growth as the developed countries and how they could get out of poverty. One of the most popular development theories, the theory of the “big push” was developed by the economist Paul Rosenstein-Rodan. Just as an airplane needs a critical speed to take off from the runway, he believes that the developing economies need a critical mass of simultaneous investments to create economic growth. He states that the developing economies are underdeveloped and characterized by high unemployment and underemployment. The economies are further characterized by low incomes, which consequently leads to low investments and very little, none or backward growth. (Martinussen, 1997)

Development economist Ragnar Nurkse proceeded with Rosenstein-Rodan’s theory, and he believes that the backward countries are caught in two interconnected vicious poverty circles of self-replicating poverty on both the demand and the supply side of the economy.
The developing economies are characterized by low levels of investment that causes low levels of capital formation. The consequence is low productivity levels, which in turn results in limited markets. Limited markets and low demand creates little incentives to invest, which again results in low levels of capital formations. The supply side of the economy is characterized by low productivity, which leads to low incomes. Low incomes reduce the capacity to save, and the low savings rate results in a lack of capital that restrains investments, so the productivity remains low. (Martinussen, 1997)

The preconditions for breaking out of these vicious circles are by creating strong incentives to invest, which requires an expansion of the existing market through capital investments. Private companies do not have the resources or the incentives to invest in crippled markets with low demand. However, debt relief should increase the level of investment, as is demonstrated in Section 4.1.3. (Martinussen, 1997) Advocates of debt relief believe that debt forgiveness is needed to release the poor countries of their debt burden, which would restore incentives for investment and a take-off from poverty.

The relationship between debt relief and the standard growth model can be described by the following resource constraint. The developing economies with limited private capital mobility face the resource constraint \( C_t + I_t \leq AK_t^\theta \) where \( C \) is consumption, \( I \) is investment, \( A \) is productivity and \( K \) is capital at time \( t \). (Burnside & Dollar, 1997) As will be explained in the following section, an excessive amount of debt constrains the availability of capital in the economy due to the increased investor risks and consequently lower investment levels. By forgiving some of the debt the capacity constraint is relaxed through the increase in capital.

### 3.2 The effect of debt on growth

The relationship between debt and growth depends on the debt level in the country. Low debt levels have a positive effect on growth, where capital accumulation is the most critical growth enhancer according to the neoclassical model. Developing countries have limited access to external financing due to the high risks involved, but capital mobility or access to external debt enable them to experience reasonable growth due to the increase in
investment. Countries with low levels of initial capital have an incentive to borrow capital and invest, as the marginal productivity of capital in a capital scarce country is higher than the world interest rate. Debt expands the economic capacity, promoting investments and stimulating growth. A higher output leads to a greater debt repayment ability and growth. (Pattillo, Poirson, & Ricci, 2002)

However, an increasing capital stock eventually leads to a decrease in the marginal investment productivity, causing the growth level to fall slightly and making repayment harder. The debt and growth relationship is described in Figure 1, where debt initially enhances growth, but after reaching a certain threshold of debt, D*, additional foreign capital is not going to stimulate growth at the same rate. The negative relationship between growth and debt is caused by a fall in the marginal productivity, and the probability of repayment decreases. This increases the risk of the investors and will eventually obstruct the country’s accessibility to external financing. (Pattillo, Poirson, & Ricci, 2002)

![Figure 1. The relationship between debt and growth](image)

The growth level is, nevertheless, still higher than if no debt had been accumulated at all. Depending on the repayment schedule the debt servicing could either crowd out
investments or if the lenders’ rescheduling policy is flexible, the country could be allowed to repay the debt once the investments have yielded profits. The optimal debt level depends on available investment opportunities. A country with better investment opportunities will have a higher optimal debt level. Thus, it is not necessarily the debt level that affects growth, but investment quality. If the investment returns remain high despite a high debt level, the country can still enjoy income growth. (Clements, Bhattacharya, & Nguyen, 2005) (Pattillo, Poirson, & Ricci, 2002)

3.3 Debt overhang
Reasonable levels of debt promote economic growth and development, however high debt levels have negative growth consequences. An increasing level of indebtedness causes the debt service expenses to grow rapidly, which accumulate a substantial debt burden. When the debt levels reach a certain threshold the debt burden grows into a debt overhang and affects growth negatively, which reduces the probability of repayment. Krugman (1989) defines debt overhang as a condition when “the expected present value of future country transfers is less than the current face value of its debt.” Debt overhang is said to have negative growth effects in three ways, through lower investments, liquidity constraints and lower public expenditures.

A debt overhang has, first of all, negative consequences for investments and growth, as investors expect higher future taxes, either through direct taxes or through higher inflation, and tighter fiscal policy to finance debt repayments. This reduces both credit supply and private investment demand, as international investors prefer countries with more favourable investment environments. Both investment volumes and quality are reduced due to diminishing investment incentives and tighter fiscal policies. Reducing these investments decreases future long term growth, as well as cutting investments results in reduced potential future returns. Nevertheless, debt overhang influence on investment depends on the respective government’s likelihood to increase fiscal revenues to service external debt, and the effect the debt levels have on the overall economic uncertainty. The reduced investment volume and quality lead to lower capital accumulation and a poorer
macroeconomic environment. (Elbadawi, Ndulu, & Ndung'u, 1997) (Pattillo; Poirson; & Ricci, 2002)

Second, debt overhang causes liquidity constraints related to debt servicing, as the debt services are partly paid with new debt. Creditors might not be willing to provide funding to debt services due to high risk involved, which causes a threat of running into a liquidity crisis where the economy’s liquidity is completely dried up. Liquidity is essential for investments, so a large debt serving ratio to GDP reduces the investment levels and the potential income from exports. (Krugman, 1988)

Finally, it affects growth negatively indirectly through contracted public expenditures and fiscal policies. A rapidly growing debt stock crowd out public investments and increasing arrears have an exponential effect on debt service ratios to GDP. Increasing debt serving ratios reduces growth renewal prospects, and as economic growth fails to take place, debt services become increasingly difficult, creating a vicious debt spiral. With increasing debt service payments, the country either defaults on its loans or burdens the foreign exchange to increase imports necessary for production and investments. The import increase causes currency depreciation, ceteris paribus, which increases the external debt payments further. Elbadawi, Ndulu and Ndung’u (1997) suggest that the fiscal contractions have more disturbing social economic effects, such as reducing spending on public services such as health care and education, than the foreign exchange effect. Other harmful governmental activities includes “excessive domestic borrowing, excessive inflationary financing and excessive taxation of some sectors of the economy” (Vaessen & Cassimon, 2007). This has devastating long run economic implications, both from an economic and a social perspective. Furthermore, the increasing debt service prevents necessary fiscal adjustments that promote economic growth and development, which further obstructs growth and accelerates the vicious debt spiral. (Elbadawi, Ndulu, & Ndung'u, 1997) Thus, large debt levels lead to low investments, poor economic policies and lower growth. Debt relief is in that case an important mechanism when pulling the economy out of its debt spiral.
4. Potential effects of debt relief

There are various effects of debt relief, direct and indirect, negative and positive. Section 4.1 assesses the positive effects of debt relief and Section 4.2 evaluates the negative effects. Section 4.3 distinguishes between the short and long run effects of debt relief, and the importance of the quality of institutions and government policies for successful debt relief and growth is furthermore discussed in Section 4.4. Section 4.5 shortly assesses the difference between the impact foreign aid and debt relief on growth.

Debt relief granted to countries suffering from a huge debt burden or to economies in financial distress have both indirect and direct effects on the economy. The direct debt relief outcome is a reduced actual debt stock. However, $1 million of debt relief does not necessarily equal $1 million worth of new money to the recipient country. The economic value (EV) of debt relief consists of the net present value of all future debt repayments in the absence of debt relief. The future repayments are discounted with the recipient country discount rate, and the value of the future non-repayments without debt relief is deducted from the EV. Second, there are numerous indirect debt relief outcomes affecting investments and new capital inflows, (NIE). Additionally, debt relief has an opportunity cost in the form of forgone bilateral or multilateral aid, which occurs when the debt relief is granted instead of aid, and is denoted by C. Thus, the economic welfare (W) of debt relief to the recipient country adds up to $W = EV – C + NIE$. As long as C is equal or close to zero, and EV and NIE are positive, the debt relief effect is positive. However, if the country would not have repaid the debt in the absence of debt relief, then the direct effect would be insignificant as the economic value of debt relief would be equal or close to zero. (Vaessen & Cassimon, 2007)

3.2 Positive effects of debt relief

Besides the moral argument for debt relief; that it is unfair that the developed world is demanding the repayment of loans from the hopelessly poor countries, there are various economic arguments in favour of debt relief. The most common debt relief justifications are
accounting reasons, future repayment probability increases, investment incentive restoration and a reduction in defensive lending. Improved investment incentives and preconditions would promote growth, which could help the country out of the vicious poverty spiral. (Henry & Arslanalp, 2003)

4.1.1 Accounting practice

It is first of all good accounting practice to write-off debt which is not going to be served. This restores “normal loan conditions” allowing new loans to be granted on a sound basis. During the 1980’s debt crisis, the market participants knew that the majority of the LDC debt was not going to be repaid, and consequently the US bank stock prices reflected the losses prior to the write off of the loans. With this argument debt forgiveness would also be in the creditor’s interest and thus increase their future stock prices. (Sachs & Huizinga, 1987) However, most of the loans granted to the LDCs today are given by multilateral institutions, which reduce the validity of this argument as they are not listed on the stock exchange.

4.1.2 The Debt Laffer Curve

There are circumstances where debt relief benefit both creditors and debtors and increases repayment. Krugman (1988) constructed a Debt Laffer Curve demonstrating that forgiveness actually increases the debt repayment probability. The bell shaped Debt Laffer Curve in Figure 2 explains the relationship between the amount of debt repayment claim and the value of the outstanding debt. The repayment probability is initially increasing with the degree of indebtedness, but after a certain debt threshold the probability starts falling again. If the economy is situated to the right of D*, it is suffering from a debt overhang. The governments finance external debt repayments through higher taxation of domestic firms and households and tighter fiscal policies. The tax increase discourages investment and growth and reduces the investment efficiency, which again decreases the likelihood of loan repayment. After passing the threshold of debt to GDP, increases in the face value of debt decreases repayment probability, as the debtor country is likely to default since the economy is too contracted and is experiencing insufficient growth and investment. If the
debt level has passed the threshold $D^*$, then debt relief increases the capacity to pay by moving from point A to B on the Debt Laffer Curve, and thus increase the repayment probability. Consequently, the expected value of the creditor’s outstanding claims rises. (Krugman, 1988) (Henry & Arslanalp, 2003) Furthermore, the debt relief frees up investment resources, which further increase repayment capacity and growth potential. Nevertheless, Corden (1991) reminds us that such an outcome is a possibility, not a certainty.

![Image of the Debt Laffer Curve](image)

**Figure 2. The Debt Laffer Curve**

### 4.1.3 Investment incentives

Most importantly, debt relief encourages and creates incentives for future investments. If a country has a huge amount of outstanding debt, all future income is used to service the debt. The consequence is that even though the investments are profitable, there are no incentives to implement these as all the surplus from the investments goes to debt repayment. The government has no incentive to undertake painful and politically suicidal reforms to improve economic performance either, as all profits are repaid to creditors. By forgiving debt the investment rate increases significantly, restoring investment incentives. The improvement in the incentives also helps to increase the expected value of the creditor’s
claims and facilitates the movement from point A to B on the Debt Laffer Curve. (Krugman, 1988) (Corden, 1991)

Private investors also have much greater investment incentives knowing that a country is not burdened by huge debt. The repayment probability of a small loan is greater when the country does not have a huge outstanding debt that has to be repaid as well. Public investors valuing the social returns are usually less concerned about the investment profitability than the private investors. The private investors evaluate the investment project profitability more carefully, which increases the investment quality. (Rajan, 2005) Furthermore, private investment is encouraged as the uncertainty about future tax rates is removed and the marginal tax rate on future cash flows decline and raises the expected return on investments. The country now has the financial option of expansional fiscal policy, which affects growth and investments positively. (Corden, 1991) (Henry & Arslanalp, 2003) (Arslanalp & Henry, 2003a) (Kraay & Chauvin, 2005) However, this argument is only valid if the debt is repaid without debt relief. Otherwise the debt relief can be seen as an accounting clean up. (Vaessen & Cassimon, 2007) Moreover, new capital inflow might reduce the discount rate in the debtor country, which reduces debt repayment costs, and new inflows lead to greater government income from tax revenues, investment and growth. (Arslanalp & Henry, 2003)

Unless there is a central international actor initiating debt relief, no private creditor is willing to provide debt relief unaccompanied. The positive debt relief effects concern all creditors, which creates a free rider opportunity that reduces the incentives for creditors to write down a part of their outstanding debt. The creditors have a collective interest to forgive the debt, but all single creditors have an incentive to free ride by preserving and increasing the expected value of their own claims by doing nothing, while other creditors forgive some debt. (Krugman, 1988) The international community therefore has a crucial role in coordinating debt relief, as no individual creditor is willing to forgive debt without the affirmation that the other creditors are doing the same.
4.1.4 Defensive lending

An excessive debt burden evokes selectivity in the donor behaviour and creates a pattern of inefficient “defensive lending”. Highly indebted countries receive increased funding from donors to prevent defaulting on loans and facilitate current repayments. Instead of using donor resources for development and investment, funds are distracted from efficient use, and donors and lenders risk becoming trapped in a rescheduling and refinancing circle. (Birdsall & Deese, 2002) Debt forgiveness restores the donor selectivity and reduces the need for defensive lending, and aid or loans can be granted for development purposes. Creditors are consequently able to be more selective when granting loans and reward well-performing countries, rather than granting most aid to the worst-performing countries and thus giving them a monetary incentive for continuous poor performance. Therefore, reduced defensive lending due to debt relief creates an incentive to implement responsible and long run reforms. (Moss, 2003)

4.2 Negative effects of debt relief

There are various development economists who believe that debt relief does not affect growth or development, or that debt relief actually worsens the economic conditions in the recipient country. The main arguments against debt relief that will be discussed in this section are the problems concerned with moral hazard and incentives, the reputation worsening of the recipient country as a borrower, and the poor debt sustainability in the recipient countries. The danger is that the countries quickly accumulate a new debt burden again, leaving debt relief without a long-term growth effect.

Debt relief may damage the country’s reputation as a borrower, which pushes up the price of future international loans. (Arslanalp & Henry, 2003) However as the HIPCs already have a very poor credit rating and most of today’s loans are given as aid from multilateral institutions, the HIPCs’ reputation is not going to affect future lending. Very few creditors expect to make money off the HIPC loans and the private sector loans have only accounted for 4 to 13 percent of total capital inflows. Therefore, debt relief is not likely to increase
capital flows, as private investors see the LDCs as too risky for investments and most loans are granted as aid. (Arslanalp & Henry, 2003a) However, removing the uncertainties and the debt overhang reduces the investor risk, which could restore private investor incentives. Thus, HIPC debt relief improbably damages the reputation of a country as a debtor, but gives the private investors a signal of removed uncertainty.

