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The uncertainty of debt service payments and economic growth of HIPCs: Is there a case for debt relief?

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The Uncertainty of Debt Service Payments and Economic Growth of HIPCs

Is there a Case for Debt Relief?

Geske Dijkstra¹ and Niels Hermes²

November 2001

Abstract

This paper investigates whether, and to what extent, the uncertainty with respect to the annual debt service payments may adversely affect economic growth of the group of highly indebted poor countries (HIPCs). We find supportive evidence for this hypothesis. Based on these results, we conclude that debt relief may contribute to regaining growth by reducing uncertainty with respect to the debt service payments, which in turn may increase the effectiveness of government policies and consequently provide the private sector with positive signals about the future profitability of their investment.

Keywords: debt relief, uncertainty, debt service, HIPC

JEL classification: F34, E6, O11

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Authors' note

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1 Introduction

Since the late 1980s, several initiatives to reduce the debt burden of poor countries have been proposed. The most comprehensive effort in this respect has been the recent launching of the so-called HIPC I (highly indebted poor countries) initiative in 1996 and the HIPC II initiative in 1999¹ by the international donor community, including IMF and World Bank. These initiatives aim at providing a broad framework for debt relief to a number of very poor countries to bring down their debt burdens to sustainable levels. In contrast with earlier proposals for debt relief, HIPC I and II also include the relief of debt to multilateral institutions like the IMF, World Bank and the regional development banks. Yet, countries become eligible for relief only after they have shown a track record of serious macroeconomic and social policy reforms before receiving relief. Moreover, after the launching of HIPC II, these countries also have to write a poverty reduction strategy paper (PRSP), indicating how they plan to use the resources available after debt relief to combat poverty.

The launching of both HIPC initiatives has reinforced the discussion on the need for debt relief.² In fact, these initiatives mark the recognition of the international donor community that the debt burden of the HIPCs has become unsustainable during the 1990s. The unsustainability of the debt burden refers to the situation in which these countries are no longer able to fully service their future debt obligations without seriously compromising economic growth. Therefore, debt relief might be needed in order to stimulate economic growth and to enable these countries to service the remaining outstanding debt.

The proponents of debt relief for the HIPCs explicitly assume that (extremely) high levels of external debt (expressed in most cases as a percentage of GDP or exports) may have a negative effect on economic growth. A dominant explanation for this negative relationship in the literature is the so-called debt-overhang hypothesis. This hypothesis states that with very high levels of debt, the government has no incentives to carry out macroeconomic reforms and good policies, since the returns to these reforms will only be used to repay outstanding debt. Postponing such reforms and policies, however, may also reduce incentives for the private sector to invest. This may lead to low or even negative levels of economic growth. Yet, the existence of such a debt overhang has not been demonstrated convincingly in empirical studies.

In this study, we pay attention to an issue that has been neglected in the literature on debt and debt relief. In particular, we hypothesize that it is the problem of the uncertainty of debt service payments—rather than the level of the external debt as such—that may compromise the economic growth of the HIPCs. Due to various causes the year-to-year variation in debt service payments may be large, making it difficult for the governments of these countries to know exactly how much resources are available to carry out economic reforms. This may seriously reduce the effectiveness of government policies, which in turn acts as a disincentive to invest by the private sector. Debt relief

¹ HIPC II is an extension of HIPC I in terms of the amount of relief and the number of countries eligible for debt relief.

² The debate on debt relief started at the end of the 1980s when the debt burden of most Latin American countries was believed to be unsustainable. For a discussion of the effectiveness of debt relief initiatives for these countries and the lessons for the effectiveness of HIPC, see Dijkstra and Hermes (2001).

may contribute to reducing the instability of annual debt service payments, thereby contributing to higher growth of the HIPCs.

The remainder of the paper is organized as follows. Section 2 discusses the relationship between the uncertainty of debt service payments and economic growth. Section 3 discusses the data and methodology used. Section 4 presents the results of the empirical analysis. Section 5 concludes and provides issues for further research.

