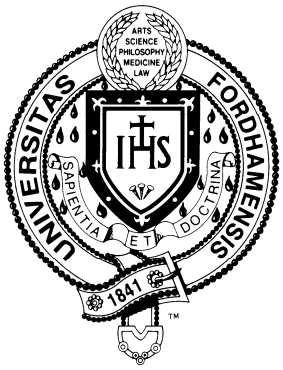

Fordham University
Department of Economics
Discussion Paper Series

Can Debt Relief Buy Growth?

Ralf Hepp
Fordham University, Department of Economics

Discussion Paper No: 2008-22
December 2008

Department of Economics
Fordham University
441 E Fordham Rd, Dealy Hall
Bronx, NY 10458
(718) 817-4048

Can Debt Relief Buy Growth?

Ralf Hepp *
Fordham University

December 1, 2008

Abstract

In this paper, I investigate whether the numerous debt relief initiatives during the 1990s have had a significant effect on economic growth rates in developing countries. The major initiatives during that time period were negotiated as bilateral agreements under the guidance of the Paris Club of Creditors. These agreements were followed up by the Heavily Indebted Poor Countries (HIPC) debt relief initiative in 1996 and its "enhanced" version in 1999 under the guidance of the World Bank and the International Monetary Fund. I find that, on average, debt relief had no effect on growth rates of developing countries. However, the effect on growth rates differed for different subsets of developing countries. I find that countries that are not classified as HIPC have benefited significantly from debt relief, whereas the growth rates of HIPC countries remained unaffected.

- *Keywords*: HIPC debt initiative, debt relief, foreign aid, growth
- *JEL Codes*: F42, F43, O19

*Address: Department of Economics, Fordham University, E-525 Dealy Hall, 441 E. Fordham Rd, Bronx, NY 10458, United States. Email: hepp@fordham.edu; phone: (+1) 718-817-4066; fax: (+1) 718-817-3518. The author would like to thank Joshua Aizenman, Carlos Dobkin, Robert Feenstra, Kenneth Kletzer, Darryl McLeod, Giovanni Peri and seminar participants at the University of California at Davis and Fordham University for very helpful comments and suggestions. The author would also like to thank Joshua Aizenman for providing data. Financial assistance from the Graduate Division of the University of California at Santa Cruz is gratefully acknowledged. All remaining errors are mine.

1 Introduction

In this paper, I investigate whether the numerous debt relief initiatives during the 1990s have had a significant effect on economic growth rates in developing countries. The major initiatives during that time period were negotiated as bilateral agreements under the guidance of the Paris Club of Creditors. These agreements were followed up by the Heavily Indebted Poor Countries (HIPC) debt relief initiative in 1996 and its "enhanced" version in 1999 under the guidance of the World Bank and the International Monetary Fund. I find that, on average, debt relief had no effect on growth rates of developing countries. However, the effect on growth rates differed for different subsets of developing countries. I find that countries that are not classified as HIPC have benefited significantly from debt relief, whereas the growth rates of HIPC countries remained unaffected.

After decades of development assistance, researchers have shown a renewed interest in the issue of aid effectiveness. This literature focuses on understanding the effects of aid inflows on growth rates, as well as determining which economic, political, and institutional factors undermine or enhance the effectiveness of development assistance with respect to growth. In my study I extend this literature in two ways. First, I explicitly consider the effects of debt relief developing countries. Second, I compare the effects for developing countries that have qualified for the HIPC initiative and developing countries that are not part of this initiative. To address these questions, I use a measure of debt relief consisting of the components *debt stock* and *debt service relief* using data from the World Bank's Global Development Finance data set [World Bank (2005a)]. I argue that the *debt service relief* variable can be interpreted as working through providing additional (contemporaneous) resources, while *debt stock relief* exerts a larger influence on long term incentives for investment decisions.

Looking at all developing countries together, I find that *debt service relief* leaves growth rates unaffected independent of whether aid is assumed to have diminishing returns or not. Separately examining countries that are classified as Heavily Indebted Poor Countries (for short called *HIPCs*) and those that are not (*Non-HIPCs*), reveals that growth rates of HIPC countries are not affected by debt relief. For Non-HIPCs, however, the effect on growth rates is unambiguous and robustly positive, particularly when diminishing returns to aid are assumed. *Debt stock relief*, on the other hand, has no influence on growth independent of the sample used.

With respect to aid effectiveness - the main concern of the previous literature - I find that aid does not have a robust link with growth. In fact, I hardly find any effect of aid on growth at all. This is true whether or not aid goes to a country with a good policy environment, thereby raising doubts about the results of the influential paper by Burnside and Dollar (2000) - as several other papers have previously done as well.[1] Good policies by themselves, however, have positive effects on growth in *Non-HIPCs*. The policy environment in HIPC countries, on the other hand, does not seem to affect growth. In the remainder of the paper, I will proceed as follows: Section 2 covers some of the related research. In section 3, the estimation strategy is described; section 4 describes the data sources and debt relief variables in detail.

[1] For a recent example, see Easterly et al. (2004).

The estimation results are presented in section 5. Section 6 concludes.

2 Literature Review

There is a large and growing literature on the effectiveness of foreign aid in promoting economic growth. One of the most-cited recent papers in this literature is Burnside and Dollar (2000) [henceforth BD], which finds that "aid has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies, but has little effect in the presence of poor policies". The authors use a new database on foreign aid developed by Chang et al. (1998), in which foreign aid is termed *effective development assistance*. This new measure consists of the summation of the *grant equivalents* of all official financial inflows to developing countries.[2] Their dependent variable is the annual growth rate of gross domestic product (GDP) per capita. The explanatory variables in their growth regression are aid as a percentage of GDP, initial GDP, ethnic fractionalization, number of assassinations, an interaction term of ethnicity and assassinations, the Knack and Keefer (1995) measure of institutional quality, M2/GDP to measure financial depth, and a policy index.[3] The BD policy index includes the budget surplus, the inflation rate, and the Sachs and Warner (1995) trade openness dummy variable. The weights attached to these three components are the coefficient estimates determined by running a regression for GDP growth including all the previously mentioned explanatory variables except aid; furthermore, the regression constant is added to form the index. In addition to Ordinary Least Squares (OLS) analysis, BD use Two-stage Least Squares (2SLS) to control for potential endogeneity of aid. Foreign aid could be endogenous. Donors may adjust their aid flows to the growth rate of the recipient country, either by rewarding a fast growing country with additional aid, or by helping a slow-growing recipient country stimulate growth with additional aid. Their results suggest first, that aid is only effective in promoting economic growth in a good policy environment, but not by itself; and second, that aid allocation seems to be independent of good policies, at least for bilateral donors. Overall, the BD result provides a strong argument to policymakers who insist on conditionality in the form of macroeconomic stabilization policies and structural reforms when giving aid. Additionally, it provides a better justification for politicians in donor countries to increase foreign aid, given the domestic budget pressures they are facing. Subsequent research shows, however, that the results of the BD study are sensitive to sample selection and may suffer from omitted variable bias.[4] Hansen and Tarp (2000) include squared aid in the regressions to control for diminishing returns to aid.[5] Using an instrumental variables approach, they can

[2] As defined by Chang et al. (1998), the "grant equivalent of a financial inflow is the amount that, at the time of its commitment, is not expected to be repaid, i.e., the amount subsidized through below-market terms at the time of commitment." (p.5)

[3] Knack and Keefer (1995) define institutional quality by simply summing index measures for the five variables *expropriation risk*, *rule of law*, *repudiation of contracts by government*, *corruption in government*, and *quality of bureaucracy* from the International Country Risk Guide data set.