4.2.1 Debt sustainability and the preferred debt level

As stated previously in Section 3.2, the correlation between high levels of debt and growth is negative. It is of great importance whether the low growth rate cause high levels of debt, or if the high debt levels cause low growth when evaluating the effect of debt relief. If the low growth rate is causing the high debt level, possibly due to bad policies and irresponsible governments, debt relief is not going to increase growth. Debt relief is only efficient if it removes an obstacle to growth, such as a debt overhang that hampers investment. (Carvounis, 1984) Easterly (1999) argues that debt relief will not cause economic growth since it does not change the preferred level of debt to GDP. If a debtor country has a preference for a high level of debt and there is no change in the savings rate, consumption or the preferred debt ratio, new lending simply restores previous debt ratios. The highly indebted countries could be assumed to have high discount rates against the future, as their credit worthiness is poor due to political unrest, wasteful governments or just simply due to their reputation of being unable to repay their loans. Consequently, newly accumulated debt grows quickly into an unmanageable debt burden. Thus, debt relief itself does not create debt sustainability; it has to be combined with other policy reforms and repayment improvement measures.

4.2.2 Moral Hazard

Easterly (2002) believes that many of the previous development programs failed to create additional growth because the projects did not take incentives and corruption into account. All individuals respond to incentives, both ordinary citizens and government officials. The incentive responsiveness is especially in poor countries where corruption is widespread. Government officials have incentives to implement policies benefitting themselves and the
economic elite, but being harmful for the rest of the economy. If the government knows or have experienced that irresponsible economic behaviour is rewarded with debt forgiveness, they have incentives to continue their irresponsible behaviour and borrowing until restoring their preferred debt ratio to GDP. (Easterly, 2002) Koeda (2006) believes that the initial economic condition of the country is an important factor when assessing the moral hazard problem. If the country has a large level of debt initially, they have greater incentives to remain highly indebted, as they will continue to receive non-concessional loans, low interest rates and debt relief. The higher the country’s debt level, the harder is it for the creditor to make contracts with incentives that secures repayment. If the government has no prospects of repaying its debt, they have an incentive to undertake additional loans without the intention of repaying it, as the penalties for defaulting are independent of the size of the loan. (Imbs & Ranciere, 2005)

Moreover, unsustainable debt can be seen as a result of irresponsible governing and bad policies. As Easterly (2002) says “a debt overhang is not like a natural disaster that just stroke poor countries”. The current generations in some of the poor countries have been taking on debt to finance current spending and a higher standard of living, on behalf of the welfare of future generations. Sadly enough is it mainly the governments that have experienced a higher standard of living and benefitted from the structural loans, and very little have trickled down to the lower income classes. (Easterly, 2002) Some of the debt has been accumulated by irresponsible governments unconcerned about the future repayments of the loans. Irresponsible governments respond to debt relief by accumulating more debt, until they have reached the same level of indebtedness as before. The granting of debt relief will expand the developing countries budget constraint and the need for reform and possibly a government change becomes less evident due to the increase in resources. This allows the continuation of bad and wasteful policies, which obstructs growth. (Birdsall & Deese, 2002) This raises the question of whether the official donors have had too slack requirements and been granting debt relief and aid to easily.

Debt relief could furthermore create perverse incentives for the debtor countries. If a country expects to receive debt relief in case of financial distress and an excessive debt
overhang, it creates moral hazard incentives for accumulating debt without having any plans of repaying it. Moreover, borrowers expecting debt relief could delay policy reforms, as to run down the assets of the country in order to keep their income levels below the cut off levels for debt relief eligibility and aid instead of repaying the debt. (Easterly, 1999) (Koeda, 2006) The donors’ concern for the poor creates even more perverse incentives. The debtors know that they receive debt relief to reduce poverty, so by keeping the poor trapped in poverty they ensure themselves future development aid, finance and debt relief. (Easterly, 2002)

Easterly (2002) points out a great risk involved with the requirements of reforms for debt relief qualifications. He believes that “bad governments” only having incentives for improving the living conditions for themselves have no incentives of implementing the reforms as this could affect their popularity or create political instability. Corrupt and negligent regimes could create an illusion of reforms instead of implementing the necessary adjustments by doing “creative fiscal accounting” and irresponsible policies. By cutting maintenance spending on e.g. infrastructure and roads, the budget deficit is reduced and resources are assembled for current consumption. Unfortunately, the neglected maintenance causes much higher reconstruction costs in the future. The World Development report from 1994 estimates that Africa has, by contracting public spending and ignoring $ 12 billion worth of road maintenance, increased the total costs of necessary infrastructure reconstruction by $ 45 billion during the past decade (Easterly, 2002). Thus, debt relief caused moral hazard undermines growth.

Various debt relief critics argue that debt relief promotes growth on only two conditions. It is first of all crucial that the debt relief is a one-time event; otherwise there is a great risk that the country falls back into their poverty trap. If debt relief were a “once-and-for-all” measure-, and the multilateral agents made clear that there will not be any future debt relief, the receiving countries would not have incentives for borrowing more and misbehaving. If the countries expect continuous debt relief, they have an incentive to remain debt burdened and thereby being eligible for future debt relief. (Easterly, 2002) (Koeda, 2006) The HIPC and the MDRI incentives have worked hard to establish a credible policy that the debt is
forgiven as a onetime event in order to remove the distorted incentives. The second condition is a fundamental change in the governmental behaviour in the recipient country. Irresponsible governments and negligent behaviour must be replaced with responsible debt management and macroeconomic policies to ensure debt sustainability. (Easterly, 2002)

4.3 Short and long run effects

The debt relief effect is expected to have both instant and long run implications for growth. Most HIPCs are credit constrained prior to debt relief. The credit constraint will be instantly eased when the debt is forgiven, and result in greater credit supply and increased private investment demand and incentives. If the investment opportunities arising from debt relief are utilized responsibly, the economy could successfully exit their debt and poverty spiral, which affects both short and long run growth through improved access to capital and higher investment levels. Additionally, maintained long run debt sustainability has positive implications for growth. (Yang & Nyberg, 2009)

The negative effects of debt relief are more likely to be long run. The potential increase in moral hazard could lead countries to implement over-expansionary policies with the expectations of potential debt relief or development financing from the international community. Such destructive policies are likely to burden the economy with excess debt and affect the long run potential growth in the economy. (Easterly, 1999)(Arnone, Bandiera, & Presbitero, 2008)

4.4 Policy and Institutional quality

The main argument for debt relief is that it promotes and restores incentives for investments, which is the main determinant of growth and development. There are however some important factors that affect the quality and productivity of investments that have been disregarded in the Jubilee 2000 campaign, namely the institutional and policy quality.

There is no consensus definition of institutional quality or governance, despite being a widely discussed topic. (World Bank, 2002) The World Bank narrowly defined governance
as “the manner in which power is exercised in the management of a country’s economic and social resources for development” in 1992 (Kaufmann, Kraay, & Mastruzzi, 2010). Kaufman, Kraay and Mastruzzi (2010) define institutional quality and governance as “the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them“ (Kaufmann, Kraay, & Mastruzzi, 2010).

Development economists have found that it is not necessarily the level of debt that has the greatest impact on growth, but it is the quality of investments that is the critical factor. (Pattillo, Poirson, & Ricci, 2002) The quality and effectiveness of investment is closely related to the institutional quality and the policies, and many development economists claim that high-quality institutions and economic policies are one of the most important sustainable growth determinants. The social infrastructure, defined as “the institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output” affects factors such as productivity, capital accumulation and investments (Burnside & Dollar, 2004). The differences in social infrastructure explain the reason why some countries have been able to develop and experience growth, whereas others are still underdeveloped and tragically poor. The institutional quality and the social infrastructure depend on how the government have succeeded in protecting the private sector and how likely it is as a private sector disturber: Rule of law, the bureaucratic quality, corruption, risk of expropriation and the risk of government rejection of contracts. The openness towards international trade and international trade policies also affect the social infrastructure; tariffs and non-tariff trade barriers, a high black market premium and government monopolisation of exports affects the quality negatively. Recent studies confirm that certain institutional factors affect the access to external finance in the developing countries. Weak legal protection of the shareholders and investors reduces the investment profitability, thereby reducing incentives and external finance flows from the rich countries to the poor. Consequently, less external
finance is available for growth renewal investments. (Rajan, 2005) (Moss, 2003) Countries long-run economic performance is dependent on the social infrastructure, as a good social infrastructure enhances capital accumulation and productivity and encourages investment. If the social infrastructure and the overall business climate and regulation are poor, simply debt relief is insufficient for increasing investment and developing the economy, but an improvement in the institutions and the business climate is also needed. (Burnside & Dollar, 2004) (Hall & Jones, 1999)

Moss (2003) believes that a high debt has negative effects on institutional development and policies, and expects debt relief to affect these two factors positively. An unsustainable debt level distorts policy dynamics and stimulates short-term policies and behavior. A high debt also puts a great pressure on the already capacity constrained institutions, the budget and policies. Debt relief removes twisted incentives for short-term objectives and reduces the pressure on the policies and institutions, which improves the institutional quality. Thus, debt relief eventually improves institutional quality. Given that a higher institutional quality improves investment efficiency, this should also help accelerate growth and improve the growth effect of future debt relief. Following this logic, multiple debt relief should promote exponential economic growth, as the institutional quality is going to pave the way for further successful debt relief. (Moss, 2003)

4.5 Debt relief versus Foreign Aid

Official development assistance and official aid has been the most common way of helping the low income economies develop in the past. Nevertheless has debt relief become a much more utilized instrument of helping the poorer countries, as can be seen in Figure 3. In 2006 was the fraction of debt relief to GDP greater than the level of foreign aid to GDP, as a large number of HIPCs reached the completion point in the HIPC program and thus got a large share of their debt forgiven in that year.
Birdsall and Deese (2002) believe that debt relief is the most efficient way of providing aid to a country, given a high institutional quality, responsible governments and a reliable rule of law. Traditional aid involves large transaction and monitoring costs, which distracts resources for the growth enhancing projects, whereas the transaction costs of debt relief are significantly lower, which paves the way for more efficient help. By directing the help directly to the government, there are no middle men in the process that distract resources. Debt relief makes the governments responsible for running the budget, without having their scarce resources tied to various projects that they cannot affect themselves. However, if the government is highly irresponsible, there is a great risk that it would just accumulate more debt by running large budget deficits and spending on ineffective projects, and traditional aid would in fact prove to be much more efficient. Thus if the countries have poor institutions and policies and are completely corrupt, no debt relief should be granted, and the resources should rather be channeled to the country in the form of aid through nongovernmental organizations. (Rajan, 2005)
5. Previous research

There are numerous theoretical arguments in favour of debt relief and aid; however the effect in practice is still relatively uncertain. Previous research concerning the effect of debt on growth is presented in Section 5.1 and research regarding the debt relief effect in Section 5.2. Section 5.3 evaluates the factors found to undermine the growth effect of debt relief and Section 5.4 presents the research done on the importance of the institutional quality. A lot of the previous research on debt relief has been done on the Latin American Debt Crisis in the 1980’s, where the majority of the involved countries were middle income countries. The empirical research on the development effect of debt relief in low-income countries is however scarce. The involved parts in the 1980’s debt crisis were mostly private creditors whereas the debt relief today is given by the multinational institutions, and the countries had a very different macroeconomic and debt structure than the poor countries of today. During the 1980’s debt crisis, the underlying problem was unsustainable borrowing in addition to increasing global interest rates, whereas Moss (2003) claim that the HIPCs’ debt problem originates in poor economic and export growth, which has been further worsened by a huge debt overhang. The suitability of the existing debt overhang and relief theories should therefore be evaluated carefully before drawing any definite conclusions about the suitability of debt relief for the HIPCs. (Arnone, Bandiera, & Presbitero, 2008)

5.1 The effect of debt on growth

In order to assess the effect of debt relief there are a number of debt relationships, such as the debt – growth relationship and the effect of debt overhang on growth that needs to be determined. Elbadawi et al. (1997) confirmed that low levels of debt have a positive effect on growth, but that a fast debt accumulation discourages growth. They found that the optimum debt level where growth is maximized would lie as high as 97 % of GDP. This ratio is above the current average debt to GDP level in the developing countries, but below the average debt level in the HIPCs before 2004.
Kraay et al. (2005) failed to find a negative correlation between debt and growth when studying 62 Low Income Countries (LICs) during the time period 1989-2003. They believe that the missing relationship between debt and growth has been the reason why debt relief has not been successful in reducing poverty and enhancing growth in the HIPCs during the seven first years of the initiative. They furthermore found very little indications that debt relief has improved policies, increased investment or spending on poverty reducing measures and nor any results that would support the hypothesis that the growth effect of debt relief would be positive. Their disappointing results could potentially be explained by data limitations, but the authors believe that it is still very unlikely that debt relief has a positive impact on growth and development. Policy makers should be careful when making recommendations about debt relief, and if these results are valid is it still important that donors do not disregard other forms of aid that could enhance development.

Pattillo et al. (2002) identify that debt has a significant negative effect on growth when the debt levels exceed a certain threshold. For the average country in their empirical investigation including 93 LDCs for the period 1969-1998, annual per capita growth is reduced by 0.5 to 1 percentage point when increasing the level of debt by 100 percent. The negative debt effect is also present when investment is included in their regression model, indicating that investment is the main factor affecting the effect of debt on growth. They furthermore found that the optimum debt level; the debt level at which debt has the optimum effect on growth and after which the marginal effect of additional debt is negative, was surprisingly low. The marginal effect of growth turns negative when debt to GDP equals 20 per cent. Imbs et al. (2005) furthermore assert that an increase in debt service is negatively correlated with growth, which also supports the hypothesis that high levels of debt affect growth negatively.

### 5.1.1 Debt overhang and the Debt Laffer Curve

Empirical studies have had difficulties in identifying whether the HIPCs are suffering from a debt overhang and especially if it exists in the LDCs. The empirical research in the field has also yielded varying results. Arslanalp et al. (2003a) claim that the HIPCs must suffer
from a debt overhang in order to benefit from debt relief, putting emphasize on the identification of a potential debt overhang. They believe that there is no positive effect of debt relief as the HIPCs are not suffering from a debt overhang, as the net inflows of capital are positive for most of the HIPCs, i.e. the capital inflows are greater than the debt service, suggesting that the debt service burden is not the main obstacle to growth. Debt relief is not likely to increase private lending to the country as most loans given today are granted as aid by multilateral institutions rather than for business purposes, and most official flows have been targeted to the official sector rather than the private. Arslanalp et al. (2003a) believe that the weak institutions are the HIPCs’ greatest obstruction to poverty reduction and growth rather than the debt overhang. They argue that the HIPC Initiative will therefore not be efficient and advocate aid as a more efficient mechanism for enhancing development in the LDCs. Given this, it is unclear whether the current debt relief initiatives will have an effect on growth or not. However, even though the HIPCs and other poor countries do not suffer from a traditional debt overhang, growth is still negatively affected by poor structural reforms, macroeconomic instability, uncertainty, short-sighted economic planning and poor management of resources, and these problems would be reduced with debt relief. (Arnone, Bandiera, & Presbitero, 2008)

Elbadawi et al. (1997) establish that the HIPCs are indeed suffering from a debt overhang. As most of the LDCs are located to the right of the Debt Laffer threshold where additional debt accumulation affects growth negatively, it could explain why most sub-Saharan African countries have experienced none or negative growth since the 1980’s. Pattillo et al. (2002) likewise established that the developing countries are indeed suffering from a debt overhang. They furthermore found evidence of a Debt Laffer Curve that describes the initially increasing but eventually decreasing relationship between outstanding debt and the expected value of the creditor’s outstanding claims. Income growth and debt are positively correlated at low levels of debt, but when the external debt level exceeds 160-170 per cent of exports or 35-40 per cent of GDP the effect of debt on average per capita growth on GDP becomes negative, thus reducing the probability of repayment.
Imbs et al. (2005) revisited the question about the existence of a debt overhang in the developing countries. The average developing country, compared with the 87 developing countries in their study, was experiencing a debt overhang when the debt to GDP ratio exceeded 55-60 percent. Both the HIPCs and the other low and lower middle income countries had relatively high levels of external debt to their GDP, as can be seen in Figure 4. The HIPCs external debt to GDP ratio has been as high as 143% of GDP in 1994 and has historically been roughly twice as high as the non-HIPCs’. The debt ratios have been reduced drastically by over 50% since the start of the HIPC initiative in 1999. The non-HIPCs’ debt to GDP ratios have been fairly low and stable over time, mostly under 60% of GDP, which should not obstruct growth according to Imbs.

