

Health Expenditures

Under the HIPC Debt Initiative

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Abstract

One of the goals of the Heavily Indebted Poor Countries (HIPC) debt initiative is to provide additional resources for basic health care to the population of eligible developing countries. In this paper I investigate the effect of debt relief on per capita health expenditure in a sample of developing countries while controlling for other factors used in the literature. I find that debt relief has – at the margin – little or no effect on health expenditure in countries that are classified as HIPC. The level of health expenditures in HIPC countries, however, is significantly higher than in other developing countries. On the other hand, countries not classified as HIPC increase their per capita health expenditures more than proportionally if they receive debt relief. This result is surprising considering that per capita amounts of debt relief provided to HIPC countries are on average significantly higher than those to Non-HIPC countries.

Keywords: HIPC debt initiative, debt relief, foreign aid, public health expenditure

JEL Classification: F42, O11, I18

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“[...] By requiring countries to prepare comprehensive, locally-owned poverty reduction strategies, the enhanced HIPC Initiative will also ensure that the proceeds of debt relief are directed towards basic health, education and poverty reduction programmes, and are not lost in corruption or military spending.”

Australian Government webpage ¹

1 Introduction

One of the goals of the Heavily Indebted Poor Countries (HIPC) debt initiative is to provide additional resources for basic health care to the population of eligible developing countries. In this paper I investigate the effect of debt relief on per capita health expenditure in a sample of developing countries while controlling for other factors used in the literature. I find that debt relief has – at the margin – little or no effect on health expenditure in countries that are classified as HIPC. The level of health expenditures in HIPC countries, however, is significantly higher than in other developing countries. On the other hand, countries not classified as HIPC increase their per capita health expenditures more than proportionally if they receive debt relief. This result is surprising considering that per capita amounts of debt relief provided to HIPC countries are on average significantly higher than those to Non-HIPC countries.

The interest of policy makers in the composition of public spending is based – at least in part – on the argument that increased government spending on health care is an effective tool in increasing long-run economic growth and reducing poverty.² This argument is reflected in the evolution of HIPC debt initiative. Initially, the main goal of the HIPC debt initiative in 1996 is to bring eligible countries on a sustainable debt path by providing debt relief to eligible countries conditional on the implementation of structural reforms advocated by the international financial institutions. Since a review of the HIPC initiative in 1998

¹ Quote from the website of the Australian Government Agency AusAID on debt relief and whether debt relief will reach the poor (<http://www.ausaid.gov.au/hottopics/debt/faq.cfm#willdebt>).

² Government spending on health care and basic education is considered “pro-poor” in the literature, meaning that these expenditures directly contribute to poverty reduction [for example, see Gomanee and Morrissey (2002)].

deems the provision of debt relief in the initiative as “too little, too late”, the HIPC initiative is “enhanced” in 1999 by speeding up the process for the disbursement of debt relief and by making poverty reduction a priority.³ Eligible countries draft a poverty-reduction strategy paper (PRSP) with input also coming from civic society. These strategy papers spell out how exactly resources will be allocated to different public sectors to eradicate poverty in the long run.⁴ Another recent initiative that focuses on public spending is the declaration of the Millennium Development Goals (MDGs). These goals include proposals to provide universal primary education and basic primary health care in developing countries.

The purpose of this paper is to investigate the effect of those recent initiatives in the affected countries on public expenditure. In particular, I focus on the question whether the implementation of these and similar initiatives has led to a significant change in health expenditures in developing countries. Furthermore, I investigate whether there are differences between countries that are part of the HIPC initiative and those that are not. The panel data covers the period 1998 to 2001. The two main contributions of this paper to the literature are the inclusion of a debt relief variable as a determinant of health expenditures and the investigation of the presence of a differential effect of debt relief on two distinct country groups – HIPC countries and Non-HIPC developing countries.

The remainder of the paper is organized as follows: Section 2 describes the relevant literature for this study. In section 3, the empirical model and methodology are laid out. Section 4 provides some details on the variables and data sources. The estimation results will be presented in section 5. Section 6 concludes.

³ See International Monetary Fund and World Bank (1998).