[4] See footnote 1.

[5] See Lensink and White (1999), Hadjimichael et al. (1995), and Durbarry et al. (1998) for different theoretical arguments for the non-linear effect of aid on growth.

replicate the BD results for their reduced sample, but if outliers removed by BD are included, the aid-policy-growth link becomes insignificant. They conclude therefore that aid effectiveness is independent of policy. Hansen and Tarp (2001) are concerned about the presence of country-fixed effects and their persistent correlation with macroeconomic policy indicators, both of which would render the BD analysis invalid.[6] They suggest using the Arellano-Bond GMM estimator (Arellano and Bond (1991)), which takes care of country fixed effects by first-differencing and includes lags of potentially endogenous variables as instruments to deal with endogeneity itself. Using this estimator, the authors find that aid exhibits diminishing returns with respect to growth. Guillaumont and Chauvet (2001) argue that inclusion of shocks to exogenous factors like terms of trade and climate into the analysis of aid effectiveness is essential.[7] Omission of these factors in the BD analysis may have led to overstating the importance of policy. The authors suggest that one of the motivations for giving aid is to smooth the effects of negative shocks (for example, a drought) in the recipient country. In their two-stage least squares (2SLS) specification, the authors find that policy does not influence the aid effectiveness, whereas aid is significantly more effective in countries more vulnerable to shocks. Furthermore, growth rates in countries less vulnerable to shocks are generally higher. Contrastingly, Collier and Dehn (2001) lend support to the BD result by showing that the inclusion of export price shocks into the regression makes their results more robust. Additionally, they find that an increase in aid in the presence of a negative export price shock leads to a higher growth rate. Easterly et al. (2004) extend the original BD data set and show that the regression result of aid effectiveness in a good policy environment is sensitive to sample period and sample countries, the inclusion of outliers, and alternative definitions of aid and good policies. In another variation of aid-growth regressions, Dalgaard et al. (2004) include the exogenous factor climate represented by the fraction of land in the tropics as well as an interaction term for aid and climate. They argue that this variable exerts influence on the evolution of institutions and also picks up differences in productivity. Using OLS and 2SLS as well as Arellano-Bond and Blundell-Bond GMM estimators (Blundell and Bond (1998)), the authors find that, in general, aid is effective in promoting growth, but it is less effective the larger the fraction of land in tropical climate is.[8] Unlike the aid-climate interaction term, the significance of the aid-policy interaction term is not robust to specification choice. A recent paper by Rajan and Subramanian (2005a) re-examines the cross-country evidence of the effects of aid on growth. The authors find little evidence of a link between the amount of aid inflows and subsequent economic growth, whether negative or positive. They test the robustness of the aid-growth relationship using different lags of aid, different time frames, multi- and bilateral aid, types of aid, short- and long-term impact of aid, different samples, and cross-section and panel specifications. The evidence of aid effectiveness is described as weak, whether the aid variable is interacted with a policy variable or not.

The overall conclusion from this literature is that several aspects of the aid-growth relationship

[6] See also Easterly and Levine (1997) and Temple (1998).

[7] The external factors included in their analysis are *trends in terms of trade*, *stability of agricultural value added* and *of real value of exports*.

[8] See Arellano and Bond (1991) and Blundell and Bond (1998) for a detailed description of the estimation technique.

need to be further investigated to reach conclusive results. First, a better theoretical understanding of the determinants of aid allocation and its links to growth will help in deciding on specification and which explanatory variables to include in regression analysis. Second, the channels through which aid influences growth have to be more closely examined. For example, Rajan and Subramanian (2005b) offer an explanation how aid can hurt growth instead of improving it. Increased aid inflows can lead to overvalued exchange rates, which then lead to a loss of competitiveness in the traded sector of a developing nation. As a consequence, this loss of competitiveness inhibits growth in the overall economy, since the (more innovative) traded-goods sector is the main driving force of growth in the economy. Their empirical evidence supports this hypothesis. A second issue in this context is aid dependence which is an under-researched area. Huge aid inflows create disincentives for developing country governments in terms of revenue collection. This will undermine otherwise sound macroeconomic policies in the long run. One promising way to ameliorate the distortions created by aid dependence - at least in the case of severely indebted countries - is to think about debt and the consequences of debt relief.

This brings us to a much related strand of literature that focuses on the link between debt and growth. A prominent example in this area is the issue of *debt overhang*. The concept of debt overhang is defined as the "presence of an existing 'inherited' debt sufficiently large that creditors do not expect with confidence to be fully repaid".[9] Krugman (1988) and Sachs (1986) argue that in this situation the high stock of debt acts like a high marginal tax on investment. They suggest that the incentives for domestic firms or the debtor government to invest at home are distorted since any positive returns from investment projects are used for debt payments. Anticipating this, however, economically sensible investment projects will be forgone, thus harming the long-term economic growth rate of the debtor country. Conceptually this idea is incorporated into the debt Laffer curve, which is represented by an "inverted U" relationship between the level of debt stock and expected net present value (NPV) of debt service payments. Debt overhang in this context means that a country is to the right of the peak of this curve. In this scenario, a decrease in debt stock (through debt relief) increases the expected NPV of repayments. Hence, from a creditor country's perspective, this theory provides an economic rationale for debt relief if the debtor suffers from debt overhang.[10]

In an empirical study, Pattillo et al. (2002) find evidence of debt overhang. Using a panel data set comprised of 93 developing countries for the period 1969-1998, they suggest that at a debt stock level of 35-40 percent of GDP, the average effect of debt on per capita GDP growth becomes negative. Clements et al. (2003) confirm their results of a debt overhang. Furthermore, they find that debt service has a "crowding out" effect on public investment, thereby lowering the overall growth rate of a developing country. If resources freed up by debt service relief could be directed towards public investment, GDP growth rates in some HIPC countries would increase by half a percentage point annually. Similarly, Chowdury (2001) finds evidence for debt overhang in his sample. He uses extreme bounds analysis to compare HIPC

[9] See Krugman (1988), p.254.