Bigsten et al. (2001) however failed to find a positive correlation between debt relief and the probability of debt repayment in Zambia and Tanzania. Their findings suggest that debt relief does not improve the credibility of the debtor country as a borrower and could be seen as a sign of non-existence of a Debt Laffer Curve in the third world.
5.2 Effect of debt relief

5.2.1 The growth effect

As stated previously, there is a direct and an indirect effect of debt relief. The direct outcome is the reduction in the actual stock of the debt and the indirect effect includes all investment and capital enhancing mechanisms and potential moral hazard problems. When looking at previous debt relief research, the empirical results have shown that the indirect effect has been more important historically, especially when looking at the Brady countries that received debt relief during the 1980’s. These countries experienced an increase in asset prices, higher investment levels and increased growth. *(Arslanalp & Henry, 2003a)*

Pattillo et al. (2002) estimate that the HIPCs receiving full debt relief could expect to experience 1 percent increase in per capita growth. The debt relief should be sufficient to reduce the economic underperformance due to debt overhang, and reduce debt to a level below the debt overhang threshold. This improves the overall macroeconomic environment, and the quality and efficiency improvements of the investments would be the main driving force of growth and should eventually result in a virtuous positive growth spiral. The positive growth cycle should reduce debt ratios further, given low increases in the debt level. However, the growth sustainability and political risks still remain a challenge, and Pattillo et al. (2002) believe that the HIPCs’ indebtedness is only reduced to the threshold where additional debt accumulation affects growth negatively. The probability of additional debt accumulation following debt relief is relatively high considering their development level and the HIPCs are therefore still at the risk of becoming heavily indebted. As their results apply to the average HIPC, they fear that the countries performing poorly and below the average still face a great risk of becoming heavily indebted again in the near future.

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3 The 16 Brady countries suffered from a severe debt overhang during the 1980’s. The countries were forgiven 60 billion USD, which is a small amount compared to the amounts of net resource transfers the countries received after having their debt problems sorted out. The Brady countries are Argentina, Bolivia, Brazil, Bulgaria, Costa Rica, The Dominican Republic, Ecuador, Jordan, Mexico, Nigeria, Panama, Peru, Philippines, Poland, Uruguay and Venezuela.
Yang et al. (2009) found that the macroeconomic performance of the completion point HIPCs were on average better than the other HIPCs. The completion point countries were, in the years following the debt relief, experiencing higher GDP growth, less fiscal deficits and lower inflation than the other HIPCs. This result implies that reaching the completion point should improve macroeconomic performance, which could be an outcome of the debt relief, the required policy reforms and implementations of the PRSP strategies.

Bigsten et al. (2001) claim that the amount of HIPC debt relief is modest in comparison to their GDP and that debt relief therefore only shows modest results. Moss (2003) also suggests that the effect of the MDRI is going to be insignificantly small due to the small amounts of off-written debt. The debt service that the African HIPCs paid to the International Development Association (IDA) on average in 2004 was $19 million, when they were granted on average $197 million in IDA loans and $946 million in aid the same year. In other words, as the cancelled debt service amounts to only two percent of total aid, it is unlikely that debt forgiveness will have a great impact on the growth. The financial impacts of debt relief might be diminutive in the short run; nevertheless World Bank forecasts estimate that the indirect long run effect will be about six times higher.

Some development economists argue that the opportunity cost of debt relief is indeed higher than the benefit of debt relief. Bulow (2002) suggests that all official loans should be replaced by aid, as he believes that aid as an alternative to loans would increase the transparency and could be directed to the area where it is most efficiently used. The multilateral loans are today given to the governments, which are not necessarily the most efficient users of the capital due to poor institutions and corruption. By giving aid instead of loans the developing nations would avoid renegotiation and running into debt crises. The moral hazard problem concerned with the private market lender would also be solved and investments would be made only where they are profitable. (Bulow, 2002)
5.2.2 The fiscal response

Various development economists have examined the recipient government’s fiscal response to debt forgiveness with respect to taxation decisions, domestic borrowing, public investment and regular government expenditures. The fiscal response to debt relief in theory expects that resources that previously were used for debt servicing are now rechanneled to fiscal spending.

Cassimon et al. (2007) studied the recipient governments’ fiscal response to debt relief, looking at the HIPC countries between 1991 and 2004. They compared the effect of different types of aid; grants, loans and debt relief, and found that only debt relief caused a positive fiscal response on government revenue collection, domestic borrowing and public investments. The effect on government consumption was non-existent, but debt relief seemed to increase government revenue collection after two years, in the form of increased tax and non-tax revenue. They furthermore found that government consumption is unchanged by debt relief, but that it reduces domestic borrowing after a year. The effect on public investments is also lagged. During the first year the public investments actually decrease, however this effect is offset by a significantly greater increase during the following years. Debt relief reduces domestic borrowing; however the effect is only significant after the second year after the debt relief. They concluded that the fiscal response effects of debt relief are delayed. During the first year the effects are non-existent or slightly negative, but during the following years the effects turn positive, which forms a J-shaped curve. These effects should only occur if the debt would actually have been served; the debt relief would otherwise have been a clean-up of the national accounts. Thus, this gives some support for the debt overhang hypothesis, even though the results were rather modest. (Cassimon & Van Campenhout, 2007)

Bigsten et al. (2001) evaluated the impact of the HIPC Initiative on the economies of Zambia and Tanzania. They found no strong evidence that debt relief improve macroeconomic conditions in these countries. The estimated growth effect is very limited, the HIPC debt relief increases growth by only 0.2 percent, which has no remarkable effect
on the Zambian economy as a whole. The HIPC initiative increase investments, but as a lot of the investments are made in low productivity sectors; the growth effect will remain modest.

5.2.3 Social spending and human development

The main objective of the HIPC Initiative is to reduce poverty. Countries suffering from a debt overhang spend a vast amount of resources on serving debt instead of spending and investment in social services. Debt relief should increase the spending on social services, which have immediate effects on development indicators and poverty. The HIPCs have been under tight monitoring and budget tracking to ensure that the resources are used for poverty reduction activities. Moss (2003) found that the HIPCs indeed have increased their spending on social services. The social spending grew from 6.4 per cent of GDP to 7.9 per cent between 1999 and 2004. As the HIPC initiative demands the implementation the PRSP it is unclear whether the increase is a consequence of the PRSP, which among other strategies includes increased spending on social services as a means to reduce poverty, or due to a looser budget constraint. Furthermore, the correlation between increased social spending and health care quality and development is not always positive. It is possible that the increased expenditures do nothing to improve the service quality due to corruption, poor management or lack of demand. (Moss, 2003)

Hepp (2005) also confirmed that debt relief indeed increases health expenditures in some countries; however the effect has been very small in the HIPCs even though the PRSP oblige the countries to increase “pro-poor” spending. He nevertheless finds that the level of health expenditure is on average higher in the HIPCs than in non-HIPCs in the same regions, which could indicate a successful implementation of the PRSP. The countries might still be suffering from a debt overhang and are therefore unable to increase their health expenditures due to both political and economic restraints, and would need more debt relief or aid to increase in the health expenditures. Furthermore, the HIPCs might have different preferences and spending patterns than the non-HIPCs, which could explain the relatively low social spending.
5.2.4 Stock prices

Arslanalp et al. (2003) investigated the effect of debt relief by studying the stock market and interest rates. The stock prices include future market expectations, so by studying its response to a debt relief agreement it is possible to detect if the expected outcome of a debt relief agreement is positive or not. They found that debt relief given to the 16 Brady countries between 1989 and 1995 resulted on average in a 60% appreciation in stock markets in the year preceding the official announcement of debt relief. Moreover, the growth rate grew by 1.9% per year. There was an increase in the capital inflows to the country, which pushed down the interest rates and increased investments. They found that during the debt relief period an investment boom occurred and the average growth rate of capital more than doubled during the five years following debt relief, concluding that debt relief increased asset prices, investment and the growth rate as a result of the inflow of new lending after the debt relief. These were all indirect debt relief consequences, resulting in a flow of new lending enabled by the debt relief. (Arslanalp & Henry, 2003a) According to their findings, debt relief impacts future expectations positively as share holders expect diminishing risks and increased growth. Debt forgiveness should have a positive impact on growth and investments, making the economy able to “take off” by itself. However, debt relief is rarely given unless the country signs up for IMF or World Bank programs, which usually includes reforms and institutional improvements. The rise in the stock prices following debt relief could possibly be explained by the expectations of future reforms. (Arslanalp & Henry, 2003)

The vast rise in stock prices and growth, however, has not occurred in most of the HIPCs. As most HIPCs lack the basic infrastructure constituting the elementary base for advantageous economic activity, debt relief is more efficient in countries that indeed are highly indebted, but are not as poor as the HIPCs. Countries having the entire necessary infrastructure, education levels, well-defined property rights and a functioning health care system have much higher potential in actually benefitting from debt write-offs. As the HIPC countries do not have the infrastructure necessary for profitable investments, it is highly unlikely that the debt relief has increased investment inflows. Countries such as
Indonesia, Pakistan, Colombia, Jamaica, Malaysia, and Turkey would have much greater chances of transferring debt relief into economic development and investment funds. (Henry & Arslanalp, 2003) (Burnside & Dollar, 1997)

5.3 Factors undermining the growth effect of debt relief

There are various factors undermining the positive effects of debt relief, where perverse incentives, a poor institutional quality and policies and the investment environment have affected growth negatively in the past.

5.3.1 Moral Hazard

Burnside et al. (1997) and Boone (1996) both found that bilateral aid and debt relief affects irresponsible government consumption positively. How much used for consumption depends on the type of government, but 75 percent of the received aid was used directly to increase government consumption in the 96 poorest countries. The aid increases the overall consumption proportionally, and not just the particular sectors of interest that could promote growth. Boone (1996) did not find any positive correlation between aid and human development, nor any sign that the poorest in the country would receive any benefit from aid. Not even after separating the countries into groups of different regimes did he find any significant impact of aid on development. His finding implies that a liberal political government is no better at allocating resources for the poor than a repressive government, suggesting that it is usually the political elite that benefits most from aid, regardless of the type of political regime.

The moral hazard argument is further confirmed by looking at the statistics of previous debt relief. Starting from the 1970’s, bilateral creditors and the Paris Club have been writing off debts to some low-income countries repeatedly; 17 African countries have received debt relief six or more times just from the Paris Club between 1980 and 2000. (Moss, 2003) According to the World Bank, eight of the countries that have reached their completion point and have had their debt ratios halved, have experienced an increase in their debt ratios
exceeding the HIPC decision point thresholds for debt relief, which furthermore raises the question whether the positive effects of debt relief really exceeds the negative. (Lala, 2006)

5.3.2 The savings rate and debt sustainability

External debt sustainability is crucial for successful debt relief. If the debt ratio is unstable, the country faces the risk of accumulating a huge debt burden again and eliminating the potential long term growth effects. In 2009 only nine of the 23 completion point HIPCs were found to face a low risk of debt distress, while the rest of the countries faced moderate or high risks of high future debt problems. Many of these countries are structurally weak, characterized by poor institutions and governments, a narrow export base and weak debt management, which limits the debt relief effects to being short run without any impact on the long run debt sustainability. (Yang & Nyberg, 2009)

The high number of completion point HIPCs that already in 2006 would qualify for HIPC debt relief again supports Easterly’s conjecture that debt relief results in the accumulation of new debt as debt relief does not change the country’s preferred level of debt to GDP. Easterly (2002) confirms that debt relief correlates positively with a high level of new borrowing. He found that the LDCs’ debt burden did not shrink between 1987 and 1997 despite debt relief. The countries that had received debt relief quickly sold off the potential welfare of future generations by accumulating new debt to replace the forgiven debt. The HIPCs’ present value of debt to exports between the years 1979 and 1997 rose significantly regardless of continuous debt forgiveness. Thus, debt relief did not lower the debt burden during this period of time. Presbitero (2008) also found that debt relief is correlated with increasing debt, supporting Easterly’s theory. Easterly (2002) found that the income of the majority of the HIPCs actually decreased between 1979 and 1998 despite twenty years of debt forgiveness and newly accumulated debt for investments. As there has been no income growth, he sees this as evidence that debt relief and the new debt has been used merely for consumption by irresponsible governments favouring present consumption over future investment.
5.3.3 External shock sensitivity

Birdsall et al. (2002) believe that many of the HIPCs will still have unsustainable debt levels even after the full debt relief. Most of the HIPCs are highly dependent on agricultural products and the exportation of natural resources, which make them sensitive to external shocks, such as terms of trade shocks, global demand and supply shocks, or even bad weather conditions. Most of the low-income countries have a very specialized export base, where the majority of these countries have one export good that represents more than 50 per cent of the total exports. The completion point HIPCs have succeeded in widening their export base slightly, nevertheless the export base still needs to be widened significantly to reduce the terms of trade vulnerability and the risk of debt distress again in the future. (Yang & Nyberg, 2009) Yang et al. (2009) also recognize the importance of fiscal revenue mobilization for managing the economy through different business cycles. A country with poor fiscal revenue mobilization might face high financing costs during temporary downturns in the economy, which could eventually lead to debt distress. Most HIPCs have improved their revenue mobilization since the 1990’s, i.e. the revenue-to-GDP, but it remains still a challenge for ensuring long-run debt sustainability. Easterly (2002) moreover rejected the hypothesis that a deterioration in the terms of trade would be partially responsible for the high indebtedness, suggesting that there would be a deeper structural underlying problem with the success of debt relief, such as moral hazard problems.

However, the debt to exports ratio was constant between the 1988 and 1994, and actually fell between 1995 and 1997. The HIPC Initiative was launched in 1996, which could have had some positive effects on the monitoring of the use of the resources, and the PRSP could have improved the climate for more efficient debt relief. If this hypothesis holds, the HIPC initiative has been more successful than previous debt relief programs in promoting development. (Easterly, 2002)
5.4 Institutions

Despite all aid and financial support, there has been little evidence of growth or development in most of these countries. Previous research on the effect of debt relief and aid on growth, among others Burnside et al. (1997), (2004) and Yang et al. (2009), found that a high quality of institutions and good fiscal, monetary and trade policies played a critical role on the impact of aid on growth. Burnside et al. (1997) constructed a policy index where they included budget surplus, inflation and the openness of the economy, and found that bad policies combined with aid resulted in inefficient government consumption; whereas significantly better policies and institutions combined with aid has had a positive impact on growth. Countries with average or poor quality institutions and policies experienced none or even negative growth despite foreign aid. Presbitero (2008) found no evidence of a positive correlation between debt relief and an improvement in the institutional quality, which challenges the argument that debt relief would improve the institutional quality. The institutional environment must thus be healthy prior to debt relief for the positive effect to take place.