⁴ “[] the enhanced HIPC initiative will boost social spending...”, quote from <http://www.worldbank.org/hipc/progress-to-date/May99v3/may99v3.htm>

2 Literature Review

This study builds on earlier work in several strands of the literature. It is most closely related to the literature on the determinants of health expenditures. First-generation studies in this literature, dealing mostly with developed countries, use cross-country analysis to determine which factors are most important with respect to health expenditure. Most of these studies find that gross domestic product is the most important determinant of health expenditure and also that the income elasticity of health expenditures exceeds one, suggesting that health care is a luxury good [Newhouse (1977), Leu (1986), Culyer (1988), Gerdtham et al. (1988, 1992a, 1992b)]. A concern about omitted variables bias in the earlier literature leads researchers to include other variables potentially impacting health expenditures. These variables are demographic structure, degree of urbanization, number of physicians, and share of public sector provision of health services.⁵ The demographic structure of the population is proxied by the percentage of the population below 15 and above 65 years of age. Health expenditures for these age groups are assumed to be above average. The number of physicians is used as a proxy for supplier-induced demand for health services; hence a positive sign is expected. Gerdtham et al. (1992b) find that the number of physicians – contrary to expectations – has a weakly negative impact on health expenditures. On the other hand, an increase in the percentage of the population above 65 years of age has the expected positive effect. The results for urbanization in the literature are mixed in the literature.⁶ It is theoretically not clear how urbanization influences health expenditure. An argument for a negative relationship is a higher risk of contagion in more densely populated areas. However, urbanization could have a positive effect by reducing travel costs to reach the population. Furthermore, access to vital health information is better and preventative health education is easier to provide. Further extending the set of explanatory variables, Gbesemete and Gerdtham (1992) include percentage of births attended by health staff, crude

⁵ Leu (1986) argues that based on “some well-known results in the public choice literature” (p.42), a higher share of public financing is associated with higher total health expenditure. Subsequent research questions this result, however. See, for example, Gerdtham et al. (1988, 1992b).

⁶ Leu (1986) finds a positive effect of urbanization on health expenditures, whereas the effect in Gerdtham et al. (1992a) is negative.

birth rate and foreign aid receipts in their empirical analysis.⁷ The percentage of births attended by health staff is interpreted as “an indirect measure of the extent to which health services have reached the people”.⁸ Furthermore, the authors find that foreign aid is consistently significant and positive. This suggests that foreign aid is effective in sustaining a higher resource allocation to the health sector and that it insulates the health care sector – at least partially – from budget cuts in times of economic downturns.

Second-generation studies in this literature use panel data to investigate the *dynamic* relationship between health expenditures and their determinants. For example, Gerdtham (1992) applies simple OLS as well as one-way and two-way fixed effects and random effects models to health expenditure data for 22 OECD countries from the early 1970s to the late 1980s. His results are sensitive to the estimation methodology. The author is able to reject random effects in the data, and the fixed effect specification is preferred over the alternative specifications. Again, gross domestic product is the main determinant of health expenditure. Hitiris and Posnett (1992) replicate the analysis of Newhouse (1977) and Leu (1986) with panel data and find that – apart from GDP – the demographic structure matters; the higher the fraction of the population over age 65 is, the higher are health expenditures, confirming the result of Leu (1986). The more recent literature explicitly recognizes the importance of institutional variables as determinants of a country’s health expenditures. Gerdtham et al. (1998), for example, find that health expenditures are lower for health care systems with public reimbursement compared to public contract systems; and for systems with primary physicians as gatekeepers for in-patient care. Budget ceilings in ambulatory care, on the other hand, have no effect on health expenditures. Barros (1998) applies an alternative approach to analyze the determinants of expenditure in health care. Rather than studying the relationship of health expenditure and GDP levels, he investigates the link of growth rates of health expenditures with GDP growth, as well as the age structure, a gatekeeper variable, and initial health expenditure. Only initial health expenditure turns out to be significant, indicating a convergence of health expenditure.

⁷ Since debt relief can be interpreted as an indirect form of aid, the results of that paper are particularly relevant to my study.

⁸ See Gbesemete and Gerdtham (1992), p.304.

A second strand of relevant literature deals with the fungibility of foreign aid. Apart from geo-strategic considerations, another purpose of foreign aid is to provide government budget support to developing nations. Rather than providing general budget support to poor countries, donors often earmark funds for particular expenditures for example on primary health care or basic education. Nonetheless, these funds are quite fungible. Fungibility is defined in the literature as follows: Suppose that a donor and a recipient country agree to spend all aid resources on the health sector. If – after the disbursement of aid - the recipient country decides to replace (some of) its own government resources initially allocated to this sector with foreign aid, then aid is called (partially) fungible. The issue of fungibility was recognized early in the development literature.⁹ Recently, aid fungibility received prominent treatment in the influential World Bank report “Assessing Aid”.¹⁰ The report expresses concern about the fungibility of aid and cites some studies providing evidence for the existence of fungible aid, but urges donors to accept it as an (unavoidable) reality in their planning. The report suggests allocating aid to “good policy” countries to minimize leakage. McGillivray and Morrissey (2000), however, question fungibility as an important concern. They argue that the effect of aid on overall public sector behavior is more important and needs to be investigated in order to improve fiscal management in developing countries. For example, in a case study of Pakistan, Franco-Rodriguez et al. (1998) find that aid has a weakly positive impact on public investment and a negative impact on tax effort. Particularly the negative impact on tax effort is worrisome, since this may have to do with incentive effects of providing large inflows of aid funds. Addressing this concern, Franco-Rodriguez (2000) applies a fiscal response model in which aid flows are endogenized into government spending decisions. Applying this model to data from Costa Rica, she finds that – in contrast to the theoretical prediction of her model – government revenue and expenditure barely react to an increase in aid inflows.