[10] Other justifications include the concept of odious debt, humanitarian concerns, political considerations (for example recent Iraq debt relief), and many others.

countries with other moderately to severely indebted countries. The main focus of his paper is whether the set of countries eligible for HIPC debt relief should be extended. He finds that debt stock and debt service have a negative effect on growth rates in both HIPC and non-HIPC countries; this suggests that debt overhang is present and that debt relief could potentially have beneficial consequences for countries currently excluded from the HIPC initiative.

However, there is disagreement on the existence or importance of debt overhang and the debt Laffer curve. For example, Bird and Milne (2003) question the presence of a debt overhang problem in low-income countries. Official resource transfers to highly indebted countries often exceed their debt service payments. Hence, incentives for domestic investment may not be distorted after all. Furthermore, they caution that providing (unconditional) debt relief to highly indebted countries may simply redistribute resources to countries with a history of unsound macroeconomic policies. Hence, "bad policies" in the past would be rewarded ex-post by providing debt relief.

In the theoretical literature, there are several papers questioning the conventionally held view that an excessive level of sovereign debt has distortionary incentive effects on the behavior of economic agents in the indebted country. [11] For example, Kletzer and Wright (2000) make the point that a renegotiation proof constrained efficient perfect equilibrium implies irrelevance of debt overhang. Debt up to a country's maximum "willingness to pay" is relevant; however, debt beyond that point, i.e., the classical debt overhang, is irrelevant. An important point directly relevant for this paper is made by Cordella et al. (2003). In contrast to the conventional theoretical literature, where only the present value of debt (stock) matters, the authors argue that only debt service matters. In their model, debt service relief can raise welfare whereas debt stock relief does not.

Another (more altruistic) rationale for debt relief - particularly in the context of the HIPC debt initiative - is to provide a debtor country with additional resources for poverty reduction. Funds otherwise used for debt service payments are "freed up" by providing debt relief and can then be used for education, public health and other social expenditures. A concern that naturally arises in this context is that of aid fungibility, i.e., are the resources freed by debt relief used as intended by the creditor/donor. A detailed discussion of this issue is beyond the scope of this paper, however. Let me now turn to the empirical model used in the present analysis of the relationship between debt relief, aid, and growth.

3 Empirical Model

Before going into details about the setup of my regression analysis, let me give a brief overview of the issues addressed in the empirical exercise. The main question being addressed here is whether debt relief measures in the last decade positively influenced growth rates of gross domestic product per capita in developing countries. First, I investigate the impact of debt relief on growth rates for low-income and lower and upper middle-income countries. Second, I divide the sample into two groups: The first group includes only countries classi-

[11] See, for example, Bulow and Rogoff (1988, 1989), Cordella et al. (2003), Kletzer and Wright (2000).

fied as *Heavily Indebted Poor Countries* (HIPC); the second group consists of the remaining developing countries in the sample (non-HIPC). As we saw in the previous section, there are numerous studies investigating the link between aid, policies, and growth rates. This study is - to the best of my knowledge - the first one that incorporates debt relief into the aid effectiveness framework and explicitly compares HIPC and non-HIPC countries in terms of aid and debt relief effectiveness. Essential to this empirical analysis is the definition of the debt relief variable(s). I use two different sets of variables to represent debt relief. The debt relief variables - derived from World Bank data - are called *debt service relief* and *debt stock relief*.[12] Neither variable precisely captures the definition of debt relief in the theoretical literature, where debt (stock or service) relief is defined as the change in net present value of debt (stock or service, respectively). However, the variables come fairly close to the theoretical measure.

To empirically address debt relief and aid effectiveness with respect to growth, I use the following specification which is fairly standard in the literature:

$$y_{i,t} = \alpha_o + X'_{i,t}\beta_x + Z'_{i,t}\gamma_z + \alpha_i + \phi_t + \varepsilon_{i,t} \tag{1}$$

where $y_{i,t}$ is the growth rate of GDP per capita; $X_{i,t}$ is a vector of variables of interest, $Z'_{i,t}$ is a vector of control variables; α_i is a country fixed effect; ϕ_t is a year dummy; and $\varepsilon_{i,t}$ is an i.i.d. error term.

The variables of interest included in $X_{i,t}$ are *aid*, aid^2, *debt stock*, *debt service*, interacted variables *aid*×*policy*, aid^2×*policy*, and - the main variable of interest - *debt relief*. The inclusion of debt relief into this framework is - as mentioned before - the main innovation of this paper. There are two main channels through which debt relief may be enhancing growth: either by providing additional resources for public investment or - if debt relief is substantial enough - by removing distortions caused by debt overhang. Except for debt relief, the other variables of interest included in the regression have previously been used in the literature. For example, foreign aid is assumed to be growth enhancing by providing additional resources for public investments that would otherwise not be undertaken due to a lack of resources. The aid^2 term is included to control for diminishing returns to aid. As previously mentioned, diminishing returns can be a consequence of aid dependence, i.e., a government may relax its efforts for revenue collection in the presence of persistent and large aid inflows. Debt stock and debt service - at least when they are at very high levels - may hinder growth by distorting private and public investment. The policy term is similar to that used in Burnside and Dollar (2000). The policy term is constructed as an equally weighted average of the inflation rate, the budget balance, and trade openness.[13]

Following the literature, I include a set of control variables $Z'_{i,t}$ into the regressions. The lagged value of per capita GDP is included to control for conditional convergence of growth rates. *M2/GDP*, lagged one period, is used as a proxy for financial depth. I include ethno-

[12] A more detailed description and discussion of the debt relief variables can be found in the next section.

[13] Burnside and Dollar (2000), and others, use the Sachs and Warner (1995) trade openness dummy. I use exports (as % of GDP) as a proxy for trade openness due to better data availability. The coefficient estimates for the interacted aid-policy terms tell us whether aid is more effective in a good policy environment - the main result of BD.

linguistic heterogeneity as a proxy to account for cross-country differences in public policies; for example, insufficient infrastructure in areas inhabited by ethnic minorities.[14] The measure for *institutional quality* is similar to that of Knack and Keefer (1995) and consists of the sum of three equally weighted measures - bureaucratic quality, rule of law, and corruption - where a higher value indicates better institutional quality. *Political stability* is derived from two index variables measuring internal and external conflict. A higher index number indicates a more stable country. The variable *restrictions on freedom* is the sum of indices measuring political rights and civil liberties, where a higher index means a lower degree of freedom. This variable is used as a proxy for the political system and the degree of a democratic process. Following Dalgaard et al. (2004), I include a variable called *land area in tropics*, which measures the percentage of the land area in a tropical climate zone. This variable is meant to capture differences in productivity and in the evolution of institutions.