Imbs et al. (2005) also concluded that the institutional quality matter for growth, where “government effectiveness, rule of law and bureaucratic quality” are useful deterrents of a debt overhang. Debt overhangs have also occurred in countries with good policies and institution, but at much higher levels of debt. A higher institutional quality reduces the probability of debt distress, which stresses the importance for improving the institutions before granting debt relief. Completion point HIPCs have on average a higher institution quality than the other HIPCs, which should facilitate economic development and reduce the risk for future debt distress. (Yang & Nyberg, 2009)

Aid has proven to be efficient on the condition of high quality institutions and policies, and as debt relief can be seen as one type of aid, debt relief should also be more efficient in a good institutional and policy environment. Hence if donors are interested in promoting growth and development, greater attention should be given to the institutions and economic policies. (Burnside & Dollar, 2004)
5.4.1 Investment quality

Devarajan et al. (1999) claim that the LDCs’ greatest challenge is not a low investment level but low investment productivity and efficiency. Inefficient capacity utilizations and constraints partly caused by poor economic policies have restrained the investment efficiency and hence reduced the levels of investment due to the low returns. The low savings rate in the average African country can also be explained by the low returns to investment, and the outward capital flow from Africa is due to the poor investment opportunities. Due to a low investment productivity as a result of a combination of poor policies and weak institutions, an investment boom created by debt relief is not going to have any positive effect on growth. Only if all the factors distorting investment productivity are removed or diminished will the increase in investment due to debt relief increase growth. Their study indicates that rather than forgiving debt, more focus should be on improving the investment climate. Imbs et al. (2005) likewise assert that a debt overhang reduces the quality and effectiveness of investments. The low quality and effectiveness cause weaker price stability and is a source of poor economic performance.

Pattillo et. al (2002) found that the efficiency and quality of investment is lower during high debt periods, and that it is the lower quality and effectiveness of the investment rather than the lower quantities of investment that has the greatest negative effect on growth. This finding raises the question whether it is the poor investment efficiency that causes the debt overhang, or the debt overhang that causes the poor investment quality. Bigsten et al. (2001) believe that the effect of the HIPC debt relief would be greater if the increased public investments and the improved macroeconomic conditions would improve private investment productivity. Nevertheless, in their simulated study of debt relief in Zambia, they failed to find a positive relationship between debt relief, increased public spending, growth and productivity, suggesting that the debt problem originates from the poor investment quality.
6. Data

This chapter introduces the data material used in the empirical study of the growth effect of debt relief conditional on the institutional quality. The variables in the study are introduced in Section 6.1; Section 6.2 provides some descriptive statistics and Section 6.3 evaluates the validity of the data.

6.1 Choice of variables

I have chosen to study the low and lower middle income countries using the World Bank’s income group classification from 2010. There are a total of 96 low and lower middle income countries, but due to poor data availability for a number of the countries, only 85 countries are included in the study of which 38 countries are classified as HIPCs. The included countries are listed in Appendix 1. Annual data for the time period 1995-2008 is used in the study. The data is collected from the World Bank database World Development Indicators Online, the Worldwide Governance Indicators website and the Heritage Foundation’s website.

6.1.1 Dependent variables

The dependent variables used in this study are the annual percentage GDP growth rate and the annual change in the GDP growth rate.

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4 The economies are divided into income groups according to their 2009 GNI per capita. Classification for low income countries: GNI per capita of $995 or less, lower middle income: $996–3,945. (the World Bank)
5 The time period 1994-2008 is used in the robustness test due to greater data availability.
6 Many previous studies evaluating the effect of aid or external debt on growth have used three and four year averages to even out short-run fluctuations in the data, among others (Burnside & Dollar, 1997) (Pattillo, Poirson, & Ricci, 2002) and (Easterly, 2003). Debt relief is however not a recurrent phenomenon, but a lump sum in a particular year. When calculating the average it is not possible to specify whether the debt relief has occurred in the beginning or in the end of the time period. This could affect the results and the averaging method is thus not suitable for this analysis.
Annual GDP growth rate

The GDP growth rate is based on the growth rate at market prices based on constant 2000 US dollars. The GDP is the sum of the gross value added of all goods and services produced within a country within a year.

Change in the GDP growth rate

The change in the GDP growth rate is also used as a dependent variable in the study. Kraay and Chauvin (2005) point out that since debt relief is usually granted to countries with poor economic development, just regressing debt relief on growth could create a spurious negative correlation between debt relief and growth. By looking at the changes in growth levels between different periods it is easier to detect the impacts of debt relief on growth instead of measuring the possible correlation between the two.

6.1.2 Independent variables

The independent variables of interest are debt relief and an interaction term combining debt relief and an index for institutional quality. Besides debt relief and the interaction term, are various control variables that are usually used in the standard growth regression included in the model to reduce the possible bias the otherwise excluded variables would impose. The control variables included in this study are investment, changes in the terms of trade, population growth, foreign aid, and the institutional quality index.

Debt relief

The most important explanatory variable is the measure of debt relief, measured as the percentage of GDP. Debt relief includes the principal debt and interest due or in arrears that was forgiven during the given time period, and includes also the debt relief granted through the HIPC program. The hypothesis is that debt relief should have a positive effect on growth.
Comprehensive data on debt relief does however not exist. Data for the debt relief under the HIPC Initiative exists, but the data on debt relief granted to the LDCs outside the HIPC Initiative is incomplete due to the large number of creditors involved. (Kraay & Chauvin, 2005) The best available data for debt relief is the data provided by the World Bank, which is the one used in this study.

**Institution index**

There are various available institution indices available for the developing countries. This study is using the Worldwide Governance Indicators as the main institutional quality index. The robustness of the results to a change in the institutional quality index will be performed using the Index of Economic Freedom as an alternative index.

Kaufmann, Kraay and Mastruzzi from the World Bank have constructed the Worldwide Governance Indicators (WGI) consisting of six dimensions of governance. The WGI score ranges between -2.5 and 2.5 points, where a higher value indicates better institutional quality. The WGI governance factors included are voice and accountability; political stability and no violence; government effectiveness; regulatory quality; rule of law and control of corruption. (Worldwide Governance Indicators, 2010) The indicators are available for 213 countries for the period 1996-2009 and are based on over 100 variables obtained from 31 different data sources. (Kaufmann, Kraay, & Mastruzzi, 2010) The WGI have been widely used in previous development studies, among others Presbitero (2009), and Burnside and Dollar (2004).

The Index of Economic Freedom (IEF) is provided by the Heritage foundation and consists of ten indicators of economic freedom. The components are business freedom, trade

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7 The index was initially called the KKM-index.
8 When the index is used in the interaction variable it is adjusted upwards by 2.5 points to only produce positive values.
9 Many of the previous researches investigating the role of institutional quality have used the Country Policy and Institution Assessment (CPIA) index made by the World Bank. Data from 2005 onwards are published, but the historical data is unfortunately confidential and thus cannot be used in this study. Another widely used index is the International Country Risk Guide, but is only available for 60 of the Low and Middle Income countries included in the study.
freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom of corruption and labour freedom. The scores range between 0 and 100, where a higher score indicates higher freedom. The index is available since 1995. (Heritage Foundation, 2010)

Both institutional indices are subjective, and capture the citizens’ perceptions about the political and institutional situation in the country, which has various drawbacks. The indices use different units of measurement which are difficult to compare and interpret, as the observations are based on perceptions. The sources and the reliability of the sources in the indices vary, and the valuation of the results is usually made by the same organizations that collect the data. This could result in ideological bias, and the results should therefore be interpreted with caution. Due to the potential subjectivity of the index, the Index of Economic Freedom is also used as an alternative index for institutional quality.

**Debt relief and institutional quality interaction variable**

To measure how the quality of institutions and policies affects the debt relief effect an interaction term is included in the model. The interaction term is composed of debt relief divided by GDP per capita (in millions)\(^{10}\) multiplied by the institutional quality index, and is expected to have a positive sign as debt relief should be more efficient in a high quality institutional economy.

**Control variables**

The control variables used in this study are similar to the control variables used by previous studies analyzing the effect of either development aid or debt relief, among others Burnside & Dollar (1997), Pattillo, Poirson & Ricci (2002) Easterly (2003) and Clements, Bhattacharya, and Nguyen (2003).

The *Population growth* variable accounts for the growth rate of labour input and measures as well how an increase in the population burdens the country’s infrastructure. *Investment*

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\(^{10}\) The term debt relief/GDP * WGI would be a better term, but correlates almost perfectly with the term debt relief/GDP.
as a fraction of GDP is expected to have a positive effect on growth through the benefits of capital accumulation. Investment is identified as gross capital formation and consists of expenditures on enlargements in the economy’s fixed assets and net changes in inventory levels. (WEO, 2010)

*Changes in the terms of trade* are included to capture external trade shocks. An improvement in the terms of trade is expected to affect the export negatively, as it increases the export prices. Many of the poor countries are dependent on exporting primary commodities and thus particularly sensitive to rapid changes and shocks. (Clements, Bhattacharya, & Nguyen, 2003). On the other hand, terms of trade growth makes imports relatively cheaper, which could have a positive growth effect. The change in the terms of trade is calculated from the net barter terms of trade index. The index is measured as “the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000” by the World Bank (WEO, 2010).

*Foreign aid* represents a significant fraction of GDP in some of the Low Income Countries (LICs), accounting for over 40% of GDP in seven LICs in one or more years. This could potentially affect the GDP growth rate and the variable net official development assistance and official aid received over GDP is therefore included in the model as well. Nevertheless, many previous studies have found that aid has no effect on growth in countries with poor institutional quality, as aid tend to increase consumption rather than investment (Boone, 1996) or finance irresponsible governments (Easterly, 2002).

Many previous studies have also included the logarithm of the *initial income per capita* to capture a potential convergence effect of the economies towards a general income level. The variable is however highly insignificant and non-stationary and would thus distort the results. As some of the other variables included in the study, such as the debt relief /GDP, the interaction term, foreign aid /GDP and investment/GDP already include the initial income effect, the logarithm of GDP per capita is excluded from the model.

Time dummies are also included in the model to capture the effect of world business cycle fluctuations. (Burnside & Dollar, 1997)
6.2 Descriptive statistic

The variables included in the study are presented below. Key variable data are reported in Table 1 and is followed by a graphical presentation of the variables of interest. The graphical presentations of the control variables are found in Appendix 2.

The data reported in Table 1 below provides an indication of the different economic situations in the countries. The variance between the observations seems rather large. The standard deviations for some of the variables are very large in comparison with the mean and median, especially for changes in the terms of trade and change in growth. The difference between the maximum and the minimum is also considerable for most variables compared with the mean.

Table 1. Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td>3.67</td>
<td>6.90</td>
<td>4.30</td>
<td>106.28</td>
<td>-51.03</td>
</tr>
<tr>
<td>Change in growth</td>
<td>0.06</td>
<td>7.16</td>
<td>0.10</td>
<td>94.16</td>
<td>-76.58</td>
</tr>
<tr>
<td>Debt relief/GDP</td>
<td>2.07</td>
<td>7.48</td>
<td>0.00</td>
<td>121.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Debt relief *WGI</td>
<td>0.73</td>
<td>3.07</td>
<td>0.01</td>
<td>33.47</td>
<td>0.00</td>
</tr>
<tr>
<td>Investment/GDP</td>
<td>21.76</td>
<td>9.40</td>
<td>20.48</td>
<td>71.84</td>
<td>-23.76</td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>0.54</td>
<td>13.07</td>
<td>-0.03</td>
<td>101.62</td>
<td>-62.29</td>
</tr>
<tr>
<td>Population Growth</td>
<td>2.02</td>
<td>1.32</td>
<td>2.23</td>
<td>11.18</td>
<td>-8.27</td>
</tr>
<tr>
<td>Foreign Aid/GDP</td>
<td>10.91</td>
<td>12.01</td>
<td>8.18</td>
<td>148.41</td>
<td>-0.66</td>
</tr>
<tr>
<td>WGI</td>
<td>-0.65</td>
<td>0.50</td>
<td>-0.60</td>
<td>0.59</td>
<td>-2.19</td>
</tr>
<tr>
<td>IEF</td>
<td>53.80</td>
<td>8.06</td>
<td>54.50</td>
<td>76.30</td>
<td>23.70</td>
</tr>
</tbody>
</table>

The GDP growth rates presented in Figure 5 have been fairly stable the difference between the HIPCs and the non-HIPCs is not substantial. The global financial crisis that started in the fall of 2008 in the US and Europe can be seen as a slight reduction in the growth rate, but the negative effects of the depression are visible in the data from 2009 onwards.
The variations in the growth rates over time have been much more volatile for the HIPC countries than for the non-HIPCs, as the difference in growth shown in Figure 6 is much larger for the HIPC countries than for the non-HIPC countries.
Both the HIPC countries and some of the non-HIPC countries have been granted debt relief during the past 15 years, as can be seen in Figure 7. The HIPCs received substantially larger debt reliefs after the year 2000, but the non-HIPCs still got a quite large sum in 2005. However, when the value of debt relief is compared with the countries’ GDPs in Figure 8, the relative importance of debt relief in the non-HIPCs seems to be very small. During 2006, the HIPCs received debt relief that averaged for 18% of their GDP, compared with less than 1% of GDP in the non-HIPC countries during the whole period.

Figure 7. Debt relief in current US$
The scores from the institution indices vary between the HIPCs and the non-HIPCs. The non-HIPCs have in general a better rating than the HIPCs when looking at the WGI in Figure 9. Noteworthy is that the WGI scores for the HIPCs actually have decreased slightly since the start of the index in 1996. The non-HIPCs scores have remained on a similar level as in 1996. 20 out of the 38 HIPC countries in the model have experienced a worsening WGI score since the start of the index.
The Heritage Foundation’s Index of Economic Freedom in Figure 10 provides a patchier picture of the situation. The economic freedom in the HIPCs has increased by three points since the start of the index in 1995. The difference between the HIPCs and the non-HIPCs has narrowed, and the HIPCs gained a higher score than the non-HIPCs between 2002 and 2005. The non-HIPCs’ scores have also increased over time.

![Index of Economic Freedom](image)

**Figure 10. Index of Economic Freedom**

### 6.2.1 Stationarity

Time series analysis presumes stationarity, which means that the time series’ characteristics are unaffected by a shift in time. Wooldridge (2009) defines a stationary process as a “time series process where the marginal and all joint distributions are invariant across time”. Non-stationarity in panel data is rather problematic, as the separate series are probably not integrated of the same order. A series could be stationary for one country but be integrated of order two, I(2), for another. Even if all the series are I(1), heterogeneity in the cointegration properties might lead to problems (Verbeek, 2008).

As most economies grow or change over time it is very likely that the time series are not stationary, as a constantly growing process does not have a constant average (Verbeek, 2008). The time series used in this study are fairly short, just 13 periods, but are still tested...
for a unit root in the levels using the Augmented Dickey Fuller (ADF) test\textsuperscript{11}. The test includes a constant and one lag length. The results are presented in Table 2. According to the results can the hypothesis of a unit root be rejected for all variables on a 10\% significance level, and for all variables except for WGI on a 1\% significance level.

Table 2. ADF test for stationarity

<table>
<thead>
<tr>
<th></th>
<th>Statistic</th>
<th>Prob.</th>
<th>Cross sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt Relief</td>
<td>763.49</td>
<td>0.00***</td>
<td>69</td>
</tr>
<tr>
<td>Debt Relief * WGI</td>
<td>182.32</td>
<td>0.00***</td>
<td>61</td>
</tr>
<tr>
<td>Investment</td>
<td>230.20</td>
<td>0.00***</td>
<td>82</td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>450.53</td>
<td>0.00***</td>
<td>72</td>
</tr>
<tr>
<td>Population Growth</td>
<td>1388.66</td>
<td>0.00***</td>
<td>85</td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>255.58</td>
<td>0.00***</td>
<td>85</td>
</tr>
<tr>
<td>WGI</td>
<td>193.66</td>
<td>0.09*</td>
<td>84</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>403.67</td>
<td>0.00***</td>
<td>85</td>
</tr>
<tr>
<td>Change in growth</td>
<td>1026.97</td>
<td>0.00***</td>
<td>85</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1\%, ** at 5\% and * at 10\%.