Another relevant area of the literature relevant for this study investigates the effectiveness of foreign aid in promoting economic growth. The seminal paper in this literature is Burnside and Dollar (2000) [henceforth BD]. The authors estimate the impact of aid, an interacted

⁹ See Little and Clifford (1965).

¹⁰ See World Bank (1998).

aid-policy term, and a set of control variables on the annual growth rate of gross domestic product (GDP) per capita.¹¹ Using Ordinary and Two-Stage Least Squares, they find 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 paper has been criticized on several grounds. Subsequent research shows that the results of the BD study are sensitive to sample selection and specification and may suffer from omitted variable bias. Hansen and Tarp (2000) include a squared aid terms in the regressions to control for diminishing returns to aid.¹² Using an instrumental variables approach, they can replicate the BD results for their reduced sample, but if outliers removed by BD are included, the aid-policy-growth link becomes insignificant. Hence, 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.¹³ Furthermore, they argue that endogeneity has not be properly dealt with in BD. They suggest using the Arellano-Bond GMM estimator, which takes care of country fixed effects by first-differencing and includes aid with different lags as an instrument to deal with endogeneity. 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.¹⁴ The omission of these factors in the BD analysis may have lead 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 2SLS specification, the authors find that policy doesn’t 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

¹¹ The set of control variables includes initial GDP, ethnic fractionalization, number of assassinations, and interaction term of ethnicity and assassinations, the Knack and Keefer (1995) measure of institutional quality, M2/GDP to measure financial depth, and two region dummies.

¹² 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.

¹³ See Easterly and Levine (1997) and Temple (1998).

¹⁴ The external factors included are trends in terms of trade, stability of agricultural value added and of real value of exports.

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 aid increase in the presence of a negative export price shock leads to a higher growth rate. Easterly et al. (2003) extend the original BD data set and show that the BD 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.¹⁵ 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 need to be further investigated to reach conclusive results. 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 retards 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. In this case, debt relief would be a valid alternative to aid, since – as argued before – it is (indirectly) providing additional resources without leading to overvaluation of exchange rates.

In this paper, I am only indirectly concerned about the link between foreign aid and economic growth. My main interest lies in investigating the link between debt relief and

¹⁵ 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 picks up differences in productivity and it also exerts influence on the evolution of institutions. They find that aid is less effective the larger the fraction of land in tropical climate is.

public spending. Interpreting debt (service) relief as a form of foreign aid by providing additional resources indirectly through a reduction of the debt (service) burden means that debt relief increases resources for public spending. If these resources are invested effectively, economic growth will increase and poverty will be reduced. This brings us to the final relevant area of the literature that deals with the links between public spending and poverty reduction. Poverty reduction will most likely lead to higher economic growth – at least in the long run. This brings us to the final area of relevant literature dealing with pro-poor spending and its effect on growth. The twin objectives of the enhanced HIPC debt initiative – debt sustainability and poverty reduction – make it fairly clear that the focus of development assistance has shifted away from pure growth promotion and towards a more balanced approach emphasizing social issues. The objective of the enhanced HIPC initiative is “to provide a permanent exit from debt rescheduling, promote growth and release resources for higher social spending”.¹⁶ Each eligible country has to draft a Poverty-Reduction Strategy Paper (PRSP) that identifies “pro-poor” budget expenditure and specifies how this expenditure will be increased in subsequent years. Most of the resources “freed up” by HIPC debt relief have been directed to the health and education sector, suggesting that those sectors are considered to be “pro-poor”.¹⁷ Several studies in this area use health and education expenditures as a proxy for pro-poor expenditure.¹⁸ Using infant mortality and the Human Development Index as proxies for the welfare of the poor, Gomane et al. (2003b) reach two conclusions. First, an increase pro-poor public expenditure is associated with an increase in the welfare of the poor. Second, they find evidence that foreign aid increases improves welfare indicators through financing pro-poor spending. Furthermore, Gomane et al. (2003a) suggest that aid is more effective in increasing the welfare of the poor in countries with lower welfare indicators. Mooji and Dev (2004) investigate the budget process in India. They argue that the rhetoric of politicians involved in the budget-making process of allocating resources for social spending beneficial to the poor is only partially matched by

¹⁶ See World Bank (2003).

¹⁷ See previous footnote.

