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External Imbalances as an Explanation for Growth Rate Differences across Time and Space:

An Econometric Exploration

vorgelegt von

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External Imbalances as an Explanation for Growth Rate Differences across Time and Space:

An Econometric Exploration

By

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General Introduction

During the period 1960-73, growth in Africa was more rapid than in the first half of the century…Since 1980, aggregate per capita GDP in sub-Saharan Africa has declined at almost 1 percent per annum. The decline has been widespread: 32 countries are poorer now than in 1980. Today, sub-Saharan Africa is the lowest income region in the world" (Collier and Gunning, 1999, p. 3)

"The debt crisis can be studied as a problem in epidemiology. A powerful virus, high world interest rate, hit the population of capital importing developing countries in the 1980s. Some countries succumbed to the virus, having to reschedule their debt on an emergency basis, while others did not. And of those countries that arrived for emergency treatment, some recovered sufficiently to enter the period of quiet convalescence, while others are still suffering from febrile seizures in the IMF's intensive care unit", Sachs and Berg (1988, p. 1).

"LDC (Less developed country) capital outflows have to be tackled as part of the solution to the debt problem, not as something that needs to be addressed only later. If capital flight is given a free ride in the caboose of LDC debt train, the train has little hope of making the station" (Morgan Guaranty (1986): in Lessard and Williamson, 1987, p. 244).

The failure of developing countries, notably those in the sub-Saharan Africa, to manage narrowing their income per capita gap with the developed and other developing nations is one of the most serious challenges of the new millennium. Several empirical studies indicate the phenomena of divergence in real income per capita across the world economy at large in the past four decades. This implies that while richer countries continued to grow richer, the poor counterparts continued to grow poorer, eventually increasing the dispersion of income per capita across countries and over time. Such studies also point out that the magnitude of divergence in income per capita was worst in the past two decades compared with the 1960s and 1970s.

The income per capita divergence of sub-Saharan Africa from the rest of the world is particularly alarming. The average growth in real per capita income that was around 2% in the 1960s, declined to nearly 1% in the 1970s, to nearly 0% in the 1980s and 1990s. The figures turned even worse when one takes a longer time horizon. The average growth in real income per capita during 1970-2000 and 1980-2000 were indeed negative. This is in contrast to the average growth for the whole world of nearly 3% in the 1960s, 2% in the 1970s, 1% in the 1980s and 1990s.

Studies also indicate that during the past two decades SSA has virtually been outrun in all essential economic and social indicators by other developing regions. This sluggish growth performance has naturally been translated into high rate of poverty, poor education standard, poor health conditions, political instability and civil wars, poor investment environment, poor subsequent economic growth, and further internal and external imbalances. The joint impacts

of all these are stagnation in economic growth and development, creating a vicious circle or self-reinforcing mechanism. The vicious circle is so strong and the elements that created the circle are so interlinked to each other that breaking it at a single point has proved to be very difficult in the past two decades.

While there is a widespread consensus on Africa's marginalization and divergence, there are differences when it comes to identifying the factors that may have accounted for the region's poor growth record. The mis-performance of Sub-Saharan Africa or „Africa's growth tragedy" as Easterly and Levine (2000) rightly put it, has been explained from various fronts. The potential factors range from bad policies and external shocks (Hadjimichael and Ghura, 1995; and Rodrik, 1999, among others), to ethnic fractionalization (Easterly and Levine, 2000), to gender inequality in education (Klasen, 2002), and to geographic location (Sachs and Warner, 1998), among others.

The justifications include that since Africa has failed to adopt and implement sound policies, it is suffering from a subsequent stagnation in economic growth and development compared to countries that exercised more friendly policies (Hadjimichael and Ghura, 1995, among others). Others argue that by the virtue of Africa's diversity in terms of ethnic structure, it is hard to reach any consensus on the long-term development doctrines for countries in this part of the world compared to countries in other regions with lower ethnic diversity (Easterly and Levine, 2000). Therefore, countries that are ethnically more diverse tend to have distorted policies compared with those that are ethnically less fragmented.

On the education front, Klasen (2002) argues that the growth rate of developing countries is mainly attributed to gender inequality in education that retards intergenerational transmission of knowledge, among other disadvantages, eventually punishes growth. His results indicate that growth was higher in countries with low gender inequality and lower in countries with higher gender inequality in education. From a different perspective, Sachs and Warner (1998) blame the extraordinarily unfriendliness of nature to Africa compared to other developing regions. They argue that most countries in Africa are landlocked, which does not allow them to easily integrate into the global trade. Moreover, most of the countries in Sub-Saharan Africa are located in the tropics, a fabulous environment for diseases to flourish and dramatic soil deterioration. These are all potential explanations for growth rate differences across various groups of developing countries.

The above explanations and others notwithstanding, there are, nonetheless, questions that remained unanswered. The first problem in this respect is the negative and significant dummy for Africa in most of the growth regressions, which virtually left Africa's slow growth problems unexplained. Second, Africa's ethnic structure has not dramatically changed in the 1980s and 1990s compared to the decades earlier. Third, Sub-Saharan Africa is in the same tropics today as it had been in the 1960s and 1970s and yet has much lower economic performance. Fourth, Africa does not seem to be particularly suffering from gender inequality problem compared to other developing regions and previous decades. Fifth, there had been no dramatic migration of African inhabitants towards or away from the coast in the past two decades to blame the density of the population as an explanation for poor growth performance in the past two decades. Moreover, with the exception of a few countries, like Ethiopia, the countries that are landlocked today had also been landlocked in the 1960s and 1970s. Furthermore, there are many countries on earth that are landlocked but have enjoyed sustainable long-run economic growth record.

In this dissertation I try to relate the "Africa's growth crisis" to the debt crisis of the 1980s and 1990s. There are several reasons behind linking Africa's mis-performance to the debt crisis.

First, the fact that the growth rate of the region has become much worse in the last two decades, which are the decades of the debt crisis, may imply that the timing cannot be taken as a mere coincidence. Rather, there is a legitimate suspect for the growth crisis to be strongly linked to the debt crisis. Second, the cruel reality that 33 of the 41 countries classified by the World Bank and IMF as heavily indebted poor countries (HIPCs) are located in this region must provoke one to link the debt crisis to the economic growth crisis of Africa. For illustration, HIPCs total external debt to GNP that was around 72% in 1984, jumped to 115% in 1998 (Global Development Finance, 2000 (CD-ROM)). This huge external debt has been accompanied by a large transfer of resources from this group to the developed world in the form of debt service payments, which accounted 21% of their exports in 1982, though dropped to 16% in 1998.

High external debt through the debt overhang, crowding out and destabilizing effects may hamper economic growth and leads to low level of investment, and poor subsequent economic growth. This seriously limits the indebted poor nations' debt repayment capacity and may

increase the demand for further external debt and rescheduling. This may serve against the creditworthiness of the indebted poor nations and prevent them from generating non-debt creating resources in order to finance their investment projects. As Edwards (1986, p. 570) concludes, "the level of the country risk premium increases with the level of foreign indebtedness (i.e., debt-GNP ratio)". Today, almost all the heavily indebted poor nations are virtually cut off from the international financial markets and are instead heavily dependent on the multinational financial institutions. That is why the IMF is often called the "watch dog" and the "gate-keeper" of the international debt management (Nafziger W., 1993).

Third, apart from the above bottlenecks of a high external debt, there is additional impediment of external debt on the growth of indebted poor nations via the capital flight. As Dooley and Kletzer (1994) point out, "in the aftermath of the 1982 debt crisis economists were surprised to learn that a large part of the borrowing of developing countries from international commercial banks was not matched by unrecorded net imports of goods and services but instead was matched by unrecorded private capital outflows from developing countries (p. 2). In this respect, despite persisting measurement problems, the estimated capital flight from Africa was around 39% of the private wealth of the region in 1990 compared to 14% for other developing countries (Collier and Gunning, p. 7).

Finally, the fact that Africa's growth performance continued to deteriorate despite two decades of structural adjustment may indicate the region's being caught in a poverty trap: High external debt accompanied by capital flight and high debt service payments generating low growth and more divergence, higher demand for external financing and rescheduling of past contractual debt obligations. This is in fact, what has come to be known as 'circular financing', where indebted poor nations are borrowing new loans from overseas at higher interest rates to pay back old ones at lower interest rates, leaving the circle closed and poor nations poor for ever.

To discuss the above issues, this dissertation has been split into four chapters:

The first chapter revisits the convergence debate using the recent Penn World Table database, ranging from 1960-2000 and a panel data approach. Particular emphasis is given to the position of the heavily indebted poor countries to account for the role of external debt in the process of convergence (divergence).

In the second chapter, this dissertation empirically explores the causes of indebtedness. The main motive is that the causes of the external indebtedness of developing countries and their subsequent failure to meet their contractual debt obligations have been one of the heated debates both in the academic circles, policy makers, and the broader international community since the outset of the debt crisis in 1982. Using the World Banks' Global Development Finance, 2000 (CD-ROM) and the World Development Indicators, 2001 (CD-ROM) databases, and employing both cross-section, cross-section pooled and random and fixed effects approaches, this part investigates the determinants of external debt.

The third chapter, using cross-section pooled logit, probit and fixed effects logit models, empirically explores the factors behind the debt repayment problems of the developing nations in general and HIPCs in particular in the past two decades. From the viewpoint of empirical strategy, the application of a panel data approach seems to be highly preferable, as it allows to control for time-specific events that are linked to overseas borrowing, particularly given the rapid changes in the global macroeconomic environment in the past years. Moreover, this strategy helps to produce a more robust explanation by allowing to incorporate country-specific factors as developing countries themselves are heterogeneous in terms of their colonial heritages, geopolitical and strategic significance, and creditworthiness, all affecting the level of indebtedness and the potential bargaining power to manage the subsequent debt crisis.

The last chapter looks at whether external imbalances could be potential explanations for growth rate differences across the developing world. Although there is a wide-ranging of theoretical literature on this issue, there are only few empirical studies that show that there is an inverse relationship between growth and external imbalances. Moreover, all empirical studies on this area have focused on the impact of total external debt stock on growth of real GDP per capita, controlling for the traditional factors that appear in all growth regression in the framework of the augmented Solow model. The critical innovation of this dissertation is the premise that total external debt stock is uninformative and rather masks important information, and therefore, should be decomposed according to maturity and source structures.

I. Growth and Convergence across Time and Space: *New Empirical Evidence for an Old Debate*

Abstract

This paper contributes to the ongoing convergence debate in several ways: First, using the recent Penn World Table's database (PWT 6.1), it shows the absence of the so-called absolute convergence across the world economy at large in the past four decades. While the decade- by-decade regressions indicate similar results, things seem to have worsened in the 1980s and 1990s. One primary suspect in this regard is the debt crisis, which kicked off in 1982 after Mexico's official announcement in the same year that it was quitting to service its external debt. From this time on, things started falling apart in developing countries and the debt crisis quickly turned into a development crisis.

A separate regression for developing countries alone indicates the absence of unconditional convergence across this group of countries. But, once we split countries into groups with similar political, economic and institutional parameters (OECD, for instance), it appears that there is evidence for unconditional convergence.

Third, turning to the conditional convergence debate, where both physical and human capital accumulations are incorporated into cross-country regressions, the results seem to suggest that, countries have experienced conditional convergence, hence poorer ones growing faster than their richer counterparts. However, the cross-section strategy is concluded as insufficient for international comparison of growth as it does not allow to control for time-specific and country-specific factors, which leads to omitted variable problem, among other things. Therefore, using random effects model and fixed effects model and cross-section pooled time series strategy, this paper further investigates the growth-rate difference across countries and over time. The results suggest that once we control for decade-specific and country-specific factors and the traditional variables that always appear in the augmented Solow growth framework, the regressions generate more plausible and robust results.The cooefficient on intial GDP per per capita become larger and highly significant, reflecting, amonmg other things, that once we control for time specific and country specific factors and the tradionional determinants of growth, it seems to suggest that countries are close to their own steady states. Moreover, these strategies help to control for the indebtedness dummy to control for the impact of external debt on the speed of convergence.

1. Introduction

Economists have always been concerned with variations in income and living standards across time and space. One way of measuring the speed at which countries are moving not only towards their own steady states but also towards the income per capita of other countries goes back to Solow's (1956) growth framework. In this framework, countries with high savings rate and low population growth are predicted to experience higher per capita income than those in the opposite camp (Solow, 1956), *ceteris paribus*. This seminal work was quickly picked up by other economists and has therefore been the subject of constant extension.

In general convergence in the context of economic growth is said to occur in a cross – section of economies, if there is a negative relationship between the growth rate of income and the initial level of income (Barro, 1991; Sala-i-Martin, 1994 and 1996a and 1996b, Barro and Sala-i-Martin, 1995). In other words, convergence takes places, in a cross-section of economies, if poor economies tend to grow faster than wealthy ones, implying that the poorer the economy the more quickly it will tend to grow over a long time horizon, and vice versa. Similarly, Baumol (1994) defines convergence as a tantamount diminishing in the degree of economic inequality among countries. Though the above definitions remain valid throughout this paper, it turns out that there are significant disputes among growth scientists regarding the theory of economic growth and convergence.[1]

Although economists have been interested in investigating whether poor economies remain poor for many years, while rich countries remain rich for generations, this was hampered by absence of long-run time series data until the mid-1980s that the convergence debate drew the attention of not only mainstream macroeconomic theorists but also econometricians. There are mainly two reasons for the growing concern in the convergence debate (Sala-i-Martin, 1996b, pp. 1019):

[1] Advocates of the endogenous growth model and other development economists in fact reject the hypothesis of converegnce.

- First, the existence of convergence across economies was proposed as the main test of the validity of modern theorists of economic growth. Moreover, estimates of the speeds of convergence across economies were thought to provide information on one of the core parameters of growth theory: the share of capital in the production function,
- Second, in the mid-1980s a data set on internationally comparable GDP levels for a large number of countries (the Penn World Tables) became available and this new data set enabled empirical economists to compare GDP level across time and space.

The convergence debate is also vital as it is concerned with the gaps in living standards between countries, i.e, whether these gaps are narrowing or rather widening across countries and over time (Pritchett, 1996). Sala-i-Martin (1996), and Barro and Sal-i-Martin (1995), using β-convergence and σ-convergence concepts, elaborate the convergence debate more broadly.[2] Sala-i-Martin (1996, pp. 1025) points out that the lack of convergence means that the degree of cross-country income inequality not only fails to disappear, but rather tends to increase overtime (σ-divergence); and that economies (nations) which are predicted to be richer a few decades from now are the same countries (nations) that are rich today (β-divergence).[3] Moreover, despite the persisting disputes among economists on the determinants of long-run growth, the convergence debate has also enormous policy implications for policy makers both in the developed and developing countries. One of the key questions in this regard is to what extent external aid and debt helped countries to achieve accelerated economic growth, hence allowing them manage narrowing the living standard gaps between the richest and poorest part of the world.

[2] β-convergence occurs if economies that are poorer are predicted to grow faster that richer ones. On the other hand, σ-convergence occurs if the disperision of income per capita across countries declines overtime. The two concepts are broadly discussed later in the paper.

[3] See, Sala-i-Martin, (1994, 1996), and Barro and Sala-i-Martin (1995) for the detailed distinguishing between sigma and beta convergence.

The objective of this paper is to empirically test whether the income gap between poor and rich countries of the world has narrowed or rather widened in the past four decades. Particular attention will be paid to the position of the heavily indebted poor countries (HIPCs) in the process of convergence (divergence) in the past four decades, with especial emphasis on the last two decades, which capture the periods of debt and financial crises and other spill over effects of the process of globalization. To translate this aim into reality, I used both the absolute and conditional convergence hypotheses and a fresh international data set (The Pen World Tables (PWT 6.1)) by A. Heston, R. Summers, and B. Aten covering the period 1960 to 2000. The remainder of the paper is organized as follows: part 2 presents the summary of the neoclassical production function and the distincion between the absolute and conditional convergence hypotheses. Using the PWT 6.1 data set, this section presents empirical evidence for absolute convergence. Part three discusses the augmented Solow model and its empirical specifications. This will be followed by data description and empirical results. The very last sub-section of this part will present results and the policy implications of this study.

2. The Solow-Swan model and the convergence debate: A theoretical review

Almost all recent empirical researches on economic growth kick off from the Solow growth framework. This paper will also first summarize the basic model before an empirical counterpart to it is presented.

The Solow model is a closed economy framework, where output (Y) is a function of input variables, such as labor (L) and capital (K). This can formally be written as:

$$Y = F(K, L) \qquad (1)$$

There are three basic assumptions that are linked to this model:

1. the production function in eq. (1) assumes positive and marginal products with respect to each input variables.

$$\frac{\partial F}{\partial K} \succ 0, \quad \frac{\partial F}{\partial L} \succ 0; \quad \frac{\partial^2 F}{K^2} \prec 0, \quad \frac{\partial^2 F}{\partial L^2} \prec 0 \qquad (1.1)$$

Equation (1.1) indicates that while each input variable contributes positively towards boosting the output that is produced, its marginal productivity falls over time as more and more of it is added, *ceteris paribus*.

2. the production function exhibits constant returns to scale, indicating a proportionate increase in output as the result of changes in all input variables. This can formally be written as:

$$F(\lambda K, \lambda L) = \lambda . F(K, L), \text{ for all } \lambda \succ 0 \qquad (1.2)$$

3. the third assumption is referred to as the so called 'Inada conditions'.

$$\begin{aligned} \lim_{K \to 0}(F_K) &= \lim_{L \to 0}(F_L) = \infty \\ \lim_{K \to \infty}(F_K) &= \lim_{L \to \infty}(F_L) = 0 \end{aligned} \qquad (1.3)$$

The Inada conditions expressed in eq.(1.3) state that while production with the absence of input variables is impossible, their excess abundance also make their marginal product diminished over time, *ceteris paribus*. The assumption of constant returns to scale in eq. (1.2) is also consistent with the balanced growth path along which capital and effective labour grow at the same rate. It is also helpful to rewrite the production function in eq.(1) in its intensive form:

$$Y = F(K, L) = L\left(\frac{K}{L}, 1\right) = Lf(k) \qquad (1.4)$$

where,

$k = \frac{K}{L} =$ capital –labour ratio; and

$y = \frac{Y}{L} =$ per capita income

Now, the production function in eq.(1) can be written in its intensive form:

$$y = f(k) \tag{1.5}$$

The change in the capital stock with a constant savings rate:

$$\dot{K} = I - \delta K = s.F(K, L, t) - \delta K \tag{1.6}$$

$$\frac{\dot{K}}{L} = s.f(k) - \delta k \tag{1.7}$$

$$\dot{k} \cong \frac{\partial\left(\frac{K}{L}\right)}{\partial t} = \frac{\dot{K}}{L} - nk$$

$$\dot{k} = s.f(k) - (n + \delta).k \tag{1.8}$$

Finally, the growth rate of k can be approximated as:

$$\gamma_k = \frac{\dot{k}}{k} = s.f(k)/k - (n + \delta) \tag{1.9}$$

Following Barro and Sala-i-Martin (1995, pp. 22), the long-run growth rates in the Solow-Swan model are determined entirely by exogenous factors. The fundamental conclusion about long-run growth, therefore, is negative, simply because the long term growth rates are independent of the savings rates and the level of the production function. Nevertheless, the model is very important in providing us with sound information about the transitional dynamics of growth, which indicates the per capita convergence of an economy towards its own stead-state value or to the per capita incomes of a cross-section of economies (Barro and Sala-i-Martin, 1995).

2.1. The absolute and relative convergence hypotheses

2.1.1. The absolute (unconditional) convergence

Following Barro and Sala-i-Martin (1995), eq. (1.9) implies that the derivative of γ_K with respect to k is negative:

$$\frac{\partial \gamma_k}{\partial k} = s.\left[f'(k) - f\left(\frac{k}{k}\right)\right] / k \prec 0 \qquad (1.10)$$

This implies that, ceteris paribus, smaller values of k are linked to larger values of its corresponding growth (γ_K). This suggests (provided that countries have similar rate of savings (s), growth of population (n), rate of depreciation (δ) and production function) that all economies have the same steady state values of k^* and y^*. Then, if the only difference across countries is the initial capital per capita (k), the model predicts that countries with less capital per capita tend to grow faster than those with relatively higher level of capital per capita. Therefore, the hypothesis that nations with lower capital per capita tend to grow faster than those with higher capital per capita without putting any restriction is referred to as absolute (unconditional) convergence (Barro and Sala-i-Martin, 1995).

To show eq. (1.8) in the context of absolute and conditional convergence, the diagram may be used to make the argument more readable. (See, figure 1). There are basically two equations in eq. (1.8): While the horizontal function line (δ + n) represents the curve for the rates of depreciation and growth rate of the population, the downward slopping curve attached to s.f(k)/k, represents the savings curve. From eq. (1.8) and diagram (1), it implies that the growth rate is rewarded by the savings rate while it is punished by the elements that constitute the depreciation curve. Assumption (1.1) discussed earlier also indicates that the saving curve is downward slopping, whereas, the Inada conditions (equation (1.3)) ensure that the saving curve is vertical at k = 0 and it approaches the horizontal axis as k tends to infinity.

Diagram (1) shows the absolute (unconditional) β-convergence hypothesis. The assumption is that countries or economies under consideration are moving to the same steady states (k^*). If the only difference among these countries is the initial capital stock

(real GDP per capita), then poor regions are predicted to grow faster than rich economies ($\Delta k_{poor} > \Delta k_{rich}$). In other words, the growth rate of the poor towards the steady state is predicted to be faster than the growth rate of the rich.

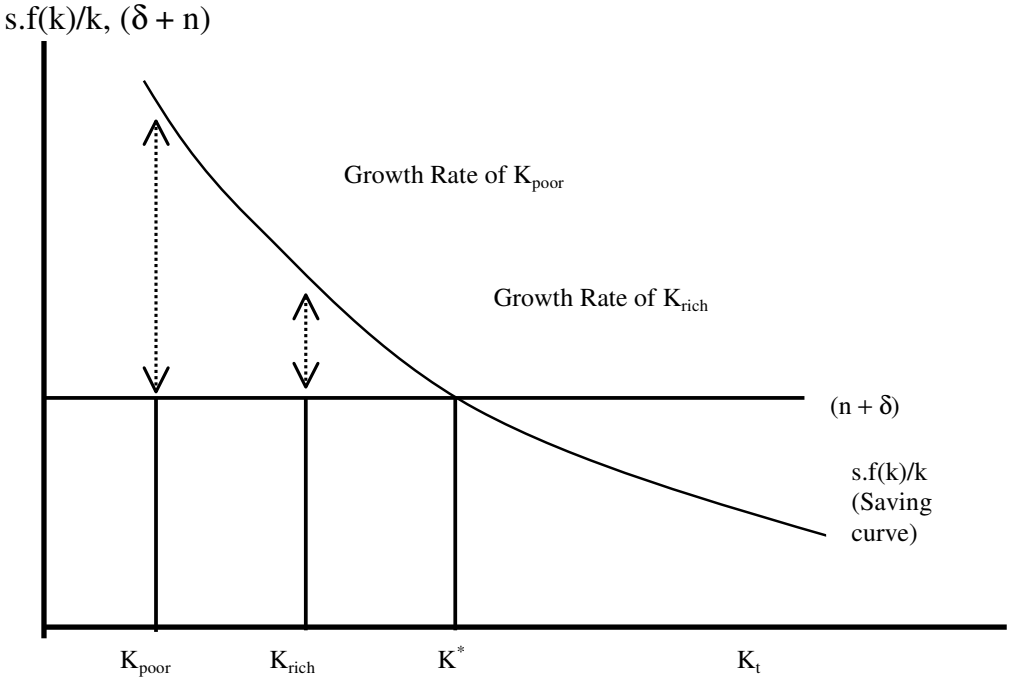

Figure (1). Absolute (unconditional) convergence
Source: Sala-i-Martin (1996, pp. 1343: in Menbere, 2000)

Reasons in favour of the absolute convergence hypothesis include (Menbere, 2000):

- the first reason is that introduced by Baumol (1986), where he argues that there is a common-force mechanism which assumes that at some stage circumstances inherent in the growth process, a set of variables influences a number of economies and drives them all in the same general direction. "It is as though a common terminal point (the steady state) is equipped with something analogous to a magnet that draws toward itself all economies whose histories it affects". Following Baumol (1994),"the unusual thing about this magnet is that it exerts the greatest force not on the economies closest to the terminal point but on those that are farthest from it". Hence, convergence occurs- the economies initially farthest from the terminal (k_{poor}) are derived to move toward it most rapidly,

which is a defining characteristics of a convergence hypothesis (in Baumol's terminology, a common-force convergence);

- since k_{poor} has lower level of initial capital (capital-labor ratio), any additional investment would quickly push these economies towards the steady state, and
- although the above two reasons are based on the assumption that all economies have similar economic parameters but different initial capital stock, there is a third reason without the underlying assumption: The contagion model of convergence predicts that because of contagion (say, imitation of production), the laggards tend to grow faster than those in advanced stage of economic development.[4]

Some arguments against the absolute β- convergence hypothesis:

The core assumption of the absolute convergence hypothesis is that the sole difference between nations is their initial levels of capital. The real world shows, however, that this is just not the case. In fact, nations are different in so many other things, including the level of technology, the propensity to save and natural endowments, among other things. This is what has come to be known as the "absolute convergence fallacy".