2 Debt, debt payments and economic growth: a survey

First initiatives for relief of external debt of the less developed countries (LDCs) were taken during the mid-1980s by the commercial banks, which by then had recognized that they would not get back the full amount of money they had lent to governments of some LDCs in the past. This led to the development of a second-hand market for LDC debt, where banks sold their claims at less than face value. A few years later, in 1988, debt relief became more or less institutionalized under the Brady initiative. With this initiative the IMF and World Bank, together with the commercial banks, launched a debt relief scheme for a reduced number of heavily indebted countries, among which were the major creditors in Latin America. While the Brady initiative was mainly focused on LDCs with high levels of commercial debt, other initiatives were developed during the late 1980s and 1990s, focusing more on relieving debt to official creditors. These initiatives mainly involved the poor countries in Sub-Saharan Africa, Latin America and Asia. These initiatives culminated in the launching of the HIPC initiative, which is the largest and most sweeping debt relief programme for poor countries to date.³

The various initiatives for providing debt relief on commercial and official debt stimulated the academic debate with respect to the effects such relief instruments may have on the economic development of debtor countries. One of the main issues in this debate focuses on the apparently negative impact of a high external debt on economic growth. During the 1980s and 1990s, many debtor countries experienced low (or even negative) growth and investment in combination with negative net resources transfers. This negative relationship between debt and growth is described by the so-called debt overhang hypothesis. This hypothesis has long dominated the discussion and has been used in many cases to support debt relief initiatives. According to the debt overhang hypothesis (Krugman 1988; Sachs 1989), beyond a certain threshold value, the outstanding external debt starts to become a disincentive for the government to carry out economic reforms and invest in productive activities. This is because the returns on such activities will be used to repay outstanding debt instead of directly improving the economic welfare of residents. Since such economic reforms may have adverse effects on the welfare of certain interest groups, it may be difficult to sell these reforms. Thus, a high debt will reduce incentives for good policies. Moreover, the high external debt will also reduce incentives for the private sector to invest. With a government that is postponing much needed economic reforms and good policies, private investors wait and see before taking new investment decisions.

³ See Boorman and Ahmed (1999) for a discussion of the contents of the HIPC Initiative.

Yet, with these disincentives to invest and reform, the debtor country may get stuck in a low (or negative) growth, high debt trap. Economic reforms and new investment are highly needed to repay outstanding debt, yet the size of the debt and its disincentives on private and public investment make it almost impossible to continue servicing the debt in the future. Therefore, the only way out of this situation may be to offer debt relief. By reducing the debt and the related debt service payments, disincentives to reform and invest also reduce, since a larger share of the returns to such activities will now benefit debtor-country residents.

While the debt overhang hypothesis may seem attractive as an explanation for the observed combination of reduced growth and investment together with an increased negative net resources transfers, the empirical evidence on the existence of a debt overhang has been rather mixed. Claessens (1990) finds a debt overhang only for a very limited number of LDCs. Oks and Van Wijnbergen (1995) test the debt-overhang hypothesis for Mexico and conclude that it does not exist. Borenzstein (1990), based on a simulated growth model for a typical debtor country, concludes that debt relief does not have important effects on growth. Cohen (1993) finds no evidence for the general existence of a debt overhang using data for a sample of 81 LDCs. Yet, for the Latin American countries he shows that high debt had a negative impact on their growth performance. This result is reconfirmed later by the same author (Cohen 1997) and by Weeks (2000). However, Cohen (1997) also explicitly states that for African countries high debt is not a major cause for the low levels of economic growth in the 1980s and 1990s. Desphande (1997) shows that a debt overhang might exist for 13 severely indebted countries. Kaminsky and Pereira (1996) find evidence for a debt overhang for Latin American countries, once social inequality and its impact on government policy and consumption are explicitly taken into account. With high social inequality, governments are too weak to resist the demands of strong pressure groups, impeding the implementation of reforms. Therefore, overlooking the empirical evidence, the existence of a debt overhang for LDCs is not undisputed.