¹⁸ See the appendix of Paternostro et al. (2005) for an overview and description of some academic studies on pro-poor spending.

action. The authors also argue that the shift in focus away from promoting growth towards increased social expenditure for the poor may have gone too far. Basic education and health care for everyone are worthy goals, but more emphasis needs to be put on creating employment opportunities for now healthier and more educated poor. Duncan and Pollard (2002) provide a conceptual framework for thinking about priorities in implementing poverty reduction as a development strategy. The building blocks for successful implementation of poverty-reduction programs are – ordered by importance – civil and social order, institutional rules and regulations, good governance, effective markets, pro-poor spending, and pro-poor growth and policy intervention. Paternostro et al. (2005) addresses a growing concern mentioned previously that the link between increased social expenditure and reduced poverty is taken as a fact and that the link from growth to poverty reduction is often ignored. Arguing that the literature does not provide much guidance in terms of how to allocate resources to different public sectors, they propose a framework unifying economic growth theory and public economics principles. This framework is intended to provide guidance in determining the impact of public spending on both growth and poverty reduction. There is a closely related area of the literature with a narrower focus: How closely linked are public expenditures in health and education to improvements in educational attainment and health status? Focusing on studies that explore the effect of health expenditures on national health status, the empirical evidence is mixed. Numerous studies conclude that health status as measured by infant or child mortality is not or only marginally affected by public health outlays [Kim and Moody (1992); Musgrove (1996); Filmer and Pritchett (1997); Filmer et al. (1998)]. Furthermore, as Filmer and Pritchett (1997) suggest, most of the differences in infant mortality can be explained simply by differences in overall income level between countries. However, there are also some studies providing empirical evidence that health status is in fact positively related to health expenditures [Anand and Ravallion (1993); Gupta et al. (2002); Hojman (1996)]. Gupta et al. (2002) suggest that more attention needs to be paid to the allocation of funds within the health and education sector. For example, they find that public expenditures on health are more effective if spent on primary (preventive) rather than secondary (curative) health care.

3 Empirical Model

In this section I describe the estimation methodology and the function of the explanatory variables used in the analysis to determine the consequences of debt relief on health expenditures. One problem with international comparisons of health systems is the weak theoretical foundation for the determinants of aggregate health expenditures. Theory, therefore, provides only little guidance for the choice of reasonable explanatory variables and the causalities involved. In the public choice literature, attempts have been made to provide a theoretical foundation for aggregate health expenditures [see Buchanan (1965) and Leu (1986)]. However, those theories have been criticized by Culyer (1988, 1989) for being “(avoidably) highly selective” in the phenomena they try to explain. In this paper, the choice of explanatory variables is mostly guided by the previous literature as well as the OECD list of core indicators for health.¹⁹

The regression model is specified as follows:

$$y_{it} = \alpha_0 + X_{it}'\beta_x + Z_{it}'\gamma_z + \alpha_i + \phi_t + \varepsilon_{it}$$

where y_{it} are total health expenditures per capita, X_{it} is a vector of the variables of interest, Z_{it} is a vector of control variables, α_i is a county fixed or random effect, ϕ_t is a time fixed effect, and ε_{it} is an i.i.d. error term.

In order to check for the robustness of regression results, I use Ordinary Least Squares, Fixed Effects, and Random Effects estimation techniques. The literature mostly uses OLS, but concern about possible omitted variables bias makes a fixed effects model a preferable choice. Before going into details about the independent variables, it is important to discuss the choice of the dependent variable, total health expenditures per capita (THEpc). The reason for using health expenditures instead of health status as my left hand side variable is fairly straightforward. The mixed results in the literature about the link between health expenditures (input) and health status (output) are only a secondary concern for this paper. Recent debt relief initiatives implicitly assume a positive link between the two and are

¹⁹ See the OECD website at <http://www.oecd.org/dataoecd/30/28/2754929.pdf>

therefore primarily concerned about the *level* of health expenditure. Even though THEpc is commonly used in the health expenditure literature, it may not seem an obvious choice for another reason. The focus of this paper is to measure the effect of recent debt relief initiatives on health expenditures. More specifically, since the debt that is being relieved is exclusively public or at least publicly guaranteed, my interest is in how this influences government behavior and spending patterns. For data availability reasons, I use THEpc, which includes private *and* public expenditures on health instead of only public health expenditure. However, I control for a possible shift in health expenditures from private to public or vice versa by including a control variable measuring public health expenditure as a share of total health expenditures.²⁰