Unlike most of the previous literature, which averages data with three to five year averages for a more balanced panel, I am using annual data. Information contained in the annual data is lost by averaging, especially when we have dramatic changes in the variables of interest over short time periods. It is also not clear whether averaging data over a particular time span appropriately deals with the issue of business cycles in a large panel data set; the length of business cycles may vary widely across countries as well as over time. The regression analysis is performed initially using Ordinary Least Squares with year dummies and country fixed effects. As pointed out by Dalgaard et al. (2004) among others, there is a problem of biased estimates when using OLS. This bias is caused by the potential endogeneity of aid, debt relief and policy with respect to growth. For example, donor countries may be rewarding a country with a high level of GDP growth with more foreign aid, or they may want to help slow-growing, low-income countries with additional aid resources. Similar reasoning applies to debt relief. When policy is defined as a combination of budget surplus, inflation, and trade openness, all of these components can potentially be correlated with the growth rate. To deal with the endogeneity of aid, debt relief and policy, I use the "first-difference" and the "system" GMM estimators (Arellano and Bond (1991), and Blundell and Bond (1998), respectively). Particularly in more recent papers of the aid effectiveness literature [Dalgaard et al. (2004), Rajan and Subramanian (2005a)], use of these estimators is fairly standard for dynamic panel data sets. Apart from dealing with endogeneity, the two GMM estimators also take care of country fixed effects, making the results comparable to the fixed effects OLS regression. The Arellano-Bond GMM estimator deals with a potential omitted variable bias (and country fixed effects) by first-differencing the original regression equations. The first-differenced endogenous variables aid, debt relief, and policy, are then instrumented with lags of their own levels. Blundell and Bond (1998) suggest including the original equations into the system, and instrumenting the levels of endogenous variables with lags of their own first differences, since lagged levels are often weak instruments for first differences. Additionally, aid is instrumented with population, since the aid allocation literature suggests that there is a small-country bias of aid.

[14] See, for example, Easterly and Levine (1997).

4 Data

The entire sample contains data on 122 developing countries that are classified as low-income, lower middle-income, and upper middle-income countries for the time period 1970-2001. As mentioned previously, to address the question of whether there are different effects of debt relief on different country groups, the entire sample will also be divided into two groups: 39 HIPC countries, and 83 non-HIPC countries.

Since my main interest lies in the effect of debt relief on growth rates, a clear description of the debt relief variable(s) is necessary. I use debt relief variables derived or taken from the World Bank (2005a) data set. The first variable is called *debt stock relief*.[15] A potential economic effect of *debt stock relief* will be on perceptions of the future. In the presence of a debt overhang, economically meaningful *debt stock relief* will remove the disincentives for investment created by the debt overhang and bring a debtor country back to a sustainable growth path. Economic agents will increase their investments in the debtor country, thereby increasing economic growth, since they are confident that the return on their investment will not be entirely taxed away to service government debt. Focusing on a different aspect of high indebtedness, namely the debt service burden, I derive a second variable from the World Bank (2005a) data set by adding the variables *principal forgiven* and *interest forgiven* and call it *debt service relief*.[16] Especially in developing countries, debt service can act as a "burden" in the sense of using government revenue for debt repayment rather than for necessary investments in infrastructure, basic education, health care, water and sanitation, to name just a few. For example, one of the main ideas behind the HIPC initiative - additionality - is addressing exactly this issue. A Poverty Reduction Strategy Paper (PRSP) put together by the debtor government specifies exactly how resources that are 'freed up' by the HIPC initiative are to be used for investments in the public sector. *Debt service relief* should therefore positively affect the growth rate: Directly by increasing public investment activity, and indirectly by increasing human capital (at least in the long term).

Data on per capita GDP, the growth rate of per capita GDP, the inflation rate, M2, and population are taken from the World Development Indicators (WDI) 2005 (World Bank (2005b)). Debt stock, debt service, and exports data (all three as percentages of GDP) are from GDF 2005. The aid variable used in this paper is *net official development assistance* (net ODA) from the OECD International Development Statistics (IDS) 2004 data set (OECD (2004)).[17] The policy variable is constructed as an average of trade openness (measured as exports as a percentage of GDP), the inflation rate, and the budget balance. Data on the budget balance - which is used for the construction of the policy variable - is taken from the

[15] This variable corresponds to the variable *debt forgiveness or reduction* in World Bank (2005a) and is defined as follows: "Debt forgiveness or reduction shows the change in debt stock due to debt forgiveness or reduction. It is derived by subtracting debt forgiven and debt stock reduction from debt buyback."

[16] These variables are described in the data definitions of World Bank (2005a): "Principal forgiven (interest forgiven) is the amount of principal (interest) due or in arrears that was written off or forgiven in any given year."

[17] Burnside and Dollar (2000) use *effective development assistance*, a data set derived by Chang et al. (1998); Easterly (2003) finds that this measure and net ODA are highly correlated, however. Hence, the choice of the aid variable in this case should only have little influence on the results.

International Financial Statistics of May 2005 (International Monetary Fund (2005)).

Data on ethno-linguistic heterogeneity is the same as the *fractionalization* variable used in Easterly and Levine (1997)[18], originally collected in the 1960s by the Soviet Union. Its values are between 0 and 1, where a higher value implies less ethnic diversity. The measure for *institutional quality* is similar to that of Knack and Keefer (1995) and consists of the sum of three equally weighted measures - bureaucratic quality, rule of law, and corruption - all taken from the International Country Risk Guide (Political Risk Services (2003)). The measure for *political stability* is taken from the same data set, and consists of the sum internal and external conflict, an index going from 2 to 14. The variable restrictions on freedom is the average of the measures for political rights and civil liberties from the Freedom House World Country Ratings (Freedom House (2004)). Finally, the variable describing the percentage of land area in the tropics is from Strahler and Strahler (1992).

Before discussing the regression results in the next section, I should note that debt relief data from the World Bank (*debt stock relief* and *debt service relief*) are only available from 1990 to 2001. Hence, the regression results only cover this timeframe.

5 Empirical Analysis

In this section I briefly comment on the descriptive statistics reported in tables 1 and 2. Furthermore, I describe and interpret the results of the regression analysis. In particular, I focus on the main question of interest here: Has debt relief had a positive effect on the GDP growth rates of developing countries? The regression results are reported in tables 3 to 5.