2.1.2 The relative (Conditional) Convergence hypothesis

The absence of broader empirical evidence in favor of absolute convergence across economies makes the traditional absolute convergence hypothesis fruitless in terms of measuring the speed of transition towards the steady state. Therefore, the idea of conditional convergence has been introduced.[5] As depicted in diagram (2) just below, if a rich economy has higher saving rate relative to a poor economy (an assumption more realistic than the previous one), then the rich economy might be proportionately further from its steady state position. Under such circumstances, it should be the rich rather than the poor economy that is predicted to grow faster towards its own steady state.

[4] William Baumol, et al. (1994) "Convergence of Productivity: Cross-National Evidence" Oxford Press Inc.

[5] Conditional β-convergence exists if the partial correlation between growth and initial income is negative. In contrast, a set of economies displays absolute β-convergence if the coefficient on initial income is negative in univariate regression (Sala-i-Martin,1996, p. 1330),.

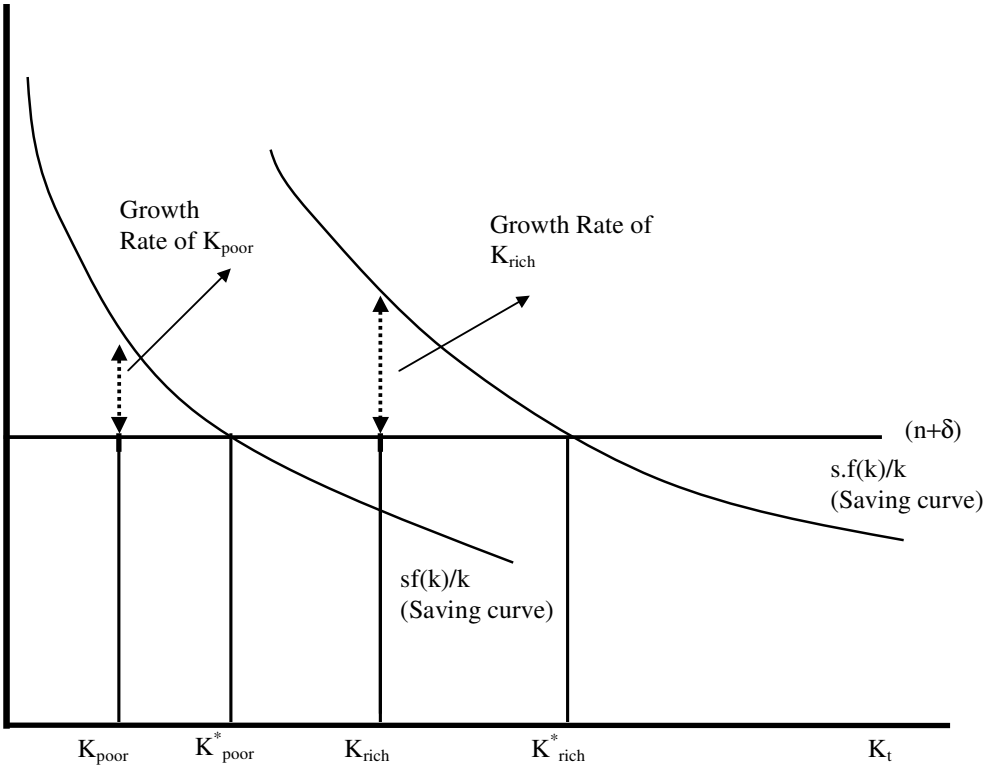

Figure (2). Conditional (relative) Convergence
Source: Sala-i-Martin and Barro (1995: in Menbere, 2000)

There are some more additional reasons against the absolute convergence hypothesis (or in favour of the conditional convergence hypothesis) (Menbere, 2000):

- Poor economies have lower savings rate (due to lower income) compared to rich ones and therefore, have lower rate of investment, and poor subsequent economic growth,
- Rich countries as opposed to their poor counterparts have high growth rates, despite their high initial capital-to-labor ratio, due to innovation,
- Ccapital is not moving from economies where it is abundant to those where it is scarce, as was predicted by the contagion model of convergence, due mainly to risk and uncertainty in most poor nations, and

- Finally, scarce qualified human capital in poor countries caused by both lack of education as well as human capital flight (brain drain) makes the possible transfer of technology and know-how from rich to poor countries slow and difficult.

2.2. Empirical specifications

The β-Convergence hypothesis

The Solow-Swan growth model that allows measuring the coefficient of β, whose value determines weather or not convergence has occurred in a cross-section of economies, could be summarized as follows (see, Sala-i-Martin, 1996, p. 1334):

$$\frac{1}{T}\left[\frac{\ln\left(Y_{i,t}\right)}{\ln\left(Y_{i,t-1}\right)}\right] = \alpha + \left[\frac{-\left(1-e^{-\beta T}\right)}{T}\right] * \ln\left(Y_{i,t-1}\right) + \mu_{i,t}, \qquad (1.11)$$

Where,

α and β - are constants,

$0 \prec \beta \prec 1$, and $\mu_{i,t}$ is the error term with, and is assumed to have mean zero, same variance (σ_{μ}^{2}) for all economies and is independent over time and across economies. Then convergence occurs if β>0 and is statistically significant, as this implies the inverse relationship between the annual growth rate ln $(Y_{i,t}/Y_{i,t-1})$ and the initial level of real per capita income ln $(Y_{i,t-1})$. Following Sala-i-Martin (1996), the coefficient on the initial per capita level $(1-e^{-\beta T})/T$, which is the slope of the initial GDP per capita level, is an expression that declines with the length of the time interval T for a given β. In other words, if the linear relation between the growth rate of real GDP per capita and the initial GDP per capita level are estimated, then the coefficient is predicted to be smaller the longer the time period over which the growth rate is averaged. The reason is that the growth rate declines as income increases. To calculate the β- coefficient from the regression, one may linearize the model as follows:

$$b = -\left(\frac{1 - e^{-\beta T}}{T}\right) \qquad (1.11a)$$

The implied β that measures the speed of convergence may then be computed using the following approximation (eq. 1.11b):

$$\beta = -\frac{\ln(1 + bT)}{T} \qquad (1.11b)$$

The σ- convergence hypothesis

The second model has been developed to measure the cross-sectional dispersion of income using sample variance of the log of income (σ- convergence)

$$\sigma^2 = \frac{1}{n}\sum_{i=1}^{N}\left[\ln(Y_{i,t}) - \mu_t\right]^2 \qquad (1.12)$$

Where,

μ_t - the sample mean of log of ($Y_{i,\,t}$), and $Y_{i,t}$ is the log of GDP per capita level of country i at time period t. The main argument here is that if countries are converging in terms of income per capita, the cross-sectional dispersion of their income should fall over time.

At the outset of the empirical test for the convergence hypothesis, there was a heated debate regarding the relationship between β-convergence and σ-convergence (apparently first introduced by Sal-i-Martin). The central point of controversy was the presumption that β- convergence be a necessary prerequisite for σ- convergence. The intuition behind is that if there is convergence, the growth rate should fall over time (because when an economy is getting richer, the predicted growth rate to be much smaller and vice versa).

However, later it was acknowledged that β- convergence is a necessary but not a sufficient condition for σ- convergence to take place. This is either because of overtaking or divergence. The first panel of diagram 3 indicates the absence of both β-convergence and σ-convergence across economies, which implies that countries are diverging in terms of their income per capita gap and this gap is increasing over time. In the second panel, it is possible to notice that there is a decline in the income per capita gap between countries and this was accompanied by a decline in the dispersion of income per capita across-countries and overtime. The last panel seems to suggest overtaking or polarization, in which case the middle class may vanish as Quah (1996) argues (more in a moment).

Absolute versus Relative Convergence in the Solow-Swan Model

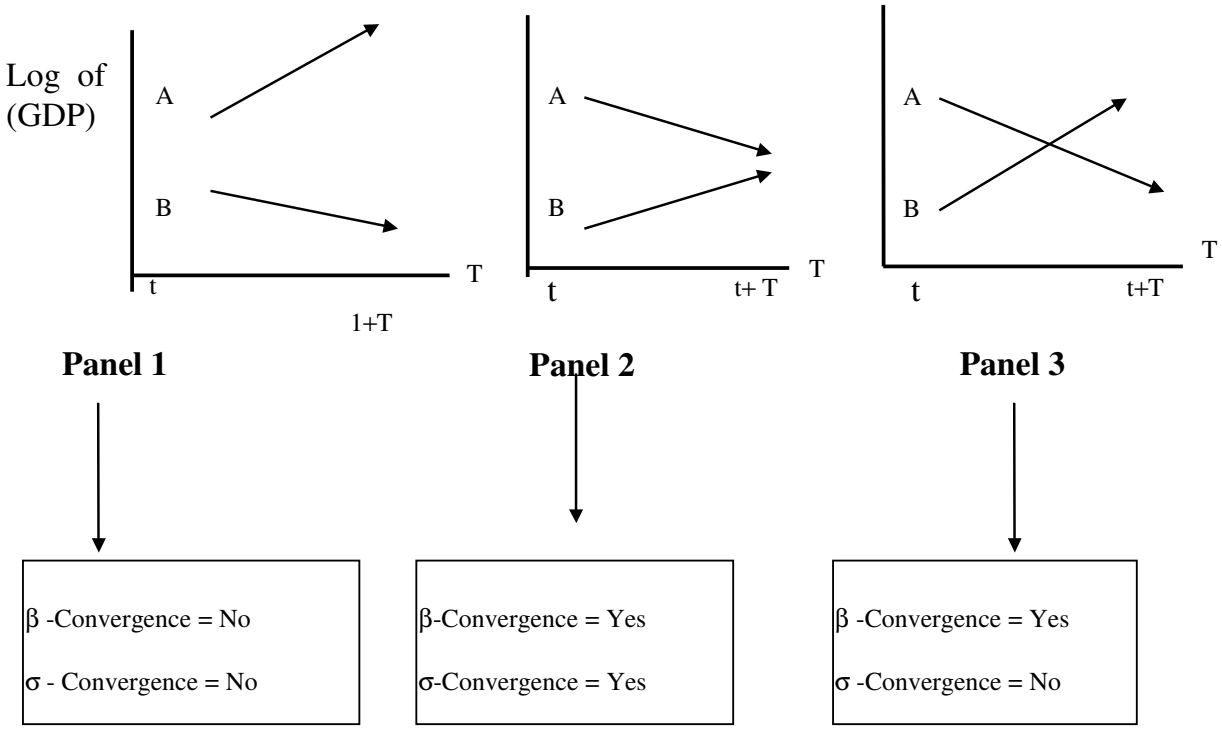

Figure 3: Absolute and relative convergence
Source: Xavier Sala-i-Martin (1996b), The Economic Journal, 106, pp. 1021

2.3. Review of previous empirical research

Baumol (1986) has been the first growth economist to examine convergence across 16 industrialized countries (1870-1979) using Madison's 1982 data. The results of the regression suggest that there were perfect convergence across these groups of economies, especially after World War II. De Long (1988) and Romer (1986) (in Sala-i-Martin, 1996b) demonstrate, however, that Baumol's attempt in measuring convergence was downplayed due mainly to the following:

- the first dispute is related to sample selection whereby historical data are constructed retrospectively, the economies that have long data series are naturally those that are more industrialized,
- Secondly, following the first reason, Baumol has been accused of biasedness. For example, Quah (1996) criticizes the traditional empirical analysis growth and convergence for overemphasizing physical capital and de-emphasizing endogenous technological progress and externalities that are main determinants of growth and convergence.

Similarly, Sala-i-Martin (1994, and 1996a), shows that β-convergence across the U.S, Japan, and five European nations is strikingly similar (about 2 % per year).[6] Based on the above results, the author reaches two conclusions:

- Ffirst, the speeds of convergence are surprisingly similar across data sets, and
- Second, as the result of the first conclusion, since the degree to which national governments use regional cohesion policies is very different, and the fact that the speeds of convergence are very similar across countries implying that public

[6] The results for 48 U.S. states from 1880-1920 indicate that dispersion of per capita personal income net of transfers declined from 0.54 in 1880 to 0.33 in 1920, then rose to 0.40 in 1930 due to the adverse shock to agriculture in 1920´s. The dispersion continued declining to 0.35 in 1940 and to 0.24 in 1960, to 0.17 in 1970 and 0.14 in 1976**.** The same observation for 47 Japanese prefectures for the period (1955-1987) of per capita income, shows that the dispersion of personal income increased from 0.47 in 1930's to 0.63 in the 1940's which was caused by explosion in military expenditure during that period. The cross-prefectual dispersion has decreased substantially since 1940: It fell to 0.29 by 1950, to 0.25 in 1960, 0.23 in 1970 and it hit a minimum of 0.12 in 1978. However, income dispersion was observed to constant since then (Sala-i-Martin 1996, pp. 1338).

> policy plays a very small role in the overall process of regional convergence. This has obvious been the subject of criticism by development economists and others

Nevertheless, as it is usual in economics, there is an ongoing serious dispute to the whole debate of both the absolute and conditional convergences hypotheses. One of the most serious criticisms comes from Danny T. Quah. Quah (1996a) interprets the neoclassical definition of convergence as a "basic empirical issue, one that reflects - among other things - polarization, income distribution, and inequality" (pp.1354). In an oversimplified way, Quah links the convergence debate to the question of whether poor economies are incipiently catching up with those already richer or instead they are caught in poverty trap. In this regard, there are criticisms against the traditional convergence hypothesis, which concludes that there exists a surprisingly similar 2% annual rate of convergence across different countries.

Quah (1996a) argues that β-convergence is uninformative as it is interested only in comparison of mean growth across countries but not in income distribution, and that cross-section regressions can represent only average behaviour, not the behaviour of the entire distribution (p. 1365). Moreover, Quah is concerned about the overall mission of the convergence debate, according to him, as it fails to inform for instance "if the poorest 10% of the world are catching up with the richest 10% of the world". He added that studying an average economy or representative one gives little insight into the empirical behaviour of the entire cross-section. He believes that for such cross-section dynamics to be interpretable, one needs a theoretical model that makes predicitions on them (p. 1368). His model then makes predictions on cross-section dynamics by taking three observations (p. 1368): Countries endogenously select themselves into groups, and thus, do not act in isolation; specialization in production allows exploiting economies scale; and ideas are an important engine of growth.

From Quah's hypothesis, two key results emerged: First, coalitions (convergence clubs) - form endogenously - the model delivers prediction on coalition membership across the entire cross-section of economies, and secondly, different convergence dynamics are

generated depending on the initial distribution of characteristics across countries. In this potential dynamics explicit convergence clubs can be characterized as (Quah 1996, p. 1368): Polarization - the rich getting richer while the poor getting poorer and the middle class vanishing (see also figure 4 below); stratification - when more than two coalition form (multiple modes in the income distribution across countries); and overtaking and divergence- two economies initially on roughly equal footing, separated over time so that one eventually becomes wealthier than the other.

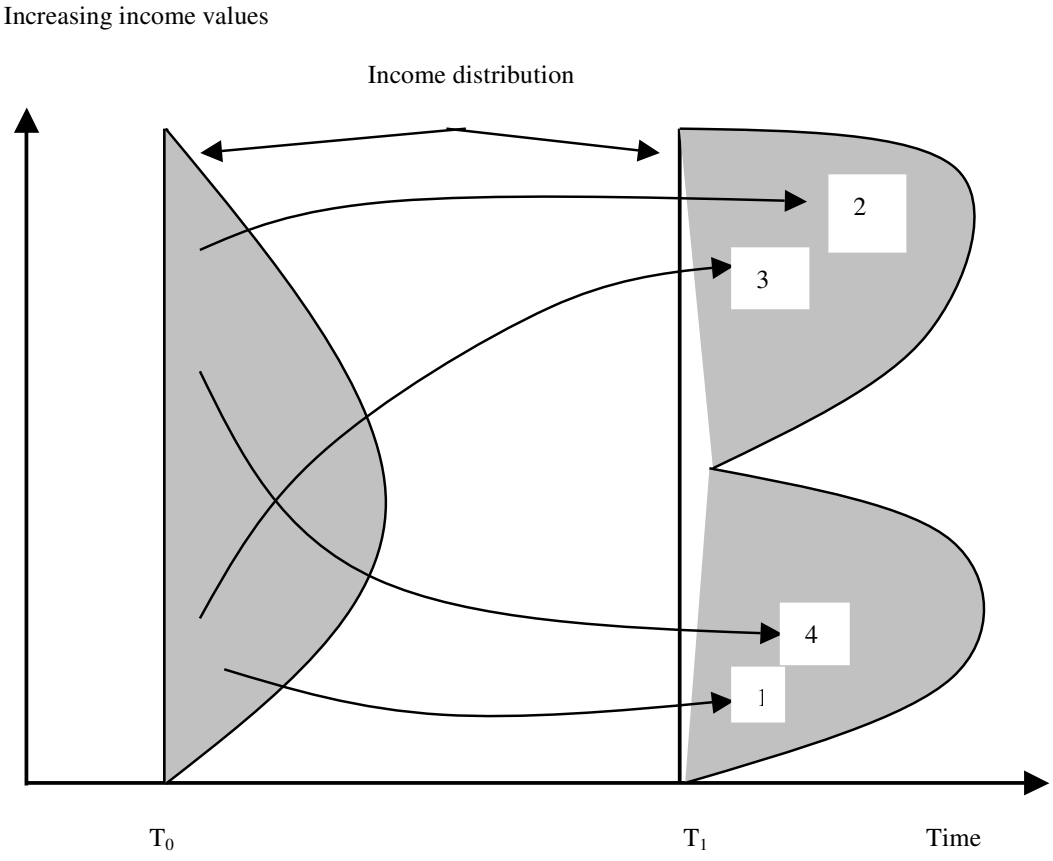

Figure 4: Evolving distributions, tending towards bimodal
Source: Danny T. Quah (1996), European Economic Review 40 (p.1369), *Numbers (1-4) added for explanation purposes.*

Figure (4) provides the following interpretation of convergence:

- Number (1) and (2) show how countries that were poor at time T_0 remain poor at time T_1, while those that were rich at time T_0 get even richer at time T_1. This shows the poverty trap or what Quah calls 'polarization'.
- Number (3) and number (4) indicate how the middle class get vanished: Those who are lucky moving towards the rich (3), while those who are unlucky rushing deep down to join the poor (4).

Galor (1996), in his part, argues in the same line with Quah. He classifies convergence into three groups: The absolute convergence hypothesis, which is convergence of per capita income across countries regardless of their initial conditions; the conditional convergence hypothesis, which assumes convergence in per capita income across countries with identical structural parameters and regardless of their initial situation; and finally the 'club convergence hypothesis' (predicts polarization, persistent poverty, and clustering), in which case there is per capita income convergence across countries with identical structural parameters provided that these countries also have similar initial conditions (p.1056).

Bernard and Jones (1996) also dispute the current convergence debate on the ground that it neglects to take into account the role of technology in the process of convergence.[7] Although there are plenty of essential points addressed by those who dispute the convergence debate, particularly regarding the claim of the 'magic 2%' convergence, there is a bulk of empirical literature that proved the existence of conditional convergence in a cross-section of economies, controlling for other factors that determine long-run economic growth.

2.4. Data description and samples

No researcher on empirical issues on developing countries can ever enjoy the luxury of choosing the number of countries he wishes to investigate. The number of countries is

[7] There cross-country analysis on dispersion of labour productivity and dipersion in technology for 14 OECD countries indicates that: First, countries are heterogenous in their level of technology, and secondly, the change in the dispersion of labour productivity overtime matches with closely with the disperison of technology (p. 1041)

rather dictated by data availability. This also holds perfectly in this paper. The number of countries ranges from 86 to 108, with their number varying from decade to decade and variable to variable. The most troublesome variable is the Barro-Lee education data set, where data is missing for a significant number of countries. I, therefore, used the log of initial life expectancy alternatively. Since most HIPCs' data on education is missing, cross-country analysis was not possible. I, therefore, run a cross-section pooled time series data using log of initial life expectancy for this group. The data for GDP per capita and investment to GDP ratio were taken from the Penn World Table (PWT 6.1), an expanded set of international comparisons, 1960-2000. Following the authors, "this data displays a set of national accounts economic time series covering many countries. Its expenditure entries are denominated in a common set of prices and in a common currency (USD) so that real quantity comparison can be made, both between countries and over time". Data for life expectancy and population was taken from the World Development Indicators (2001, CD-ROM). More information about the definitions and sources of the variables that are used in the regression are in table (1). Table (2) presents the descriptive statistics for the cross-sections of all observations. Table (13) presents descriptive statistics for the panel data of all observations. Tables (16) and (24) present descriptive statistics for cross-section and panel data regressions, respectively, for developing countries alone. Table (27) show the descriptive statistics for HIPC's pooled data. Finally, table (30) shows the list of all countries that are included in the regression, depending on data availability. In the decade-by-decade analysis, the averages were calculated in a non-overlapping way: 1960-69, 1970-79, 1980-89, and 1990-2000.

Figures A1 to A15 in the appendix also show the regression lines that show the correlation between log of GDP per capita growth and log of its initial value. Graphs A1 to A8 show the divergence (absence of absolute convergence) across all countries in the world on decade-by-decade basis. Graphs A9 to A12 show the existence of rather divergence across developing countries themselves. Graphs A13 to A15 show the presence of absolute convergence across OECD members. While linear regression lines indicate divergence (richer countries at the initial period experiencing higher average economic growth), the inverse relations indicate convergence (those who were poorer at

the beginning of the observation period enjoying higher average economic growth). The figures capture both for decade average regressions, the long-period averages, and across different groups.

2.5. Results for cross-section regression and discussion

The results of the regression for absolute β -convergence are summarized in Tables (4). The results for σ -convergence are in table (5). Table (3) presents annual growth rate of real GDP per capital. The regression results in table (4) suggest that there was a substantial divergence across the world economy at large in all the periods under consideration when all countries were included in the regression (the values of β being negative and statistically significant) indicating that there is a linear relationship between Log of GDP per capita growth and initial Log of GDP per capita). In other words, countries that were already rich in each initial period had also high annual growth rate over the period in which it is averaged. This is consistent with the results of other empirical studies including Sala-i-Martin (1991, 1996a and 1996b) and Barro and Sala-i-Martin (1995), among others. Moreover, there is an evidence for σ-divergence (the dispersion of income per capita increasing over time) during all the decades under consideration. When all countries are included, the variance of income per capita captured by σ^2 increased from 0.778 in 1960 to 0.948 in 1970; to 1.253 in 1980; to 1.483 in 1990; and to 1.704 in 2000. (See table (5)). When SSA countries were excluded from the regression, the implied β-convergence become positive (except for the 1970-2000 period) though remains statistically insignificant, an indication of the absence of drastic divergence across other developing countries relative to OECD countries. As one would expect, Asia seems to have done quite well in narrowing the income gap with OECD, though the situation worsened in the period 1990-2000, which obviously is linked to the financial crisis many of the countries in the region have experienced during this period This can also be seen from statistically significant coefficient of β, though things worsened in the 1990s, and slightly declining dispersion in income per capita (σ-convergence).

In contrast, there is a magnificent income divergence between SSA and OECD with the strongest statistically significant values for β in all the periods that have been investigated in this study. This is also supported by the poorest annual growth performance of SSA (table 3) and high and increasing variance in income (an evidence for σ-divergence). The income dispersion across OECD and SSA is drastic: the variance of per capita income increased from 1.164 in 1960 to 1.416 in 1970; to 1.916 in 1980s; to 2.315 in 1990; and to 2.679 in 2000.

Though Latin America is slightly better than SSA, it has not either managed to substantially narrow its income gap relative to OECD. The regression results for developing countries alone suggest that there was divergence of per capita income particularly in the last two periods (1980-2000 and 1990-2000). (See, graphs A9 to A12). This is mainly attributed to the presence of outliers (East Asian countries) on the one hand, and the severe external shocks Latin America and SSA have experienced during these periods, on the other hand. As one would expect, there was a substantial progress in narrowing the income gap across OECD countries, though the situation worsened during the period (1980-2000). This again is linked to the recessions in most OECD countries in the 1980s and the 1990s (see, graphs A13 to A15 in the appendix).

2.6. Conclusion

The empirical results so far indicate the following conclusions:

- Although there are disputes among economists regarding the measurement of the speed at which the growth rates of different economies are approaching to each other, there is no doubt that convergence has been a real world phenomenon in regional groups with similar economic, institutional and political conditions and convergence criteria (OECD and EU).
- The intensified divergence of the developing nations, notably those in Sub-Saharan Africa, Latin America and South Asia may imply the failure of the

process of globalization to generate a proportionate benefit both for poor and rich countries in the past two decades.