Let me now turn to the explanatory variables included in the regression analysis. The vector X_{it} includes *debt relief*, a *dummy variable for HIPC status*, and an interacted variable *HIPC*Debt relief*. These are the main variables of interest. Many non-governmental organizations (NGOs) argue that the debt (service) burden on poor countries is one of the main reasons these governments are using their scarce resources for debt repayment instead of social expenditures on health and education. The perception in developing countries is that falling into arrears with creditors presumably has much graver consequences for the country than neglecting the health and education sector. There are at least two ways to address this problem. One is for industrialized nations to increase foreign aid to those highly indebted countries thereby providing them with the necessary resources to finance health and education outlays. Another way of providing additional resources to developing countries – potentially more politically viable due to budget constraints faced by policymakers in wealthy countries – is the granting of debt relief. Another advantage of debt relief compared to aid is that large aid inflows may lead to an overvalued exchange rate, thereby hurting competitiveness of the export sector and consequently growth [Rajan and Subramanian (2005a)]. Debt relief, on the other hand, is cutting the outflow of resources rather than increasing inflow and its associated problems. As previously mentioned, debt relief can function as an indirect form of aid in freeing up resources that otherwise would have been used for debt repayment. If this argument holds true and additional resources are

²⁰ See Leu (1986).

devoted to increasing the health budget, debt service relief is expected to have a positive effect on total health expenditures.²¹ Resources that otherwise would be used for debt service, can now be used for health expenditure. On the other hand, if the resources “freed up” by debt service relief are fungible, then health expenditure will not increase at all or increase by less than one-to-one. The interacted variable *HIPC*Debt relief* will allow us to distinguish between the effects of debt relief on health expenditures in countries classified as heavily indebted poor countries from that in non-HIPC developing countries. The dummy variable *HIPC* controls for differential levels of health expenditures in the two countries groups. Additional variables of interest are *aid per capita*, and *debt service*. An earlier study by Gbesemete and Gerdtham (1992) found that aid positively influences health expenditures by providing additional resources above and beyond the regular government revenue. Since the government’s capacity to generate tax revenue is limited, high debt service payments will also influence public health expenditure negatively.

In addition to the previously mentioned variables, I include a set of control variables (Z_{it}) into the regressions that are fairly standard in the literature. The most important variable in terms of significance in past studies is per capita gross domestic product (GDP). It serves as a proxy for resource availability in an economy. Previous empirical evidence suggests that a population’s health expenditure increases with per capita income. Other standard variables include the age distribution of the population; the degree of urbanization, the crude birth rate, the percentage of births attended by health staff, and the number of physicians per 100,000 people. The effect of increased urbanization on health expenditures can be positive or negative. For example, Schultz (1993) finds that mortality rates in rural households are significantly higher than those in urban areas, suggesting that the health status of the urban population is higher thereby decreasing health expenditures. On the other hand, one can imagine that increased urbanization leads to higher risk of contagion, therefore requiring higher health expenditures. The age structure of a society may be an important determinant of health expenditure. The utilization of medical services for the population under 15 years and above 65 years of age is higher than average. One caveat, especially for developing

²¹ This argument implicitly assumes that fungibility of resources is not an issue and that developing countries honor the commitments made to donor countries.

countries, is that high child mortality rates may lower the demand for health services in the under-15 age group. On the other hand, parents may decide to utilize health services only once their children are extremely sick, which will then lead to high medical expenditures. Following previous studies, the percentage of births attended by health staff is used as an indirect measure for the degree to which health services reach the population. As argued by Gerdtham et al. (1992), the number of physicians serves as a proxy for supplier-induced health expenditures.²² However, one can also imagine that the number of physicians is endogenously determined by the size of the public health sector. In the context of the present empirical analysis, this should not be an issue due to the long lags involved.²³

Additionally, I include the *lagged value of the budget balance*, assuming that decisions on health expenditures depend on the economic situation of the government. In case of a budget deficit, politicians may be more inclined to cut health expenditures in the coming budget rather than – say – raise tax rates. Following a similar argument, I include the *per capita growth rate of GDP* in some specifications. Myopic politicians may divert resources otherwise going into health expenditures to other sectors that have a better chance at stimulating short-term economic growth. Given the focus in recent development initiatives on poverty, I add a variable for the share of the population living below \$1/day. Given the correlation between wealth and health status, a poorer population suffers from worse health and will therefore require higher expenditures on primary health care. The *institutional quality* measure 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. A higher number indicates better institutional quality. Hence, in an environment with better run institutions, we would expect lower health expenditures.

²² See, for example, Leu (1986) and Gerdtham et al. (1992a, 1992b).

²³ From the decision to become a physician to being one, several years will pass.

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. These countries can be further divided into two sub-groups: 39 HIPC countries, and 83 Non-HIPC countries. The restriction of the data set to the four year time period 1998 to 2001 is mainly due to data availability. However, this coincides with the period where the HIPC debt initiative should have the biggest impact on health expenditures.