5.1 Descriptive Statistics

We first focus on the descriptive statistics reported in tables 1 and 2 for HIPC and non-HIPC countries, respectively, to get a better idea about differences and similarities of the two groups. The data covers the time period 1984 to 2001. It is obvious from a casual comparison that similarities are rare and differences quite stark between the two groups. Starting with gross domestic product, we see that HIPC countries have very low average income levels (about 380 dollar per capita) compared to non-HIPC countries (about 2,500 dollar per capita). The same is true for average per capita growth rates. We see that HIPC countries grew much slower in the sample period, 0.5 vs. 2.4 percent annual growth. As we would expect, the average debt stock for HIPCs was twice as high (with a maximum level of about 740 percent of GDP for Nicaragua in 1995, compared to about 230 percent for Jordan in the same year). Somewhat surprisingly, the debt service burden is very similar for the two sets of countries as a percentage of GDP. This gives little support to the argument that debt service is a major inhibitor of social expenditure in HIPC countries. A point that has also been noted in earlier studies is the very significant amount of aid received by HIPCs: more than 10 percent of GDP! In line with our expectations, HIPCs received significantly more debt relief. A very interesting observation about the components of the policy variable - budget balance, inflation, and trade

[18]There, the variable is called *ethnolinguistic fractionalization*.

openness - is that HIPC and non-HIPC countries differ significantly only with respect to their trade openness with non-HIPCs having much greater export volumes. Lastly, financial depth as proxied by M2/GDP is significantly higher in non-HIPCs, which are also less ethnically diverse and have less area in the tropics.

5.2 Regression Results

One problem with the available data is that all the panel data sets that follow are unbalanced due to sometimes severe limitations in data availability. Many studies in the aid effectiveness literature have tried to fill gaps in the data by extrapolation, averaging, etc.; my preferred strategy, however, is to work with an unbalanced panel data since the estimation methods used work also for unbalanced panels.

The time period considered here is 1990 to 2001 and results for the complete sample of 122 developing countries are reported in table 3. First of all, the debt relief variables for debt stock and debt service do not significantly influence growth rates when using the undivided sample. Of the other main variables of interest, only debt service has a fairly robust negative effect on growth across specifications, particularly when we control for diminishing returns to aid by including the squared aid term. A one percent increase in debt service leads to a drop in the average annual per capita GDP growth rate of between 0.19 to 0.26 percent depending on the specification. In other words, debt service does indeed act as a burden and lowers the growth rate possibly by crowding out public investments. The debt stock only shows a highly significant effect in the OLS fixed effects regressions. As previously discussed, these OLS may be biased, due to unaccounted for endogeneity of aid, debt relief and policies. However, the estimates in the other specifications do have the expected negative sign. The policy variable is positive and significant at the one percent level across all specifications, implying that good policies lead to higher growth rates. However, in contrast to Burnside and Dollar (2000), but in line with some subsequent studies, my results indicate, that aid effectiveness is *independent* of the policy environment, particularly when I control for diminishing returns of aid [columns (4) to (6) in table 3].[19] Furthermore, foreign aid by itself does not seem to have a significant influence on the growth rate of the economy in any specification. Among the control variables, the coefficient on political stability is significantly positive in the OLS fixed effects and Arellano-Bond regressions. This is expected as a higher indicator for political stability implies more stability, which then leads to a higher growth rate of the economy. The coefficient of the lagged level of GDP is negative as expected, suggesting conditional convergence of growth rates. The coefficient estimate of institutional quality is insignificant, which can mean one of two things. Either we have already controlled for the most important factors determining institutional quality and hence, institutional quality may still matter; or – the more straightforward, but less convincing conclusion – that institutional quality doesn't matter. Lastly, less democratic countries - indicated by a higher index number of restrictions on freedom, grow somewhat slower, but the result is not robust.

[19]Recalling the Burnside and Dollar (2000) results, good policies make aid only more effective when squared aid terms are not included. This has been pointed out earlier, for example, by Dalgaard et al. (2004).

As pointed out earlier, the differences in economic indicators between HIPC and non-HIPC countries are fairly substantial. We will see that this is also reflected in significant differences in the regression results. Turning our attention to HIPC countries first [table 4], a fairly bleak picture emerges particularly with respect to the effectiveness of debt relief initiatives in promoting growth in the last decade. Neither debt service nor debt stock relief has any significant effect on growth rates in this sub-sample of countries. This is disappointing from a policy perspective since many of the initiatives in the 1990s have focused on these very indebted and poor countries. Furthermore, neither the aid terms nor the interacted aid terms are statistically significantly different from zero irrespective of estimation method or specification. Policies by themselves also do not seem to matter, either. When comparing the results on debt service with those for the whole sample, coefficient estimates turn out to be in the same ballpark, but significance is much less robust for HIPC countries. In fact, only when using the system GMM approach, significant estimates result. Among the control variables, the coefficient estimates for restrictions of freedom and for political stability have the correct signs and are (at least) weakly significant for most specifications. Even growth rates do not seem to converge for HIPC country data. Overall, these results beg the question: What are the determinants of growth in heavily indebted poor countries? Future research will have to address this question.

Finally, the focus turns to countries that are not classified as HIPC. Table 5 reports the results of the empirical analysis. Given the extent of debt relief provided to HIPC countries compared to non-HIPCs, it is quite surprising to see that *debt service relief* effectively improved growth rates in non-HIPC countries. This may indicate that the additional resources were used for socially worthwhile investments rather than being diverted to consumption expenditure. A one percent increase in debt service relief leads to a 0.2% increase in GDP growth in the specification including a squared aid term [columns (4)-(6)]. Hence, non-HIPC countries have benefited unambiguously in terms of higher growth from debt relief and rescheduling initiatives in the 1990s. *Debt stock relief*, on the other hand, had no statistically significant effect on growth. These results lend support to Cordella et al. (2003) who suggest that only debt service relief matters, whereas debt stock relief is irrelevant. Increasing debt stock and debt service both lower economic growth – with debt service having a bigger effect; the coefficient estimates are highly significant. A one percent increase in debt service leads to a 0.4 percent drop in growth, while a one percent increase in debt stock reduces growth by "only" 0.025 to 0.090 percent. For non-HIPC countries, policy matters. Good policy by itself increases growth as well as enhancing aid effectiveness, thus lending some support to the BD results. The coefficient estimates for policy are robust and highly significant independent of estimation method and specification. Aid by itself, however, does not seem to be beneficial in terms of growth; if anything, aid seems to have a detrimental effect on growth rates. One possible explanation could be that increased aid inflows are interpreted as a negative signal by private investors, who then decrease their investments while public investments are not able to compensate for the decline completely. The coefficient estimates for lagged GDP per capita provide empirical support for the conditional convergence hypothesis of growth rates among non-HIPC countries. Finally, financial depth has a fairly robust positive influence on

growth rates.