Moreover, in recent discussions on the need of debt relief for the HIPC, critics of the debt-overhang hypothesis have pointed out that the adverse incentive effects of high debt cannot be an important issue for most HIPC. They support their view by showing that these countries generally have experienced positive net resource transfers during the 1990s (Birdsall, Claessens and Diwan 2001; Easterly 2001).

As an alternative to the debt-overhang hypothesis, we hypothesize that it is not so much the amount of debt that may hamper economic growth, but the uncertainty with respect to the annual debt service payments that really matters. We argue, moreover, that this uncertainty may be of particular importance for the HIPC (see below). We define uncertainty of debt service payments as the unanticipated or unexpected instability of these payments (Lensink and Morrissey 2000: 37). Thus, we argue that there is a close link between uncertainty and instability: the annual instability of payments may contribute to uncertainty of debt payments. This uncertainty of payments may hamper much needed (changes in) government policies, which in turn reduce the incentives to private investors.

Our focus on the uncertainty of debt payments and its relationship with growth is inspired by some recent papers that have investigated the role of instability of certain financial variables in determining government policy, private investment and economic growth. Lensink and Morrissey (2000) show that instability of annual aid receipts

negatively influences the effectiveness of development aid. Gemmell and McGillivray (1998) argue that aid inflows are more volatile than other government revenues. Moreover, they find that this volatility influences government spending and taxation. Bleaney, Gemmell and Greenaway (1995) show that government revenue instability is highest for Sub-Saharan African countries. Moreover, they find that revenue instability is associated with expenditure instability and instability in the sources of deficit finance. Basically, what these studies show is that instability/uncertainty of revenues for the government reduces the effectiveness of their policies. This in turn adversely influences investment and ultimately growth.

Although these studies may not be directly linked to external debt problems, in our view there is an indirect link. While they look at the impact of instability in revenues, we aim at investigating the impact of instability of one of the expenditure categories of the government, i. e., debt service payments. High instability of annual debt service payments increases the uncertainty with respect to the implementation of government policies. The government in fact has no clear idea of the amount of money available for carrying out economic reforms, investments in infrastructure and spending on health and education programmes. It may also lead to erratic monetary policies. Therefore, if governments do not have a clear picture of the annual debt service payments, carrying out sound policies becomes extremely difficult. The uncertainty with respect to government policies in turn will adversely affect private investment and may even stimulate capital flight (Hermes and Lensink 2001). Both the erratic government policies and lower private investment will contribute to lower (and perhaps even negative) rates of economic growth.

Oks and Van Wijnbergen (1995) are the first to acknowledge the influence of the uncertainty of debt service payments on economic growth. In their study they empirically analyse this relationship for Mexico (based on monthly data for 1988.4-1990.12) and find that instability of debt service payments did matter. In particular, they show that the Brady initiative led to a smoothening of external resource transfers, which reduced the uncertainty about future exchange rate crises. This, they argue, stimulated private investment, which contributed to regaining growth in Mexico in the early 1990s. Sachs *et al.* (1999) also acknowledge the relationship between the instability of debt service payments and economic performance.

In our analysis, we explicitly focus on the HIPC countries when investigating the relationship between the uncertainty of debt service payments and economic performance. In our view, these countries are particularly confronted with unstable payment patterns. This instability may come from several sources. First, most HIPC countries are regularly negotiating with bilateral and multilateral donors about the terms of debt service repayments. The outcomes of these negotiations are difficult to predict, contributing to the uncertainty about the annual debt service payments due. Second, the uncertainty about debt payments is also at least partly explained by the way the debt servicing system is organized (Sachs *et al.* 1999). In most cases, these countries only pay part of the debt service due; the rest is postponed. A substantial part of the debt service payments actually made is paid for by new loans (mostly on concessional terms from the International Development Association of the World Bank, IDA) and grants from bilateral donors. Yet, for governments of HIPC countries it remains highly uncertain how much is exactly available to pay debt service from own and external sources. Again, this may involve lengthy negotiations between donors and recipient country governments. Moreover, a part of the grants are earmarked for special purposes, since the donors do

not want their aid money to be used for payment of debt service.⁴ These characteristics of the debt servicing system in turn contribute to erratic patterns of debt service payments actually made, reflecting uncertainty with respect to the sources available for servicing the debt.