Data on the dependent variable – the *health expenditures per capita* – and on the government share of total health expenditure are from the World Health Report 2004 published by the World Health Organization. *Debt stock*, *debt service*, and the main explanatory variable *debt relief* – which is defined as the sum of principal and interest forgiven in a given year – are from the World Bank’s Global Development Finance (GDF) 2005 data set. Data on aid comes from OECD International Development Statistics (IDS) 2004 CD-Rom. Budget balance data is taken from the International Financial Statistics (May 2005). *Debt service*, *debt stock*, and the *budget balance* are expressed as a percentage of GDP. Data on *gross domestic product*, the *growth rate of GDP*, the *share of the population living on \$1/day or less*, the *number of physicians per 100,000 people*, the *share of population below 15 years of age and above 65 years of age* are all taken from the online version of the World Bank’s World Development Indicators (WDI) 2005 data set. The data on *physicians*, on *births attended by health staff* and on *poverty* are only available as 5-year averages from 1998 to 2002. Due to this data restriction, they appear to be time invariant, and therefore drop out of the fixed effects regressions. Data on *urbanization*, the *crude birth rate*, and *population* are from the United Nations Population Division. All monetary values are expressed in terms of international dollars (i.e., converted to purchasing power parity).²⁴

²⁴ Additional variables that were used in the regression include the variable *freedom* measuring political rights and civil liberties, the *adult literacy rate* (more educated people are better informed which could lower health expenditures), and *life expectancy*. The coefficient estimates of these variables turned out to be insignificant and are therefore not reported.

5 Empirical Analysis

5.1 Descriptive Statistics

To get a better sense about the data and the differences between the two groups of countries (HIPC and non-HIPC countries), descriptive statistics for the variables included in the regressions are reported in tables 1 and 2. Starting with per capita health expenditures, we see that health expenditure have a much larger range in non-HIPC countries. Average health expenditures in HIPC countries are about a sixth of those in non-HIPC which very closely corresponds to the difference in incomes (GDP). Hence, on average both groups spend about the same on health in percentage terms of gross domestic product. Not surprisingly, we see a large difference in average debt stock and share of population living below \$1/day. HIPC countries are more than twice as indebted as a percentage of GDP and the poverty rate is about three times that of non-HIPC countries. Furthermore, average debt relief in HIPC countries between 1998 and 2001 was 5 percent of GDP, whereas it was only around 0.4 percent for non-HIPC countries; actual average debt service (in % of GDP), however, was very similar. GDP growth and budget balance are comparable in the two groups, which may be an indication of success of the initiatives in the late 1990s. Urbanization, births attended by health staff, and number of physicians are all higher in non-HIPC countries as we would expect. Overall, what becomes clear from the comparison is that the two groups are very different from each other in some basic characteristics. Hence, it is not surprising that debt relief had quite distinct consequences on health expenditures in the time period considered here for the two groups.

5.2 Regression Results

This section presents the results of the regression analysis. In particular, I focus on the question whether recent debt relief initiatives had a positive effect on public health expenditure. All regressions distinguish between HIPC and non-HIPC countries using a dummy variables approach. Additionally, I check the robustness of the results by using three different specifications. The first specification includes most of the standard variables used in the literature plus the debt relief measure. In the second specification, I drop the debt stock variable as an explanatory variable with the idea that this variable has long-term rather than short-term effects on public health expenditures. The lagged growth rate of GDP per capita is also dropped since it does not seem to play a role in influencing health expenditure (at least in the short term). Finally, in the third specification I drop the control variable for the share of public expenditure in total health expenditure.

The empirical results are reported in Table 3. I find that debt relief has a significantly positive effect on health expenditures per capita in countries that are not classified as Heavily Indebted Poor Countries. This result is robust across different specifications and also to using different estimation methodologies. For example, in the fixed effects estimation, a one dollar increase in debt relief is associated with an increase of around 1.60 dollar in per capita health expenditures. This may be an indication that debt relief affects current behavior as well as expectations about the future. If debt relief – as suggested by the debt overhang literature – removes distortions on investment behavior, investment increases, thereby creating expectations of higher future growth rates that justify increased health expenditures today.²⁵ Analyzing the situation of HIPC countries, however, my results indicate that a positive effect of debt relief for this country group is – for all practical purposes – nonexistent. Recalling the descriptive statistics in tables 1 and 2, this result is somewhat surprising given the much larger extent of debt relief granted to HIPC countries. This is disappointing from a policy perspective. This may be an indication of significant fungibility of funds. The resources freed up by debt relief may have been used in other sectors instead of leading to additional expenditure in the health sector. Like Gbesemete and Gerdtham (1992), the regression also includes foreign aid as an explanatory variable. In contrast to the aforementioned study, foreign aid has a negative effect on health expenditures though. This result, however, is only significant using the OLS estimation technique. As in most of the studies on health expenditures, GDP per capita is a robust and significantly positive determinant. An additional dollar of GDP per capita increases health expenditures between 3 and 7 cents, depending on the estimation technique. This suggests that health expenditures in higher income countries are on a higher level. Of the remaining variables, coefficient estimates for the degree of urbanization as well as for age distribution are inconclusive and contradictory. Urbanization has a positive effect on health expenditure in OLS and random effects; in the preferred fixed effects regressions, however, the significance disappears. Contradictory to expectations, an increased share of the population belonging to the age group under 15 or over 65 has a negative effect on health expenditures in the fixed effects regressions suggesting that health expenditures are higher the larger the share of the working