- The divergence of Sub-Saharan Africa implies, among other things, that since 33 of the 41 countries characterized by the World Bank and IMF as HIPCs are in Sub-Saharan Africa, this may also suggest that the external shocks negatively impacted on the region's long term economic growth and overall development. Having said that, however, since the quality of data for Sub-Saharan Africa has been ranked by Alan Heston and Robert Summers as poor, the results of the regression should be interpreted with caution.
- Finally, although the neo-classical growth model predicts convergence in the sense that countries with lower initial capital-labor ratio are predicted to have higher growth rates, it appears that this is only valid for moderately backward countries that belong to a relatively advanced convergence club (poorer members of OECD and EU) or for those countries that are well integrated into the global economy through foreign trade and investment (East Asia).

3. The augmented Solow model and the conditional convergence debate: Revisiting Mankiw, Romer and Weil (1992)

The previous empirical investigation using the concepts of beta and sigma convergences (see, tables (4) and (3)) clearly demonstrate interesting findings in the past four decades. First, there was divergence in the cross-sections of the world economy at large ($\beta - divergence$) and the per capita income dispersion across countries was increasing overtime ($\sigma - divergence$). Second, there is an empirical evidence of income per capita convergence across countries with relatively homogenous economic, political and institutional parameters (OECD, for example), an empirical confirmation for the validity of unconditional convergence. Third, the empirical results for developing countries alone suggest that there was no absolute convergence across this group of countries despite their heterogeneity in terms of per capita income. In contrast, rather there was a profound degree of divergence particularly in the 1980s and 1990s. The greater degree of divergence across developing countries in the past two decades is by no means a mere

coincidence, but could be the result of the debt crisis and other external shocks. This is not, however, to discount the impacts of poor domestic policies and overall mismanagement across the developing world.

Though there are seeds of truth in the previous analyses, there are some caveats that need to be addressed to check the robustness of the results and the subsequent conclusion. The first shortcoming of the previously discussed analyses is linked to selection biasedness where countries are apriori chosen and put into groups based on similarities in their economic, political and institutional parameters. The second caveat has something to do with the empirical strategy that is employed in the convergence debate, which is based on a cross-section analysis, which does not allow to control either for country-specific events or time-specific factors that may affect countries' growth performance and the subsequent rate of convergence.[8]

To find a modest remedy to this issue, I have run several regressions, which include but not limited to the following:

- The first attempt is to check conditional convergence in the spirit of the augmented Solow model during the period 1960-2000, the longest period for which data is available for the larger number of countries.
- Second, like in other similar studies, instead of apriori classifying countries into groups, I incorporated initial life expectancy and education, alternatively, and investment to GDP ratio to control both for human and physical capital accumulations and initial GDP per capita to capture the conditional convergence effect.
- Third, in the context of the above point, to check how the growth rate of economies behaved during different decades, I decomposed the entire period into decade averages. This has been done for the entire sample, developing countries, and for HIPCs alone. The reason is that factors that affect developing countries growth performance might differ from those that affect developed ones.

[8] such issues have been broadly discussed by Islam (1995), Hoeffler (2000), among others.

- Fourth, switching to a panel data approach, I run both pooled cross-section time series and random and fixed effects models. The main reason is that endogeneity and omitted variable problems can not be solved in the cross-section framework. The fixed effects model allows researchers on growth to control for time-specific factors (decade-specific factors in this case) and country-specific factors that are peculiar to the sample countries. Moreover, since the HIPCs dummy has always been negative and significant in the cross-section approach, the model did not explain the factors that account for HIPCs poor growth performance. As one of the reasons for this to happen may be linked to the missing variables that may determine the growth rate of this group but are not included, the fixed effects model is used to take care of this problem.

3.1. The Textbook Solow Model

$$Y = K(t)^{\alpha}\left(A(t)L(t)\right)^{1-\alpha} \qquad (1.12)$$
$$0 \prec \alpha \prec 1$$

Where, Y, K, A, L, and α stand for output, capital, the level of technology, labour, and the share of capital in the production function, respectively. The model assumes that both the growth rates of population and technology are exogenously determined. Therefore, the level of technology and labor are expected to grow in the following ways:

$$A(t) = A(0)e^{gt} \qquad (1.12a)$$
$$L(t) = L(0)e^{nt} \qquad (1.12b)$$
$$\ln(A0) = a + \varepsilon \qquad (1.12c)$$

The model also assumes that the number of effective units of labor, A(t)L(t), grows at rate $n + g$.

Now, defining

$$y = \frac{Y}{AL}$$ is output per effective labour

$$k = \frac{K}{AL}$$ is capital per effective labour

The evolution of k is determined by:

$$k^{\bullet}(t) = sy - (n + g + \delta) \quad (1.13)$$

$$= sk(t)^{\alpha} - (n + g + \delta)k(t) \quad (1.14)$$

The steady state value of capital per effective labor,

$$k^{*} = \left[\frac{s}{(n + g + \delta)}\right]^{\frac{1}{1-\alpha}} \quad (1.15)$$

Substituting equation (1.15) into the production function and taking logs, they arrived at the steady state income per capita:

$$\ln\left(\frac{Y(t)}{L(t)}\right) = \ln A(0) + gt + \frac{\alpha}{1-\alpha}\ln(s) - \frac{\alpha}{1-\alpha}(n + g + \delta) \quad (1.16)$$

$g+\delta$ = assumed as constant across countries

A(0) = resource endowments, climate, institutions, etc.

$\ln A(0) = \alpha + \varepsilon$, where α and ε are a constant and country specific shocks respectively.

3.2. The augmented Solow model and its empirical specification

The augmented Solow model considers Cobb-Douglas production function, where output (Y) is a function of both physical and human capital.

$$Y = K^{\alpha} H^{\beta} (AL)^{1-\alpha-\beta} \quad (1.2)$$

Defining $h = \frac{H}{AL}$, and leaving y and k as defined above, the production function in intensive form can be written as:

$$y = k^{\alpha} h^{\beta} \qquad (1.2/)$$

The evolution of k and h, therefore, take the following form:

$$\dot{k} = s_k y - (n + g + \delta)k \qquad (1.2a)$$

$$\dot{h} = s_h y - (n + g + \delta)h \qquad (1.2b)$$

In the steady state, the levels of physical and human capital per effective labour are constant. Thus, setting (1.2a) and (1.2b) to zero and solving the resulting equation gives the following steady state values:

$$k^{*} = \left(\frac{(s_k)^{1-\beta}(s_h)^{\beta}}{n + g + \delta} \right)^{\frac{1}{1-\alpha-\beta}} \qquad (1.2c)$$

$$h^{*} = \left(\frac{(s_k)^{\alpha}(s_h)^{1-\alpha}}{n + g + \delta} \right)^{\frac{1}{1-\alpha-\beta}} \qquad (1.2d)$$

Substituting (1.2c and 1.2d) into the production function (1.2/) and taking logs produces:

$$\ln\left[\frac{Y(t)}{L(t)}\right] = \ln A(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n + g + \delta) + \frac{\alpha}{1-\alpha-\beta}\ln(s_k) + \frac{\beta}{1-\alpha-\beta}\ln(s_h) \qquad (1.3)$$

Measuring the speed of convergence

Following Mankiw, Romer, and Weil (1992), the Solow model makes quantitative predictions about the speed of convergence to the steady state. Taking y^{*} as the steady-state level of income per effective worker given by equations (1.2c and 1.2d), and let y(t)

be the actual value at time t. Approximating around the steady state, the speed of convergence is given by the following relationship:

$$\frac{\partial \ln(y(t))}{\partial t} = \lambda\left[\ln(y^*) - \ln(y(t))\right] \quad (1.4)$$

$$\lambda = (n + g + \delta)(1 - \alpha - \beta) \quad (1.5)$$

From equation (1.4), they move to a regression equation that measures the speed of convergence.

$$\ln(y(t)) = (1 - e^{-\lambda t})\ln(y^*) + e^{-\lambda t}\ln(y(0)) \quad (1.6)$$

Subtracting y(0) from both sides,

$$\ln(y(t)) - \ln(y(0)) = (1 - e^{-\lambda t})\ln(y^*) - (1 - e^{-\lambda t})\ln(y(0)) \quad (1.7)$$

Substituting for y^*:

$$\begin{aligned}\ln(y(t)) - \ln(y(0)) &= (1 - e^{-\lambda t})\frac{\alpha}{1-\alpha-\beta}\ln(s_k) + (1 - e^{-\lambda t})\frac{\beta}{1-\alpha-\beta}\ln(s_h) \\ &- (1 - e^{-\lambda t})\frac{\beta}{1-\alpha-\beta}\ln(n + g + \delta) - (1 - e^{-\lambda t})\ln(y(0))\end{aligned} \quad (1.8)$$

An empirical counterpart to (1.8) is given as:

$$\ln(y(t)) - \ln(y(0)) = \beta 1 + \varphi.\beta 2\ln(s_k) + \varphi.\beta 3\ln(s_h) - \varphi.\beta 4\ln(n + g + \delta) - \varphi.\ln(y(0)) \quad (1.11)$$

where: $\varphi = 1 - e^{-\lambda t}$

$$\left(\ln(y(t)) - \ln(y(0)) = \beta 1 + \gamma 1\ln(s_k)\right) + \gamma 2\ln(s_n) + \gamma 3\ln(g + n + \delta) + \gamma 4\ln(y(0)) + \varepsilon \quad (1.12)$$

Where, $\beta 1 = \ln\left[A(0)\right] * \varphi$

The Hausman specification test for the random and fixed effects model

The Hausman specification test helps to decide whether it is the random effects model or the fixed effects one that is more appropriate to be used. STATA provides with the computed hausman for $\hat{\beta}_{RE}$ (random effects model) and $\hat{\beta}_{FE}$ (fixed effects model), where $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are consitent under the null hypothesis $H_0 : E(\varepsilon_{it}, X_{it}) = 0$ but this is not happening if the null hypothesis does not hold. The $\hat{\beta}_{FE}$ is consistent regardless of the null hypothesis. The $\hat{\beta}_{RE}$ is BLUE, consistent and asymptotically efficient under the null hypothesis, turn into inconsistent if the null hypotheisis fails to be true.

The Hausman test statistics is based on the differences between the estimated coefficients on the two models ($\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$), whereby both models are equally specified. Then, the Hausman test can be written as follows (Greene, 2003, among others):

$$(\hat{\beta}_{FE} - \hat{\beta}_{RE})' [\hat{V}\{\hat{\beta}_{FE}\} - \hat{V}\{\hat{\beta}_{RE}\}]^{-1} (\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

This under the null hypothesis is asymptotically distributed as χ^2_K, where K stands for the degrees of freedom. STATA provides both the χ^2_K and its probability based on which one can either opt for the random or fixed effects model.

3.3. Previous empirical studies on conditional convergence

Despite the disputes among economists, there is a bulk of empirical evidence on conditional convergence across countries once the variables that affect the steady state are controlled for. Barro (1991) is one the first in this regard, where using data for 98 countries in the period 1960-85, he shows that initial capital is negatively correlated with the growth rate of GDP per capita, controlling for both human and physical capital

accumulation, and other policy variables. Human capital is believed to play a key role in achieving accelerated economic growth from various fronts (Barro, 1991, p. 409).[9]

Mankiw, Romer and Weil (1992) tested the absolute convergence hypothesis using a sample of 98 non-oil exporting countries, 75 intermediated countries and 22 OECD countries in the period 1960-85. Their results indicate that the log of GDP per working-age population is correlated positively with the investment and negatively with population growth. Next, adding human capital accumulation to their model, while population continues to have a negative impact on GDP per working-age person in 1985, education and investment are positively correlated with GDP.

Here it is important to note two points: First, after controlling for education, the impact of investment is now in line with the predictions. Second, once education is incorporated into the regression, the explanation power of the model has jumped from 59% to 78% for non-oil exporting countries. The jump in the R^2 is quite high for the other groups as well. Turning to the log difference in GDP per working-age (1960-85) as a dependent variable, while they find an evidence for unconditional convergence across OECD, the remaining groups have not demonstrated unconditional convergence. Finally, turning to the augmented Solow framework, where schooling (a proxy for human capital accumulation) was added, all groups have demonstrated conditional convergence and the overall explanatory power of the model has improved substantially. Tsangarides (2000) using a sample of 22 OECD and 42 African countries in the period 1960-90, indicates that while

[9] Following Romer (1980, in Barro 1991), it is a fundamental input into the research sector, which is indispensable for technological progress. The empirical evidence also seems to suggest that countries with higher stock of human capital have a greater tendency to grow faster. As argued by Nelson and Phelps (in: Barro, 1991, p. 409), a larger stock of human capital also makes it easier for nations to imitate new ideas developed elsewhere. This gives the country that is a follower an enormous advantage to catch up relatively quickly towards those that are advanced. However, it appears that it is not only total education that matters for log-run economic growth. The quantity-quality trade offs and the distribution of education among men and women are issues that are on the agenda in recent empirical studies on economic growth and development. It seems that high total education if accompanied by gender inequality may not be extremely helpful for long-run economic growth. Klasen (2002) empirically shows that lower gender inequality may enhance economic growth through its direct externality effects (by feeding the economy with more educated labor force), and through its indirect externality effects, operating through demographic effects, lower gender inequality means higher education for women increasing the opportunity cost of women not to work and this leads to lower rate of fertility, which ultimately downsizes the population growth rate and increases capital deepening and growth, among other things.

there was an empirical evidence for unconditional convergence across OECD countries, he finds unconditional convergence for Africa only in the fixed effects model.[10]

3.4. Data description, results of the regression and discussion

Table (3.1)

Economic growth, capital accumulation, and population growth (1960-2000)

	Heavily indebted poor countries				**Non-Heavily Indebted countries**			
Variables	1960-69	1970-79	1980-89	1990-2000	1960-69	1970-79	1980-89	1990-2000
GDPG[1]	1.5	0.56	-0.75	-0.45	3.08	3.02	1.42	2.13
Log (INV)[2]	2	2.3	2.54	2.73	2.17	2.77	3.2	3.13
Log (SCHL)[3]	0.38	0.46	0.57	0.81	0.75	0.92	1.27	1.38
Log (LIFE)[4]	3.56	3.65	3.73	3.77	3.68	3.76	3.83	4.03
Log (POPG)[5]	2.5	2.65	2.74	2.66	2.34	2.09	2.1	1.82

1. the growth rate of log of real GDP per capita
2. the log of average investment to GDP ratio
3. the log of education (initial period value for each decade)
4. the log of total life expectancy at birth (the initial period of each decade)
5. the log of the growth rate of the population +0.05

Source: own calculations based data from the PWT 6.1, and the World Development Indicators, 2001 CD-ROM

The results of the cross-section regressions of the entire sample are in tables (6-12). Tables (4 and 5) present variables used in the regressions and their descriptive statistics. Tables (14 and 15) present the cross-section pooled time series and random and fixed effects models, respectively for the entire sample of observations. The corresponding descriptive statistics are presented in table (13). Tables (17) and (23) present the cross-section regression for developing countries alone, while table (16) presents the descriptive statistics for the data. Tables (25 and 26) present the cross-section pooled time series and random and fixed effects models, respectively for developing countries alone; and the corresponding descriptive statistics are presented in table (24). Table (27) presents descriptive statistics for HIPCs panel data and tables (28) and (29) present

[10] Hoeffler, (2000) using the augmented Solow growth framework and taking a sample of 85 countries (in most cases) during the period from 1960-89, with the panel data of four-year non-overlapping averages indicates several problems linked to both the OLS approach and the African dummy. Hoeffler (2000) concludes that using the first difference GMM model is appropriate for in international growth comparison.

regression results for cross-section pooled time series and random and fixed effects models, respectively for HIPCs. Finally Table (30) contains the list of countries that are considered in the convergence analysis in this work.

Table (3.1) shows the differences in growth, investment, schooling, life expectancy, and the growth rate of the population between HIPCs and non-HIPCs. The differences are strikingly significant: The growth rate for HIPCs in the 1960s was about 1.5% compared to around 3% for non-HIPCs counterparts. During this decade, HIPCs had quite comparable figures in all the indicators in table (3.1). Although the growth rate failed to 0.56% in the 1970s, it seems that the worst was about to come. In fact, HIPCs, on average, had negative growth rates throughout the 1980s and 1990s. What is even more puzzling is that the deterioration in growth occurred despite improvements in investment ratios, which puts both the quality of the data and investment under serious suspicion.

Now, turning to the results themselves, in regressions (6-12), while the average investment to GDP ratio and initial education and initial life expectancy at birth, boost income per capita growth; in contrast, the average growth rate of population, in most cases, punishes it. The initial GDP per capita is inversely correlated with that of the growth of GDP per capita, an indication of conditional convergence, holding investment, education (life expectancy) and population growth rate constant. The results here are generally consistent with the findings of most previous empirical studies.

My attempt in the framework of a cross-section regression was to figure out the extent to which heavily indebted poor countries' (HIPCs) growth performance had been deviating from the other group of countries in the sample. In the first decade (1960-69, see, table 6), the HIPCs dummy was negative and significant perhaps indicating that this group of countries had a relatively poorer growth performance during the decade while there was a wide-spread growth across the world. Moving to the 1970s and 1980s (tables 7 and 8), now HIPCs' dummy became negative and relatively significant. In the 1990s, the coefficient for this dummy was the highest in all the preceding decades and highly statistically significant, reflecting among other things, the impact of the debt crisis to this group during this decade. To capture the turbulence period of the 1980s and 1990s, I ran

the (1980-2000) log of GDP per capita growth against the 1980 log of real GDP per capita, controlling for investment and education. The results indicate that this period was in particular unfavorable to this group of countries. The coefficient on the initial log of GDP per capita is also the lowest among all the other regressions. The longest period (1960-2000, presented in table 10) also indicates the deviation of this group from the rest of the countries in the sample.

HIPCs' dummy did not change substantially even when I run separate regressions for developing countries alone. In the first decade (1960-69), for instance, HIPCs did not deviate too much from the rest of the developing world (table 21). While the 1970s and 1980s were quite unfavorable for this group, the 1990s seem to be even worse for HIPCs as a whole, where there is an indication of a dramatic lag in terms of economic growth (table 20). The longest period regression (1960-2000) also indicates that this group of countries, on average, has the lowest economic growth relative to the rest of the world during the entire past 40 years.

Switching to the panel data analysis, the first attempt was to run a cross-section pooled time series regression for all observations (see table 14). The result now indicates that while all the variables remain as in the previously discussed cross-section regressions, HIPCs continues to have experienced a more sluggish economic growth as opposed to the rest of the countries under investigation in this study. It is also interesting to note the coefficients on the decade dummies included to capture decade-specific factors that may hinder economic growth. The results seem to suggest that while the 1960s is the most favorable decade, followed by the 1970s, the remaining two decades, the 1980s and 1990s were very poor ones for growth performance. It is also equally important to note that the whole explanatory power of the regression has now increased after the inclusion of the HIPCs' and decades' dummies relative to the simple cross-section regression that was discussed earlier. The R^2 in every regression where HIPCs dummy is included is higher than when it has dropped.

Similarly, staying further in the spirit of the panel data approach, while the random effects model generates almost similar results as that of the cross-section pooled time

series regression, the fixed effects model results confirm that the 1980s were harsh for HIPCs.[11] Isolating developing countries from the developed ones, the cross-section pooled time series regression (table 25) indicates that while they all were doing well in the 1960s and 1970s, things had changed for the worse in the 1980s, which got even worse in the 1990s. Moreover, HIPCs themselves have experienced a drastic deterioration in economic growth during these decades (see also table 3.3). The fixed effects model again confirms that the 1980s were in fact the worst period for developing countries as a whole.

The fact that the HIPCs dummy was always significant and negative does indicate the problem of the augmented Solow model in explaining why some countries remain poor while others remain rich. Other empirical researchers have often encountered similar problems in empirical studies based on cross-section or panel of a large sample of countries. As Hoeffler (2000, p. 32) puts it,"the coefficient on the Africa dummy is significant and negative. This confirms the commonly found result in the literature when unobserved country specific effects and endogeneity are not accounted for, i.e, the Solow growth model appears to be unable to account for the growth experience of African economies".[12]

My final attempt was to run a separate cross-section pooled time series and random and fixed effects models for HIPCs alone. The objective here is to empirically explore to what extent the growth rate of these economies were converging towards themselves or rather diverging from each other. The results for cross-section pooled time series

[11] The theoretical justification for using a fixed effects model to study the convergence hypothesis is linked to several explanation. First, it is not possible to control for all variations across countries in the cross-section framework, which gives rise to the omitted variable problem, among other things. Secondly, since the HIPCs dummy has always carried a negative coefficient, this may imply the failure of the augmented model to explain the factors that account for the growth-rate differences of this group. This may be due to missing important factors that affect the growth rate of this group, but are not included in the regression. Thirdly, endogeneity problem (the possibility that some of the covariates may be correlated to each other and leads to biased estimators). The fixed efects model should helo to control for country-specific factors that affect the determinants of long-run growth.

[12] See, Englebert (2000) for the discussion of the ‚mystery' of the African dummy.

regressions are presented in table (28).[13] The first attempt was to check if there is an empirical evidence for absolute convergence. The results in column 1 of table (28) indicate that there is, in fact, a per capita income convergence across these countries, controlling for investment and population growth rate. This may seem to suggest that these countries have all moved towards poor growth path, which may be in line with what Quah called 'polarization' in his "twin peaks" analysis. Then, moving to the conditional convergence hypothesis, I added the log of initial life expectancy index, now the coefficient on the initial GDP per capita decreases and the explanatory power of the model improves, though very marginally. The last attempt is to control for decade dummies as the global macroeconomic fluctuations during different decades did not benefit or hurt all developing countries equally. This time, while the coefficient on log of initial per capita income increases, the life expectancy index, which was negative previously, now turned into positive, though remain insignificant.[14] The signs on decade dummies are as one would expect: While HIPCs on average enjoyed economic growth during the 1960s (also called the "Golden age"), and to a great extent also in the 1970s, things dramatically changed for worse in the 1980s and 1990s.

Since country-specific factors, that may affect economic growth are not incorporated. I finally shifted to the fixed effects model, that allows to overcome the problem of omitted variable, and other bottlenecks that the cross-section framework is suffering from (the results are in table 29). The results for the random effects model are similar to that of the cross-section pooled time series model that was discussed. The results in the fixed effects model, which allows to control for country-specific effects, in addition to the traditional covariates suggest that there is a significant indication of conditional convergence across HIPCs, which may again imply convergence towards a poverty trap rather than to a standard steady state. The decade dummies also indicate the worst period for the 1980s, though larger coefficients for the constant term, which also capture the decade dummy

[13] Since data on education for those HIPCs that are included in the regresion is missing, cross-section analysis was unlikely, though it may have been helpful.

[14] The negative sign on life expectancy does not mean that human capital hurts economic growth. Hoeffler (2000), using Barro-Lee data set for education also found a negative coefficient on education. Tsangarides (2000) who also found an insignificant coefficient on education variable argues that this does not mean human capital accumulation does not help African economies but it might be rather due largely to multicollinearity or simply measurement error.

for the 1990s that was left out, is a bit puzzling. One possible explanation for such a high constant term in the fixed effects model may be that countries had a very high growth at the beginning of the 1960s which was turned down as the result of the debt crisis in the 1980s and 1990s.

3.5. Conclusion and the policy implications

The objective of this paper was to figure out the extent to which the growth rate difference in real income per capita across countries has improved in the past four decades. The availability of the fresh international data set (the Penn World table 6.1) makes it possible to carry out the empirical analysis across countries and over time. The first attempt was to find an empirical evidence for the unconditional convergence hypothesis. The results seem to suggest that there was no absolute (unconditional) convergence across the world economy at large in the past four decades. In contrast, the gap between poor and rich countries increased over time, perhaps reaching its climax in the 1980s and 1990s. From the analysis it also implies that SSA, on average, comes out to be the most affected region in terms of its degree of divergence from the rest of the world. In fact, this region, on average, has virtually been outrun by all developing regions in all essential economic and social indicators in the 1980s in particular. Since 33 of the 41 countries characterized by the World Bank as heavily indebted poor countries (HIPCs) are located in this region, the primary legitimate suspect in this regard is the debt crisis of the 1980s that drove many of the poor nations into a deeper vicious circle of poverty.

On the contrary, there was a magnificent degree of unconditional convergence across countries with similar economic, political and institutional parameters and convergence criteria (OECD). This may suggest that unconditional convergence is an exception rather than a rule and that poverty is not a guarantee for convergence. In other words, unconditional convergence is purely a phenomena to moderately backward countries that are lucky to join an advanced economic club or to those that are well integrated into the global economy through trade and foreign investment (South East Asia, for instance).