In the remainder of this paper we empirically investigate the relationship between the uncertainty of debt service payments and economic growth, with particular reference to the HIPCs. As far as we know, this is the first comprehensive attempt to empirically investigate this issue.

3 Data and methodology

The empirical analysis in this paper uses information from a panel of 104 LDCs. In particular, we use observations of variables that have been averaged over three periods, 1970-79, 1980-89 and 1990-98. Our panel of countries is determined by the availability of data on debt and debt service. Information on external debt is based on the *Global Development Finance* (CDROM, version 2000).⁵

In all regressions the dependent variable is the real GDP per capita growth rate (*GDPPC*). One set of independent variables consists of proxies for the uncertainty of the annual actual debt service payments divided by GDP. These are the variables of interest in this study. In particular, we use proxies for the uncertainty of total debt service payments actually paid (*UTDS*) and the uncertainty of long-term debt service payments actually paid (*ULTDS*). Moreover, in alternative specifications we also investigate the influence of the uncertainty of total net resource flows (*UNRF*), total net resource transfers (*UNRT*), net resource flows on debt (*UNRFD*) and net resource transfers on debt (*UNRTD*).

The different proxies for uncertainty have been constructed as follows. Our approach is to measure uncertainty of a specific variable by taking the variance of the unpredictable part of a stochastic process. We first specify and estimate a forecasting equation for a particular variable to determine the expected part of the stochastic process. Next, the standard deviation of the unexpected part of the variable, i. e., the error terms of the forecasting equation, is used as a measure of uncertainty.⁶ We apply a very simple first-order autoregressive process with a time trend as the forecasting equation. The specification is as follows:

$$X_t = \alpha + \varepsilon X_{t-1} + \varepsilon T + \varepsilon_t \quad (1)$$

where α is a constant term, X is the variable of interest, T is a time trend, and ε is the error term. Equation (1) has been used to carry out country-specific regressions for the six variables related to debt service payments and resource flows and transfers (*i.e.* *TDS*, *LTDS*, *NRF*, *NRT*, *NRFD* and *NRTD*) using data for the 1970-98 period.

⁴ Note that, if this is the case, then having net positive resource transfers as such does not mean that there cannot be a debt overhang (Sachs *et al.* 1999).

⁵ See Appendix B for a complete list of the countries included in our data set.

⁶ This approach has also been used by, e. g., Aizenman and Marion (1993) and Ghosal (1995).

As was already briefly mentioned, our measures of uncertainty are in fact measures of unanticipated or unexpected instability of the variables related to debt service payments and resource flows and transfers. The specification in equation (1) assumes that governments who pay debt service and/or receive net flows or transfers apply adaptive expectations when determining current and future debt payments and flows or transfers. This also allows for anticipating at least some instability in these variables. What we aim to measure here is the unanticipated part of the instability (Lensink and Morrissey 2001: 37).

Next to the uncertainty variables, we include a restricted set of variables in the regressions, the so-called conditioning variables, taken from a pool of variables that have been found to be important in other cross-country regression analyses on the determinants of economic growth. They are included to account for possible omitted variable bias. Since several variables appear to be multicollinear, we only take into account those variables that appear to be significant in our regressions and for which we cannot detect problems of multicollinearity. The following conditioning variables have been included in the regressions.

- (1) *The logarithm of GDP per capita at the beginning of the period (LGDP)* to test for the convergence hypothesis, which is standard in the economic growth literature (see, for example, Barro 1991). According to this literature we should find a negative sign for this variable, since countries that have higher levels of GDP per capita at the beginning of the period will have relatively less opportunities to grow (-).
- (2) *The ratio of total investment to GDP (INVGDP)*, which is a measure for the build-up of physical capital. As many studies have shown, this variable is positively related to growth (+) (Levine and Renelt 1992; Sala-i-Martin 1997).
- (3) *A proxy for the number of government crises (GCRI)*, which is a measure of political risk. The higher the political risk in a country, the lower economic growth will be (-).