²⁵ See, for example, Krugman (1988) and Sachs (1986) on the effects of debt overhang on incentives of domestic agents.

age population. Finally, an increase in the number of physicians significantly increases health expenditures which is what we expect if the number of physicians is a valid proxy for supplier-induced health expenditures; on the other hand an increase in the government share of health expenditure leads to a decrease in health expenditure contradicting earlier studies that suggest the opposite.²⁶ The coefficients of other variables commonly used in this literature – the crude birth rate, and the percentage of births attended by health staff – are insignificant. As explained in the previous section, the fixed effects regression does not include the number of physicians per 100,000 people, the percentage of births attended by health staff, and the share of the population living on less than one dollar a day as regressors, because only averaged data for the sample period is available. The lagged growth rate of GDP is used to see whether the public sector adjust its health expenditure with the macroeconomic environment. One can imagine that health expenditures are high on the list of budget cuts in case of an economic downturn and governments may wish to re-allocate resources towards infrastructure investments, for example. My results, however, suggest that this is not the case. The coefficient estimates are negative, but not significant. Finally, neither institutional quality, nor debt service or debt stock per se play a role in determining the level of resources devoted to health care. Apart from the variables reported, I also included a range of additional variables into the regressions, none of which turned out to be significant, however.²⁷

6 Conclusion

In this paper, I have investigated the effects of debt relief on health expenditures in developing countries between 1998 and 2001. I find that debt relief was effective in increasing health expenditures in some developing countries. However, debt relief for countries classified as Heavily Indebted Poor Countries debt initiative – despite being the

²⁶ See Leu (1986).

²⁷ Other variables included were the degree of democratization, life expectancy, infant mortality, adult literacy rate, as well as the contemporaneous values of budget balance and the GDP growth rates.

main beneficiaries – did not affect health expenditures significantly. There are several possible explanations for this result. First, even though the empirical model already accounts for differences in debt service and debt stock, these variables may not very precisely capture their influence on economic decision-making. There may still be substantial debt overhang in HIPC countries even after debt relief, which would make it politically and economically very hard to increase expenditures in the health sector under a still back-breaking debt (service) burden. Hence, more debt relief would be required to enable these countries to substantially increase their expenditures in the health sector. A second explanation could be that – for some as yet unaccounted for reason – HIPC countries may have substantially different spending priorities from non-HIPC countries. Furthermore, aid fungibility may be a serious problem, meaning that aid resources directed to the health sector will simply replace government resources. These resources will then be spent on higher priorities of the governments, for example, military expenditure or government consumption, or in a worst case scenario, will be pocketed by the ruling elites.

This immediately brings up further questions. Since the empirical model in this paper already accounts for debt service, debt stock, and the poverty level, what is the factor that makes debt relief more efficient in Non-HIPC compared to HIPC countries? Or – if there are no differences in the effectiveness of debt relief with respect to health expenditures between the two sets of countries – how have the “freed up” resources been used in HIPC countries? Further research in this area is needed to better understand the links between institutional characteristics, the budgetary process, and public expenditure allocation.

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Appendix

Table 1 Descriptive Statistics. Non-HIPC countries.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Health expenditure*	171	368.02	306.84	26.00	1523.00
Debt Service Relief*	163	0.37	1.86	0.00	18.23
Debt Service	163	5.61	3.94	0.71	26.45
Aid*	168	27.21	40.33	-7.85	308.05
Income*	168	6,362.87	4,175.84	834.00	18,151.00
Budget Balance	171	-3.13	3.23	-19.66	10.34
Age Distribution	168	0.39	0.05	0.30	0.48
Urbanization	171	50.79	21.31	6.50	91.90
Crude Birth Rate	168	24.04	8.25	8.80	41.70
Birth w/ Health Staff	162	75.68	26.25	11.00	100.00
Doctors	171	125.14	98.63	5.10	439.70
Poverty	125	12.62	15.20	2.00	70.20
Public Health Share	171	53.57	18.23	20.70	93.40
Debt Stock	163	47.35	25.78	6.38	158.28
GDP Growth Rate	171	1.21	3.64	-14.30	7.24

Notes:

* = in per capita terms.
Short variable descriptions will be included here.