Turning to the conditional convergence debate, the results are quite consistent with the predictions of the augmented Solow model. First, the results suggest that while investment in human and physical capital enhances growth of per capita income, the growth rate of the population, in most cases, harms it. Second, controlling for human and physical capital accumulations, and population growth rate, there is an evidence for conditional convergence across countries in the past four decades. The HIPCs dummy that was included to control for the impact of indebtedness, indicates that HIPCs growth performance had indeed been terribly worse relative to non-HIPCs. Finally, the decade dummies incorporated to control for decade-specific effects suggest that the 1980s and 1990s were indeed the worst decades in terms of income per capita convergence

The Policy implications of this paper

The policy implication from this study is quite apparent. The first policy implication is that poor countries should invest scarce resources into education and capital formation if long-run growth that could lead to accelerated convergence is to be achieved. Second, the fact that heavily indebted poor countries did not grow despite huge foreign debt build up and substantial foreign aid transfers may imply that either these resources had been virtually eaten up, deposited in foreign banks in the form of capital flight, and /or invested in projects that were totally ineffective. In fact, the past inherited external debt of poor nations has become a chronic development bottleneck and a factor of instability rather than a growth accelerator. This calls for a radical policy change that encompasses governments' accountability, the role of the international financial institutions, donor governments and the broader international community. The situations in many poor countries indicate that they are converging to such unbearable phase of poverty that many of them are on the verge of collapse as nations, which may have fatal spill-over effects in terms of both regional and global peace and security in the decades ahead. An ancient wisdom "you can't sleep in peace unless your neighbour does so" is a case in point here.

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Appendix to Chapter I.

Table (1)

Definitions of variables and sources

Variables	**Definitions**	**Sources**
GDPG	Growth rate of the logarithm of GDP per capita (PPP-adjusted)	The Penn World Tables 6.1 Alan Heston and Robert Summers
LGDP	The logarithm of GDP per capita (PPP-adjusted) (initial period value)	The Penn World Tables 6.1 Alan Heston and Robert Summers
INV	The logarithm of the average level of investment to GDP ratio	The Penn World Table (PWT, 6.1)
LLIFE	The logarithm of the index of life expectancy (initial period value)	The World Development Indicators, 2001, The World Bank
LSCHOOL	Percentage of the total population aged 15 and above who have at least some secondary school education (which is the sum of "secondary school attained, secondary school complete, higher school attained, and higher school complete")	Barro-Lee education data set (2000)
Ln (n+g+ δ)	The average growth rate of the population and the rate of depreciation	The World Development Indicators, 2001, The World Bank

Table (2)

Descriptive statistics for all observations (1960-2000)

Variable	Observations	Mean	Std. Dev.	Min	Max
LGDP60	113	7.714	0.882	5.948	9.607
LGDP70	114	8.008	0.973	5.811	9.924
LGDP80	114	8.180	1.119	4.018	10.192
LGDP90	114	8.268	1.218	3.614	10.630
GDPG6069	113	2.835	2.268	-3.163	8.881
GDPG7079	113	2.252	2.776	-6.296	10.772
GDPG8089	114	0.909	2.554	-4.412	10.489
GDPG902000	114	1.356	2.541	-7.056	10.012
GDPG602000	113	1.688	2.058	-10.483	6.131
GDPG702000	114	1.319	2.447	14.987	6.105
GDPG802000	114	1.117	2.016	-4.655	6.257
LLIFE60	109	3.928	0.247	3.45	4.3
LLIFE70	109	4.006	0.218	3.54	4.31
LLIFE80	109	4.069	0.205	3.57	4.34
LLIFE90	111	4.128	0.194	3.56	4.37
LSHOOL60	90	2.533	1.179	-0.1053	4.5705
LSCHOOL70	92	2.844	1.154	0.0953	4.6643
LSCHOOL80	96	3.265	1.053	0.1823	5.0530
LSCHOOL90	98	3.548	0.960	0.8329	4.9530
LINV6069	114	2.7928	0.9410	0.001	4.011
LINV7079	112	2.9865	0.8272	0.177	4.438
LINV8089	114	2.8742	0.6780	0.815	4.369
LINV6099	112	2.6443	0.6633	0.706	3.888
LINV7099	112	2.6701	0.6461	0.771	4.01
LINV8099	114	2.6515	0.6389	1.068	4.018
LINV9099	114	2.7221	0.7355	0.707	4.103

Source: see table (1)

Table (3)

Annual growth rate of real GDP per capita

Region (group)	1960-69	70-79	80-89	90-2000	60-2000	70-2000	80-2000
All countries	2.83	2.25	0.90	1.35	1.68	1.31	1.11
OECD+SSA	2.73	1.66	0.69	0.72	1.13	0.74	0.65
OECD+ASIA	3.66	3.18	2.36	2.31	2.90	2.63	2.40
OECD+LA[1]	3.14	2.51	0.77	1.92	2.11	1.76	1.40
AFR+ASIA+LA	2.45	2.09	0.50	1.23	1.39	1.04	0.83
OECD	3.82	2.48	1.91	1.84	2.52	2.19	1.96
SSA	1.94	1.13	0.05	0.04	0.41	-0.07	-0.05
HIPCs[2]	1.50	0.56	-0.75	-0.45	-0.25	-0.80	-0.67

Source: own calculations based on PWT 6.1

1. LA = Latin Amrica. 2. Hevily indebted poor countries

Table (4)

Regression results for cross-sections of countries

Countries	**Period**	**No. Obs.**	**β[a]**	**R^2**	**t-value[b]**	**Probability**
All	1960-2000	113	-0.06	0.026	1.75	0.08
	1970-2000	113	-0.08	0.023	1.65	0.10
	1980-2000	114	-0.12	0.100	3.57	0.00
	1990-2000	114	-0.18	0.063	2.75	0.00
OECD	1960-2000	75	0.04	0.008	-0.91	0.36
and	1970-2000	75	-0.04	0.007	-0.22	0.29
Non-SSA	1980-2000	75	0.11	0.005	-0.59	0.59
	1990-2000	75	0.07	0.024	-1.64	0.10
OECD	1960-2000	62	-0.08	0.059	2.45	0.00
and	1970-2000	63	-0.10	0.082	2.10	0.03
SSA	1980-2000	63	-0.14	0.252	4.71	0.00
	1990-2000	63	-0.20	0.143	3.09	0.00
OECD	1960-2000	40	0.06	0.064	-1.61	0.11
and	1970-2000	41	0.07	0.070	-1.99	0.05
ASIA	1980-2000	41	0.09	0.125	-2.28	0.02
	1990-2000	41	0.11	0.107	-2.11	0.04
OECD	1960-2000	42	-0.07	0.041	1.46	0.15
and	1970-2000	43	-0.07	0.034	1.29	0.20
Latin America	1980-2000	43	-0.02	0.143	2.73	0.00
	1990-2000	43	0.21	0.021	-1.08	0.28
AFRICA,	1960-2000	89	-0.01	0.001	0.38	0.70
ASIA,	1970-2000	89	-0.03	0.002	0.46	0.64
and	1980-2000	89	-0.12	0.061	2.54	0.01
L.America	1990-2000	89	-0.21	0.070	2.61	0.01
OECD	1960-2000	23	0.10	0.631	-5.49	0.00
	1970-2000	24	0.17	0.325	-3.08	0.00
	1980-2000	24	0.15	0.149	-1.82	0.08
	1990-2000	24	0.30	0.249	-2.58	0.01

Note: Heteroskedasticity has been corrected using the White direct method for correcting heteroscedasticity, which is available in E-Views package.

[a.] β has been computed from the OLS regression coefficient on initial GDP per capita using the following formula: $\beta = -\frac{\ln(1+bT)}{T}$, where b is the coefficient on the initial GDP per capita and T is the time period over which the growth rate is averaged.

[b.] the t-values represent for the coefficient on the initial GDP per capita (LGDPI), which is "b", which has not been reported here for space consumption reasons.

Table (5)

Variance of GDP per capita (σ- convergence)

Regions	Years	Variance (σ^2)	Regions	Years	Variance (σ^2)
	GDP60	0.7788		GDP60	0.6345
	GDP69	0.9117		GDP69	0.7093
	GDP70	0.9480	**OECD &**	GDP70	0.7227
All	GDP79	1.0574	**Non-SSA**	GDP79	0.7462
	GDP80	1.2532		GDP80	0.7755
	GDP89	1.4259		GDP89	0.8322
	GDP90	1.4839		GDP90	0.8556
	GDP2000	1.7045		GDP2000	0.8752
	GDP60	1.1649		GDP60	0.3520
	GDP69	1.3679		GDP69	0.4008
	GDP70	1.4160		GDP70	0.4256
OECD&SSA	GDP79	1.5798	**SSA**	GDP79	0.4598
	GDP80	1.9168		GDP80	0.7107
	GDP89	2.2139		GDP89	0.8618
	GDP90	2.3153		GDP90	0.9022
	GDP2000	2.6796		GDP2000	1.1105
	GDP60	0.9051		GDP60	0.4377
	GDP69	0.9756		GDP69	0.5239
	GDP70	0.9748		GDP70	0.5497
OECD and	GDP79	0.9548	**AFRICA, ASIA,**	GDP79	0.6565
ASIA	GDP80	0.9887	**and**	GDP80	0.8414
	GDP89	0.9569	**L. America (LA)**	GDP89	0.9557
	GDP90	0.9816		GDP90	0.9945
	GDP2000	0.9267		GDP2000	1.2208
	GDP60	0.5102		GDP60	0.1502
	GDP69	0.6282		GDP69	0.0824
	GDP70	0.6265		GDP70	0.0725
OECD and	GDP79	0.6398	**OECD**	GDP79	0.0499
L. America	GDP80	0.6734		GDP80	0.0614
	GDP89	0.8465		GDP89	0.0540
	GDP90	0.8865		GDP90	0.0702
	GDP2000	0.8739		GDP2000	0.0532

Source: Own calculations using the PWT (6.1) data base

Conditional convergence

A. Results for cross-section regression for all

Table (6)

Dependent variable is growth rate of log of real GDP per capita (1960-69)

Variable	1	2	3	4
CONSTANT	3.489 (1.32)	4.971* (1.84)	-6.534* (-1.71)	-4.884 (-1.14)
LGDP60	-0.429 (-1.18)	-0.569 (-1.56)	-0.647* (-1.91)	-0.670** (-1.97)
LINV6069	1.084*** (5.0)	0.994*** (4.56)	0.927*** (3.9)	0.903 (3.77)
LSCHL60	0.332 (1.37)	0.336 (1.42)		
LLIFE60			3.219** (2.39)	2.894** (2.06)
Log (n+g+ δ)	-0.537*** (-2.57)	-0.515** (-2.50)	-0.393* (-1.84)	-0.398* (-1.86)
HIPCs		-1.001* (-1.97)		-0.433 (-0.85)
No. of Observation	88	88	107	107
R^2	0.37	0.40	0.33	0.34

For all regression results , the asterisks *, **, and *** indicate significance leveles at 10%, 5% and 1% , respectively.

Table (7)

Dependent variable is growth rate of log of real GDP per capita (1970-79)

Variable	1	2	3	4
CONSTANT	4.725 (1.35)	8.105** (2.34)	-20.018*** (-3.57)	-16.261*** (-2.72)
LGDP70	-1.301*** (-2.77)	-1.55*** (-3.44)	-1.374*** (-3.89)	-1.414*** (-4.03)
LINV7079	1.901*** (5.42)	1.623*** (4.74)	1.555*** (4.67)	1.448*** (4.31)
LSCHL70	0.824** (2.46)	0.792** (2.5)		
LLIFE70			6.918*** (3.93)	6.192*** (3.45)
Log (n+g+ δ)	0.053 (0.17)	0.038 (0.13)	0.392* (1.73)	0.414* (1.84)
HIPCs		-2.144 (0.13)		-0.998* (-1.68)
No. of Observation	88	88	105	105
R^2	0.33	0.41	0.44	0.46

Table (8)

Dependent variable is growth rate of log of real GDP per capita (1980-89)

Variable	1	2	3	4
CONSTANT	4.339 (1.52)	6.625** (2.14)	-0.871 (-0.14)	3.522 (0.53)
LGDP80	-0.972** (-2.51)	-1.097*** (-2.82)	-0.980*** (-3.23)	-1.128*** (-3.66)
LINV8089	1.956*** (4.65)	1.705*** (3.88)	1.958*** (4.57)	1.735*** (3.97)
LSCHL80	0.175 (0.56)	0.107 (0.35)		
LLIFE80			1.44 (0.77)	0.915 (0.49)
Log (n+g+ δ)	-0.843*** (-3.01)	-0.863*** (-3.11)	-0.857*** (-3.38)	-0.90*** (-3.58)
HIPCs		-1.149* (-1.78)		-1.218** (-2.03)
No. of Observation	95	95	108	108
R^2	0.30	0.32	0.37	0.40

Table (9)

Dependent variable is growth rate of log of real GDP per capita (1990-2000)

Variable	1	2	3	4
CONSTANT	4.706 (1.58)	8.587*** (2.84)	-13.762* (-1.8)	-4.593 (-0.57)
LGDP90	-0.908** (-2.23)	-1.131*** (-2.9)	-0.980*** (-2.69)	-1.061*** (-3.0)
LINV902000	1.273*** (3.12)	0.987** (2.51)	1.215*** (2.87)	0.973** (2.32)
LSCHL90	0.683* (1.88)	0.448 (1.28)		
LLIFE90			5.071 (2.26)	3.285 (1.45)
Log (n+g+ δ)	-0.876 (-2.57)	-0.794** (-2.46)	-0.547* (-1.71)	-0.531* (-1.71)
HIPCs		-2.304*** (-3.48)		-1.897*** (-2.78)
No. of Observation	97	97	110	110
R^2	0.24	0.33	0.23	0.29

Table (10)

Dependent variable is growth rate of log of real GDP per capita (1960-2000)

Variable	1	2	3	4
CONSTANT	7.642*** (3.91)	10.07*** (5.51)	-10.702*** (-2.75)	-6.779* (-1.81)
LGDP60	-1.221*** (-4.85)	-1.386*** (-6.09)	-1.503*** (-5.87)	-1.621*** (-6.77)
LINV6099	1.546*** (6.96)	1.162*** (5.39)	1.23 (4.28)	0.845*** (2.99)
LSCHL60	0.441*** (2.73)	0.490*** (3.38)		
LLIFE60			5.473*** (4.56)	5.056*** (4.51)
Log (n+g+ δ)	-0.711*** (-4.04)	-0.676*** (-4.29)	-0.376* (-1.64)	-0.356* (-1.68)
HIPCs		-1.582*** (-4.62)		-1.563*** (-4.08)
No. of Observation	86	86	105	105
R^2	0.55	0.64	0.54	0.60

Table (11)

Dependent variable is growth rate of log of real GDP per capita (1970-2000)

Variable	1	2	3	4
CONSTANT	9.409** (4.18)	11.928*** (5.63)	-16.421*** (-2.78)	-11.256* (-1.91)
LGDP70	-1.626*** (-5.57)	-1.781*** (-6.57)	-1.806*** (-6.25)	-1.889*** (-6.79)
LINV7099	1.876*** (6.85)	1.413*** (5.24)	1.614*** (4.25)	1.24*** (3.28)
LSCHL70	0.652*** (3.2)	0.655*** (3.55)		
LLIFE70			7.190*** (4.25)	6.414*** (3.9)
Log (n+g+ δ)	-0.804*** (-3.8)	-0.768*** (-4.0)	-0.469* (-1.64)	-0.469* (-1.71)
HIPCs		-1.761*** (-4.38)		-1.564*** (-3.13)
No. of Observation	89	89	106	106
R^2	0.51	0.60	0.51	0.56

Table (12)

Dependent variable is growth rate of log of real GDP per capita (1980-2000)

Variable	1	2	3	4
CONSTANT	6.644*** (3.06)	9.759*** (4.47)	-1.746 (-0.35)	2.814 (0.58)
LGDP80	-1.153*** (-4.06)	-1.328*** (-4.94)	-0.748*** (-3.25)	-0.907*** (-4.09)
LINV8099	1.781*** (5.44)	1.401*** (4.37)	1.679*** (4.74)	1.293*** (3.7)
LSCHL80	0.374 (1.60)	0.287 (1.31)		
LLIFE80			1.485 (1.04)	1.032 (0.76)
Log (n+g+ δ)	-1.00*** (-4.4)	-0.990*** (-4.65)	-0.784*** (-3.51)	-0.772*** (-3.66)
HIPCs		-1.729*** (-3.83)		-1.618*** (-3.71)
No. of Observation	95	95	108	108
R^2	0.43	0.51	0.43	0.50

B. Regression results for panel data (decade averages (1960-2000) -All

Table (13)

Descriptive statistics for panel data (1960-2000)-All

Variable	No. of Obs.	Mean	Std.Dev.	Min	Max
GDPG	454	1.8354	2.6428	-7.0562	10.7724
LGDPI	455	1.8354	1.074	3.6144	10.6306
LLIFE	438	4.0336	0.2291	3.45	4.37
SCHOOL	358	1.1944	1.1302	0.001	5.742
INV	359	3.3196	0.3956	1.98	4.32
Ln(n+g+ δ)	452	2.0253	1.061	-3.634	5.9592

Table (14)

Cross-section pooled time series (1960-2000)-All

Variable	1	2	3	4	5	6
Constant	5.157***	8.176***	7.429***	-2.321	2.167	-5.529*
	(3.47)	(5.37)	(5.06)	(-0.87)	(0.77)	(-1.79)
LGDPI	-1.039***	-1.247***	-1.212***	-0.912***	-1.028***	-1.013***
	(-5.04)	(-6.19)	(-6.3)	(-5.24)	(-5.97)	(-6.17)
LINV	1.907***	1.594***	1.409***	1.878***	1.686***	1.415***
	(10.5)	(8.72)	(7.72)	(10.52)	(9.37)	(7.73)
LSCHL	0.272*	0.253*	0.482***			
	(1.77)	(1.71)	(3.2)			
LLIFE				1.678**	1.02	2.95***
				(2.02)	(1.23)	(3.36)
LPOPG	-0.592***	-0.574***	-0.574***	-0.328**	-0.325***	-0.257***
	(-4.13)	(-4.18)	(-4.37)	(-2.51)	(-2.54)	(-2.10)
HIPCs		-1.825***	-1.621***		-1.385***	-1.101***
		(-5.69)	(-5.25).		(-4.46)	(-3.68)
1960s			1.164***			1.444*
			(3.66)			(4.48)
1970s			0.609**			0.552*
			(1.96)			(1.79)
1980s			-0.622**			-0.572**
			(-2.18)			(-1.99)
No. Obser.	372	372	372	430	430	430
R^2	0.28	0.34	0.40	0.28	0.31	0.38

Table (15)

Regression results for panel data (1960-2000)

	Random Effects Model				**Fixed Effects Model**			
Variable	1	2	3	4	5	6	7	8
Const.	6.372*** (3.64)	9.329*** (5.32)	8.065*** (4.74)	-5.301 (-1.61)	19.03*** (6.28)	19.03*** (6.28)	16.701*** (4.56)	9.487 (1.17)
LGDPI	-1.246*** (-5.34)	-1.427*** (-6.36)	-1.337*** (-6.21)	-1.063*** (-6.12)	-2.662*** (-7.57)	-2.662*** (-7,57)	-2.416*** (-6.00)	-1.738*** (-5.69)
LINV	2.089*** (10.31)	1.743*** (8.68)	1.542*** (7.58)	1.492*** (7.71)	1.537*** (5.09)	1.537*** (5.09)	1.701*** (5.56)	1.906*** (6.4)
LSCHL	0.226 (1.38)	0.209 (1.34)	0.487*** (2.99)		0.187 (0.97)	0.187 (0.97)	0.232 (0.99)	
LLIFE				2.935*** (3.17)				0.279 (0.16
Log (n+g+δ)	-0.563*** (-3.31)	-0.547*** (-3.45)	-0.551*** (-3.62)	-0.236* (-1.84)	-0.226 (-0.87)	-0.226 (-0.87)	-0.22 (-0.84)	-0.046 (-0.25)
HIPCs		-2.053*** (-5.17)	-1.717*** (-4.44)	-1.123*** (-3.34)				
1960s			1.068*** (3.54)	1.397*** (4.42)			-0.062 (-0.14)	0.386 (0.79)
1970s			0.521* (1.8)	0.504* (1.69)			-0.203 (-0.57)	-0.159 (-0.43)
1980s			-0.666*** (-4.44)	-0.593** (-2.16)			-0.956*** (-3.57)	-0.903*** (-3.12)
No. Obser.	372	372	372	430	372	372	372	430
R^2	0.20	0.23	0.30	0.29	0.29	0.29	0.33	0.31
Prob(Chi2)[1]	0.000	0.000	0.055	0.031				

[1]. The hausman test for column 3 and 4 accepts the Ho, so I opt for the random effects model, while column 1 and 2 rejects it, therefore I opt for the fixed effects model

C. Cross-section results for developing countries' convergence

Table (16)

Descriptive statistics for developing countries (1960-2000)

Variable	Observations	Mean	Std. Dev.	Min	Max
LGDP60	91	7.421	0.689	5.948	9.016
LGDP70	91	7.678	0.772	5.811	9.333
LGDP80	91	7.833	0.950	4.018	9.727
LGDP90	91	7.898	1.038	3.614	9.944
GDPG6069	91	2.576	2.296	-3.163	8.606
GDPG7079	91	2.236	3.021	-6.296	10.772
GDPG8089	91	0.728	2.769	-4.412	10.489
GDPG602000	91	1.308	2.735	-7.056	10.129
GDPG702000	91	1.170	2.647	-14.978	6.105
GDPG802000	91	0.976	2.138	-4.655	6.105
GDPG902000	91	1.308	2.735	-7.056	10.012
LSCHL60	68	2.1544	1.001	-0.1053	4.0377
LSCHL70	70	2.4782	1.0309	0.0953	4.5261
LSCHL80	74	2.9634	0.9643	0.1823	4.5261
LSCHL90	76	2.9634	0.9643	0.1823	4.8434
LLIFE60	86	3.851	0.211	3.45	4.3
LLIFE70	86	3.944	0.195	3.54	4.31
LLIFE80	86	4.014	0.188	3.57	4.33
LLIFE90	88	4.081	0.185	3.56	4.35
INV6069	91	2.607	0.8814	0.482	3.935
INV7079	88	2.8049	0.8351	0.177	4.438
INV8089	90	2.709	0.661	0.815	4.369
INV6099	88	2.4821	0.6426	0.706	3.888
INV7099	88	2.5059	0.6241	0.771	4.01
INV8099	90	2.491	0.6095	1.068	4.018
INV902000	90	2.5436	0.715	0.707	4.103

Table (17)

Cross-section results for developing countries (1960-2000)

Variable	1	2	3	4
CONSTANT	7.266*** (2.99)	10.347*** (4.51)	-11.206** (-2.46)	-6.548 (-1.48)
LGDP60	-1.147*** (-3.54)	-1.424*** (-4.8)	-1.489*** (-4.69)	-1.726*** (-5.72)
LINV6099	1.621*** (6.18)	1.190*** (4.63)	1.303*** (4.01)	0.881*** (2.72)
LSCHL60	0.446** (2.09)	0.538*** (2.81)		
LLIFE60			5.612*** (4.15)	5.193*** (4.11)
Log (n+g+ δ)	-0.846 (-3.6)	-0.741*** (-3.52)	-0.485* (-1.64)	-0.378 (-1.37)
HIPCs		-1.551*** (-4.04)		-1.578*** (-3.63)
No. of Observation	64	64	82	82
R^2	0.55	0.65	0.53	0.60

Table (18)

Cross-section results for developing countries(1970-2000)

Variable	1	2	3	4
CONSTANT	8.991*** (3.34)	12.155*** (4.71)	-16.023** (-2.37)	-10.73 (-1.59)
LGDP70	-1.522*** (-4.24)	-1.761*** (-5.31)	-1.837*** (-5.17)	-2.032*** (-5.84)
LINV7099	1.985*** (6.34)	1.491*** (4.77)	1.726*** (4.09)	1.297*** (2.99)
LSCHL70	0.606** (2.41)	1.491*** (2.84)		
LLIFE70			7.172*** (3.76)	6.552*** (3.55)
Log (n+g+ δ)	-1.01*** (-3.75)	-0.906*** (-3.69)	-0.609* (-1.67)	-0.518 (-1.47)
HIPCs		-1.691*** (-3.77)		-1.581*** (-2.78)
No. of Observation	66	66	82	82
R^2	0.55	0.64	0.53	0.58

Table (19)

Cross-section results for (1980-2000)

Variable	1	2	3	4
CONSTANT	6.475**	9.965***	-1.761	2.466
	(2.58)	(3.84)	(-0.33)	(0.46)
LGDP80	-1.067***	-1.318***	-0.677**	-0.884***
	(-3.18)	(-4.06)	(-2.56)	(-3.37)
LINV8099	1.964***	1.574***	1.802***	1.428***
	(5.26)	(4.24)	(4.57)	(3.59)
LSCHL80	0.299	0.225		
	(1.05)	(0.83)		
LLIFE80			1.468	1.122
			(0.95)	(0.76)
Log (n+g+ δ)	-1.294***	-1.219***	-1.073***	-0.995***
	(-4.49)	(-4.49)	(-3.93)	(-3.79)
HIPCs		-1.61***		-1.439***
		(-3.18)		(-2.96)
No. of Observation	72	72	84	84
R^2	0.48	0.55	0.49	0.52

Table (20)

Cross-section results for developing countries (1990-2000)