6 Conclusion

In this paper, I investigated the effects of debt relief as well as other factors like foreign aid and economic policies on GDP growth rates. My sample includes 122 low-income, lower middle-income, and upper middle-income developing countries. Contrary to the Burnside and Dollar (2000) study, I find that aid effectiveness is independent of the policy environment, which seems to be particularly true for HIPC countries. This may be indicative of possible aid dependence in HIPC countries, where aid amounts to around 10 percent of GDP on average. My main variable of interest, however, is debt relief. Debt relief is measured with two different variables from World Bank data. To investigate the effects of debt relief on different groups of countries, I analyze the effects for HIPC and non-HIPC countries separately. I find that debt service relief for non-HIPC countries had a positive effect on growth. In contrast, debt service relief had no effect on the growth rates of HIPC countries. This suggests that increasing debt relief has potential to be growth enhancing thereby lifting poor countries out of poverty. We need to investigate further which factors are responsible for its ineffectiveness in HIPC countries. Further research is needed to develop better measures for debt relief, but the results of this paper tentatively suggest that debt relief may be an effective way to increase growth rates in poor countries.

References

Arellano, Manuel and Stephen Bond, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies*, 1991, *58* (2), 277–297.

Bird, Graham and Alistair Milne, "Debt Relief for Low-Income Countries: Is it Effective and Efficient?," *The World Economy*, 2003, *26*, 43–59.

Blundell, Richard and Stephen Bond, "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics*, 1998, *87*, 115–143.

Bulow, Jeremy and Kenneth Rogoff, "The Buyback Boondoggle," *Brookings Papers on Economic Activity*, 1988, *2*, 675–698.

_ **and** _ , "A Constant Recontracting Model of Sovereign Debt," *Journal of Political Economy*, 1989, *97*, 155–178.

Burnside, Craig and David Dollar, "Aid, Policies and Growth," *American Economic Review*, 2000, *90* (4), 847–868.

Chang, Charles C., Eduardo Fernandez-Arias, and Luis Serven, "Measuring Aid Flows: A New Approach," 1998. Available online at `http://www.worldbank.org/research/growth/abschang.htm`.

Chowdury, Abdur R., "External Debt and Growth in Developing Countries: A Sensitivity and Causal Analysis," *WIDER Discussion Paper*, 2001, (95).

Clements, Benedict, Rina Bhattacharya, and Toan Quoc Nguyen, "External Debt, Investment, and Growth in Low-Income Countries," *International Monetary Fund Working Paper*, 2003, (249).

Collier, Paul and Jan Dehn, "Aid, Shocks, and Growth," *World Bank Policy Research Working Paper*, 2001, (2688).

Cordella, Tito, Giovanni Dell'Ariccia, and Kenneth M. Kletzer, "Conditional Aid, Sovereign Debt, and Debt Relief," *IMF staff papers*, 2003, *mimeo.*

Dalgaard, Carl-Johan, Hendrik Hansen, and Finn Tarp, "On the Empirics of Foreign Aid and Growth," *Economic Journal*, 2004, *114*, F191–F216.

Durbarry, Ramesh, Norman Gemmell, and David Greenaway, "New Evidence on the Impact of Foreign Aid on Economic Growth," *CREDIT Research Paper*, 1998.

Easterly, William, "Can Foreign Aid Buy Growth?," *Journal of Economic Perspectives*, 2003, *17* (3), 23–48.

_ **and Ross Levine**, "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*, 1997, *112* (4), 1203–1250.

_ **,** _ **, and David Roodman**, "New Data, New Doubts: A Comment on Burnside and Dollar's "Aid, Policies, and Growth"," *American Economic Review*, June 2004, *94* (3).

Freedom House, "Freedom in the World Annual Country Ratings 1072 through 2003," 2004. Available online at `http://www.freedomhouse.org/ratings/index.htm`.

Guillaumont, Patrick and Lisa Chauvet, "Aid and Performance: A Reassessment," *Journal of Development Studies*, 2001, *37* (6), 66–92.

Hadjimichael, Michael T., Dhaneshwar Ghura, Martin Muhleisen, Roger Nord, and E. Murat Uçer, "Sub-Saharan Africa: Growth, Savings, and Investment, 1986-93," *IMF Occasional Paper*, 1995, (118). International Monetary Fund, Washington, D.C.

Hansen, Hendrik and Finn Tarp, *Foreign Aid and Development: Lessons Learnt and Directions for the Future*, Routledge: London,

_ **and** _ , "Aid and Growth Regressions," *Journal of Development Economics*, 2001, *64*, 547–570.

International Monetary Fund, "International Financial Statistics," May 2005.

Kletzer, Kenneth M. and Brian Wright, "Sovereign Debt as Barter," *American Economic Review*, 2000, *90* (3), 621–639.

Knack, Stephen and Phillip Keefer, "Institutions and Economic Performance: Cross-Country Tests using Alternative Institutional Measures," *Economics and Politics*, 1995, *7* (3), 207–227.

Krugman, Paul R., "Financing vs. Forgiving A Debt Overhang," *Journal of Development Economics*, 1988, *29*, 253–268.

Lensink, Robert and Howard White, "Is There An Aid Laffer Curve?," *CREDIT Research Paper*, 1999, *99* (6). University of Nottingham.

OECD, "International Development Statistics 2004," 2004. CD-Rom.

Pattillo, Catherine, Helene Poirson, and Luca Ricci, "External Debt and Growth," *International Monetary Fund Working Paper*, 2002, *02* (69).

Political Risk Services, "International Country Risk Guide 19984-2002," 2003. PRGroup, Inc.

Rajan, Raghuram G. and Arvind Subramanian, "Aid and Growth: What Does the Cross-Country Evidence Really Show?," *International Monetary Fund Working Paper*, 2005, *05* (127).

_ **and** _ , "What Undermines Aid's Impact on Growth?," *International Monetary Fund Working Paper*, 2005, *05* (126).

Sachs, Jeffrey D., *Debt, Stabilization, and Development: Essays in Memory of Carlos Diaz-Alejandro*, Basil Blackwell,

_ **and Andrew Warner**, "Economic Reform and the Process of Global Intergration," *Brookings Papers on Economic Activity*, 1995, *1995* (1), 1–118.

Strahler, Alan H. and Arthur N. Strahler, *Modern Physical Geography*, 4 ed., John Wiley and Sons, Inc., 1992.

Temple, Jonathan, "Initial Conditions, Social Capital and Growth in Africa," *Journal of African Economies*, 1998, *7* (3), 309–347.

World Bank, "Global Development Finance 2005," 2005. online version.

_ , "World Development Indicators 2005," 2005. online version.