6.2.2 Correlation between the variables

Multicollinearity appears if the correlation coefficient between the explanatory variables is close to 1, and is a potential problem in the analysis. Perfect multicollinearity makes the estimation of the model impossible. High multicollinearity increases the estimator variance, which in turn distorts the significance of the estimates. (Verbeek, 2008) In order to identify multicollinearity a correlation matrix is applied to the data. Correlation coefficients close to |1| implies a serious problem (Koop, 2008). If the square of the pair wise correlation coefficients exceeds the determination coefficient in the estimated models, it could also be an indication of multicollinearity.

The correlation coefficients of the explanatory variables between 1995 and 2008 are presented in Table 3. None of the coefficients are highly correlated, but the correlation coefficient between the interaction term and the debt relief variable is fairly high, 0.64. Foreign aid and debt relief seem to correlate slightly, which is not surprising as one would

\textsuperscript{11} More information about the ADF test can be found in Verbeek (2008).
expect a country receiving aid to be given debt relief as well. Investment is positively correlated with the institution variable. Nevertheless, as none of the correlation coefficients are close to \(|1|\), there is no evidence of high or perfect multicollinearity.

### Table 3. Correlation coefficients

<table>
<thead>
<tr>
<th>Correlation coefficients</th>
<th>Debt relief/ GDP</th>
<th>Debt Relief * WGI</th>
<th>Investment / GDP</th>
<th>Δ Terms of trade</th>
<th>Population Growth</th>
<th>Foreign Aid/GDP</th>
<th>WGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt relief/ GDP</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt Relief *</td>
<td>0.642</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WGI</td>
<td>0.007</td>
<td>-0.036</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment/GDP</td>
<td>0.066</td>
<td>0.081</td>
<td>0.013</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ Terms of trade</td>
<td>0.106</td>
<td>0.13</td>
<td>-0.221</td>
<td>0.035</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Growth</td>
<td>0.227</td>
<td>0.227</td>
<td>-0.093</td>
<td>0.003</td>
<td>0.297</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Foreign Aid/GDP</td>
<td>0.007</td>
<td>0.045</td>
<td>0.400</td>
<td>-0.101</td>
<td>-0.166</td>
<td>-0.078</td>
<td>1</td>
</tr>
<tr>
<td>WGI</td>
<td>-0.022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 6.3 Data validity problems

The data for all the variables might not give the right impression of the current economic situation. Out of 96 low and lower middle income countries I only use 85 countries, as some countries are excluded due to poor data availability. It is mostly the poorest countries that have poor data records, which creates a bias towards the richer low income countries. (Baltagi, 1995) Furthermore, the countries might not have the capacity to collect reliable data. When making the statistics of the national accounts it is assumed that all goods and services are exchanged on the official market. However, as a lot of goods and services are produced and consumed within the households or exchanged in other ways, e.g. through social networks, this leads to considerable inaccuracies within the national accounts. There are additionally a number of missing observations in the dataset, which reduces the number of countries included in the study from 85 to 70 when the variables for change in terms of trade and investment are included.
7. Methodology

The following chapter discusses the methodology and model used in the analysis. This study uses panel data to estimate the effect of debt relief on GDP growth, as it includes both time series- and cross section data. The benefit of using panel data for the investigation is that it is possible to analyze changes over time in the data on a country specific level.

One would expect the debt relief effect to be slightly delayed, which justifies the use of time series data in the analysis. The country specific effects are also likely to vary, as the initial economic, political and institutional conditions in the low and lower middle income countries vary vastly. By using panel data, it is possible to take this heterogeneity into account and provides a good reason for including country level cross-sectional data in the study.

There are various advantages and drawbacks with panel data. The benefit with panel data sets is that they are usually larger than just time series or cross-sectional data sets and the independent variables vary over both the time and the individual dimension. This offers more variability and information, which provide more degrees of freedom and makes the estimators more precise and efficient (Baltagi, 1995). The problem with multicollinearity in time series data is reduced in panel data, as the cross section data provides more variation in the data through country specific variables. It is also easier to identify and measure outcomes that are hard to detect in pure cross-section or time-series data, and allows for more complex models.

The potential drawbacks of using panel data are that collection of data is usually more complicated and results in a number of missing observations. If there are a large number of observations missing this causes a selectivity problem. However, despite the problems with panel data it is the most appropriate type of data for the objective of this study. Section 7.1 presents some panel data models, and Section 7.2 introduces the econometric model used in this study.
7.1 Panel data models

There are various methods for analyzing panel data. The three most common panel data models, the pooled OLS model, the fixed effects model and the random effects model, are presented in the following section. All the models have their potential advantages and drawbacks. The biggest difference between the models is their assumptions about the intercept and error term and with respect to time and country specific dimensions. (Gujarati, 2003) Many previous studies on debt relief or aid and growth, such as Burnside and Dollar (1997), (2004) Easterly (2003) and Kraay and Chauvin (2005), have use pooled OLS as one of their data models. This study uses the pooled OLS as the main panel data model and the Random Effects model with the Generalized Least Squares estimators, to correct for heteroskedasticity and autocorrelation.

Pooled OLS

The pooled OLS model is a standard regression model with a time variable and a country variable, and pools the observations together as if they came from the same regression model. (Koop, 2008) The model looks as follows:

\[ y_{it} = \alpha + \beta x_{it} + \varepsilon_{it} \]  

(1)

In the pooled OLS model \( x_{it} \) is a k-dimensional vector of explanatory variables. The intercept \( \alpha \) and the slope coefficients \( \beta \) are identical for all cross-sections and time series, as can be seen by the lack of a time or cross section identifier. The error term \( \varepsilon_{it} \) is assumed to be IID \((0, \sigma^2)\), varying over both the time and cross-sectional dimension and assumed to include all the additional variables affecting \( y_{it} \). The drawback with the pooled OLS model is that as the same countries are studied over time, it is unlikely that the error terms would not be correlated over time. The pooled model does not take heterogeneity between the countries into account, which causes a risk of correlation between the error term and the variables and could result in biased and inconsistent estimates. (Verbeek, 2008) The model is nevertheless the most suitable for this study in question.
The Fixed Effects model

In the fixed effects model (2) each country has its own intercept.

\[ y_{it} = \alpha_i + \beta x_{it} + \epsilon_{it} \]  

(2)

The model does not include a constant and assumes that the country specific intercepts \( \alpha_i \) do not vary over time. \( \epsilon_{it} \) are the individual and time specific error terms and are assumed to be i.i.d \((0, \sigma^2)\). All explanatory variables \( x_{it} \) are independent of all error terms \( \epsilon_{it} \).

To control for the individual specific effects a dummy variable for each country is included in the model.\(^{12}\) The model can be estimated with OLS and the estimators are called the Least Squares Dummy Variables (LSDV) estimators. The within estimator produces identical results to the LSDV estimator and is computed from the individuals’ deviations from their means. This eliminates the individual effects \( \alpha_i \) when the data is transformed by subtracting the mean values from the observed observations. (Verbeek, 2008) However, this study wants to test whether the country specific institutional quality matters for the debt relief effect. As the fixed effect model controls for the country specific effects by inserting dummy variables for each country, the institutional quality effect would be accounted for in the country specific effects and hence not show up in the model. The fixed effects model is therefore not used in this study.

The Random effects model

In the random effects model (3) the country specific effect is assumed to be a random variable drawn from a larger sample.

\[ y = \mu + \beta x_{it} + \alpha_i + \epsilon_{it} \]  

(3)

The error term consists of two components: an individual time-invariant component \( \alpha_i \) that does not vary over time, and \( \epsilon_{it} \) that considers the time-series characteristics. The

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\(^{12}\) One dummy variable is excluded as one of the countries is the reference country, resulting in \( n-1 \) dummies. \( n \) dummy variables in the model would result in perfect collinearity, causing a very big variance which would produce very small t-values.
components are uncorrelated over time, independent and mutually independent of all explanatory variables. However, unless the variance of $\alpha_i$ is 0, the combined error terms exhibit autocorrelation. The OLS estimators are therefore unsuitable, and the Generalized Least Squares (GLS) estimators are more efficient in the random effects model. The GLS estimator consists of the best possible combination of the between and the within estimator. The between estimator makes use of the difference between the cross-sections and is obtained as an OLS estimator by regressing the country specific averages of $y$ on the country specific averages of $x$ (Verbeek, 2008). In the random effects model the intercept term a constant, resulting in a smaller loss of degrees of freedom than the fixed effects model. However, if the error terms are correlated with one or more of the regressors, the random effects estimators are biased.

7.2 The econometric model

The effect of debt relief is analysed by regressing the annual GDP growth on debt relief. To measure how the quality of institutions and policies affects the effect of debt relief an interaction term Debt relief * institutional quality is also added to the regression. The initial pooled OLS model looks as follows:

$$ g_{it} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \varepsilon_{it} $$

(4)

The variable $g_{it}$ represents the growth rate of country $i$ at period $t$, $\beta_1$ is a constant $d_{it}$ is debt relief relative to GDP in country $i$ at period $t$, and $\varepsilon_{it}$ represents the error terms. The interaction variable $d_{it}p_{it}$ measures the effect of debt relief conditional on the institutional quality. If the interaction term has a positive sign, one could expect the positive debt relief effect to be increasing with the quality of the institutions and policies.

It is however possible that just regressing growth on debt relief creates a spurious regression, as debt relief usually is granted to countries with poorer growth and lower income (as also seen in the correlation matrix in Table 3.) By using the change in growth as the dependent variable in equation 5, the effect of debt relief on the change in growth is measured.
The variable $g_{it} - g_{it-1}$ represents the changes in the growth rate of country $i$ at period $t$ and $g_{it-1}$ is the lagged GDP growth rate. A different way of presenting equation (5) is by moving previous GDP growth $g_{it-1}$ to the right hand side.

$$g_{it} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \beta_4 g_{it-1} + \varepsilon_{it}$$

There are however various additional variables affecting economic growth. Many previous studies have included a number of control variables in their models to capture the effect of the additional factors. As ignoring these variables could cause bias estimators, a number of control variables are included in the extended models. The included control variables are investment/GDP, terms of trade change, population growth, foreign aid/GDP and the institution index. $X_{kit}$ is a vector representing the five additional control variables. The extended models look as follows:

$$g_{it} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \beta_4 X_{kit} + \cdots + \beta_{3+k} X_{kit} + \varepsilon_{it}$$

$$g_{it} - g_{it-1} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \beta_4 X_{kit} + \cdots + \beta_{3+k} X_{kit} + \varepsilon_{it}$$

$$g_{it} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \beta_4 g_{it-1} + \beta_5 X_{kit} + \cdots + \beta_{4+k} X_{kit} + \varepsilon_{it}$$

The lagged variables of debt relief and the interaction variable are also going to be tested for in the models, as it is possible that the debt relief effect is delayed.
8. Results

The results from the empirical analysis are presented in the following section. The results from models (4) and (7) are reported and presented in the first passage, models (5) and (8) in the second and the results from models (6) and (9) in the third passage of Section 8.1. Robustness tests are carried out in Section 8.2, testing the stability of the results to a change of the institution index. The series are tested for serial correlation in the error terms and the autocorrelated series are re-estimated using GLS in Section 8.3. The presentation of the results is followed by a discussion.

8.1 Results

The coefficients from the regressions with corresponding robust t-statistics in brackets are presented in tables below. The variables of interest are bolded. The panel robust t-statistics are corrected for heteroskedasticity and are consequently less biased than the regular t-statistics, but produce smaller t-values. This makes it harder to obtain significant results. As there are some data missing for some variables for various countries, the panel is unbalanced. The number of observations included in the regressions varies depending on the variables included, and ranges between 812 and 591 observations. The number of observations is not considered large, but sufficient for the analysis. Time dummies are included in the regressions but not reported in the tables. The determination coefficient $R^2$ is reported as well as the Wald test statistic$^{13}$ that tests the goodness of fit of the model.

8.1.1 Annual GDP growth

The annual GDP growth rate is regressed over debt relief, the interaction term Debt relief *WGI and the control variables in regressions (1) to (3) using pooled OLS. In regressions (4) to (5) the lagged variables of debt relief are used instead of the present. The results are reported in Table 4.

---

$^{13}$ More information about the Wald test can be found in Wooldridge (2009) and Verbeek (2008).
### Table 4. Annual GDP growth 1995-2008

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt Relief</td>
<td>-0.013</td>
<td>-0.036*</td>
<td>0.012</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.86)</td>
<td>(-1.88)</td>
<td>(0.664)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt Relief * WGI</td>
<td>0.079*</td>
<td>0.186***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(3.68)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>0.130***</td>
<td>0.117***</td>
<td></td>
<td>0.129***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.48)</td>
<td>(3.03)</td>
<td></td>
<td>(3.46)</td>
<td></td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>0.038***</td>
<td>0.033**</td>
<td></td>
<td>0.040***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.58)</td>
<td>(2.19)</td>
<td></td>
<td>(2.73)</td>
<td></td>
</tr>
<tr>
<td>Population Growth</td>
<td>1.009***</td>
<td>0.847**</td>
<td></td>
<td>1.003***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.8)</td>
<td>(2.06)</td>
<td></td>
<td>(2.77)</td>
<td></td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>-0.049</td>
<td>-0.053</td>
<td></td>
<td>-0.045</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.52)</td>
<td>(-1.58)</td>
<td></td>
<td>(-1.43)</td>
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<tr>
<td>WGI</td>
<td>0.701</td>
<td>0.310</td>
<td></td>
<td>0.739</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.2)</td>
<td>(0.45)</td>
<td></td>
<td>(1.27)</td>
<td></td>
</tr>
<tr>
<td>Debt Relief -1</td>
<td></td>
<td>-0.036*</td>
<td>-0.041**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.85)</td>
<td>(-2.34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt Relief -1 * WGI</td>
<td></td>
<td>0.108***</td>
<td>0.168***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.48)</td>
<td>(4.85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.958***</td>
<td>1.607</td>
<td>2.092</td>
<td>4.971***</td>
<td>1.630</td>
</tr>
<tr>
<td></td>
<td>(7.98)</td>
<td>(1.29)</td>
<td>(1.55)</td>
<td>(7.97)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>R²</td>
<td>0.049</td>
<td>0.191</td>
<td>0.151</td>
<td>0.051</td>
<td>0.193</td>
</tr>
<tr>
<td>Wald test</td>
<td>3.25</td>
<td>38.81***</td>
<td>20.84***</td>
<td>13.41**</td>
<td>48.05***</td>
</tr>
<tr>
<td>No. of observations</td>
<td>810</td>
<td>594</td>
<td>600</td>
<td>810</td>
<td>594</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.

**Debt relief and debt relief * WGI**

The debt relief effect on growth seems to vary depending on the different variables included in the model. The debt relief effect is negative but insignificant when GDP growth is regressed only on debt relief and the interaction term. The interaction term, however, is both positive and significant at a 10 % significance level. The effect of debt relief is thus increasing with institutional quality according to this model. These results are fairly similar to Burnside and Dollar’s (1997 and 2004) conclusions drawn about the growth effect of aid and institutional quality. They found that aid had none or even a negative effect on growth,
but aid in high-quality institutions has a significant positive effect on growth. In regression (2) a number of control variables are included in the model. The result from the second regression confirms the findings in regression (1). Debt relief has a significant negative effect on growth according to the model, whereas the debt relief effect conditional on the institutional quality is significantly positive. The coefficients are also bigger in absolute terms than in regression (1).