Variable	1	2	3	4
CONSTANT	4.473	8.720**	-12.716	-4.881
	(1.27)	(2.36)	(-1.53)	(-0.55)
LGDP90	-0.744	-1.073**	-0.917***	-1.082**
	(-1.5)	(-2.19)	(-2.09)	(-2.49)
LINV902000	1.381***	1.138**	1.36***	1.123**
	(3.08)	(2.6)	(2.91)	(2.4)
LSCHL90	0.643	0.433		
	(1.45)	(1.0)		
LLIFE90			4.82**	3.457
			(1.97)	(1.4)
Log (n+g+ δ)	-1.349***	-1.209***	-0.887**	-0.813**
	(-3.27)	(-3.04)	(-2.25)	(-2.11)
HIPCs		-2.024***		-1.683**
		(-2.74)		(-2.22)
No. of Observation	74	74	86	86
R^2	0.33	0.40	0.29	0.33

Table (21)

Cross-section results for developing countries (1960-69)

Variable	1	2	3	4
CONSTANT	2.561 (0.8)	4.135 (1.26)	-7.277 (-1.52)	-5.895 (-0.56)
LGDP60	-0.368 (-0.80)	-0.526 (-1.14)	-0.382 (-0.95)	-0.417 (-1.02)
LINV6069	1.147*** (4.23)	1.047*** (3.82)	1.027*** (3.53)	1.01*** (3.42)
LSCHL60	0.363 (1.23)	0.373 (1.29)		
LLIFE60			2.875* (1.89)	2.618* (1.64)
Log (n+g+ δ)	-0.459* (-1.76)	-0.425* (-1.65)	-0.438* (-1.66)	-0.432 (-1.63)
HIPCs		-0.895* (-1.69)		-0.306 (-0.56)
No. of Observation	66	66	84	84
R^2	0.33	0.36	0.31	0.31

Table (22)

Cross-section results for developing countries (1970-79)

Variable	1	2	3	4
CONSTANT	3.828 (0.89)	7.783* (1.82)	-21.981*** (-3.4)	-17.684** (-2.51)
LGDP70	-1.182** (-1.98)	-1.533** (-2.65)	-1.331*** (-3.09)	-1.432*** (-3.31)
LINV7079	1.92*** (4.76)	1.638** (2.29)	1.58*** (4.28)	1.469*** (3.92)
LSCHL70	0.924** (2.21)	0.908** (2.29)		
LLIFE70			7.336*** (3.77)	6.573*** (3.28)
Log (n+g+ δ)	-0.037 (-0.09)	0.001 (0.01)	0.386 (1.47)	0.429 (1.64)
HIPCs		-2.098*** (-2.88)		-0.978 (-1.47)
No. of Observation	66	66	82	82
R^2	0.40	0.44	0.47	0.48

Table (23)

Cross-section results for developing countries (1980-89)

Variable	1	2	3	4
CONSTANT	4.596 (1.32)	7.403* (1.91)	-1.249 (-0.17)	3.013 (0.39)
LGDP80	-0.998** (-2.06)	-1.187** (-2.4)	-0.891** (-2.43)	-1.08*** (-2.83)
LINV8089	2.03*** (4.06)	1.743*** (3.31)	1.986*** (4.03)	1.765*** (3.49)
LSCHL80	0.147 (0.36)	0.073 (0.18)		
LLIFE80			1.463 (0.68)	1.01 (0.47)
Log (n+g+ δ)	-0.914** (-2.42)	-0.892** (-2.39)	-1.025*** (-3.15)	-1.024*** (-3.18)
HIPCs		-1.214 (-1.59)		-1.134 (-1.63)
No. of Observation	72	72	84	84
R^2	0.26	0.28	0.35	0.38

D. Panel Regression for developing countries (1960-2000)

Table (24)

Descriptive Statistics for Developing countries' Panel (1960-2000)

Variable	Observation	Mean	Std. Dev.	Min	Max
LGDPG	360	1.650	2.836	-7.056	10.77
LGDPI	360	7.67	0.859	3.614	9.94
LLIFE	342	3.961	0.207	3.45	4.35
LSCHL	284	2.743	1.062	-0.105	4.84
LINV	358	2.665	0.780	0.177	4.43
Ln(n+g+ δ)	352	2.364	0.902	-3.63	5.96

Table (25)

Cross-section pooled time series results for developing countries (1960-2000)[10]

Variable	1	2	3	4
CONSTANT	3.121*	7.013***	6.259***	-7.506**
	(1.66)	(3.61)	(3.37)	(-2.05)
LGDP	-0.640**	-0.999***	-1.014***	-0.952***
	(-2.44)	(-3.84)	(-4.08)	(-4.68)
LINV	1.752***	1.466***	1.374***	1.387***
	(8.6)	(7.24)	(6.98)	(6.97)
LSCHL	0.109	0.121	0.424**	
	(0.59)	(0.68)	(2.27)	
LLIFE				3.378***
				(3.34)
Log (n+g+ δ)	-0.645***	-0.585***	-0.616***	-0.342**
	(-3.38)	(-3.2)	(-3.52)	(-2.28)
HIPCs		-1.839***	-1.574***	-0.988***
		(-5.17)	(-4.59)	(-2.93)
1960s			1.223***	1.652***
			(3.0)	(4.06)
1970s			0.852**	0.786**
			(2.16)	(2.07)
1980s			-0.773**	-0.626*
			(-2.15)	(-1.76)
No. of Observation	278	278	278	336
R^2	0.25	0.32	0.39	0.37

[10.] dependent variable is growth rate of log GDP per capita

Table (26)

Panel regression results for developing countries (1960-2000)

	Random Effects Model			Fixed Effects Model				
Variable	1	2	3	4	5	6	7	8
Const.	4.88** (2.24)	8.484*** (3.88)	7.279*** (3.46)	-7.437** (-1.95)	21.071*** (5.58)	21.071*** (5.58)	17.31*** (4.13)	4.897 (0.51)
LGDPI	-0.904*** (-3.02)	-1.203*** (-4.16)	-1.181*** (-4.26)	-0.992*** (-4.73)	-2.884*** (-6.02)	-2.884*** (-6.02)	-2.498*** (-5.0)	-1.698*** (-4.84)
LINV	1.838*** (8.05)	1.528*** (6.9)	1.442*** (6.65)	1.412*** (6.88)	1.379*** (4.05)	1.379 (4.05)	1.505*** (4.43)	1.714*** (5.2)
LSCHL	0.079 (0.41)	0.09 (0.49)	0.454** (2.26)		0.117 (0.50)	0.117 (0.50)	0.293 (0.97)	
LLIFE				3.411*** (3.26)				1.333 (0.61)
Log (n+g+δ)	-0.603*** (-2.77)	-0.555*** (-2.73)	-0.596*** (-3.04)	-0.318** (-2.07)	-0.458 (-1.45)	-0.458 (-1.45)	-0.408 (-1.28)	-0.059 (-0.28)
HIPCs		-2.053*** (-4.88)	-1.683*** (-4.09)	-1.013*** (-2.83)				
1960s			1.165*** (2.94)	1.632*** (4.04)			0.171 (0.30)	0.731 (1.16)
1970s			0.799** (2.12)	0.767** (2.05)			0.161 (0.35)	0.177 (0.38)
1980s			-0.797** (-2.39)	-0.637* (-1.83)			-1.033*** (-2.95)	-0.932*** (-2.53)
No. Obser.	278	278	278	336	278	278	278	336
R^2	0.13	0.49	0.24	0.25	0.23	0.23	0.29	0.28
Prob(Chi2)[1]	0.000	0.000	0.17	0.044				

[1]. The Prob (Chi^2) in columns 1 and 2 indicate that one the Hausman test is in favor of the fixed effects model while in colums 3 and 4, the Hausman test indicate that the random effects model should be chosen.

E. Panel Regression for HIPCs (1960-2000)

Table (27)

Descriptive statistics for HIPCs (1960-2000) four decades panel

Variable	Observation	Mean	Std.Dev.	Min	Max
GDPG	116	0.2148	2.6351	-7.0562	6.6288
Log (GDPI)	116	7.034	0.6896	3.144	8.2961
Log (INV)	90	3.085	0.4621	1.98	3.87
LLIFEI	112	3.8085	0.1527	3.45	4.2
POPG	116	2.637	0.6836	-0.46	4.25

Table (28)

Cross-section pooled time series results (1960-2000) decade averages-HIPCs alone

Variable	1	2	3
Constant	2.188 (1.42)	12.551* (1.92)	-1.614 (-0.23)
GDPI	-1.67*** (-3.46)	-1.375*** (-2.61)	-1.789*** (-3.56)
INV	2.109*** (4.03)	2.272*** (4.25)	2.369*** (4.73)
LLIFEI		-2.581 (-1.35)	1.601 (0.78)
POPG	0.226 (0.61)	0.208 (0.56)	0.148 (0.43)
Dummy for 1960s			2.636*** (3.7)
Dummy for 1970s			1.282** (1.98)
Dummy for 1980s			0.078 (0.13)
No. Observations	90	90	90
R^2	0.21	0.22	0.37

Table (29)

Regression results using a panel data (1960-2000) decade averages-HIPCs alone

	Random Effects Model		**Fixed Effects Model**	
Variable	1	2	3	4
CONST	12.552*	-1.614	63.85***	56.542**
	(1.92)	(-0.23)	(6.23)	(2.43)
LGDPI	-1.375***	-1.789***	-5.441***	-5.297***
	(-2.61)	(-3.56)	(-5.27)	(-4.84)
INV	2.272***	2.369***	1.334*	1.239*
	(4.25)	(4.73)	(1.89)	(1.72)
LLIFE	-2.581	1.601	-8.022***	-6.385
	(-1.35)	(0.78)	(-3.39)	(-1.19)
POPG	0.208	0.148	0.68	0.673
	(0.56)	(0.44)	(1.29)	(1.21)
Dummy for 1960s		2.636***		0.296
		(3.7)		(0.22)
Dummy for 1970s		1.282**		0.228
		(1.98)		(0.26)
Dummy for 1980s		0.078		-0.276
		(0.13)		(-0.45)
No. observations	90	90	90	90
R^2	0.23	0.37	0.49	0.50
Prob (Chi2)[1]	0.000	0.04		

[1.] Prob (Chi^2) = 0.04 is a Hausman test that indicates that the random effects model in column 1 is a more appropriate model to use for this regression, while column 2 indicates the other way around.

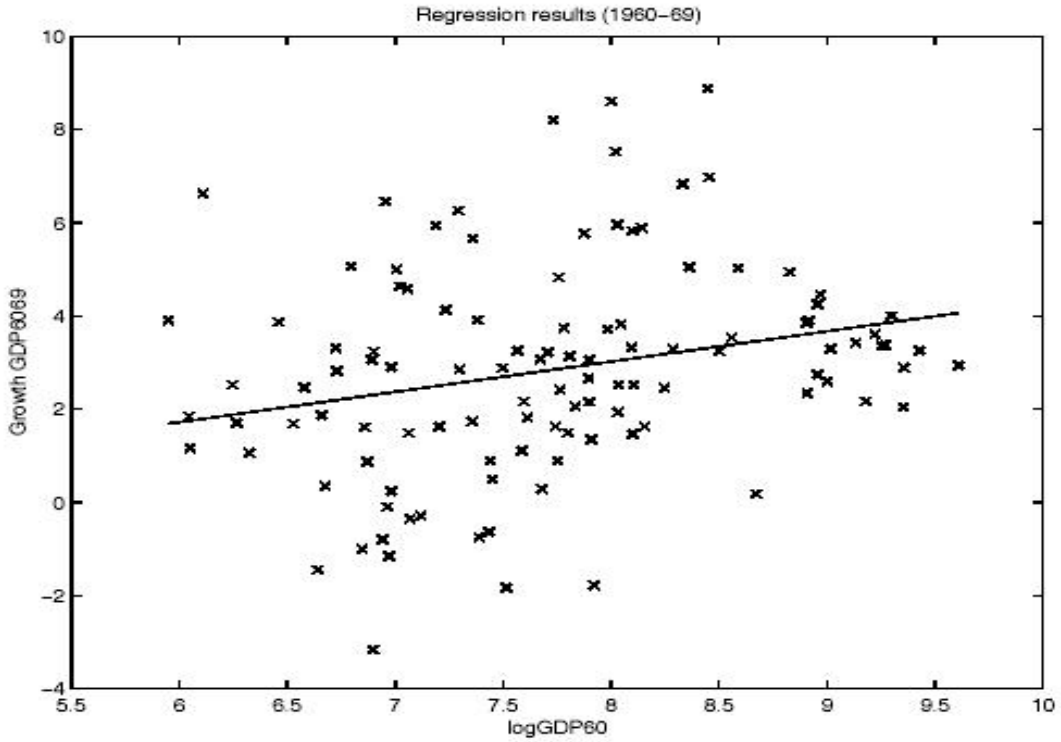
Table (30)

List of countries included in the regression

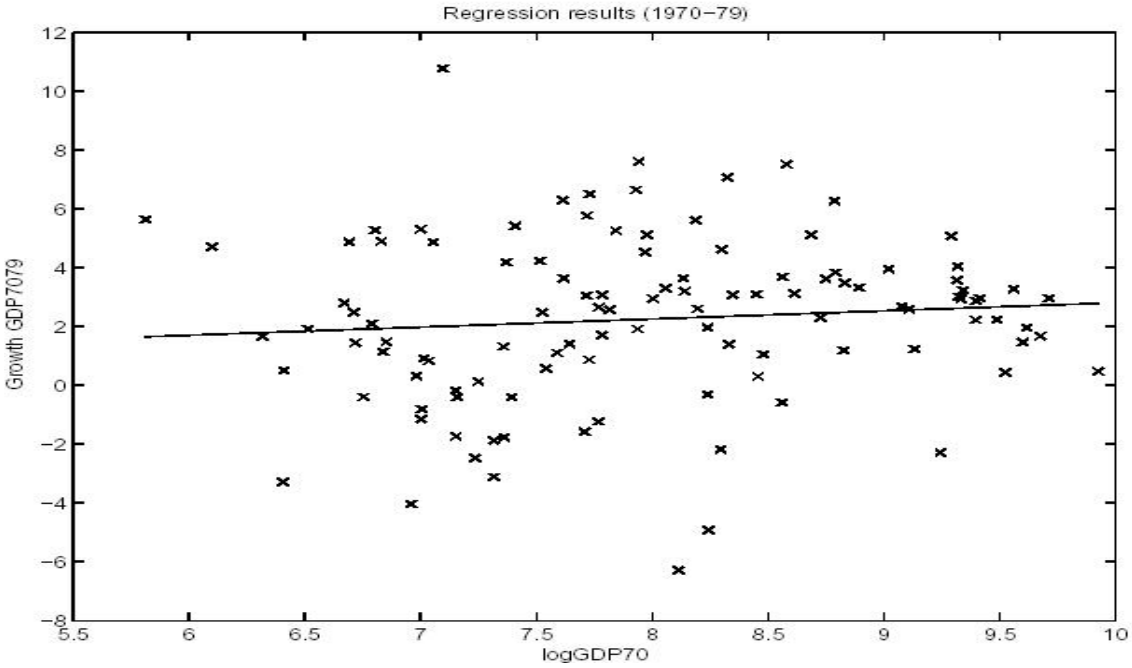
Angola	Cape Verde	Guyana	Mozambique	Senegal
Argentina	Costa Rica	Hong Kong, China	Mauritania	Singapore
Australia	Ecuador	Honduras	Mauritius	Sierra Leone
Austria	Egypt, Arab Rep.	Haiti	Malawi	El Salvador
Burundi	Denmark	Indonesia	Malaysia	Sweden
Belgium	Cyprus	India	Namibia	Seychelles
Benin	Dominican Republic	Ireland	Niger	Syrian Arab Republic
Burkina Faso	Algeria	Iran, Islamic Rep.	Nigeria	Chad
Bangladesh	Spain	Iceland	Nicaragua	Togo
Bolivia	Ethiopia	Israel	Netherlands	Thailand
Brazil	Finland	Italy	Norway	Trinidad and Tobago
Barbados	Fiji	Jamaica	Nepal	Tunisia
Botswana	France	Jordan	New Zealand	Turkey
Central African Republic	Germany	Japan	Pakistan	Tanzania
Canada	Gabon	Kenya	Panama	Uganda
Switzerland	United Kingdom	Korea, Rep.	Peru	Uruguay
Chile	Ghana	Sri Lanka	Philippines	United States
China	Guinea	Lesotho	Papua New Guinea	Venezuela, RB
Cote d'Ivoire	Gambia, The	Luxembourg	Portugal	South Africa
Cameroon	Guinea-Bissau	Morocco	Paraguay	Congo, Dem. Rep.
Congo, Rep.	Equatorial Guinea	Madagascar	Romania	Zambia
Colombia	Greece	Mexico	Rwanda	Zimbabwe
Comoros	Guatemala	Mali		

Unconditional convergence (graphic representation)

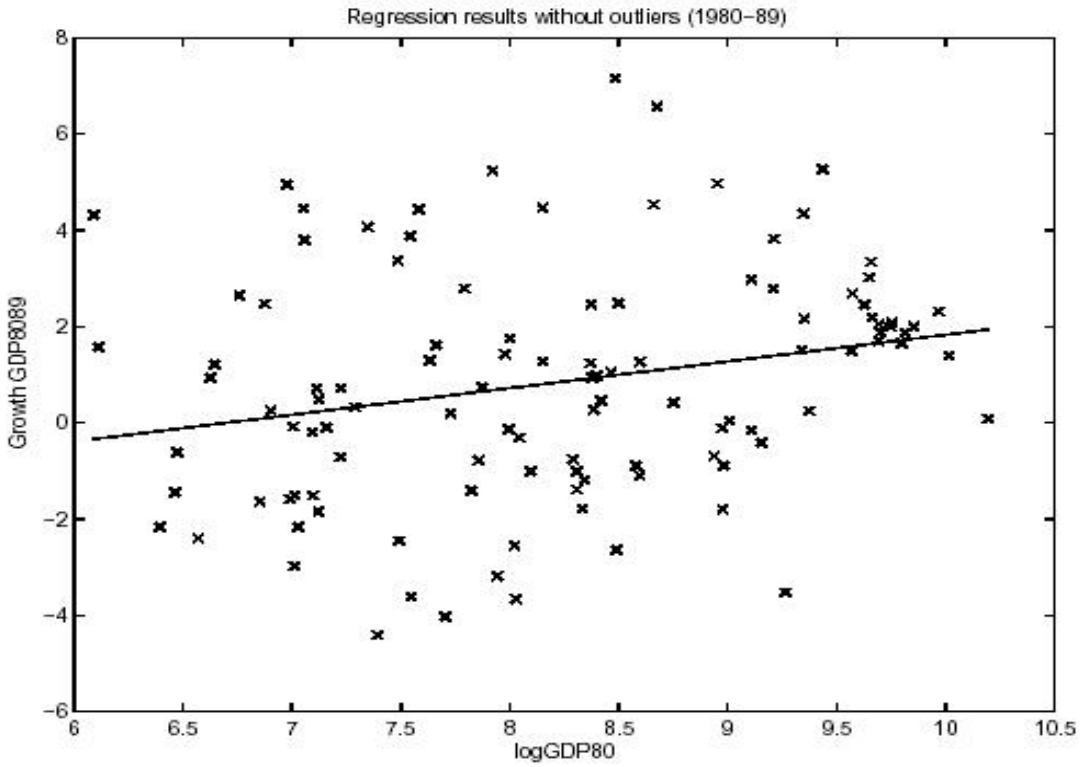
Graph (A1)



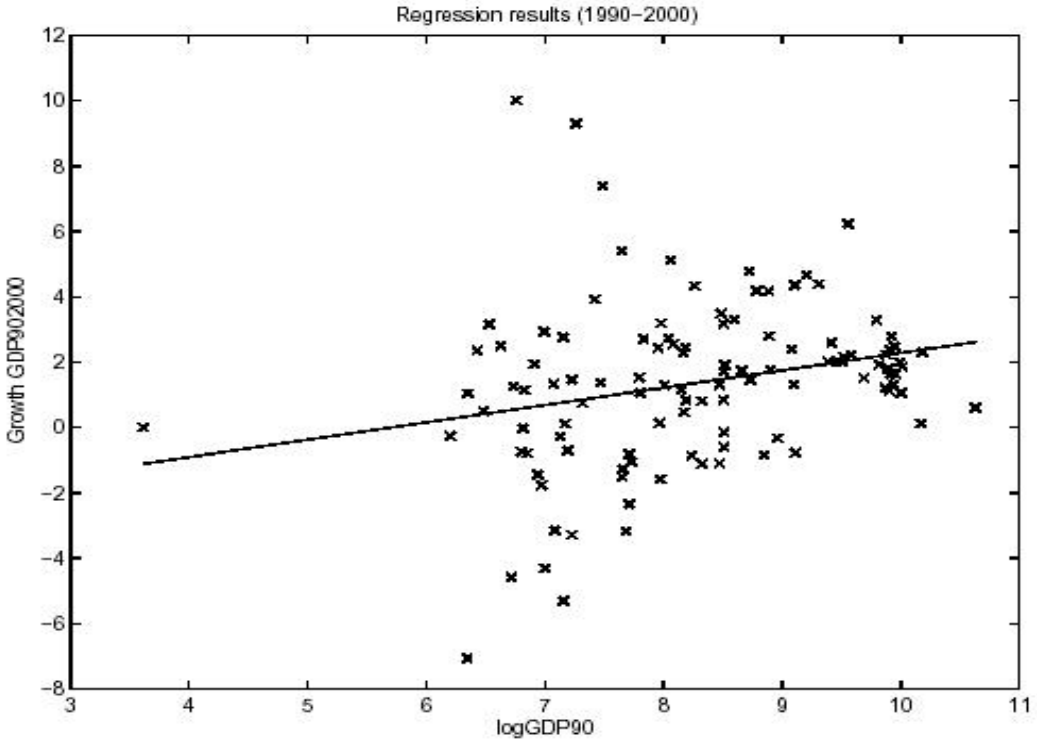
Graph (A2)



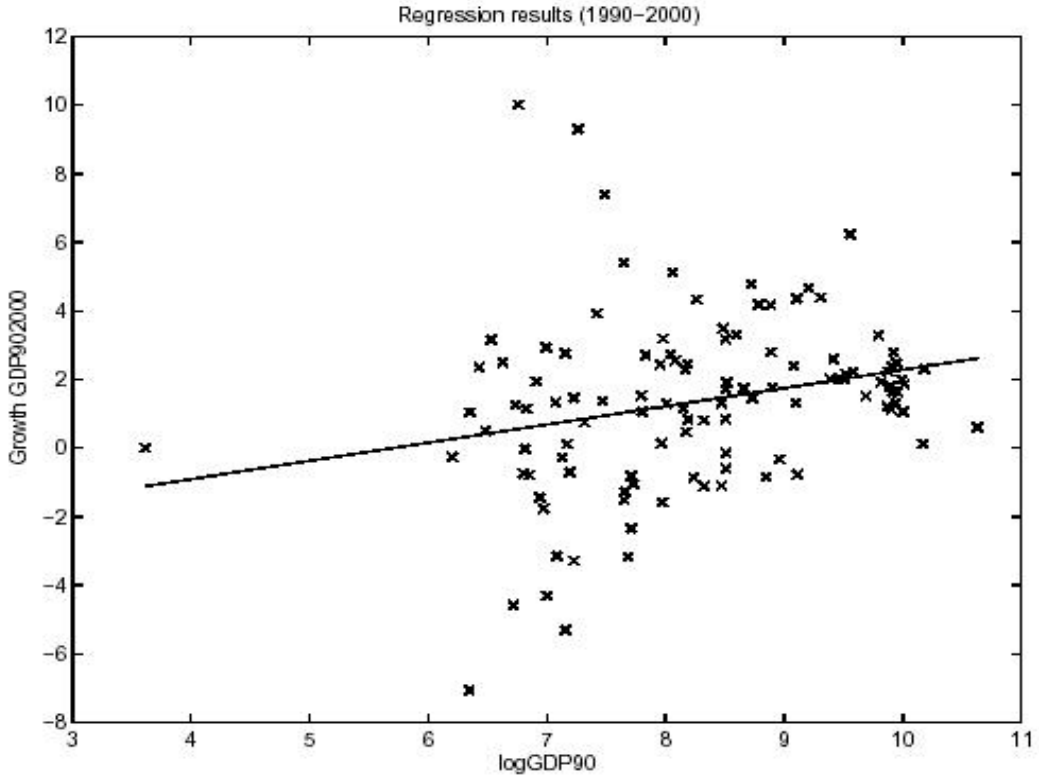
Graph (A3)