A Descriptive Statistics

Table 1: Heavily Indebted Poor Countries (HIPCs)

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
GDP per capita	474	376.87	286.55	74.74	1,339.84
GDP Growth per capita	501	0.52	5.70	-28.20	25.16
Debt Stock*	486	82.81	77.77	0.90	738.26
Debt Service*	486	4.33	4.00	0.03	35.57
Debt Stock Relief*	220	2.12	6.75	0.00	73.02
Debt Service Relief*	220	1.30	7.58	0.00	92.47
Aid*	486	11.37	9.59	0.58	95.00
Trade Openness	513	20.87	13.14	0.42	80.31
Budget Balance*	526	-3.74	4.46	-41.22	5.76
Inflation Rate	464	19.00	45.78	-13.99	547.53
Financial Depth*	498	19.93	8.76	0.46	48.23
Ethnolinguistic Heterogeneity	509	0.59	0.29	0.04	0.90
Land Area in Tropics	526	0.56	0.34	0.00	1.00

Notes: *** = in % of GDP. Trade openness is measured as "exports as a percentage of GDP". Ethnolinguistic Heterogeneity is the probability that two people in a country picked at random belong to the same ethnic group. Financial Depth is measured as M2/GDP.**

Table 2: Countries not part of the HIPC initiative (non-HIPCs)

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
GDP per capita	1468	2,510.69	2,365.11	138.97	12,068.38
GDP Growth per capita	1461	2.37	5.23	-19.06	34.77
Debt Stock*	1336	43.09	29.70	0.00	231.50
Debt Service*	1336	5.08	3.82	0.00	26.45
Debt Stock Relief*	579	0.20	1.50	0.00	30.35
Debt Service Relief*	581	0.26	1.23	0.00	12.18
Aid*	1357	3.94	5.64	-0.45	43.30
Trade Openness	1437	33.10	20.67	2.90	121.31
Budget Balance*	1500	-3.35	4.72	-31.63	22.63
Inflation Rate	1414	16.91	33.16	-12.43	432.83
Financial Depth*	1361	37.43	25.27	3.56	181.09
Ethnolinguistic Heterogeneity	1182	0.36	0.27	0.01	0.89
Land Area in Tropics	1298	0.40	0.44	0.00	1.00

Notes: *** = in % of GDP. Trade openness is measured as "exports as a percentage of GDP". Ethnolinguistic Heterogeneity is the probability that two people in a country picked at random belong to the same ethnic group. Financial Depth is measured as M2/GDP.**

B Regression Results

Table 3: Debt Relief for all sample countries

	Dependent variable: annual growth rate of per capita GDP					
	(1) FE	**(2) AB**	**(3) BB**	**(4) FE**	**(5) AB**	**(6) BB**
Debt Service Relief	0.034	-0.022	-0.007	0.036	0.048	0.027
	(0.044)	(0.083)	(0.051)	(0.044)	(0.030)	(0.028)
Debt Stock Relief	-0.011	0.025	0.028	-0.014	-0.01	0.029
	(0.041)	(0.027)	(0.034)	(0.041)	(0.019)	(0.025)
Debt Service	-0.228***	-0.216	-0.189*	-0.237***	-0.244*	-0.259***
	(0.082)	(0.142)	(0.105)	(0.084)	(0.132)	(0.073)
Debt Stock	-0.016***	-0.007	-0.008*	-0.017***	-0.011	-0.006
	(0.006)	(0.011)	(0.004)	(0.006)	(0.007)	(0.004)
Aid	-0.022	0.042	0.018	-0.175	-0.227	-0.139
	(0.064)	(0.088)	(0.062)	(0.145)	(0.243)	(0.175)
Aid squared				0.004	0.004	0.004
				(0.004)	(0.006)	(0.004)
Aid * Policy	-0.003***	-0.004	0.011*	0.005	-0.001	0.011
	(0.001)	(0.005)	(0.006)	(0.006)	(0.010)	(0.007)
Aid squared * Policy				0	0	0
				(0.000)	(0.000)	(0.000)
Policy Index	0.083***	0.123***	0.058***	0.069***	0.089***	0.062***
	(0.015)	(0.042)	(0.013)	(0.018)	(0.023)	(0.012)
Institutional Quality	0.378	-0.647	0.185	0.3	-0.105	-0.277
	(0.450)	(1.128)	(0.658)	(0.452)	(0.786)	(0.580)
Financial Depth, t-1	0.004	0.177**	0.01	0.008	0.095*	0.01
	(0.033)	(0.076)	(0.019)	(0.033)	(0.051)	(0.013)
GDP per capita, t-1	-14.618***	-31.995***	-0.154	-14.065***	-22.225***	-0.14
	(1.815)	(10.243)	(0.470)	(1.842)	(6.605)	(0.637)
Restrictions on Freedom	-0.438	-0.367	-0.567**	-0.452	-0.347	-0.564***
	(0.288)	(0.444)	(0.229)	(0.288)	(0.303)	(0.205)
Political Stability	0.251***	0.379**	0.242	0.242***	0.280**	0.171
	(0.082)	(0.163)	(0.158)	(0.082)	(0.138)	(0.118)
Land Area in Tropics			1.702			0.119
			(1.183)			(0.752)
Ethnolinguistic Heterogeneity			0.991			0.78
			(1.896)			(1.630)
Observations	538	486	538	538	486	538
R-squared	0.25			0.25		
p values for						
Hansen Test		1.000	1.000		1.000	1.000
AB AR(1) in first diff.		0.014	0.001		0.006	0.001
AB AR(2) in first diff.		0.430	0.540		0.411	0.439

Notes: *** significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in all regressions is the annual growth rate of per capita GDP. All regressions include year dummies and a constant term. Heteroskedasticity-robust standard errors are reported in parenthesis. All debt and all aid terms are expressed in percent of gross domestic product. Financial depth is defined as M2/GDP. GDP per capita is the natural logarithm of GDP per capita. In the GMM regressions, policy, aid, and aid squared are instrumented with 10 lags of their own levels, and additionally with 10 lags of their first-differences in (3) and (6). Additionally, aid is instrumented by the natural logarithm of population.**

Table 4: Debt Relief for Heavily Indebted Poor Countries (HIPCs)