A very interesting result appears when the interaction variable is excluded from the model. The debt relief effect, that was negative in the previous regressions, is now positive but insignificant. According to the results from (1), (2) and (3) the positive debt relief effect seems to be conditional on the institutional quality in the economy, and there is thus no evidence that the debt relief effect is positive in all institutional environments.

**Lagged debt relief and debt relief *WGI**

Kraay and Chauvin (2005) suggest that debt relief has a delayed effect on growth. A slight delayed debt relief effect is tested for in regression (4) by regressing GDP growth over the lagged variables for debt relief and lagged debt relief times the WGI. The delayed effect of debt relief now has a significant negative effect on growth, and the interaction variable of debt relief and institutional quality has a significant positive effect. The coefficients are also greater in absolute terms than in regression (1), suggesting that the effect is greater one year after the debt relief. The control variables are included in the analysis in regression (5). The debt relief effect is still significantly negative while debt relief conditional on the institutional quality is significantly positive. Both coefficients are bigger in absolute terms than in regression (3).

**Control variables**

Investment has a significant positive effect on growth in all models when included. These results are also in line with the results obtained by Clements, Bhattacharya, and Nguyen (2003) and (Koeda, 2006). Terms of trade growth has a significant positive effect on growth, which is in line with the results obtained by (Pattillo, Poirson, & Ricci, 2002). Population growth produces significant positive coefficients, contrary to the results by Clements, Bhattacharya, and Nguyen (2003). Clements et al. however used GDP growth
per capita as their dependent variable, which explains why they found that population growth has a negative effect on the growth rate as the GDP per capita denominator consequently increased. Population growth could also arise from higher immigration or lower outward migration and thus reduce brain drain. This would affect growth positively through the increase in labour supply.

Foreign aid has a negative but insignificant effect on growth. This is in line with previous studies such as Burnside and Dollar (2004) and Easterly (2003), who found that aid has no significant effect on growth in economies with poor institutions. The institutional quality seems to affect growth positively, but the variable is insignificant. Most previous studies have obtained positive significant coefficients for the variable, such as Easterly (2003) and Burnside and Dollar (2004) but other studies have also found insignificant coefficients.

The results do not change markedly when removing some of the insignificant variables from the models. The control variables do not vary much when the present variables of debt relief and the interaction terms are exchanged for the lagged variables, suggesting that the debt relief effects are fairly comparable the year and the year after the debt relief.

**Goodness of fit**

The Wald test measures the overall significance of the models. According to the test, all but the first model is significant, which indicates that the independent variables jointly explain some of the fluctuations in the GDP growth rate in all regressions but (1). $R^2$, the coefficient of determination, is relatively low. The results from regression (1) should therefore be interpreted with caution. Including control variables in (1) clearly improves the model, as the Wald test now is significant and $R^2$ has increased from 4.9 to 19.1. Regressions (2), (3) and (5) all have relatively high determination coefficients, explaining between 15.1 to 19.3% of the variation in the annual GDP growth. The $R^2$ for regression (4) is on the other hand almost as low as for regression (1). The models with control variables are thus better models for estimating the effect of debt relief on growth. It is also possible that the models have problems with multicollinearity, as the $R^2$ are smaller than the square of the pair wise correlation coefficient of debt relief and the interaction term. This could be a problem especially in regressions (1) and (4) where the $R^2$ is especially low, where the
multicollinearity would make it harder to obtain significant results. The debt relief term in regression (3) is nevertheless not significant when the interaction term is omitted, so the insignificance of the coefficient is probably not caused by multicollinearity.

8.1.2 Change in growth
This following regressions tests whether debt relief has an effect on the change in growth. As debt relief is usually granted to countries with poor economic development, just regressing debt relief on growth could create a spurious negative correlation between debt relief and growth. Regressions (6) to (8) are estimated with annual change in GDP growth using pooled OLS and the results are reported in Table 5.

Table 5. Annual change in GDP growth 1996-2008

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Change in growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(6)</td>
</tr>
<tr>
<td>Debt Relief</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(0.74)</td>
</tr>
<tr>
<td>Debt Relief * WGI</td>
<td>-0.033</td>
</tr>
<tr>
<td></td>
<td>(-0.88)</td>
</tr>
<tr>
<td>Investment</td>
<td>-0.013</td>
</tr>
<tr>
<td></td>
<td>(-0.61)</td>
</tr>
<tr>
<td>Terms of Trade change</td>
<td>0.063**</td>
</tr>
<tr>
<td></td>
<td>(2.28)</td>
</tr>
<tr>
<td>Population Growth</td>
<td>-0.082</td>
</tr>
<tr>
<td></td>
<td>(-0.50)</td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>-0.027</td>
</tr>
<tr>
<td></td>
<td>(-1.38)</td>
</tr>
<tr>
<td>WGI</td>
<td>0.194</td>
</tr>
<tr>
<td></td>
<td>(0.65)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.249*</td>
</tr>
<tr>
<td></td>
<td>(1.87)</td>
</tr>
<tr>
<td>R²</td>
<td>0.025</td>
</tr>
<tr>
<td>Wald test</td>
<td>1.05</td>
</tr>
<tr>
<td>No. of observations</td>
<td>812</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.
In regression (6) the change in growth is regressed on debt relief and the interaction variable. In contrast to the results from the previous regressions, the debt relief effect is positive and the interaction term is negative. None of the variables except the constant are nevertheless significant.

The control variables are added to the model in (7). Debt relief has a significant positive effect on growth when the control variables are included in the model. The interaction term is still negative and insignificant. These results supports the hypothesis that just regressing growth on debt relief creates a spurious negative correlation between debt relief and growth, but when the change in growth is regressed on debt relief the relationship is positive. Nevertheless, when the interaction term is excluded from the model in regression (8) the debt relief coefficient decreases and becomes insignificant, even though it is still positive. Hence it seems like debt relief does not have an effect on the change in growth in all institutional environments after all and the insignificant or negative debt relief effect is not only caused by a spurious relationship between growth and debt relief. When the lagged variables of debt relief and the interaction variable are used as explanatory variables, none of the variables are significant, and thus not reported. The results do not vary significantly when the time dummies are excluded from the model.

The control variables are not as significant as in the previous models. The only control variable that is significant is the change in terms of trade, which is positive. The coefficient is positive, but much smaller than in regressions (2), (3) and (5). Investment has a negative effect on the change in growth, which is contrary to economic theory, but the effect is insignificant. Population growth now has a negative sign but is insignificant, as is foreign aid. The institution index is also insignificant but positive. Some of the control variables change slightly when the interaction term is excluded from the analysis in regression (8), but the change in the terms of trade is still the only significant variable.

**Goodness of fit**

According to the Wald test for the overall significance of the models none of the models using change in growth as the dependent variable are significant. The explanatory power of
the models is relatively low compared to models (1) - (5), as the model only explains between 2.5 to 6.2 % of the changes in the GDP growth rate. The model excluding the control variables is just as in regressions (1) and (4) the least appropriate according to the R² and the Wald test.

There are several explanations behind why change in growth is unaffected by debt relief. It is possible that debt relief simply does not have a significant effect on the change in growth at all, and that the negative relationship between growth and debt relief in (2), (4) and (5) is spurious caused by the actuality that debt relief is usually given to poorer countries with lower growth. It is also possible that factors affecting the relationship are excluded, which causes biased results. The change in growth especially in the HIPCs has been very volatile and there are a large number of variables affecting the change in growth from one year to another. The R² is much smaller than the squared correlation coefficient of debt relief and the interaction term, which could signify problems with multicollinearity. The debt relief term in regression (8) is again not significant when the interaction term is omitted, indicating that the insignificance of the coefficient is not caused by multicollinearity.
8.1.3 GDP growth and lags

Another way of testing if debt relief has an effect on the change in growth is by moving the lag of GDP growth to the right hand side in the model. The model is estimated using pooled OLS and the results are presented in Table 6 below.

Table 6. Annual GDP growth with lags included, 1995-2008

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth -1</td>
<td>0.396***</td>
<td>0.395***</td>
<td>0.422***</td>
<td>0.419***</td>
</tr>
<tr>
<td></td>
<td>(5.9)</td>
<td>(5.91)</td>
<td>(5.81)</td>
<td>(5.83)</td>
</tr>
<tr>
<td>Debt Relief</td>
<td>-0.004</td>
<td>-0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.49)</td>
<td>(-0.187)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt Relief -1</td>
<td>-0.021</td>
<td>-0.020</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.46)</td>
<td>(-1.25)</td>
<td></td>
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<tr>
<td>Debt Relief * WGI</td>
<td>0.036</td>
<td>0.092**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.12)</td>
<td>(2.28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt Relief -1 * WGI</td>
<td>0.067***</td>
<td>0.108***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.89)</td>
<td>(4.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>0.071**</td>
<td>0.071**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.33)</td>
<td>(2.39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>0.038***</td>
<td>0.039***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.2)</td>
<td>(3.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Growth</td>
<td>0.570**</td>
<td>0.562**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.29)</td>
<td>(2.23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>-0.041</td>
<td>-0.036</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.72)</td>
<td>(-1.53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WGI</td>
<td>0.482</td>
<td>0.497</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.19)</td>
<td>(1.22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>3.489***</td>
<td>3.506***</td>
<td>1.511</td>
<td>1.519</td>
</tr>
<tr>
<td></td>
<td>-5.14</td>
<td>(5.15)</td>
<td>(1.43)</td>
<td>(1.43)</td>
</tr>
<tr>
<td>R²</td>
<td>0.28</td>
<td>0.28</td>
<td>0.31</td>
<td>0.31</td>
</tr>
<tr>
<td>Wald test</td>
<td>38.31***</td>
<td>69.54***</td>
<td>100.4***</td>
<td>130.4***</td>
</tr>
<tr>
<td>No. of observations</td>
<td>807</td>
<td>807</td>
<td>591</td>
<td>591</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.

In regression (9) with only lagged GDP growth, debt relief effect and the interaction variable are both variables of interest insignificant. The debt relief coefficient is negative and the interaction term positive as in most previous regressions. When the lagged variables of debt relief and the institutional variable are used instead of the present variables, the
results change slightly. The lagged interaction term is positive and significant, again indicating that debt relief has a positive effect on growth conditional on the institutional quality. Lagged debt relief has a significant negative effect on growth, but the coefficient is much smaller than the interaction term coefficient.

The interaction term is significantly positive when the control variables are included in the models with both present debt relief and interaction or lagged terms. The debt relief effect is negative and insignificant in both models.

The lagged GDP growth is highly significant and positive in all models. The other control variables investment, terms of trade changes and population growth are all significantly positive in the regression with the present terms, like in regressions (2), (3) and (5). Foreign aid is again significantly negative and WGI is insignificant. Only lagged GDP and terms of trade change is significant in the regression with lagged debt relief and interaction term.

**Goodness of fit**

The model is clearly significant according to the Wald test. $R^2$ is also much higher than in the responding previous models. The model now explains between 28 to 31 % of the changes in GDP growth and the presence of multicollinearity between debt relief and the interaction variable thus seems less likely. The explanatory power of the model is higher when the control variables are included and the Wald test statistic further confirms that models (11) and (12) are superior to (9) and (10).

Despite producing significant results and a high $R^2$, the model has some severe problems. When adding a lag of the dependent variable the assumption that the independent variables are uncorrelated with the individual effect does not hold any more. The lagged variable is endogenous and correlation between the lagged variable and the residual thus causes negatively biased estimators. A more appropriate estimator for evaluating the effect of debt relief on growth with lags included is the General Method of Moments (GMM) estimator (Verbeek, 2008).
8.2 Robustness tests

The robustness of the results to a change in the institutional index is evaluated in this section by exchanging the WGI index to the Index of Economic Freedom (IEF). Regressions using GDP growth and change in growth as dependent variables are re-run with the alternative interaction variable. All the control variables are included in the models, as the previous tests confirmed that the control variables markedly improved the models. The results are presented below in Table 7.

Table 7. GDP growth and change in growth using IEF index, 1995-2008

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>GDP growth (13)</th>
<th>Change in growth (15)</th>
<th>GDP growth with lags (17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth -1</td>
<td>-0.056***</td>
<td>-0.027*</td>
<td>0.293***</td>
</tr>
<tr>
<td></td>
<td>(-3.02)</td>
<td>(-1.67)</td>
<td>(3.91)</td>
</tr>
<tr>
<td>Debt Relief</td>
<td>0.004***</td>
<td>0.003**</td>
<td>0.291***</td>
</tr>
<tr>
<td></td>
<td>(4.02)</td>
<td>(2.41)</td>
<td>(3.88)</td>
</tr>
<tr>
<td>Debt Relief * IEF</td>
<td>0.144***</td>
<td>0.144***</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(3.68)</td>
<td>(3.68)</td>
<td>(0.22)</td>
</tr>
<tr>
<td>Investment</td>
<td>0.019*</td>
<td>0.019*</td>
<td>0.027**</td>
</tr>
<tr>
<td></td>
<td>(1.82)</td>
<td>(1.8)</td>
<td>(2.21)</td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>0.988***</td>
<td>-0.178</td>
<td>0.650***</td>
</tr>
<tr>
<td></td>
<td>(3.63)</td>
<td>(-1.5)</td>
<td>(3.09)</td>
</tr>
<tr>
<td>Population Growth</td>
<td>0.011</td>
<td>0.007</td>
<td>0.259***</td>
</tr>
<tr>
<td></td>
<td>(0.37)</td>
<td>(0.25)</td>
<td>(1.27)</td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>0.013</td>
<td>0.012</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.37)</td>
<td>(0.34)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Debt Relief -1</td>
<td>-0.054***</td>
<td>-0.019</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>(-3.12)</td>
<td>(-1.33)</td>
<td>(1.21)</td>
</tr>
<tr>
<td>Debt Relief -1 * IEF</td>
<td>0.005***</td>
<td>0.002**</td>
<td>0.004***</td>
</tr>
<tr>
<td></td>
<td>(4.47)</td>
<td>(2.17)</td>
<td>(3.96)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.213</td>
<td>2.343</td>
<td>-0.218</td>
</tr>
<tr>
<td></td>
<td>(-0.44)</td>
<td>(1.45)</td>
<td>(-0.10)</td>
</tr>
<tr>
<td>R²</td>
<td>0.198</td>
<td>0.199</td>
<td>0.281</td>
</tr>
<tr>
<td>Wald test</td>
<td>49.38***</td>
<td>24.28***</td>
<td>102.7***</td>
</tr>
<tr>
<td>No. of observations</td>
<td>727</td>
<td>730</td>
<td>724</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.
The results obtained are all in line with the results obtained from the previous regressions. The debt relief effect is negative both as such as when lagged. The variable is significant in all regressions except in (16). The coefficient sizes for the present and lagged debt relief variables are almost of the same size, indicating that the effect is quite similar both years. The interaction term is positive and significant in all regressions. The size of the coefficient varies between 0.002 and 0.005, but does not vary significantly when exchanged for the lagged variable.\textsuperscript{14}

It is notable that the debt relief effects on the change in growth are significant, contrary to the results in (6) – (8). This result thus undermines the hypothesis that debt relief would have no effect on growth, and debt relief in poor quality institutions seems to have a negative effect also on the change in growth.

Investment and change in terms of trade have a positive effect on growth, and they are significant in all regressions except for (15) and (16) where investment is clearly insignificant. Population growth is also insignificant in these regressions, but significantly positive in the other tests. Interesting is also that foreign aid is positive in all regressions and even significant in (15) and (16). This outcome is contrary to the results obtained in previous models, where the foreign aid effect was found to be insignificantly negative. The institution variable is positive in the regressions using GDP growth as endogenous variable, and negative when change in growth is used. The variable is nevertheless insignificant in all regressions, just like the WGI. The Wald test confirms that the models are appropriate and the $R^2$ is also in line with the values from earlier regressions.