The standard errors for the regressions are based on White heteroskedastic adjusted standard errors. All equations are estimated with fixed effects to allow for country-specific intercepts, and with time dummies for the 1970s and 1980s.

4 Empirical results

Table 1 shows the results of the empirical analysis. Equation [1.1] shows the results of the model only incorporating the conditioning variables. This is the base equation. Next, we add the different uncertainty variables one by one to this base equation (eqs. [1.2]-[1.7]). The results in the Table show that the different uncertainty variables are not statistically significant. This means that apparently for the entire set of LDCs, uncertainty of debt payments, total net resource flows and/or transfers, and net resource flows and/or transfers on debt does not affect economic growth.

Table 1
Instability of transfers and economic growth

Eq.	[1.1]	[1.2]	[1.3]	[1.4]	[1.5]	[1.6]	[1.7]
<i>LGDP</i>	-0.063 (-10.06)*	-0.063 (-9.68)*	-0.062 (-9.59)*	-0.063 (-9.88)*	-0.063 (-9.92)*	-0.065 (-9.82)*	-0.065 (-9.81)*
<i>INVGDP</i>	0.00087 (2.67)*	0.00078 (2.49)**	0.00081 (2.53)**	0.00081 (2.51)**	0.00080 (2.51)**	0.00084 (2.63)*	0.00084 (2.62)*
<i>GCRI</i>	-0.026 (-4.57)*	-0.024 (-4.46)*	-0.024 (-4.29)*	-0.025 (-4.53)*	-0.025 (-4.52)*	-0.024 (-4.47)*	-0.024 (-4.47)*
<i>UTDS</i>		-0.070 (-1.21)					
<i>ULTDS</i>			-0.138 (-0.75)				
<i>UNRF</i>				0.001 (0.03)			
<i>UNRT</i>					0.003 (0.05)		
<i>UNRFD</i>						-0.023 (-1.61)	
<i>UNRTD</i>							-0.022 (-1.53)
N	258	250	250	250	250	250	250
Adj. R ²	0.61	0.62	0.62	0.62	0.62	0.63	0.63
F	128.9	104.3	104.3	104.0	104.0	105.1	104.9

Notes: See appendix A for explanations of the abbreviations used. The estimation technique used is OLS. The dependent variable is GDP per capita growth. In all estimates fixed effects are taken into account, as well as time dummies for the 1970s and 1980s. Adj. R² is the adjusted R². N is the total number of observations. White heteroskedastic adjusted t-values are given between parentheses. F is the F-statistic. *) denotes significance at the 1 per cent level; **) denotes significance at the 5 per cent level.

Table 2 shows the results of the same empirical analysis. This time, however, we specifically focus on the effects of uncertainty for the HICPs. To do this we add an interactive variable of the uncertainty variables times a HIPC dummy (*DUMH*), which takes the value 0 for non-HICPs and 1 for HICPs to the equations presented in Table 1. The results clearly show that for the HICPs, uncertainty with respect to total debt service payments and long-term debt service payments negatively affect economic growth, as was hypothesized in section 2 of this paper (eqs. [2.1] and [2.2]). Whereas both debt service payments variables remain insignificant, the coefficients for both variables interacted with the HIPC dummy are negative and statistically significant. The adverse effect of uncertainty holds for debt service only, however. The coefficients of the other uncertainty variables included in our analysis appear not to be statistically significant (eqs. [2.3]-[2.6]).