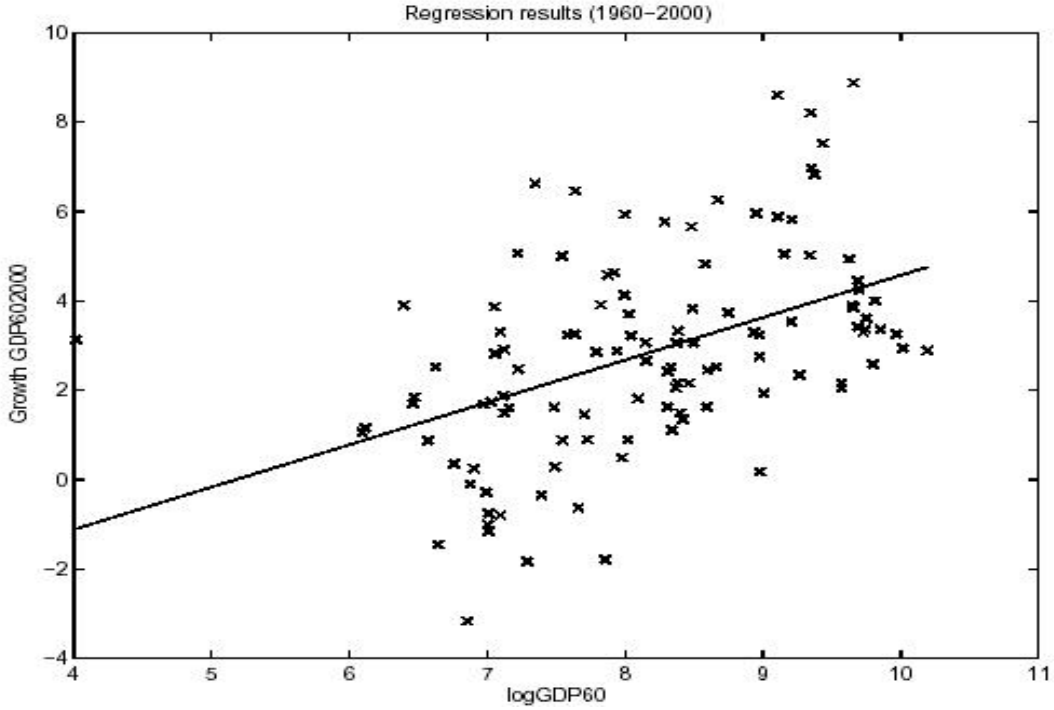
Graph(A4)



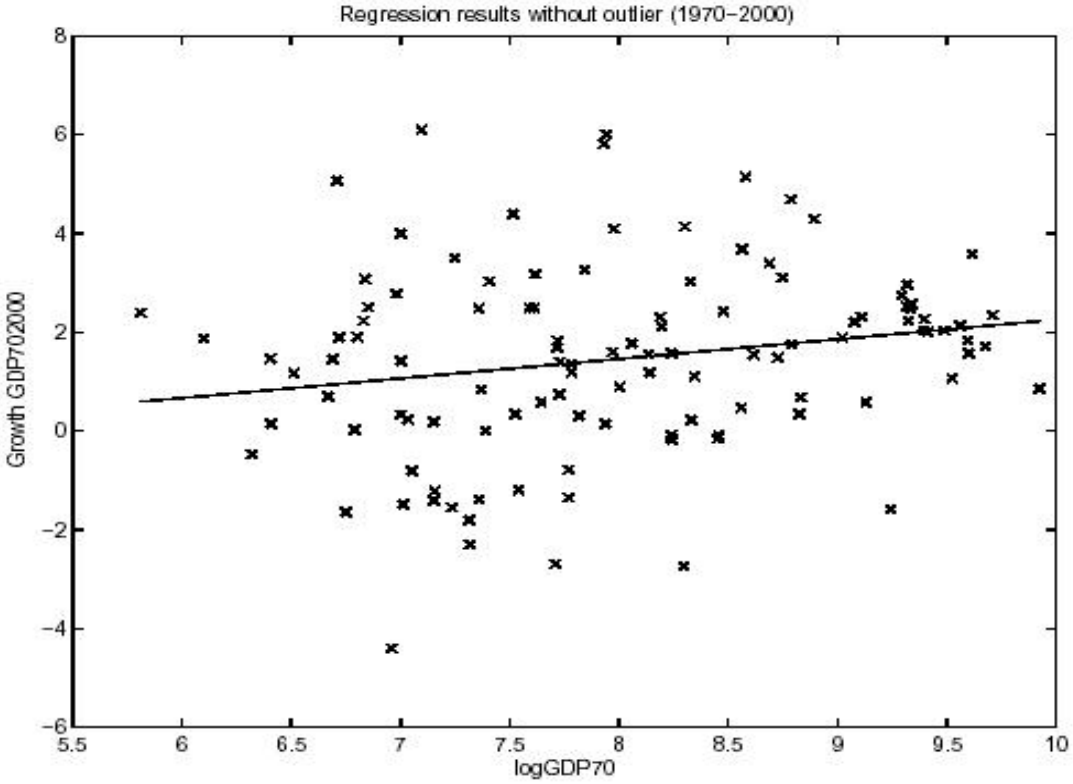
Graph (A5)



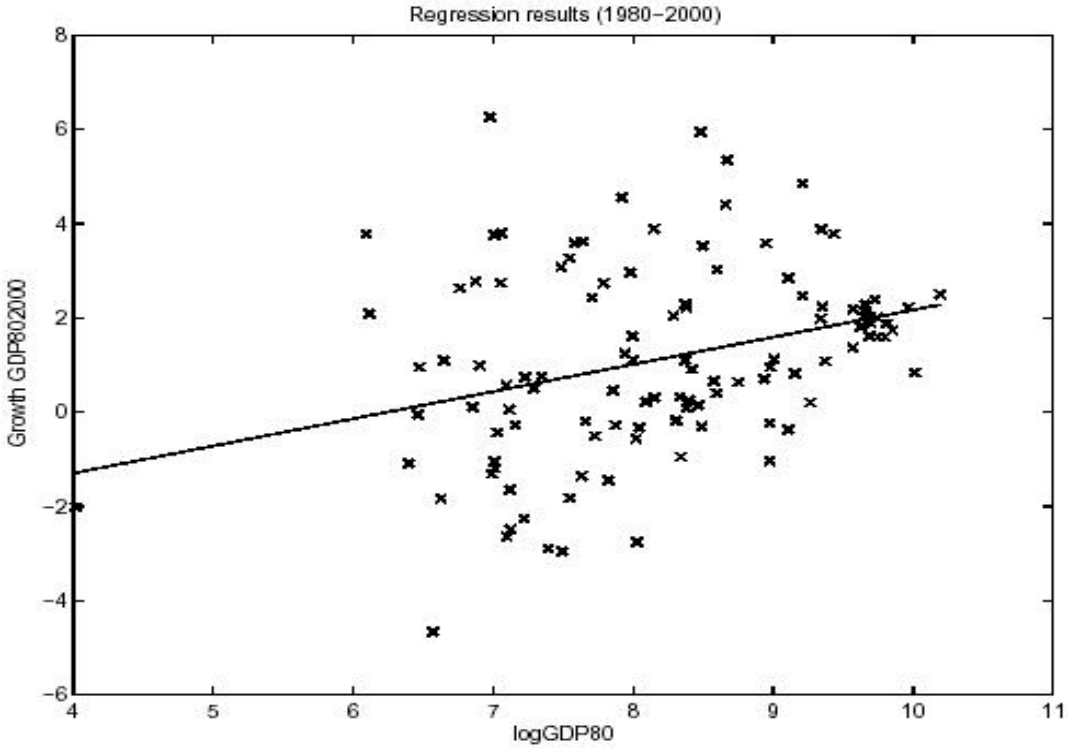
Graph (A6)



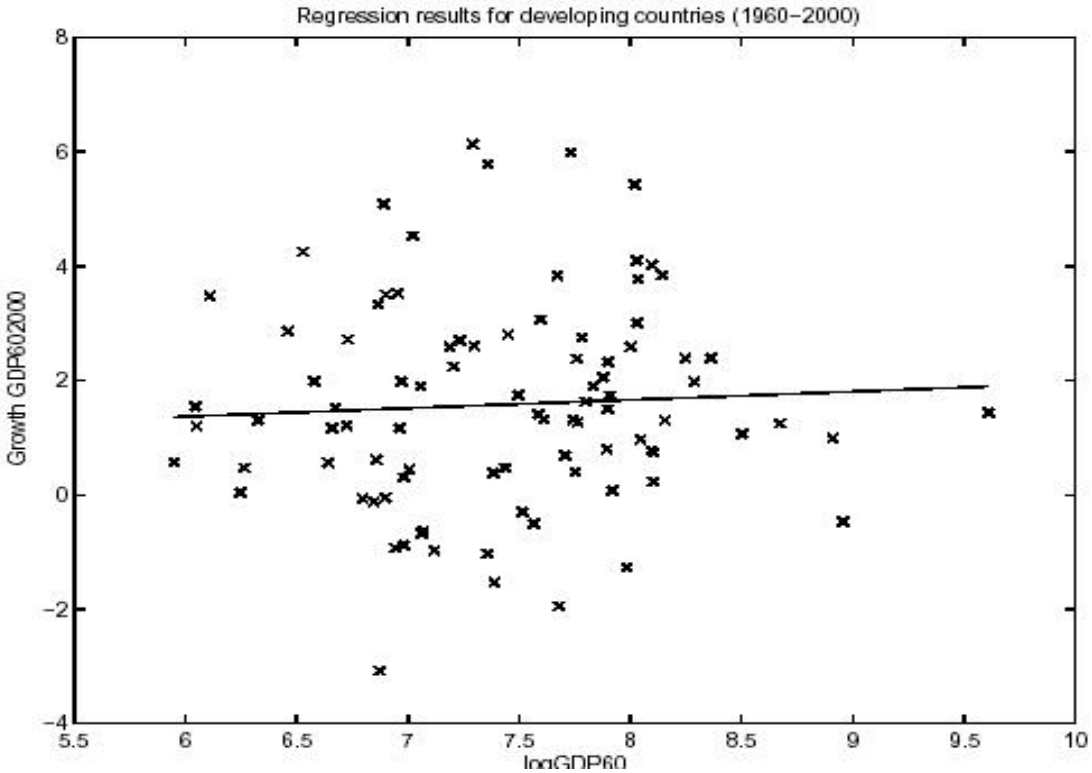
Graph (A7)



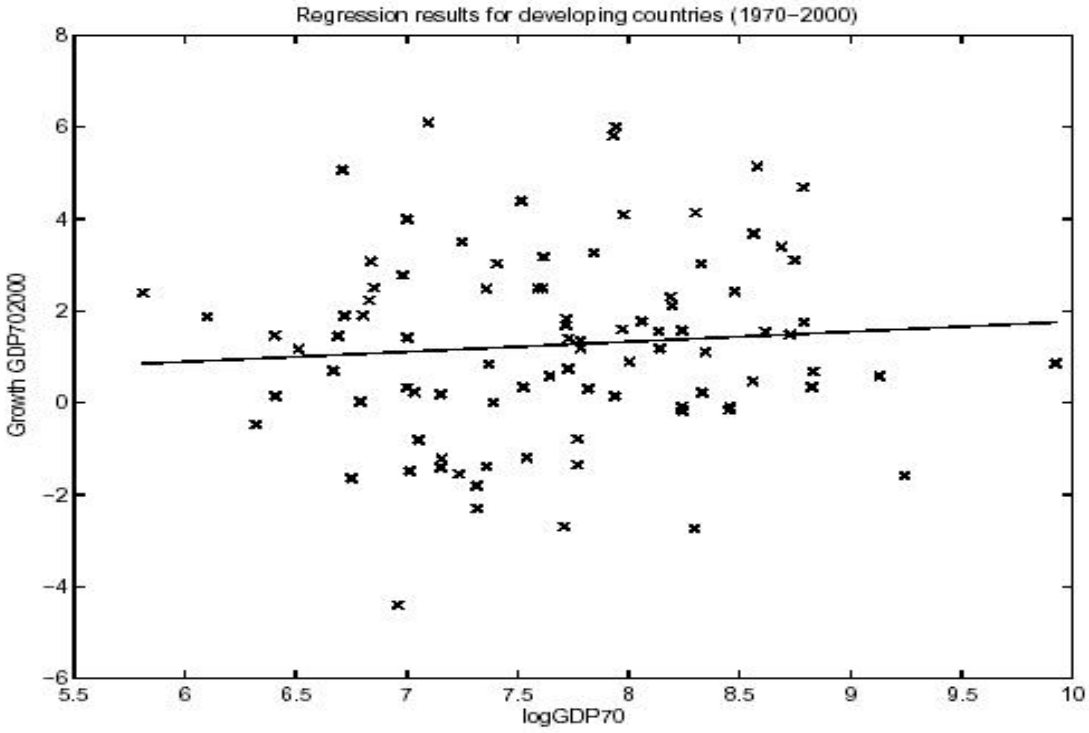
Graph (A8)



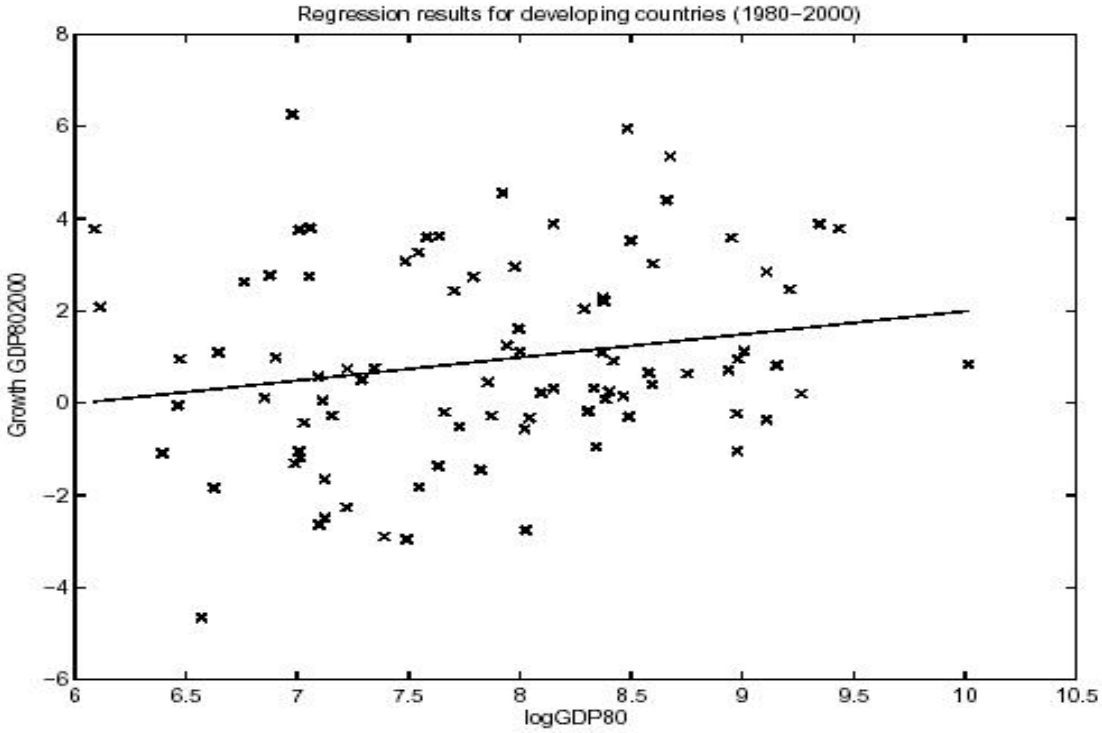
Graph (A9)



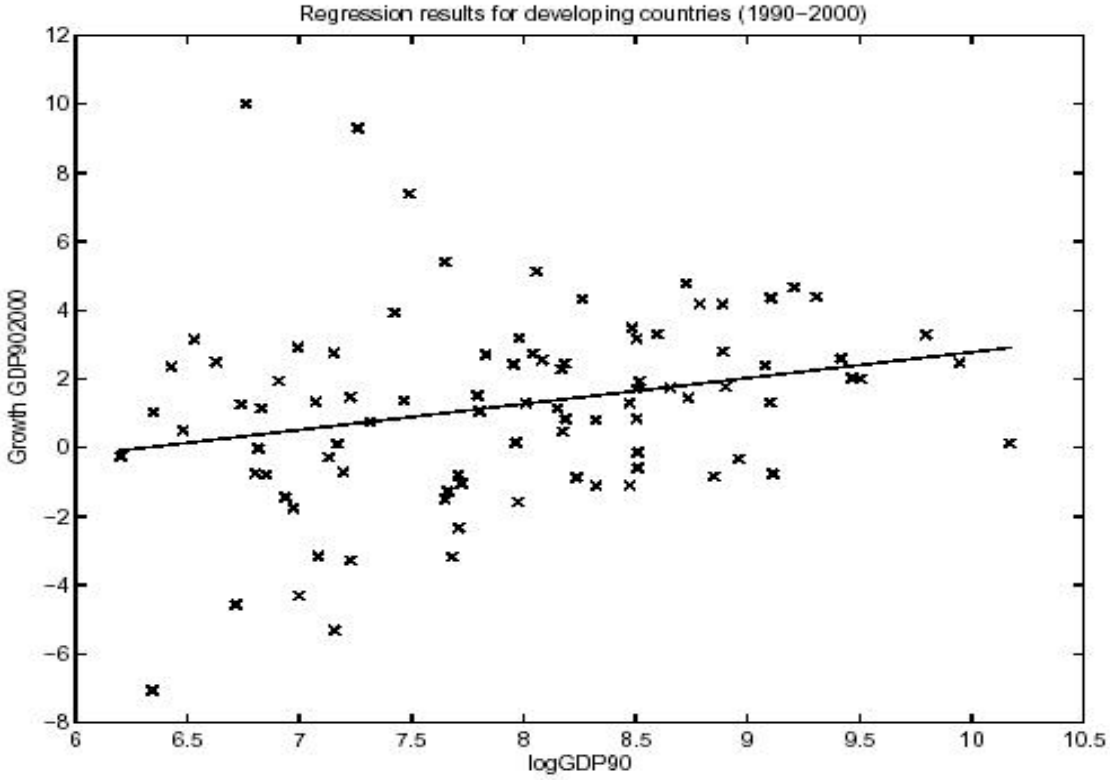
Graph (A10)



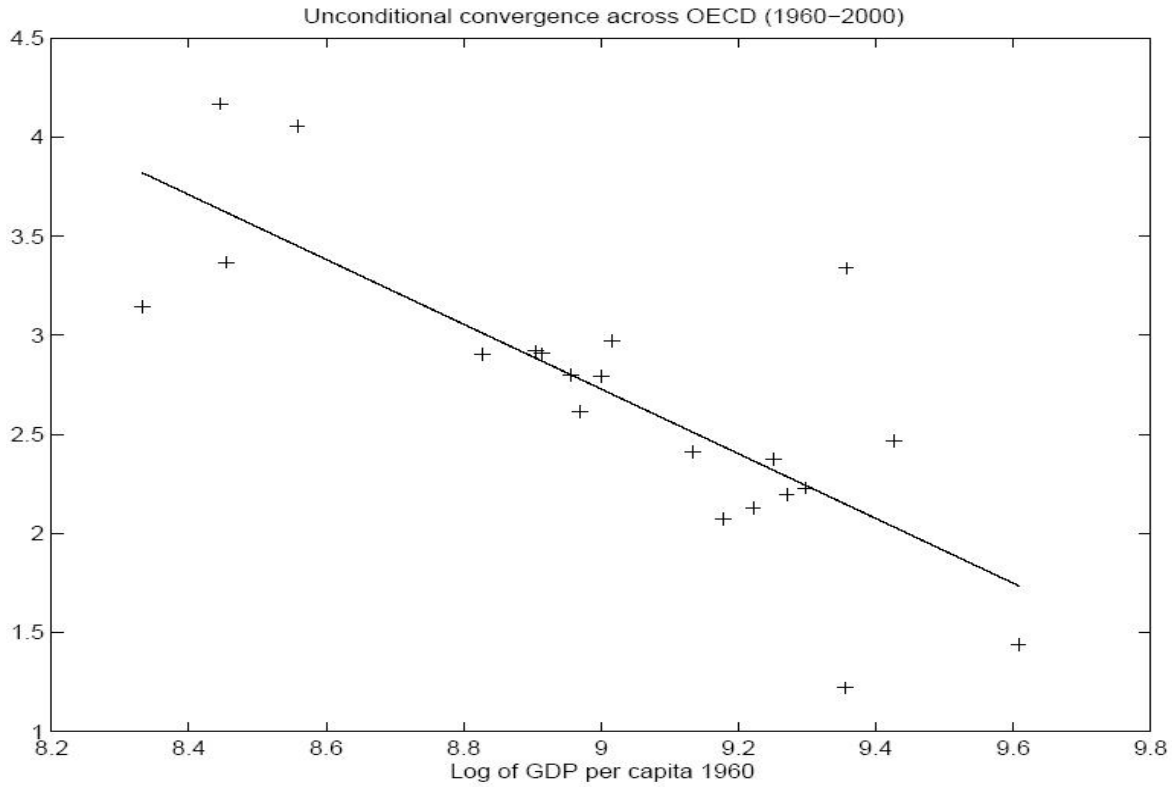
Graph (A11)



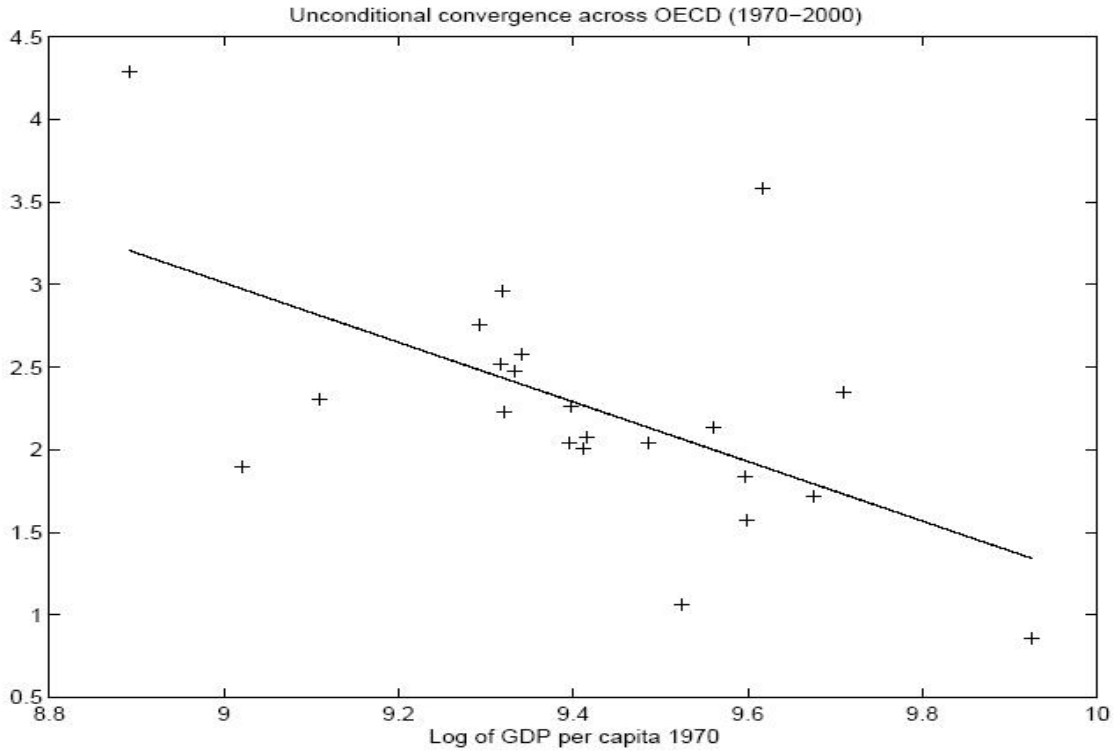
Graph (A12)



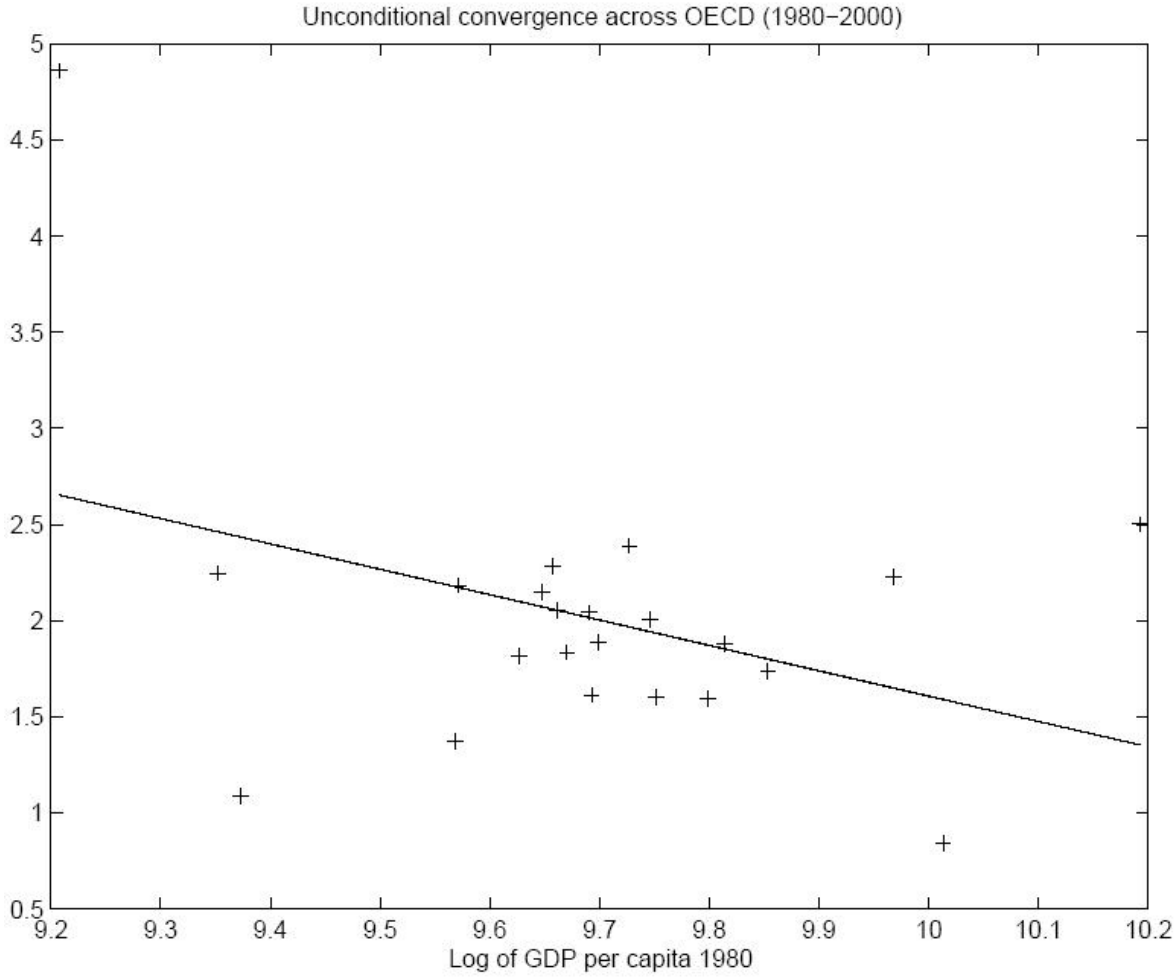
Graph (A13)



Graph (A14)



Graph (A15)


Unconditional convergence across OECD (1980−2000)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
9.2
9.3
9.4
9.5
9.6
9.7
9.8
9.9
10
10.1
10.2
Log of GDP per capita 1980

II. An Empirical Exploration into the Determinants of External Indebtedness

Abstract

The causes of the external indebtedness of developing countries and their subsequent failure to meet contractual debt obligations have generated the heated debates both in the academic circles, policy makers, and the broader international community since the outset of the debt crisis in 1982. While poverty and external factors seem to be the most profound factors behind the external indebtedness of poor nations, there is still an ongoing debate on the determinants of the demand for overseas borrowing by developing countries.