Table 2 Descriptive Statistics. HIPC countries.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Health expenditure*	68	57.87	46.06	11.00	158.00
Debt Service Relief*	68	5.03	13.78	0.00	81.69
Debt Service	64	4.17	2.75	0.88	12.79
Aid*	68	37.08	34.08	1.56	178.78
Income*	64	1,283.64	635.33	447.00	2,575.00
Budget Balance	68	-3.23	3.44	-19.65	5.76
Age Distribution	68	0.47	0.04	0.37	0.53
Urbanization	68	30.34	15.48	7.50	61.90
Crude Birth Rate	68	40.00	8.90	20.20	50.70
Birth w/ Health Staff	64	45.02	17.16	6.00	70.00
Doctors	68	27.92	41.77	1.90	164.40
Poverty	49	37.99	18.48	14.40	72.80
Public Health Share	68	41.25	16.28	10.60	72.40
Debt Stock	64	106.46	50.10	38.53	262.56
GDP Growth Rate	68	1.42	3.88	-10.29	12.18

Notes:

* = in per capita terms.
Short variable descriptions will be included here.

Table 3

Regression Results. Dependent Variable: Total Health Expenditures per capita.

	Ordinary Least Squares			Random Effects			Fixed Effects		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Debt Relief	10.140*** (3.330)	9.984*** (3.332)	8.190** (3.599)	2.011** (0.865)	1.961** (0.859)	1.978** (0.847)	1.659** (0.768)	1.596** (0.755)	1.579* (0.833)
HIPC * Debt Relief	-10.437*** (3.372)	-10.200*** (3.371)	-8.437** (3.643)	-1.867** (0.898)	-1.857** (0.885)	-1.874** (0.873)	-1.467* (0.784)	-1.500* (0.771)	-1.487* (0.848)
HIPC	140.390*** (23.060)	143.373*** (21.387)	115.783*** (22.452)	69.610* (40.034)	74.265* (39.174)	68.416 (43.662)			
Debt Service	1.412 (2.798)	2.049 (2.171)	3.44 (2.339)	-0.408 (1.006)	-0.382 (0.904)	-0.424 (0.896)	-0.395 (0.935)	-0.201 (0.841)	-0.178 (0.831)
Aid	-0.879*** (0.300)	-0.879*** (0.292)	-1.176*** (0.311)	-0.046 (0.157)	-0.045 (0.154)	-0.073 (0.152)	-0.044 (0.123)	-0.031 (0.119)	-0.053 (0.114)
Income	0.079*** (0.006)	0.079*** (0.006)	0.067*** (0.006)	0.048*** (0.006)	0.048*** (0.006)	0.043*** (0.006)	0.030*** (0.010)	0.030*** (0.011)	0.027** (0.011)
Budget Balance, t-1	-4.696** (2.179)	-5.038** (2.171)	-2.231 (2.278)	0.887 (0.783)	0.818 (0.765)	0.926 (0.756)	1.101 (0.900)	1.107 (0.882)	1.11 (0.869)
Age Distribution	8.222* (4.223)	7.004* (3.822)	10.510** (4.083)	-1.825 (3.296)	-1.888 (3.284)	-3.62 (3.346)	-9.126** (4.135)	-9.056** (4.173)	-11.368*** (3.837)
Urbanization	1.031* (0.559)	1.243** (0.544)	1.136* (0.591)	1.770** (0.865)	1.812** (0.862)	1.521* (0.920)	-1.099 (1.252)	-1.204 (1.276)	-1.829 (1.296)
Institutional Quality	-8.483 (14.051)	-12.474 (13.360)	4.368 (14.048)	10.551 (7.218)	9.719 (6.976)	7.34 (6.938)	4.398 (6.899)	4.441 (6.313)	3.108 (6.198)
Birth Rate	-3.099 (2.519)	-2.317 (2.226)	-4.082* (2.388)	1.258 (1.911)	1.251 (1.903)	0.934 (1.934)	0.237 (2.033)	0.08 (1.944)	-0.7 (1.766)
Births w/ health staff	0.349 (0.490)	0.284 (0.488)	0.057 (0.528)	0.46 (0.848)	0.488 (0.846)	0.306 (0.925)			
Doctors	0.785*** (0.133)	0.764*** (0.127)	0.915*** (0.134)	1.007*** (0.225)	1.005*** (0.224)	1.090*** (0.249)			
Poverty	0.855 (0.574)	0.801 (0.527)	1.003* (0.570)	0.246 (1.038)	0.269 (1.031)	0.374 (1.143)			
Public Share of Health	-2.774*** (0.554)	-2.778*** (0.555)		-1.139** (0.452)	-1.221*** (0.442)		-0.604 (0.509)	-0.711 (0.469)	
Debt Stock	0.051 (0.300)			0.092 (0.175)			0.158 (0.144)		
Growth Rate, t-1	-2.451 (1.617)			-0.368 (0.458)			-0.186 (0.440)		
Observations	151	151	151	151	151	151	151	151	151
R-squared	0.93	0.93	0.92				0.99	0.99	0.99
Adjusted R-squared									

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%
short description will be inserted.