Table 2
Instability of transfers and economic growth: HIPCs versus non-HIPCs

	Eq.	[2.1]	[2.2]	[2.3]	[2.4]	[2.5]	[2.6]
<i>LGDP</i>		-0.066 (-9.84)*	-0.065 (-9.81)*	-0.063 (-9.81)*	-0.063 (-9.92)*	-0.064 (-10.17)*	-0.064 (-10.10)*
<i>INVGD</i>		0.00079 (2.53)**	0.00087 (2.57)**	0.00082 (2.53)**	0.00077 (2.37)**	0.00083 (2.61)*	0.00083 (2.60)**
<i>GCRI</i>		-0.026 (-4.75)*	-0.024 (-4.40)*	-0.025 (-4.53)*	-0.025 (-4.55)*	-0.026 (-4.49)*	-0.025 (-4.49)*
<i>UTDS</i>		0.156 (1.12)					
<i>UTDS*</i> <i>DUMH</i>		-0.310 (-2.02)**					
<i>ULTDS</i>			0.113 (0.58)				
<i>ULTDS*</i> <i>DUMH</i>			-0.925 (-2.39)**				
<i>UNRF</i>				-0.026 (-0.23)			
<i>UNRF*</i> <i>DUMH</i>				0.032 (0.25)			
<i>UNRT</i>					0.058 (0.54)		
<i>UNRT*</i> <i>DUMH</i>					-0.066 (-0.52)		
<i>UNRFD</i>						-0.026 (-1.74)	
<i>UNRFD*</i> <i>DUMH</i>						0.061 (0.49)	
<i>UNRTD</i>							-0.023 (-1.59)
<i>UNRTD*</i> <i>DUMH</i>							0.043 (0.36)
N		250	250	250	250	250	250
Adj. R ²		0.63	0.63	0.62	0.62	0.62	0.62
F		87.6	89.6	86.0	86.1	87.2	87.0

Note: See note to Table 1.

The general conclusion that may be drawn from the results presented in the Tables is that the uncertainty of debt service payments has a negative impact on economic growth of HIPCs, but not for the LDCs in general. This conclusion has implications for the implementation of debt relief initiatives for the HIPCs. Reducing outstanding debt of these countries may contribute to reducing the instability of debt service payments. Debt relief initiatives like HIPC II with its all-embracing character with respect to debt and debt payments of all official creditors would certainly help to make clear to the HIPCs

governments how much debt service payments fall due over the next 15 to 20 years. Moreover, it will also reduce the number and frequency of negotiations with respect to new loans and terms of repayment. Ideally, such negotiations might no longer be needed if debt relief is sufficient in order to make the remaining debt sustainable in the long term.

A sweeping debt relief initiative may help governments of HIPCs to plan more carefully revenues and expenditures related to different government policies needed to contribute to restoring economic growth. In turn, this will contribute to making government policies more predictable, which may act as a stimulus to private investment and lead to restoring economic growth. It is not clear whether HIPC II will provide enough debt relief to sufficiently reduce debt service payment uncertainty, thereby stimulating economic growth. An analysis of the contribution of HIPC II in this respect is beyond the scope of this paper, however.

5 Conclusion

This paper has investigated the impact of the uncertainty of debt service payments on economic growth of HIPCs. In particular, we hypothesized that it is the problem of the uncertainty of debt service payments, rather than the level of the external debt as such, that may compromise economic growth. We argued that due to the nature of the current debt service payment system, the year-to-year variation in debt service payments of HIPCs may be large. In particular, most HIPCs are regularly negotiating with bilateral and multilateral donors about the terms of debt service repayments. Moreover, debt service payments are partly financed by new loans and grants from bilateral donors. Yet, for the governments of HIPCs it remains highly uncertain how much is exactly available to pay debt service from own and external sources. The outcomes of these negotiations are difficult to predict, contributing to uncertainty about the annual debt service payments due. These characteristics make it difficult for the government of the indebted country to know exactly how much is available to carry out economic reforms. This may seriously reduce the effectiveness of government policies, which in turn acts as a disincentive to invest by the private sector and compromise economic growth.

The outcomes of the empirical analysis support our premise. The uncertainty measures of total and long-term debt service payments actually made both appear negative and statistically significant in the standard economic growth models, but only in the case of HIPCs. For the other LDCs in the dataset, this negative relationship could not be found.

These results have important implications with respect to debt relief for HIPCs. A sweeping debt relief initiative may reduce the instability of annual debt service payments, since it may seriously cut the number and/or frequency of negotiations on the terms of debt payments and on new loans and grants. This may help the governments of HIPCs to plan more carefully revenues and expenditures related to different government policies, making them more predictable. This, in turn, may stimulate private investment and lead to restoring economic growth.