	Dependent variable: annual growth rate of per capita GDP					
	(1) FE	**(2) AB**	**(3) BB**	**(4) FE**	**(5) AB**	**(6) BB**
Debt Service Relief	0.017	0.013	-0.002	0.018	0.015	-0.006
	(0.058)	(0.038)	(0.043)	(0.059)	(0.038)	(0.045)
Debt Stock Relief	-0.03	-0.031	-0.019	-0.032	-0.033	-0.013
	(0.053)	(0.027)	(0.027)	(0.054)	(0.027)	(0.028)
Debt Service	-0.193	-0.151	-0.246**	-0.194	-0.16	-0.281**
	(0.160)	(0.139)	(0.112)	(0.167)	(0.122)	(0.105)
Debt Stock	-0.002	-0.003	-0.006	-0.003	-0.004	-0.007
	(0.009)	(0.006)	(0.004)	(0.009)	(0.006)	(0.004)
Aid	0.107	0.097	0.183**	0.005	-0.036	0.126
	(0.102)	(0.082)	(0.063)	(0.252)	(0.244)	(0.219)
Aid squared				0.003	0.003	0.001
				(0.006)	(0.006)	(0.005)
Aid * Policy	0	0	-0.001	0.003	0.01	0.016
	(0.001)	(0.001)	(0.001)	(0.015)	(0.015)	(0.012)
Aid squared * Policy				0	0	0
				(0.000)	(0.000)	(0.000)
Policy Index	0.029	0.027	0.066**	0.015	-0.018	-0.002
	(0.037)	(0.018)	(0.027)	(0.072)	(0.063)	(0.054)
Institutional Quality	-0.963	-0.942	0.262	-1.034	-1.093	0.475
	(1.294)	(1.526)	(0.789)	(1.321)	(1.598)	(0.849)
Financial Depth, t-1	0.032	0.033	0.017	0.029	0.024	0.013
	(0.103)	(0.074)	(0.042)	(0.106)	(0.075)	(0.039)
GDP per capita, t-1	-6.719*	-5.754	0.866	-6.105	-5.165	0.707
	(3.673)	(5.442)	(0.824)	(3.961)	(6.335)	(0.668)
Restrictions on Freedom	-1.167*	-1.169	-1.004**	-1.176*	-1.181	-1.095**
	(0.654)	(1.160)	(0.444)	(0.664)	(1.153)	(0.493)
Political Stability	0.294*	0.287*	0.171	0.294*	0.286*	0.12
	(0.174)	(0.137)	(0.128)	(0.176)	(0.135)	(0.127)
Land Area in Tropics			1.021			1.702
			(1.555)			(1.405)
Ethnolinguistic Heterogeneity			2.274			2.333
			(1.520)			(1.551)
Observations	156	139	156	156	139	156
R-squared	0.24			0.24		
p values for						
Hansen Test		1.000	1.000		1.000	1.000
AB AR(1) in first diff.		0.032	0.035		0.032	0.033
AB AR(2) in first diff.		0.953	0.945		0.939	0.989

Notes: *** significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in all regressions is the annual growth rate of per capita GDP. All regressions include year dummies and a constant term. Heteroskedasticity-robust standard errors are reported in parenthesis. All debt and all aid terms are expressed in percent of gross domestic product. Financial depth is defined as M2/GDP. GDP per capita is the natural logarithm of GDP per capita. In the GMM regressions, policy, aid, and aid squared are instrumented with 10 lags of their own levels, and additionally with 10 lags of their first-differences in (3) and (6). Additionally, aid is instrumented by the natural logarithm of population.**

Table 5: Debt Relief for Countries not part of the HIPC initiative (Non-HIPCs)

	Dependent variable: annual growth rate of per capita GDP					
	(1) FE	**(2) AB**	**(3) BB**	**(4) FE**	**(5) AB**	**(6) BB**
Debt Service Relief	0.203*	0.124	0.098	0.200*	0.200***	0.158***
	(0.104)	(0.077)	(0.083)	(0.106)	(0.058)	(0.036)
Debt Stock Relief	0.198	0.327*	0.244	0.194	0.203	0.257
	(0.136)	(0.182)	(0.247)	(0.137)	(0.147)	(0.181)
Debt Service	-0.368***	-0.481**	-0.238*	-0.370***	-0.397***	-0.238***
	(0.102)	(0.223)	(0.120)	(0.103)	(0.142)	(0.079)
Debt Stock	-0.073***	-0.090***	-0.025**	-0.073***	-0.075***	-0.028***
	(0.015)	(0.032)	(0.012)	(0.016)	(0.018)	(0.010)
Aid	-0.241**	-0.219	-0.317***	-0.217	-0.193	-0.233
	(0.102)	(0.147)	(0.067)	(0.270)	(0.384)	(0.196)
Aid squared				-0.001	-0.002	-0.004
				(0.010)	(0.011)	(0.007)
Aid * Policy	0.026***	0.025**	0.019**	0.030*	0.026	0.031**
	(0.008)	(0.012)	(0.007)	(0.016)	(0.025)	(0.012)
Aid squared * Policy				0	0	-0.001
				(0.001)	(0.001)	(0.000)
Policy Index	0.056***	0.056**	0.066***	0.053***	0.057**	0.064***
	(0.016)	(0.025)	(0.014)	(0.020)	(0.024)	(0.012)
Institutional Quality	-0.106	-0.831	-0.079	-0.127	-0.113	0.768*
	(0.458)	(0.591)	(0.529)	(0.464)	(0.435)	(0.404)
Financial Depth, t-1	0.081**	0.113**	0.011	0.082**	0.074*	0.006
	(0.036)	(0.051)	(0.014)	(0.037)	(0.043)	(0.009)
GDP per capita, t-1	-17.800***	-29.152***	-0.432	-17.673***	-18.479***	-0.21
	(2.354)	(6.831)	(0.469)	(2.408)	(3.396)	(0.474)
Restrictions on Freedom	-0.395	-0.62	-0.2	-0.387	-0.404	0.055
	(0.323)	(0.400)	(0.254)	(0.324)	(0.282)	(0.203)
Political Stability	0.149	0.282	0	0.149	0.161	-0.001
	(0.093)	(0.172)	(0.125)	(0.094)	(0.114)	(0.098)
Land Area in Tropics			-0.264			0.161
			(0.522)			(0.505)
Ethnolinguistic Heterogeneity			-0.118			0.268
			(1.143)			(0.920)
Observations	382	347	382	382	347	382
R-squared	0.42			0.42		
p values for						
Hansen Test		1.000	1.000		1.000	1.000
AB AR(1) in first diff.		0.009	0.004		0.004	0.004
AB AR(2) in first diff.		0.768	0.666		0.838	0.743

Notes: *** significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in all regressions is the annual growth rate of per capita GDP. All regressions include year dummies and a constant term. Heteroskedasticity-robust standard errors are reported in parenthesis. All debt and all aid terms are expressed in percent of gross domestic product. Financial depth is defined as M2/GDP. GDP per capita is the natural logarithm of GDP per capita. In the GMM regressions, policy, aid, and aid squared are instrumented with 10 lags of their own levels, and additionally with 10 lags of their first-differences in (3) and (6). Additionally, aid is instrumented by the natural logarithm of population.**