The use of a different institutional quality index confirms that the results are not dependent on a particular institutional index, but similar results can be obtained by using a different index. When comparing the Wald statistics it seems like the IEF is a more appropriate instrument for estimating the effect of the interaction between debt relief and institutional

\textsuperscript{14} Note that the sizes of different interaction coefficients cannot be compared due to different scales on the institution indices. The WGI ranges between -2.5 and 2.5, and the IEF between 0 and 100.
quality on the difference in growth. The difference between the models when using GDP growth as dependent variable is however not substantial, even though the results obtained from regressions (13) to (18) were more significant in general. These results verify that the institutional quality index is an appropriate instrument for estimating the effect of debt relief conditional on the institutional quality.

### 8.3 Autocorrelation

Another problem when dealing with time series and panel data is autocorrelation. Wooldridge (2009) defines autocorrelation, also called serial correlation, as “correlation between the errors in different time periods”. Regressions (1) to (8) seem to have problems with autocorrelation according to the AR (1) test\(^{15}\) for first order autocorrelation presented in Table 8. Models (9) to (12) appear not to have serially correlated errors.

<table>
<thead>
<tr>
<th>Table 8. Autocorrelation tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>GDP growth</td>
</tr>
<tr>
<td>(1)</td>
</tr>
<tr>
<td>(2)</td>
</tr>
<tr>
<td>(3)</td>
</tr>
<tr>
<td>(4)</td>
</tr>
<tr>
<td>(5)</td>
</tr>
<tr>
<td>Change in Growth</td>
</tr>
<tr>
<td>(6)</td>
</tr>
<tr>
<td>(7)</td>
</tr>
<tr>
<td>(8)</td>
</tr>
<tr>
<td>Growth with lags</td>
</tr>
<tr>
<td>(9)</td>
</tr>
<tr>
<td>(10)</td>
</tr>
<tr>
<td>(11)</td>
</tr>
<tr>
<td>(12)</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.

\(^{15}\) Verbeek (2008) provides more information about the AR(1) test.
Wooldridge (2009) suggest using the Generalized Least Squares (GLS) estimators instead of the OLS to correct for serial correlation in the error terms. The regressions (2), (3), (5), (7) and (8), all including control variables, are re-estimated using GLS. The results are reported in Table 9.

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Annual GDP Growth</th>
<th>Change in growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2a)</td>
<td>(3a)</td>
</tr>
<tr>
<td>Debt Relief</td>
<td>-0.014</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(-0.50)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>Debt Relief * WGI</td>
<td>0.077</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.99)</td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>0.076***</td>
<td>0.067**</td>
</tr>
<tr>
<td></td>
<td>(2.98)</td>
<td>(2.56)</td>
</tr>
<tr>
<td>Terms of trade change</td>
<td>0.027**</td>
<td>0.026*</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(1.94)</td>
</tr>
<tr>
<td>Population Growth</td>
<td>0.906***</td>
<td>0.741***</td>
</tr>
<tr>
<td></td>
<td>(3.56)</td>
<td>(2.83)</td>
</tr>
<tr>
<td>Foreign Aid</td>
<td>-0.009</td>
<td>-0.008</td>
</tr>
<tr>
<td></td>
<td>(-0.41)</td>
<td>(-0.33)</td>
</tr>
<tr>
<td>WGI</td>
<td>1.732***</td>
<td>1.390**</td>
</tr>
<tr>
<td></td>
<td>(3.22)</td>
<td>(2.51)</td>
</tr>
<tr>
<td>Debt Relief -1</td>
<td>-0.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.41)</td>
<td></td>
</tr>
<tr>
<td>Debt Relief -1* WGI</td>
<td>0.074</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.939***</td>
<td>3.348***</td>
</tr>
<tr>
<td></td>
<td>(2.69)</td>
<td>(3.00)</td>
</tr>
<tr>
<td>Wald test</td>
<td>40.78***</td>
<td>28.06***</td>
</tr>
<tr>
<td></td>
<td>22.32***</td>
<td>21.68***</td>
</tr>
<tr>
<td>Autocorrelation</td>
<td>1.39</td>
<td>1.93*</td>
</tr>
<tr>
<td></td>
<td>-1.57</td>
<td>-1.53</td>
</tr>
<tr>
<td>No. of observations</td>
<td>594</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>596</td>
<td>602</td>
</tr>
</tbody>
</table>

Note: *** denotes significant at 1 %, ** at 5 % and * at 10 %.

Neither the debt relief term nor the interaction term is significant in any of the regressions estimated with GLS. The lagged variables are also insignificant. The coefficients for debt relief are negative in regression (2) and (5), and positive in the rest. The interaction term is
still positive in all regressions. The same regressions are run using the IEF index in the interaction variable instead of the WGI, but the results do not vary markedly and are thus not reported.

All the control variables except for foreign aid are positive and significant in regressions (2), (3) and (5) where the annual GDP growth is used as the dependent variable. In regressions (7) and (8) change in terms of trade is the only significant variable. Contrary to the previous results attained in this study, are the signs of investment and population growth negative though insignificant.

The models are not miss-specified according to the Wald test statistic. The series are also tested for first order autocorrelation. Regression (2) could still reject the null-hypothesis of no autocorrelation at a 10 % significance level, but none of the other regressions have serially correlated errors.

Thus, when controlling for autocorrelation, the debt relief effect and the effect conditional on the institutional quality seem to be insignificant. Nevertheless, the positive autocorrelation statistics could occur due to miss-specifications caused by omitted variables such as delayed effects of the variables. (Verbeek, 2008) As the debt relief effect is delayed, (as seen in regressions (4), (5) (11) and (12)), one could expect the debt relief effect in a previous period to show up in the error term and thus turn out as autocorrelation. When the delayed debt relief effect is controlled for when using GLS, the debt relief effect is consequently controlled for and the effect disappears. Interestingly are only the variables including debt relief insignificant when using the GLS, which supports the suggestion that the autocorrelation is caused by the delayed debt relief effect. The errors in the models including lagged GDP growth are not serially correlated either, which supports the inclusion of lags further. If autocorrelation is caused by delayed debt relief the estimators are not necessarily misleading, but lagged variables should be included in the model. This however requires a dynamic panel data model such as a GMM model, which is beyond the scope of this thesis. (Verbeek, 2008)
8.4 Discussion

Debt relief does not have a positive effect on growth in all institutional environments according to the results in this study. The debt relief effect is significantly positive in economies with functioning institutions, but is absent or even negative in economies with poor institutions. These results are in line with previous studies analyzing the debt relief effect, and are also in line with the outcome of studies focusing on aid effectiveness. Previous studies have found that aid as such does not have an effect on growth, but the effect is positive in good quality institutions. As debt relief could be seen as a form of foreign aid, one could expect the properties to behave similarly.

The models using GDP growth as dependent variable seem to be more appropriate than the one using change in growth, which is based on the higher and significant Wald test statistic and R². Furthermore, the models including lagged growth seem more appropriate as they do not show evidence of autocorrelation. Nevertheless, the models have some problems, as the lagged variable could be correlated with the error term and thus produce biased estimators.

There are many reasons why the debt relief does not have an effect on growth in all institutional environments. As Easterly (2003) said, is debt relief a two-sided instrument. Debt relief is on the one hand intended to help the poor out of their debt spiral and poverty trap, but is on the other hand a way of rewarding the most irresponsible governments. Debt relief to irresponsible governments increases moral hazard, rewards irresponsible policies and encourages further debt accumulate for the future, rather than helping the countries out of their debt spiral. This could even have negative consequences for growth. If a country defaults on a loan the debt is restructured and the repayment is moved forward in time. However, the repayment probability of the restructured debt is rather low in some of the countries. If the debt was never to be repaid in the first place then the direct effect of debt relief would be nonexistent and the growth effect limited. The economy should nevertheless benefit from having the debt distortion removed from their balance sheet, but if investors expect the country to rapidly accumulate debt again the increase in investment may not occur.
Debt relief increases the domestic credit supply and availability and restores investor incentives. One of the purposes of debt relief is to reduce the debt level to a sustainable level to enable the country to attract capital and investments. If the new credit inflow is not employed in profitable and responsible investment projects and the countries take on excessive debt again, a relapse back to a debt overhang is very likely. The growth enhancing effect is subsequently destroyed by the negative effects of debt overhang. This conjecture is in line with the studies that have found that debt relief is positively correlated with increasing debt. Even though the economy is run by a responsible government but the institutional quality is poor, the economy does not have the basic infrastructure and preconditions necessary to utilize the economic opportunities arising from debt relief.

Debt relief is nevertheless significantly positive in good quality institutional environments. A lower debt level restores the investor incentives and confidence in the economy. If the country has functioning institutions and a healthy social infrastructure, the country can utilize the benefits of a sustainable debt level and experience profitable and productive investments. The increase in investment helps the country to increase economic growth and possibly “take off” from poverty. Irresponsible governments are more likely eradicated from power in a good institutional environment, which enhances the growth effect further.

The debt relief effect is distributed over a number of years according to the results obtained in the analysis. The short run effects are the improved investment incentives, which are present still a couple of years after the debt relief, given that the country does not accumulate a huge debt burden again. Debt relief is supposed to help the country out of a debt spiral and should elevate the countries from slowly developing to an emerging economy in the long run.
9. Summary and conclusion
The aim of this study is to investigate whether debt relief in HIPC countries has had any effect on economic growth, conditional on the institutional quality. Burnside and Dollar (1997) provided a pioneering study of the effect of aid conditional on the institutional quality in 1997, that served as an initiator for studies of the relationship between aid and institutional quality. The growth effect of debt relief conditional on the institutional quality has nevertheless not been studied recently.

This study finds no evidence supporting the hypothesis that debt relief would have a positive effect on growth in all institutional environments. If the institutional quality is high the debt relief effect is positive, otherwise nonexistent or even negative. The results are furthermore robust to a change in the institutional index. Both effects are nevertheless insignificant when regressions (1) – (8) are corrected for autocorrelation, but the serial correlation seems to be caused by the lagged effect of debt relief and GDP growth. The serial correlation is therefore not necessarily a problem, but the results should be interpreted with caution. The error terms in regressions (9) – (12) are not serially correlated and the models produce results verifying that the debt relief effect is significantly positive conditional on the institutional quality. The debt relief effect is again absent or even negative in countries with poor institutions.

As debt relief to countries with non-functioning institutions does not promote economic development, the HIPC Initiative and the MDRI should be reformed to only grant debt relief to countries after they reach a certain level of institutional functionality. More effort should be concentrated on improving policies and institutions before granting debt relief to countries unable to efficiently use it, as previous studies have shown that debt relief does not improve the institutional quality in an economy. Considering that the poorest countries usually do not have the most developed institutions, is debt relief not the most efficient mechanism for promoting development and reduce poverty. If the richest countries would be sincerely interested in helping the poorest countries out of their poverty trap, then removing the gigantic agricultural subsidies given to the first world farmers could be a more efficient way of promoting growth in the third world.
9.1 Shortcomings of the study and suggestions for further research

There is always a risk of excluding some of the explanatory variables which creates inconsistent estimators. Considering the variety of the countries included in the study, it is very likely that some of the factors that explain the growth or the change in GDP growth in some particular country are not included. The inclusion of lags seems to be necessary as well. The autocorrelation test and the relatively low $R^2$ support these hypotheses.

The debt relief effect seems to be delayed and dispersed over a number of years according to the results in this study. To capture the long term effect of debt relief the delayed effect of debt relief should be added to the model. The analysis could be expanded by using a dynamic panel model, which allows for the inclusion of lagged variables of both the dependent and independent variables. A dynamic model would also reduce some of the misspecification problems mentioned in this study.

A recurrent problem when analyzing developing countries is the data reliability and availability. Some of the data observations are based partly on estimations done by the World Bank due to a low trustworthiness of the original reporters. Some countries are excluded completely from the study due to missing data. A longer time period would most likely provide more trustworthy results, but the time period in this study is limited by the institutional indices. The CPIA index constructed by the World Bank goes back to the 1970’s and is constructed for all the poorest countries as well. This index is unfortunately confidential, but if available it could be used to perform the analysis on a longer time period. A longer time series would produce more reliable and robust results.

The debt relief effect conditional on the institutional quality seems not to be dependent on the particular type of institution index used. It would nevertheless be interesting to identify which dimension of the institutional quality that has the greatest negative growth hampering effect, i.e. the most important channel through which the debt relief effect is disturbed. When identified, enhanced efforts to remedy that particular institutional feature could improve the conditions for growth through debt relief or aid.
10. Svensk sammanfattning

10.1 Introduktion


10.2 Bakgrund till skuldavskrivningar
Under de senaste årtionden har flera försök gjorts för att hjälpa upp utvecklingsländerna ur deras fattigdomsklyfta. Skuldavskrivningsprogrammet HIPC som drivs av Världsbanken och IMF, grundades för att befria de fattigaste och mest skuldsatta länderna ifrån deras skuldbörda. För att antas till programmet måste ett land uppfylla ett antal kriterier, som en

10.3 Teori


ur fattigdomsklyftan är starka investeringsincitament, vilket kräver en utvidgning av den existerande marknaden genom kapitalinvesteringar. Skuldavskrivningar återställer investeringsincitamenten och ökar därmed investeringsnivån, vilket borde hjälpa utvecklingsländerna ur fattigdomscirkeln.

10.3.1 Förhållandet mellan tillväxt och statsskuld

10.3.2 De potentiella skuldavskrivningseffekterna

Skuldavskrivningar kan ha både positiva och negativa ekonomiska konsekvenser. De positiva effekterna är trovärdigare statsfinanser, bättre investeringsincitament och en förbättrad återbetalningsmöjlighet på återstående lån. De negativa följderna är en ökning i moral hasard och en återkommande ökning i statsskulden.

Enligt god bokföringssed hör det till att skriva av skulder som inte kommer att återbetalas. Detta gör statsfinanserna trovärdigare, och landet kan bli beviljade lån på sunda villkor i framtiden. (Sachs & Huizinga, 1987) En avskrivning av skulder återställer även investeringsincitamenten och ökar kapitalstocken eftersom de privata investerarna förväntar sig lägre skatter och den offentliga sektorn har även större möjligheter att genomföra statliga investeringsprojekt. Ökade investeringar torde leda till enökning i tillväxt, vilket även inverkar positivt på landets återbetalningsförmåga och förväntningar på betalning av de återstående skulder. (Henry & Arslanalp, 2003)


Det finns dock ett antal utvecklingsekonomer som anser att skuldavskrivningar inte påverkar tillväxten positivt. Ifall skulden inte skulle ha betalats tillbaka på grund av begränsade betalningsmöjligheter, är den ekonomiska effekten av skuldavskrivningen begränsad. I sådana fall är den största effekten en upprensning i statsfinanserna. (Vaessen & Cassimon, 2007)


10.3.3 Institutionernas inverkan på skuldavskrivningseffekten

10.4 Tidigare forskning


Även Pattillo et al. (2002) konstaterade att statsskulden har en signifikant negativ inverkan på tillväxten då skuldnivån överstiger en viss nivå, och att utvecklingsländerna överstigit


10.5 Presentation av datamaterialet

16 Klassificeringen är gjord av Världsbanken enligt ländernas BNI per capita år 2009.
10.5.1 Val av variabler

Denna studie använder årlig BNP-tillväxt och förändringen i BNP-tillväxt som beroende variabler. Eftersom skuldavskrivningar vanligtvis beviljas till fattiga länder med låg tillväxt finns det en risk för att det uppstår en negativ skenkorrelation mellan tillväxt och skuldavskrivningar. För att undersöka hur avskrivningar påverkar förändringen i tillväxt kommer även förändringen i tillväxt att användas som beroende variabel.