Further research could focus on analysing the impact of the uncertainty of debt service payments on government income and spending, as well as on the quality of government policies. Moreover, the analysis could look at the relationship between the uncertainty

of debt service payments and private investment and/or capital flight. Finally, it would be interesting to investigate more carefully the debt service system as it currently works. This may provide a better picture of how exactly debt relief initiatives might reduce debt service payment instability and how such initiatives should be designed in order to maximize their contribute to restoring private investment and economic growth.

Appendix A: List of variables used in the analysis

<i>DUMH</i>	=	Dummy variable for HIPCs; 0=non-HIPCs and 1=HIPCs
<i>GCRI</i>	=	Proxy for the number of government crises
<i>GDPPC</i>	=	GDP per capita growth
<i>INVGDP</i>	=	Total investment to GDP
<i>LGDP</i>	=	Logarithm of GDP per capita at the beginning of the period
<i>LTDS</i>	=	Total debt service payments on long-term debt to GDP
<i>NRF</i>	=	Net resource flows to GDP
<i>NRFD</i>	=	Net resource flows on debt to GDP
<i>NRT</i>	=	Net resource transfers to GDP
<i>NRTD</i>	=	Net resource transfers to GDP
<i>TDS</i>	=	Total debt service payments to GDP
<i>ULTDS</i>	=	Uncertainty of debt service payments on long-term debt to GDP
<i>UNRF</i>	=	Uncertainty of net resource flows to GDP
<i>UNRFD</i>	=	Uncertainty of net resource flows on debt to GDP
<i>UNRT</i>	=	Uncertainty of net resource transfers to GDP
<i>UNRTD</i>	=	Uncertainty of net resource transfers on debt to GDP
<i>UTDS</i>	=	Uncertainty of total debt service payments to GDP

Data sources:

Data on *GCRI*, *GDPPC* and *INVGDP* have been taken from Easterly and Yu (1999). Data on *LGDP* are given in Easterly and Yu (1999), but are originally taken from Penn World Table 5.6. All other data are obtained from World Bank (2000), CDROM version. The calculation of the uncertainty measures is explained in the main text. All variables have been averaged over 1970-79, 1980-89 and 1990-98.

Appendix B: List of countries used in the analysis

For the estimations data for the 104 countries listed below have been used. Countries in bold italic are in the group of 41 HIPC's (IDA 2001).

Algeria; *Angola*; Argentina; Bangladesh; Barbados; Belize; *Benin*; Bhutan; *Bolivia*; Botswana; Brazil; Bulgaria; *Burkina Faso*; *Burundi*; *Cameroon*; Cape Verde; *Central African Republic*; *Chad*; Chile; China; Colombia; *Democratic Republic of Congo*; *Republic of Congo*; Costa Rica; *Côte d'Ivoire*; Czech Republic; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; *Ethiopia*; Fiji; Gabon; *The Gambia*; *Ghana*; Grenada; Guatemala; *Guinea*; *Guinea-Bissau*; *Guyana*; Haiti; *Honduras*; Hungary; India; Indonesia; Iran; Jamaica; Jordan; *Kenya*; Korea; Lesotho; *Liberia*; *Madagascar*; *Malawi*; Malaysia; *Mali*; *Mauritania*; Mauritius; Mexico; Mongolia; Morocco; *Mozambique*; Nepal; *Nicaragua*; *Niger*; Nigeria; Oman; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; The Philippines; Poland; Romania; *Rwanda*; Samoa; *Senegal*; Seychelles; *Sierra Leone*; Solomon Islands; South Africa; Sri Lanka; St. Kitts and Nevis; St. Lucia, St. Vincent and the Grenadines; *Sudan*; Swaziland; Syria; *Tanzania*; Thailand; *Togo*; Trinidad and Tobago; Tunisia; Turkey; *Uganda*; Uruguay; Vanuatu; Venezuela; *Zambia*; and Zimbabwe.

The number of observations for individual equations presented in the Tables may not be equal to three times the number of countries due to missing data for some countries for one or more sub-periods.

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