This chapter contributes to this debate by empirically investigating the causes of external indebtedness by developing countries in the 1980s and 1990s. First, I empirically examine the robustness of a recent study, which is based on the hypothesis that indebted countries have a greater tendency to exercise bad policies. Second, moving to a broader approach and using annual cross-section, fixed effects and random effects models and cross-section pooled time series strategies, this paper shows that poverty (the savings gap), income instability, and external factors that include debt service payments to be the main causes of overseas borrowing by developing countries in the 1980s and 1990s.

As far as the empirical strategy is concerned, the application of a panel data approach seems to be highly preferred, as it allows us control for time-specific events that are linked to overseas borrowing, particularly given the rapid changes in the global macroeconomic environment in the past years. Moreover, this strategy helps to produce a more robust explanation by allowing to incorporate country-specific factors as developing countries themselves are heterogeneous in terms of their colonial heritages, geopolitical and strategic significance, and creditworthiness, all affecting the level of indebtedness and the potential bargaining power to manage the subsequent debt crisis.

1. Introduction

"International debt has become the defining feature of the contemporary world economy", (Eatwell and Taylor, 2000, in: Dymski, 2002, p. 244)

The problem of developing countries' external debt is believed to be one of the major challenges of the new millennium The debate has been further intensified thanks to the involvement of not only the traditional international financial institutions, but also independent analysts, and non-governmental organizations (NGOs). Though it is generally believed that external debt helps countries that are suffering from capital deficiency to achieve accelerated economic growth, once this financial gap becomes unmanageable, the past accumulated external debt is likely to provoke further external borrowing, creating a vicious circle problem. This obviously creates a gloomy picture on future growth prospects and reduces the likelihood of developing countries to meet their debt-service obligations, which is exactly the current experience of the poorest nations of the world, earning the new name "heavily indebted poor countries" (HIPCs).

It is particularly crucial given the factors behind this huge debt build up. Although poverty (the savings gap) seems to be the natural reason behind overseas borrowing, there are additional, mainly exogenous, factors that drove most developing nations into a chronic external debt crisis situation. The most frequently cited determinants of overseas borrowing in the 1970s and 1980s are the two-oil price shocks of the early and late 1970s, and the subsequent recession in major industrialized countries, the change in the global economic policy and the deterioration in developing countries terms of trade are just to mention a few. On the supply side, the generous and irresponsible lending policies of private commercial banks in industrialized countries that are linked to the recycling of the "Petrodollars" are another widely acknowledged root causes behind developing countries debt accumulation. What is even worse in this context is that as private commercial banks were fast to discharge loans to developing countries in the 1970s, they were even faster to cut lending when the first sign of the debt crisis came into play

following Mexico's official announcement in August 1982 that it was no longer able and willing to meet its contractual debt obligation. [15]

It should, however, be added that irresponsible and corrupt governments (sometimes unelected ones) in developing countries themselves are the key players of the debt build up. Such leaders across the developing world, like Mobutu of Zaire, have been accused of shamelessly squandering their nations' scarce resources for luxurious activities rather than investing them to improve the lives of these desperately poor nations. The joint effects of all these and other factors led most indebted countries to experience multiple debt crisis, which ultimately forced them to undertake frequent rescheduling and beg for debt reduction and relief.

The objective of this chapter is to add to the current empirical literature on the determinants of overseas borrowing by developing countries in 1980s and 1990s. To answer this question, the remainder of the paper is divided into three parts. Part 2 presents the general theoretical discussion on the evolution of the debt crisis, including the magnitude and structure of developing countries external debt with emphasis on HIPCs. In section 2.2., I investigate the robustness of Easterly's (2002) study on the determinants of HIPCs external borrowing using a cross-section, and cross-section pooled times series, fewer countries and slightly different time period. In section 2.3, using annual cross-section, panel data and cross-section pooled time series approachs; I present a further empirical investigation into the causes of indebtedness across HIPCs and non-HIPCs developing countries during the 1980s and 1990s. Finally, part three summarizes the highlights of this study and its policy implications.

[15] The abnormal nature of the external debt problem of developing countries in the 1970s and 1980s was best expressed by the popular joke of the 1930s, which characterizes private credit as "an umbrella that a person is allowed to borrow as long as the weather is fine, but which he has to return the moment it starts raining" Anonymous (in: Wayne, 1993).

2. Why indebted countries got indebted in the first place? A theoretical explanation

External borrowing is not a new phenomenon at all. Most of today's industrialized countries had been net borrowers in their path to economic development. But the reasons for being indebted might differ from country to country and time to time. This part mainly discusses the reasons behind developing countries indebtedness in the 1980s and 1990s. The arguments for overseas borrowing and lending are numerous. Though as is well known, there is a lender to every borrower, I will rather focus my analysis on the indebted countries, hence the demand side of external indebtedness. The supply side will only be marginally discussed when relevant. The causes of external indebtedness might be classified into four categories: poverty-driven indebtedness, the foreign exchange gap, the return argument, and the contribution of external factors, are just to mention the major factors behind overseas borrowing.

A. The savings gap as a driving force behind external indebtedness

There is a widespread consensus among growth economists that poverty plays an enormous role in driving countries into serious external indebtedness. In this context, from the view point of debtors, the economic justification to borrow overseas is associated with the rising gap between national savings and domestic investment.[16] That is, at the expense of running a current account imbalance, a country may manage to obtain resources to invest even if its domestic savings levels are low. Several studies associate the major cause of external indebtedness to the poverty-vicious circle type of argument. For example, Singer (1990, in: Healey (1995)), argues that the external imbalance is caused by the vicious circle of poverty: poor people are poor because they are undernourished or illiterate, and they are undernourished and illiterate because they are poor. In the same token, poor countries are poor because they have low savings and investment and they have low savings and investment because they are poor.

[16] For the formal treatment of the savings gap and the foreign exchange gap (the two-gap model), see Basu (2000).

Similarly, Root (1990) argues that the major development obstacle of developing countries is the vicious circles of the saving-investment gap: productivity is low because investment is low, investment is low because savings are low, saving are low because income is low, income is low because productivity is low; thus, in a very real sense, according to Root (1990), the poor nations are poor because they are poor. The savings gap, therefore, reflects the inability of poor countries to save sufficient amount of resources to finance the desired level of investment necessary for self-sustained growth. Overseas borrowing is bound to fill this gap by generating resources that domestic savers are unable or unwilling to sacrifice.[17] With the elapse of time, growth in income should boost domestic savings, eventually generating a surplus over investment which can be used to repay the accumulated past borrowing. Furthermore, the absence of developed (malfunctioning) financial system to mediate savings and investment in developing countries makes the situation for savers difficult to place their funds directly into investment opportunities leading to insufficient domestic savings available to provide the finance for domestic investment (Gybson, 1996, among others). From this standpoint, it is possible to argue that the deficit in poor countries is simply a development deficit that is inevitable if countries are to achieve long-term positive economic growth. Such a deficit, however, is not without cost as it increases foreign debt, which must be serviced and repaid in the future. Pereira and Rosser (1996) also take this same line, where they strongly link the external indebtedness of developing countries to their level of poverty.[18] Table (1.1) below indicates that HIPCs are substantially lagging behind non-HIPCs counterparts in income per capita level, gross domestic savings and investment, literacy rates and life expectancy. In contrast, they send out more resources abroad in the form of debt service payments.

[17] Many believe that under the circumstances of low level of savings, overseas borrowing by the public sector may help the private investment via the public investment and avoids possible crowding out effect of the private investment through domestic borrowing. This may also feed the economy with additional foreign exchange to finance past accumulated debt and imports (Serieux, 2001).

[18] Their analysis is based on the 1990 UN Chronicle that presents the following statistical evidence on poverty across the world (Pereira and Rosser, 1996, pp. 46): 1 billion people live in absolute poverty, 100 million persons are completely homeless, 800 million go hungry everyday, 1.75 billion people are without access to safe drinking water, and 1.5 billion are without access to primary education, an alarming figure that demonstrates the severity of poverty across developing countries, many of which are members of HIPCs.

Table (1.1)

Some economic and social indicators for HIPCs and Non-HIPCs (1980-98)

Economic and social indicators	Heavily indebted poor countries (HIPC)		Low & middle income	
	1980-89	1990-98	1980-89	1990-98
GDP per capita (constant 1995 US$)[a]	310.69	338.10	1158.65	1341.01
Gross Domestic Investment (% of GDP)	17.82	19.25	27.82	29.28
Gross Domestic Savings (% of GDP)	11.01	12.16	27.99	28.70
Total Debt Service (% of exports)	24.41	20.61	22.52	18.90
Illiteracy rate, adult total [b]	53	44	38	31
Life expectancy at birth, total (years) [c]	50	52	60	63

[a.] the 1980-89 average is only 1984-89
[b.] this is data for 1980 and 1990
[c.] this is data for 1980 and 1990

Source: own calculations based on data from the World Bank, World Development Indicator, 2001 (CD-ROM)

The poverty driven indebtedness is particularly alarming to heavily indebted poor countries (HIPCs). As Serieux (2001, pp.307) rightly puts it, "heavily indebted" and "poor" clearly spells out the combined attributes that HIPCs apart from other developing countries and make them a focus of concern for northern governments, international public agencies, and international civil-society organizations". All the gap models argue in this direction.[19] Classens, et al (1997) also indicates that HIPCs situation differ from other middle-income debtors in several respects that include the poor income level and poor economic reform in this group (pp. 233). IMF in its recent study acknowledges that "the increase in many low-income countries' debts, beginning in the 1970s and peaking

[19] For a further discussion, see Agenor and Montiel (1996), Taylor (1994), and Bacha (1990), among others. In this context many argue that overseas borrowing may be beneficial to generate higher economic growth if an increase in investment contributes to higher growth, which generates additional foreign exchange to finance past accumulated debt. In this context Healey (1995) among others, argue that foreign capital would be translated into growth if the saving and foreign-exchange gaps can in due course be reversed, and the funds are invested in projects that generate higher rate of returns compared to the cost of borrowing, hence the market interest rate. Similarly, others, for example Easterly (1999) argue that if aid is viewed as a permanent income by a developing country government, the recipient government is highly likely to spend these resources on boosting consumption rather than investment, making aid meaningless in terms of boosting growth. The endogenous growth theory is also in this line. The central argument is that if aid is transferred as a lump sum, it would have no impact on investment.

in the 1980s, was accompanied by disappointing performance in their struggle against poverty" (IMF, 2003, pp. 6).[20]

B. The foreign-exchange constraint

Another equally important justification behind the overseas borrowing of developing countries is that of the foreign exchange gap. Because even assuming that there were no capital deficiency and no savings gap that serve as a constraint to economic development, the growth rate of developing countries may still be hindered by a foreign exchange gap. This seems to suggest that domestic savings in developing countries are necessary but not sufficient conditions for raising investment to a desired level.[21] This is again linked to the import structure of developing countries where imports of capital goods are vital for the further expansion of the tradable sector in poor countries. The significance is twofold given that most of the least income countries own domestic currencies that are not freely convertible. Moreover, export earnings are usually insufficient to generate enough foreign exchange to finance imports making overseas borrowing the indispensable means of gaining access to the technology that is vital for the expansion of the export sector that ultimately leads to rapid economic growth.

C. The return argument for overseas borrowing

Though it is more of a supply-side story, the return argument is another justification for overseas borrowing.[22] The central argument here is that since poor countries are suffering from financial deficiency and in contrast, there is a surplus in developed countries, capital should move from the latter to the former. The neo-classical growth theory supports this idea. Because since the ratio of capital to labor in developing countries is lower, the

[20] The IMF (2003, pp. 6) added that "for HIPCs alone, nominal debt stocks rose from moderate debt levels in the early 1980s to some 800 percent of exports and 160 percent of gross national income in the mid-1990s, in many cases contributing a debt overhang that may have contributed to these countries poor growth performance", again indicating the link between external indebtedness and poverty.

[21] As Easterly (1999) summarizes that investment must be both sufficient in terms of quality as well as quantity if it is to be translated into growth.

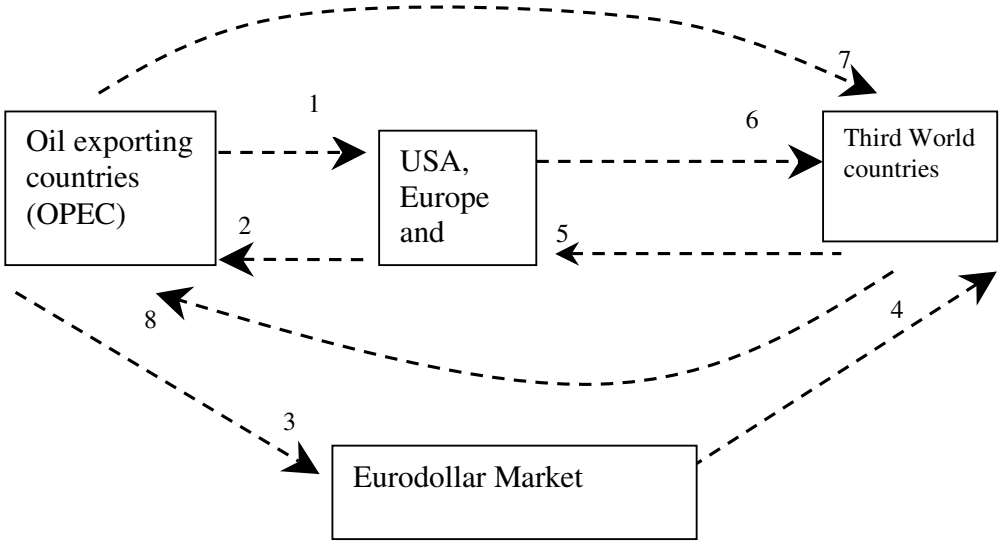
[22] The risk is often accompanied by higher premium for invested resources, which in the absence of any actual risk, generates higher rate of returns in countries that are more risky than less risky one.

marginal product of capital is bound to be higher. In contrast, in countries with high capital to labor ratio (because of high level of savings) and the investment opportunities exploited already, savings of these countries are invested in developing countries where they turn out to generate higher expected rates of returns (Barro (1991); Sala-i-Martin and Barro (1995); and Solow (1956); among others). This seems to suggest that the flow of resources from rich to poor countries is mutually beneficial. The LDCs can make use of the excess savings of the rich countries for financing their investment while the lending developed countries would potentially generate high rates of returns by investing in poor countries as opposed to in their own countries. Therefore, as Healey (1995), among others, argue theoretically economic efficiency (the marginal efficiency of capital) and commercial logic dictate that capital should flow from the relatively less- profitable ”First World” to the relatively more-profitable ”Third World”.

D. External factors as driving force to external indebtedness

The evolution of the debt crisis goes back to the two oil-price shocks of the 1973-74 and 1979-80 and the subsequent recession of the world economy. Most of today's indebted poor countries got indebted mainly during and after these periods. This has been accompanied by the dramatic fall in the terms of trade of mainly primary commodities, which further widened the financial gap and made things even more complicated. The Organization of Oil Exporting Countries (OPEC), which initially comprised of only five countries, namely, Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela, was established in 1960. However, in 1973, the organization was enlarged when it was joined by another eight oil-producing countries (Algeria, Equador, Gabon, Indonesia, Libya, Nigeria, and United Arab Emirates). This group of countries having formed a cartel got a remarkable concentration of power by producing nearly two-thirds of world oil resources (Chacholiades, 1990).[23]

[23] Although initially OPEC had functioned properly, things had moved to a different direction in 1973 because of the Arab-Israeli war when the Arab members of OPEC temporarily embargoed oil exports to the United States and other pro-Israeli countries. As soon as the Arab oil embargo was lifted in 1974, OPEC made use of the temporary supply shortage to increase the price of crude oil within three months (from 2.59 USD to 11,65 USD a barrel (Pilbeam, 1992; Chacholiades, 1990, Wayne, 1993; among others). The Iranian revolution was another phenomenon for the rise of oil price in 1978, where Iran that had produced nearly



1. oil transfer; 2. monetary transfer; 3. monetary transfer; 4. monetary transfer; 5. monetary transfer; 6. Transfer of goods, 7. oil transfer, and 8. monetary transfer

Fig. 3. The recycling of the petrodollar scheme
Source: Chacholiades, M. (1990), "International Economics" McGraw Hill, Inc., pp. 395 (*numbers 7 and 8 added)*

An increase in the price of oil increased its revenue in excess of these countries' demand. These"petrodollars" were, therefore, deposited in Eurodollar markets by OPEC countries. The"fund-starved" developing countries borrowed these funds from the Eurodollar market to pay their import bills from Europe, the United States and Japan (see figure 1 above). Moreover, most developing countries themselves are net importers of oil adding a further pressure on their demand for foreign exchange either in the Eurodollar market or else where. This is one of the important things that the "petrodollars" scheme does not capture (numbers 7 and 8 in figure 3).

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20 percent of OPEC exports suddenly disappeared from the world oil market. This already bad situation got even worse when the war broke out between Iran and Iraq resulting in the rise of Saudi Arabian light crude oil price which reached the record level of 32 USD a barrel (Chacholiades, 1990, among others). The fall in the supply of oil and the dramatic rise in its price in the 1970s gave OPEC members the historical chance of maintaining the most lucrative monopoly in the world. Following that, there was a tremendous amount of the so called "petrodollars" that was transferred from oil importing to oil exporting- countries.

While figure (1) indicates the evolution of the debt build up in developing countries in the 1980s, the debate on how poor nations got indebted is far from over. One of the major debates on the exogenous causes of the debt crisis in the 1980s is linked to the change in the global macroeconomic policy from the part of developed countries that developing nations could not help at all. Such policy changes include but are not limited to the dismantiling of the Bretton Wood Monetary System, and the switch from an expansionary monetary policy to a restrictive monetary policy. What is even worse is that these policy changes took place during the second oil price shock of 1979-80, together with persistently high inflationary expectations and large deficits in the United Sates, boosted real interest rates up to almost 10 % (Wayne, 1993), among others. The spill over effects of these and other policy changes had been particularly detrimental to the growth prospects of poor nations. Higher real interest rates, for instance, meant high debt service payments and as the result, little resources are left over for domestic investment, which hampers subsequent economic growth, and leads again to higher demand for external loans.

In this context, many argue that the way most of today's heavily indebted countries (HIPCs) came to indebtedness significantly differ from those of middle-income countries, often referred to as the "MBA debt crisis".[24] As Serieux (2001, pp. 314) argues, "the current crisis facing the poorest countries has little to do with the large transfers of private credit that precipitated the MBA debt crisis in the 1980s. Rather it is the result of the change in the global economy that placed new, long-term limits on these countries debt-carrying capacities-a reality the rest of the world was slow to recognize". This is consistent with the source structure of HIPCs that is predominantly from multilateral rather than from private commercial banks as it was the case for the middle-income indebted countries, notably Latin America.

Others, for instance, Dymski (2002), accuse of multinational banks in developed countries in the late 1970s and early 1980s for "pushing" credit on to less-developed countries because of their competition to get rid-of the accumulated petrodollars. Some

[24] MBA refers to Mexico, Brazil and Argentina.

call this as " the herd instinct about investors", where lenders found themselves in an aggressive competition to lend to developing countries.[25]

Schwartz (1988) argues in this line. "The current debt problem differs from historical ones in at least two respects: First, in the present case, international debt settlement involves not only the private creditors and debtor countries but also international agencies and creditor-country governments. Second, in the present case, the creditors have been urged, if not coerced, lending and however reluctantly, have continued lending to troubled nations" (pp. 9-10). As Schwartz further argues, the hidden though behind lending new money was to protect the old money lent.

Similarly, Pereira and Rosser (1996) link the debt crisis of the 1980s to the irresponsible lending policies of the industrialized countries. As they put it, "the proof of the wrong-mindedness of lending in the 1970s, became dramatically apparent in 1981". Like numerous authors argue, they further blame the rise in the interest rates, and the deterioration in the terms of trade of primary commodities.[26]

But the conclusion is rather mixed. While Sachs and Berg (1988, p. 4) believe that in many of the indebted countries external debt in the 1970s was provoked by irrational political decision (borrowing overseas rather than raising the tax rates to avoid domestic political risk), they also acknowledge that this indebtedness was aggravated by other structural changes, such as expansionary US-monetary policy in the early 1970s, the breakdown of the fixed exchange rate system and the subsequent sharp rise in global liquidity, OPEC oil price shock and the subsequent growth of "petrodollar recycling", and the dimming of bankers' memories of defaults on sovereign loans in the Great Depression.

[25] In a similar fashion, Vos (1994, in: Dymaki (2002)), argues that the main driving force of overlending was the oligopolistic nature of overseas lending markets, competitors goal of expanding their market share, and lenders tendency to underassess risk. He added that most current LDC borrowers have defaulted in the past, more than once.

[26] Pereira and Rossel (1994) indicate that the very deep recession of 1981-82 made it impossible for developing countries to pay back their loans. They also argue, quoting UNCTAD, commodity prices (for essentially food stuff, fuels, mineral) dropped by 28% in 1981-82, and interest payments on loans increased by 50% in nominal terms and 75% in real terms" (pp. 6). This is also consistent with Wayne (1993) and the Jubilee (2000) initiative.

Similarly, Easterly (2002) associate the current debt crisis to the wrong investment policies of the indebted nations, among other things. As he puts it, "the HIPCs debt problem arose not because of new borrowing, but because of disinvestment in productive potential" (p.1683). Moreover, the uniqueness of HIPCs indebtedness mirrors the absence of any substantial improvement in the economic growth of this group despite decades of structural adjustment and external aid. In contrast, the debt build up continued to mount increasing the likelihood of furure debt servicing difficulties.

Whatever the arguments and counter-arguments regarding the causes of the external debt of developing countries, one thing is true: these countries are suffering from huge external debt and that exogenous shocks played vital roles in aggravating the already ridicules situation across the heavily indebted countries in particular.

2.1. What went wrong with the magnitude and structure of developing countries' external debt? *Some stylized facts*

Tables A1 to A2 in the appendix show the magnitude of the external debt of developing countries and various groups. Tables B1 to B3 give the costs associated with external debt. Tables C1 to C4 provide information about the term and source structures of external debt. Tables D1 to D6, indicate some of the factors that are linked to the balance of payments problem of developing countries.