Tabell 10. Deskriptiv statistik

<table>
<thead>
<tr>
<th></th>
<th>Genomsnitt</th>
<th>Standardavvikelse</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNP-tillväxt</td>
<td>3,67</td>
<td>6,90</td>
<td>106,28</td>
<td>-51,03</td>
</tr>
<tr>
<td>Förändring i tillväxt</td>
<td>0,06</td>
<td>7,16</td>
<td>94,16</td>
<td>-76,58</td>
</tr>
<tr>
<td>Skuldavskrivning/BNP</td>
<td>2,07</td>
<td>7,48</td>
<td>121,17</td>
<td>0,00</td>
</tr>
<tr>
<td>Skuldavskrivning *WGI</td>
<td>0,73</td>
<td>3,07</td>
<td>33,47</td>
<td>0,00</td>
</tr>
<tr>
<td>Investeringar/BNP</td>
<td>21,76</td>
<td>9,40</td>
<td>71,84</td>
<td>-23,76</td>
</tr>
<tr>
<td>Förändring i bytesförhållande</td>
<td>0,54</td>
<td>13,07</td>
<td>101,62</td>
<td>-62,29</td>
</tr>
<tr>
<td>Befolkningstillväxt</td>
<td>2,02</td>
<td>1,32</td>
<td>11,18</td>
<td>-8,27</td>
</tr>
<tr>
<td>Bistånd/BNP</td>
<td>10,91</td>
<td>12,01</td>
<td>148,41</td>
<td>-0,66</td>
</tr>
<tr>
<td>WGI</td>
<td>-0,65</td>
<td>0,50</td>
<td>0,59</td>
<td>-2,19</td>
</tr>
</tbody>
</table>

17 Skuldavskrivningarna divideras här med BNP per capita.
18 Investeringar och bistånd är båda dividerade med BNP.
Variablerna är testade för stationäritet med ett ADF-test. Alla serier är stationära på en 10 % signifikansnivå, och alla variabler förutom institutionsindexet är stationära på en 1 % signifikansnivå. Serierna är även testade för multikollinearitet med hjälp av en korrelationsmatris. Eftersom inga variabler är perfekt eller högt korrelerade finns det inga tecken på hög multikollinearitet.

Dock är det viktigt att notera att datatillförlitligheten är något begränsad. Alla länder har inte tillräcklig kapacitet att samla in data, och de flesta länder har dessutom en stor inofficiell ekonomisk sektor. En stor del av varorna produceras i hushållen och utbytes på informella marknader eller via sociala nätverk, vilket påverkar den nationella bokföringens tillförlitlighet.

10.6 Metodik och den ekonometriska modellen

Denna studie använder paneldata för att estimera effekten av skuldavskrivningar på BNP-tillväxt. Eftersom det finns en möjlighet att effekten är något fördröjd finns det skäl att använda tidsseriedata och då jag även vill undersöka ifall den institutionella kvaliteten i utvecklingsländerna påverkar effekten kommer jag även att använda tvärsnittsdata i studien. Därför är en paneldatastudie den mest lämpliga i detta fall. Jag använder en sammanslagen (poolad) OLS modell, som är en vanlig regressionsmodell med både tidsserie- och tvärsnittseegenskaper.

Tre olika modeller används för att analysera skuldavskrivningarnas effekt. I den första ekvationen (7) regresseras BNP-tillväxt $g_{lt}$ på skuldavskrivningar $d_{lt}$, interaktionsvariabeln som kombinerar skuldavskrivningar och institutionsindexet, $d_{lt} * P_{lt}$ och kontrollvariablerna. $\varepsilon_{lt}$ är en lands- och tidsspecifik felterm och $\beta_1$ en konstant.

$$g_{lt} = \beta_1 + \beta_2 d_{lt} + \beta_3 (d_{lt}P_{lt}) + \beta_4 X_{1lt} + \cdots + \beta_{3+k} X_{ktlt} + \varepsilon_{lt}$$  (7)

I ekvation (8) används förändringen i tillväxt $g_{lt} - g_{lt-1}$ som beroende variabel. Alla övriga variabler är oförändrade.

$$g_{lt} - g_{lt-1} = \beta_1 + \beta_2 d_{lt} + \beta_3 (d_{lt}P_{lt}) + \beta_4 X_{1lt} + \cdots + \beta_{3+k} X_{ktlt} + \varepsilon_{lt}$$  (8)
I ekvation (9) är tillväxten i föregående period \( g_{it-1} \) förflyttad till högra sidan av ekvationen. BNP-tillväxt är modells beroende variabel. De resterande variablerna är oförändrande.

\[
g_{it} = \beta_1 + \beta_2 d_{it} + \beta_3 (d_{it}p_{it}) + \beta_4 g_{it-1} + \beta_5 X_{it} + \cdots + \beta_{4+k} X_{kit} + \varepsilon_{it} \quad (9)
\]

I alla modeller testas även den tidsfördröjda effekten av skuldavskrivningar och interaktionsvariablen.

### 10.7 Resultatredovisning

De viktigaste resultaten presenteras nedan i stycke 10.7.1. Resultatens robusthet testas även och regressionerna testas för autokorrelation. De regressioner som har problem med autokorrelation estimeras med hjälp av Generalised Least Squares (GLS) metoden.

#### 10.7.1 Resultat från regressionerna

Koefficienterna från de viktigaste regressionerna med motsvarande panelrobusta t-värden i parentes är presenterade i Tabell 11 på följande sida. Variablerna av intresse är svärtade. Förklaringsgraden \( R^2 \) och Wald-testet för modellens lämplighet är även presenterade i tabellen. Eftersom data fattas för vissa tidpunkter för ett antal länder varierar antalet observationer mellan 591 och 812. Tidsdummyvariabler är även inkluderade i regressionerna men är inte rapporterade i tabellen.
### Tabell 11. Resultat

<table>
<thead>
<tr>
<th>Beroende variabel</th>
<th>BNP-tillväxt</th>
<th>Förändring i tillväxt</th>
<th>BNP-tillväxt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(5)</td>
</tr>
<tr>
<td>Skuldavskrivningar</td>
<td>-0,036*</td>
<td>0,012</td>
<td>0,036*</td>
</tr>
<tr>
<td></td>
<td>(-1,88)</td>
<td>(0,664)</td>
<td>(1,75)</td>
</tr>
<tr>
<td>Skuldavskrivn. * WGI</td>
<td><strong>0,186</strong>***</td>
<td>(-0,031)</td>
<td><strong>0,092</strong>**</td>
</tr>
<tr>
<td></td>
<td>(3,68)</td>
<td>(-0,73)</td>
<td>(2,28)</td>
</tr>
<tr>
<td>Investeringar /BNP</td>
<td>0,13***</td>
<td>0,117***</td>
<td>0,129***</td>
</tr>
<tr>
<td></td>
<td>(3,48)</td>
<td>(3,03)</td>
<td>(3,46)</td>
</tr>
<tr>
<td>Förändring i bytesförhållande</td>
<td>0,038***</td>
<td>0,033**</td>
<td>0,04***</td>
</tr>
<tr>
<td></td>
<td>(2,58)</td>
<td>(2,19)</td>
<td>(2,73)</td>
</tr>
<tr>
<td>Befolkningstillväxt</td>
<td>1,009***</td>
<td>0,847***</td>
<td>1,003***</td>
</tr>
<tr>
<td></td>
<td>(2,8)</td>
<td>(2,06)</td>
<td>(2,77)</td>
</tr>
<tr>
<td>Bistånd/BNP</td>
<td>-0,049</td>
<td>-0,053</td>
<td>-0,045</td>
</tr>
<tr>
<td></td>
<td>(-1,52)</td>
<td>(-1,58)</td>
<td>(-1,43)</td>
</tr>
<tr>
<td>WGI</td>
<td>0,701</td>
<td>0,310</td>
<td>0,739</td>
</tr>
<tr>
<td></td>
<td>(1,2)</td>
<td>(0,45)</td>
<td>(1,27)</td>
</tr>
<tr>
<td>Skuldavskrivn. -1</td>
<td><strong>-0,041</strong>**</td>
<td>(-2,34)</td>
<td></td>
</tr>
<tr>
<td>Skuldavskrivn. -1 * WGI</td>
<td><strong>0,168</strong>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4,85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNP-tillväxt -1</td>
<td>1,607</td>
<td>2,092</td>
<td>1,630</td>
</tr>
<tr>
<td></td>
<td>(1,29)</td>
<td>(1,55)</td>
<td>(1,3)</td>
</tr>
<tr>
<td>Konstant</td>
<td>0,191</td>
<td>0,151</td>
<td>0,193</td>
</tr>
<tr>
<td></td>
<td>(0,51)</td>
<td>(0,80)</td>
<td>(0,51)</td>
</tr>
<tr>
<td>R²</td>
<td>38,81***</td>
<td>20,84***</td>
<td>48,05***</td>
</tr>
<tr>
<td></td>
<td>(5,81)</td>
<td>(5,83)</td>
<td>(5,83)</td>
</tr>
<tr>
<td>Wald-test</td>
<td>959</td>
<td>600</td>
<td>594</td>
</tr>
<tr>
<td>Antal observationer</td>
<td>594</td>
<td>600</td>
<td>594</td>
</tr>
</tbody>
</table>

*** indikerar signifikans på en 1 % nivå, ** på 5 % och * på 10 %.

Enligt resultaten i regression (2) och (5) har både skuldavskrivningar samma år och det föregående året en signifikant negativ inverkan på tillväxten. När interaktionsvariabeln exkluderas från modellen blir skuldavskrivningsvariabeln positiv, men inte signifikant. Detta motsvarar även resultat som tidigare studier kommit till vid analys av biståndets inverkan på tillväxten. I regression (7), med förändring i tillväxt som beroende variabel, är variabeln signifikant positiv, men denna effekt försvinner i regression (8) då
interaktionsvariabeln exkluderas. Igen tycks skuldsavskrivningar oberoende av den
institutionella miljön inte ha en positiv inverkan på tillväxten. Då förra årets tillväxttakt,
BNP-tillväxt -1, inkluderas i modellen är effekterna av både skuldsavskrivningar i samma
eller tidigare period negativa men inte signifikanta.

Interaktionsvariabeln (skuldsavskrivningar gånger institutionsindexet), har en signifikant
positiv inverkan i alla regressionsmodeller med tillväxt som beroende variabel. Detta motsvarar
even de resultat som forskning om biståndets inverkan på tillväxten i en fungerande
institutionsmiljö kommit fram till. Även de tidsfördröjda effekterna är signifikant positiva. I
regressionerna med förändring i tillväxt som beroende variabel är dock
interaktionsvariabeln negativ men inte signifikant. Dock är förklaringsgraden mycket låg
för regressionerna (7) och (8), endast lite på 6 %, och även Wald-testet tyder på att
modellen är felspecificerad. De andra modellerna har en förklaringsgrad mellan 15 och
31 %, och Wald-testet för modellens lämplighet tyder också på att modellerna är passande.
Regressionerna med tillväxt tycks alltså vara bättre modeller för att testa ifall
skuldsavskrivningar påverkar BNP-tillväxt. Namnsvärt är dock att även om regressionerna
(11) och (12) enligt Wald-testet verkar vara de lämpligaste modellerna har dessa modeller
ett stort problem. Den tidsfördröjda effekten av BNP-tillväxt kan vara korrelerad med
feltermen och därmed orsaka snedvridna parametrar. Resultaten från regressionerna (11)
och (12) bör därför tolkas med stor försiktighet.

Kontrollvariablerna investeringar och befolkningstillväxt har båda en signifikant positiv
inverkan på tillväxten i regressionerna med tillväxt som beroende variabel, medan de i
regressionerna (7) och (8) är negativa och insignifikanta. Förändringen i bytesförhållandet
mellan export och importprodukter påverkar tillväxten signifikant positivt i alla
regressioner, vilket även tidigare studier kommit fram till. Biståndet har inte en signifikant
negativ inverkan på tillväxten, vilket även flera andra undersökningar konstaterat.
Institutionsindexets inverkan är positiv men insignifikant. Förändringen i BNP-tillväxt den
föregående perioden har en signifikant positiv inverkan på tillväxten. Regressionerna har
gjorts även utan kontrollvariablerna. Resultaten förändras inte namnvärt, men eftersom
modellerna har en mycket mindre förklaringsgrad och är mindre lämpliga enligt Wald-testen, rapporteras de inte här i sammanfattningen.

10.7.2 Robusthetstest och autokorrelation
Resultatens robusthet testas genom att byta ut WGI institutionsindexet mot Heritage stiftelsens ekonomiska frihetsindex. Resultaten från regressionerna blir mera signifikanta och modellerna är passande enligt Wald-testet. Skuldavskrivningar har en signifikant negativ inverkan på tillväxten i alla regressioner förutom (8), och interaktionsvariabeln är signifikant positiv i alla regressioner. Resultaten tycks följaktligen vara konsekventa även vid byte av institutionsindex och även dessa resultat tyder på att skuldavskrivningar endast har en positiv inverkan på tillväxten i ekonomer med fungerande institutioner.


10.7.3 Diskussion
Det finns flera orsaker till varför skuldavskrivningar har en negativ inverkan på tillväxten i ekonomier med dåliga institutioner. Eftersom en del av skuldavskrivningarna går till lån
som ändå inte skulle ha betalats tillbaka på grund av begränsade återbetalningsmöjligheter, kan det vara en orsak till att tillväxteffekten uteblir. Ökningen i moral hasard orsakar en ansvarslös ekonomisk politik och en ökad statsskuld, vilket kunde ha negativa konsekvenser för tillväxten.

I ekonomier med fungerande institutioner är skuldavskrivningseffekten däremot positiv. En lägre statsskuld ökar inflödet av kapital och återställer investeringsincitamenten i ekonomin. Detta ökar investeringarna, vilket torde ha en positiv effekt på tillväxten.

**10.8 Avslutning**


Med tanke på fortsatta skuldavskrivningar för fattiga länder kan följande slutsats dras: Innan skuldavskrivningar beviljas borde större krav ställas på en förbättrad institutionell kvalitet. Eftersom de allra fattigaste länderna vanligtvis är de med de sämsta institutionerna är skuldavskrivningar inte nödvändigtvis det lämpligaste instrumentet för att få bukt på fattigdomen. Mera ansträngningar borde istället koncentreras på att förbättra institutionerna, eftersom de är en förutsättning för att bistånd och skuldavskrivningar skall fungera.
Bibliography


Abbreviations:

ADF – Augmented Dickey Fuller
BNI - Bruttonationalinkomst
BNP – Bruttonationalprodukt
CPIA – Country Policy and Institution Assessment
GDP – Gross Domestic Product
GLS – Generalized Least Squares
GMM – Generalized method of moments
GNI – Gross National Income
HIPC – Highly Indebted Poor Countries
IDA – International Development Association
IEF – Index of Economic Freedom
IMF – The International Monetary Fund
LDCs – Least developed Countries
LIC – Low Income Country
MDG - Millennium Development Goals
MDRI – Multilateral Debt Relief Initiative
OLS – Ordinary Least Squares
PRSP - Poverty Reduction Strategy Paper
UNCTAD – United Nations Conference on Trade and Development
WGI – Worldwide Governance Indicators
**Appendix 1. List of countries included in the study.**

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
<th>Country</th>
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</thead>
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<td>Guinea</td>
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Appendix 2. Graphical representations of the control variables

Figure 11. Changes in the terms of trade

Figure 12. Investment