The magnitude of the external debt of developing countries grew from about 808 bn USD in 1982 to more than 2,536 bn. USD in 1998, indicating that the external debt grew by a factor of three in sixteen years.[27] For HIPCs (Heavily Indebted Poor Countries), the total external debt which stood at around 74 bn. USD in 1982 turned to 213 bn USD, in 1998 increasing by a factor of around three. It is interesting to note, however, that in absolute term, the total external debt of either SSA (Sub-Saharan Africa) or HIPCs, is by far

[27] All debt indicators are in nominal terms.

lower than that of LAC (Latin America and the Caribbean) and EAP (East Asia and the Pacific). For instance, in 1982, SSA's total external debt represented only 21% and 58% of the total external debt of LAC and EAP, respectively. In 1998, this ratio remained around 29% and 34% of the external debt of LAC and EAP, respectively. The ratio for HIPCs is very similar to that of SSA.[28] HIPC's share of the developing countries' total external debt was around 9% in 1982, which declined to 8% in 1998. It is also equally important to note that while the share of SSA, HIPCs, LAC and MENA's debt over the total developing countries' debt had been declining over time, there was an increase in the share of ECA (Eastern Europe and central Asia) and EAP's debt in total developing countries' external debt.[29] (See; table A2 in the appendix for other groups).

However, external debt comparison using absolute values as discussed above could be misleading as it fails to take into account the size of a country and its economic potential. Tables A3 and A4 present the share of external debt to GNP and exports of goods and services. It now becomes apparent why HIPCs are, in fact, called HIPCs. The most indebted region in terms of absolute value, LAC, had a share of its total debt to GNP of 45% and 41% in 1982 and 1998, respectively. In contrast, HIPCs' share of total debt to GNP was 72% in 1984 and 115% in 1998, respectively. What is even more interesting is that this alarming share has been increasing over time. This ratio for SSA had been 32% in 1982 and 72% in 1998, respectively.

Tables B1 to B3 indicate the costs linked to external debt. While the total debt service to GNP indicates the solvency problem of an indebted country, the total debt service to exports of goods and services ratio indicates the liquidity burden of external debt. This may also capture the impact of external debt on foreign exchange cash flows (Schadller, 1993). In other words, this indicates the amount of foreign exchange that an indebted country has got to surrender when debt service payments are due. Table B1 indicates that the debt service to exports of goods and services ratio for LAC was around 47% in 1982

[28] Since 33 of the 41 countries categorized by the World Bank and the IMF as HIPCs are in SSA, the similarity between SSA and HIPCs is not surprising.

[29] This may suggest that there was a diversion of resources away from SSA and LA towards Eastern Europe and East Asia, the two regions with better track record of creditworthiness and overall trade significance for the developed world.

and 34% in 1998. This ratio for HIPCs was 21% and 16% in 1982 and 1998, respectively. This shows that HIPCs had to sacrifice around 20% of their export revenues to pay back part of their accumulated external debt.[30] Table B2 shows the ratio of interest payments to GNP and exports, which is a major indicator of the pure (net) cost of external debt on foreign exchange cash flows. This also captures the swings in the interest rates across developed countries, which had been a peculiar characteristic of the 1980s. From table B2 it is also apparent that while the highest interest payment burden was in LAC, HIPCs seem to have been the second largest victim in transferring foreign exchange to creditors, which reached 12% in 1982, though declined to 6% in 1998.[31]

Now turning to the maturity and source structures of the external debt of developing countries' external debt, it appears that there is indeed a substantial difference across different groups. From the perspectives of the maturity structure of external debt, as shown in table C1, it is clear that though HIPCs had around 12% of its debt in the form of short term debt; this had been maintained until 1998. The situation is even worse for SSA, which had 15% of its debt in the form of short term debt in 1982, which grew to 18% in 1998.[32] The source structure in tables C2 to C4, indicate that SA (South Asia), SSA and HIPCs, had been the biggest recipients of multilateral and concessional loans. This indicates, among other things, the poor creditworthiness of these groups, hence their inability to secure loans from other sources at market conditions. HIPCs received high concessional loans both in absolute value and in terms of the ratio to total external debt, which reached around 20% in 1982 and 28% in 1998. This may also seem to suggest that this group of countries, on average, received more foreign aid relative to other groups. Tables D1 to D8, indicate different economic indicators that are linked to the current account stability and overall balances-of- payments sustainability.

[30] On the other hand, the relatively lower debt service ratio also suggests that this group of countries had access to more concessional loans relative to wealthier countries across the developing countries.
[31] The decline of interest rate payments for HIPCs, particularly in 1990s might indicate debt relief on the one hand and the concentration of multilateral debt (as the result of the drying up of loans from private sources) during this decade.
[32] The negative impact of short term debt on economic growth will be both theoretically and empirically discussed in chapter 3 of this dissertation.

2.2. Why HIPCs become HIPCs? *Revisiting Easterly (2002)*

HIPCs are different from other groups in several ways: "they are poorer, they have lower level of human capital, they carry much higher debt stock, they owe debt to the public, and they failed to generate debt-servicing revenue despite long-years of adjustment" (Serieux, 2001, p. 309-310).

The objective of this section is to investigate the robustness of Easterly's (2002) empirical study on the determinants of HIPCs' external indebtedness. Easterly's empirical strategy was to regress an average of each policy indicator or macroeconomic imbalance (over the debt relief period, 1980-97) on the log of initial income, and a dummy for HIPCs for the whole sample of less-developed countries (p. 1684). The objective was to identify the determinants of HIPCs indebtedness. For this analysis, he relies on the following hypotheses (p.1682): First, HIPCs become HIPCs through unfavorable exogenous shocks, such as terms of trade and war. Second, highly indebted countries tend to exercise bad policies. Third, heavily indebted countries have a greater desire to discount the future. Finally, "the irresponsible lender story predicts that public debt will substitute private debt".

Easterly's findings suggest the following (see also table 2.37 in the appendix): First, on the macroeconomic policy front, he finds that HIPCs have worse macroeconomic policies compared to non-HIPCs. This is reflected in high current account and government budget deficits, low M2/GDP ratio, and high real overvaluation index. HIPCs, however, were not substantially different from non-HIPCs developing countries in inflation, real interest rate and black market premium (though the former two variables were marginally statistically significant) (p. 1685). Second, from the perspectives of external financing, it appears that while HIPCs received less foreign direct investment compared to non-HIPCs counterparts, in contrast, it got indebted by borrowing a lot from the international financial institutions (p. 1686).[33] He concludes that "multilateral lenders filling the financing gap will have significant role in financing high-discount rate economies" (p. 1686). Third, turning to the terms of trade shocks and war, he finds that none of these factors is the major players for HIPCs to become HIPCs.

[33] Easterly (2002) argues that low level of foreign direct investment is an indirect measure of bad policies in HIPCs countries. HIPCs have been bypassed by foreign direct investment thanks to their bad policies.

Though, Easterly's findings are interesting, there are some caveats that need to be sorted out to check the robustness of his results. First, there is a reverse causality issue. For instance, HIPCs have higher capital account deficit due to lack of growth and the savings and foreign exchange constraints rather than the other way around. The remedy to this is not straightforward, but this may imply that the results should be interpreted with caution. Second, there are missing variables that aggravated HIPCs external indebtedness. In this respect, though I have not overcome the measurement problem, capital flight has been incorporated to check to what extent it contributed to external indebtedness of HIPCs. One of the reasons for the low rate of investment in poor countries is linked to capital flight, which provokes further borrowing as past debt is not translated into growth. Third, since external indebtedness has also been caused by violent crisis and war, and we know that most of the poor countries across the world have been undergoing these incidences, Eatsrely's finding that war was not a big issue for HIPCs is counterintuitive and against other empirical evidences. Using the SIPRI (Stockholm International Peace Research Institute) index, these two have been included to find a further explanation for indebtedness. Fourth, one of the major causes of the external indebtedness of HIPCs is both the fall in the demand for their primary goods and decline in foreign aid inflows. These have been substantially aggravated by the sluggish growth in OECD trade partners of HIPCs. It may also be an indirect measure of the fall in the terms of trade as the demand for HIPCs' exports is exogenously determined in the industrialized world. I, therefore, incorporated the growth of OECD trade partners as an additional explanatory variable. Finally, from the perspectives of empirical methodology, as opposed to Easterly, who uses only cross-section analysis, I used both cross-section and panel (cross-section pooled times-series analysis). The panel data approach turned out to be more plausible relative to the classical cross-section approach at least for two reasons: First, in terms of the overall significance of the regression results of the coefficients thanks, among other things, to the enlargement of the observations and the subsequent gain in the degrees of freedom. Second, the panel approach helps to control for time-specific factors that are very relevant given the turbulence macroeconomic-policy environment that aggravated the indebtedness of poor nations in the past two decades.[34]

[34] Easterly (2002), for instance classified the past two decades into three periods (p. 1684): the 1979-87

The variables chosen are based on economic theory, past theoretical and empirical studies, mainly Easterly's 2002 paper, and the specific nature of the past two decades. The definitions of the variables and their source are presented in table (2.1). The comparison between HIPCs and non-HIPCs in selected variables are in table (2.2). The list of countries included in this analysis is in table (2.4) and tables (2.5) and (2.6) present descriptive statistics for the panel and the cross-section regression, respectively

2.2.1. Model, data description, empirical results and discussion

The variables chosen are falling into three categories:

1. The first include general macroeconomic factors that derive to potential external indebtedness. These include: capital flight, current account deficit to GDP ratio, quasi-money to GDP ratio (M2/GDP), an index of overvaluation, the real interest rate, and log of the black market premium.
2. The second category includes external factors that lead an economy into foreign indebtedness, which include: log of the percentage change in the terms of trade, violent crisis and war incidence, which might contribute to involuntary (forced) indebtedness and the growth of industrialized countries.
3. The last category represents the forms of financing the current account deficit, which include: foreign direct investment; IMF and World Bank financing and their joint financing (the summation of both institutions).

when debt ratios rose, the 1988-94, when debt ratios remained constant, and the 1995-97 in which debt ratios fell". This may imply that the time-specific factors should be incorporated to capture these effects, which calls for the switch to a panel data approach.

Table (2.1)

Definitions of the variables in the HIPCs regression

Variable[a]	Definition[b]	Source[c]
CFLGDP	Capital flight to GDP ratio (calculated using "source-uses" approach) = (change in debt +foreign direct investment) – (current account deficit + change in reserves)	Global Development Finance, 2000 (CD-ROM) and World Development Indicators, 2001 (CD-ROM)
CAGDP	Current account to GDP ratio	World Development Indicators, 2001 (CD-ROM)
DEFGDP	Government budget deficit (including transfers) to GDP ratio	Easterly William and Mirvat Sewadeh (2002)
INFL	Log (1+inflation rate)	Easterly William and Mirvat Sewadeh (2002)
OVERVAL	Index of real overvaluation (1992 Dollars)	Easterly William and Mirvat Sewadeh (2002)
RINT	Real interest rate (the deposit rate less the rate inflation measured by GDP deflator)	Easterly William and Mirvat Sewadeh (2002)
LMBP	Log of black market premium (parallel exchange rate/market exchange rate)*100	Easterly William and Mirvat Sewadeh (2002)
LM2GDP	Log of M2 to GDP ratio	Easterly William and Mirvat Sewadeh (2002)
GRIND	GDP growth of OECD trade partners	Easterly William and Mirvat Sewadeh (2002)
LTOTG	Log of the percentage change in the terms of trade	Easterly William and Mirvat Sewadeh (2002)
FDIGDP	Foreign direct investment to GDP ratio	Easterly William and Mirvat Sewadeh (2002)
IBRDGDP	Disbursements from the IBRD to GDP ratio	Global Development Finance, 2000 (CD-ROM)
IMFGDP	Disbursements from the IMF to GDP ratio	Global Development Finance, 2000 (CD-ROM)
War	The percentage of time at war	WWW.SIPRI.org
Violent	The percentage of time at violent crisis	WWW.SIPRI.org

all variables are average values; b. my own calculation; and c. Easterly and Mirvat (2002), Database for Global Development Network, World Bank

Table (2.2)

Macroeconomic policy, financing, and external shocks: A comparison between HIPCs and Non-HIPCs (1982-99)[b]

Variables	Heavily indebted poor countries (HIPCs)			Non-heavily indebted less-developed countries		
	1982-87	1988-93	1994-99	1982-87	1988-93	1994-99
LWBGDPI	6.81	6.68	7.40	7.80	8.18	8.40
CFLGDP	0.02	2.79	10.46	3.47	3.51	3.61
CAGDP	-8.83	-8.61	-8.59	-3.43	-1.54	-2.46
LBMP	3.80	3.06	1.24	3.10	2.87	1.60
RINTR	-0.66	11.56	8.93	4.79	7.38	10.98
FDIGDP	0.48	0.47	2.39	1.08	1.94	3.79
DEFGDP	-3.29	-2.57	-2.85	-4.18	-1.44	-1.96
INFL	3.14	3.85	5.18	3.20	4.08	4.96
OVERVAL	218.50	148.07	122.15	107.14	99.74	105.79
LTOTG	0.30	-1.97	0.33	-0.53	-0.37	-0.23
LM2GDP	2.95	2.84	3.16	3.38	3.43	3.56
IMFGDP	1.074	0.747	1.158	0.777	0.445	0.324
WBGDP	0.520	0.266	0.018	0.762	0.672	0.477

Source: own calculation based on data sources
b. see, table (2.1) for the definitions of the variables

The dependent variables are defined the same as that of Easterly. The results for the cross-section regressions are in tables (2.7) to (2.20), while the regression results for cross-section pooled time series are in tables (2.21) to (2.36) in the appendix. Most of the results in this paper are consistent with the findings of Easterly (2002), despite the fact that I have used a panel data and cross-section pooled time series approach, fewer number of observations (due to usual data constraint) ,we do not consider identical time period (Easterly considers the period (1979-97), while my case is (1982-99)). However, the panel data approach generates more plausible results than a simple cross-section approach.

1. Macroeconomic stability

"Macroeconomic stability- reflected in low and stable inflation, sustainable budget deficit, and appropriate exchange rates, sends important signals to the private sector about the direction of the economic policies and the credibility of the authorities regarding their ability to manage the economy efficiently" (Hadjimichael and Ghura (1995, p. 3)

There is a general consensus, despite persisting measurement problems, that one of the primary root causes of the external indebtedness of indebted countries is undoubtedly capital flight. As it will broadly be discussed in chapter four of this dissertation, although LDCs (less developed countries) got heavily indebted, paradoxically, they were reported to have the highest capital flight in the world. Part of the reason is macroeconomic instability (financial repression, and other detrimental policies like high tax rates) in poor countries. In this calculation, the positive sign would mean capital flight while a negative sign would mean capital flight reversal. I therefore, expect a more capital flight from HIPCs relative non-HIPCs counterparts.[35] This indicator has a negative sign, though not significant, for HIPCs (surprisingly, indicating that the private sector in heavily indebted countries is engaged in higher capital flight that in non-HIPCs countries (see tables (2.7) and (2.21)). Having said that, however, the result of this coefficient should be interpreted with caution as there is high measurement problem that may result in a downward biased estimator. If part of the insignificance were not caused due to measurement errors, the result would have simply been interpreted as anomalous, because it is purely counterintuitive and against the available evidence.

The most important macroeconomic factor relevant to external indebtedness is the current account balance.[36] Basically, the current account balance indicates the savings–investment gap (see graph 1). This captures the behavior of both the private and the government sector. If there is a current account deficit, this is either because the private

[35] Zaire under Mobutu is an example in point. For almost 10 years Zaire had been engulfed by several debt crises. Following Erbe (1985), while for example in 1982, Zaire's total external debt stock stood at around 4 billion USD, Mobutu's and his clan private assets held abroad in the same year was estimated to be between 4 and 6 billion USD (p. 268). It is also believed that 39% of private capital of SSA be held abroad, while at the same time the region got to a historically high record of external indebtedness (Collier; Hoeffler; and Pattillo (1999), in: Easterly 2002, pp. 1689)).Collier and Gunning (1994) also support this. A similar result has been found by Ajayi (1997), who indicates that the stock of accumulated capital flight over the period 1980-91 for HIPCs to have represented 40% of the group's outstanding debt (Ajayi, 1997; in: Easterly (2002), pp. 1689). Boyce and Ndikuman (2001) for 25 low-income Sub-Saharan countries find out that, while the accumulated capital flight in 1996 totaled more than 285 billion USD, the accumulated external debt stock in the same year was 178 USD, making the region as they call it, a 'net creditor' to the rest of the world. Dornbusch (1985, in Smith et al (1985, p. 215)) concludes that "the debt build up does not correspond one-for-one to a resource transfer from lending countries to the borrowers. Part of the increased gross debt merely reflects capital flight and no change in aggregate foreign assets".

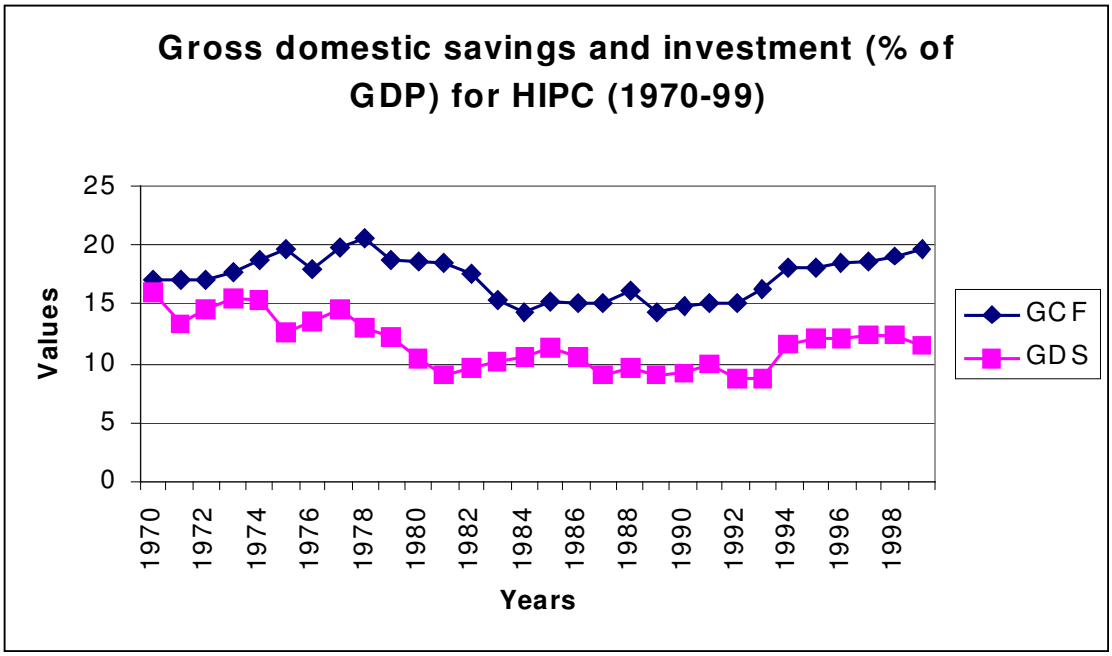
[36] Most argue that after the 1982 debt crisis the view on current account changed. As Fischer (1988, pp. 115, in: Edwards (2001, pp. 10) puts it, "the primary indicator (of a looming crisis) is the current account deficit. Large actual or projected current account deficits or, for countries that have to make heavy debt repayments, insufficiently large surpluses ..., are a call for devaluation)".

sector invests (consumes) more than it manages to save, or the government sector spends more than it is capable of collecting tax revenues.[37] As will be discussed further on, this might also be due to other exogenous factors that are beyond the scope of the domestic economy. The external balance on goods and services (resource balance) also indicates that HIPCs have done very poorly with this indicator (see graph 2).[38] The empirical results of both the cross-section and the cross-section pooled- times series indicate that the current account deficit played an enormous role in the process of HIPC's indebtedness.[39] (See tables (2.8) and (2.22)). This is consistent with the finding of Easterly (2002), who rightly concludes that "HIPCs got indebted by borrowing a lot" (p. 1685).

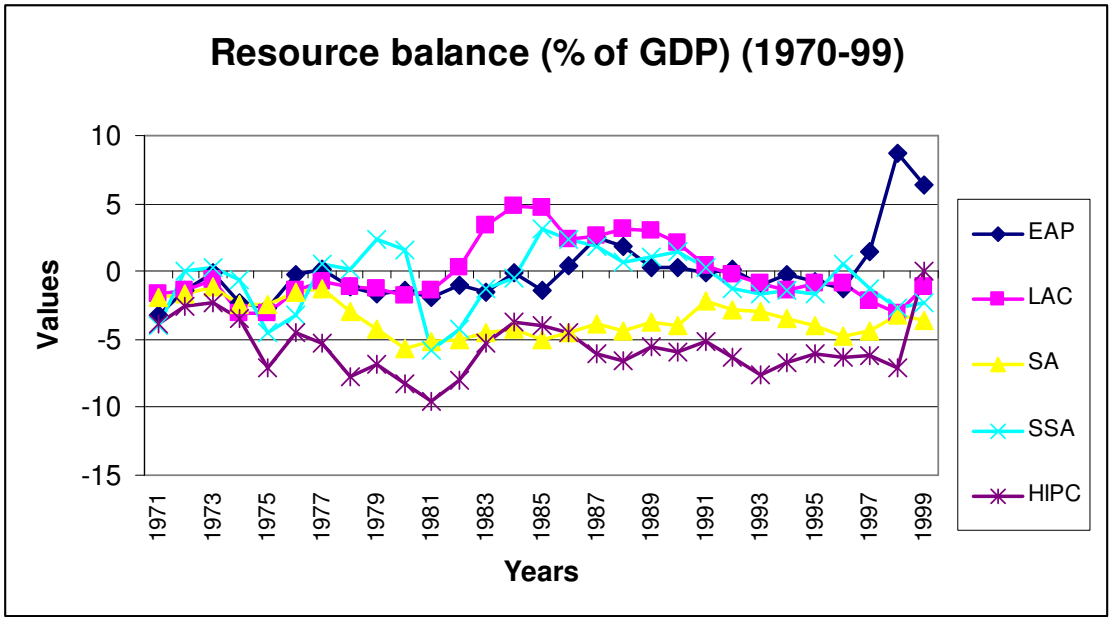
[37] As McFadden, et al, (1985, in Smith, et al (1985, p. 182) rightly puts it, "pegging exchange rate at unsustainable levels or borrowing to finance current consumption can lead to a"day of reckoning". These policies also signal to creditors a lack of the economic control necessary to generate the foreign exchange inflows for debt service".

[38] The external balance on goods and services captures the difference between exports of goods and services and imports of goods and services (WB, Global Development Finance, CD- ROM, 2000).

[39] This is not a surprising finding for HIPCs. Most HIPCs are suffering from the saving-investment gap as the result of their weak income. Moreover, even under the assumption of domestic saving availability to finance investment, still external indebtedness is likely to occur due, among other things, to the foreign-exchange gap. Most HIPCs do still have inconvertible domestic currencies and as the result, foreign reserves to finance imports are extraordinarily vital.



Graph 1



Graph 2

The government budget deficit is thought to be detrimental to the external account. Higher government expenditure, in the context of developing countries, put further pressure on the current account balance and increases external indebtedness. However, there is a reverse causality problem. On the one hand, it is possible that there is a high government budget deficit in order to finance past current account deficit. On the other hand, a high current account deficit may be due largely to high government expenditure. The results indicate that high budget deficit was not a major policy distortion across HIPCs (see, table 2.9). The impact of inflation on the indebtedness process is not that straightforward. Inflation might increase external borrowing by depressing external competitiveness and consequently widening the current account deficit. On the other hand, it might worsen the current account deficit simply by reducing investment, since high rate of inflation leads to low real interest rates that discourage both savings rate and foreign investment. This may have enormous implications to LDCs due mainly to the absence of developed and functioning capital markets.[40] Inflation in the early 1980s had been quite high for Latin America and since 33 of the 41 countries classified as HIPCs are in Africa, it implies that inflation had been a phenomena more relevant to Latin America rather than HIPCs (see, tables (2.10 and 2.24)).

On the exchange-rate policy front, LDCs (less developed countries) have always been criticized for their unwise exchange-rate policies. In theory, an overvaluation of the domestic currency may lead to higher external indebtedness by weakening the export sector's international competitiveness and subsequently reducing the foreign exchange that is vital for financing import bills. A decline in export revenue in the context of LDCs in general and HIPCs in particular is crucial as other forms of financing imports (foreign direct investment and portfolio investment) are highly limited. If the domestic currency is perceived as overvalued, it is often accompanied by devaluation expectation, which hinders investment as people would prefer to wait and see simply because they do not have any clue about the timing of devaluation and its magnitude. The results of both the

[40] The negative impact of inflation on growth in the context of poor countries reflects, among other things, the decision by households of holding their assets during high rate of inflation. In the absence of functioning capital market, which is the case in most poor countries, people hold their wealth either in the form of real estates, foreign currencies or keep it in foreign bank accounts in the form of capital flight. This obviously reduces both the rate of savings and the amount of foreign exchange available in the economy.

cross-section and pooled-time series indicate that HIPCs have in fact been driven to external indebtedness also thanks to their mistaken exchange-rate policies (See tables (2.11) and (2.25)).[41] This may also be interpreted as the inclination of indebted countries to choose bad rather than good policies as has been argued by Easterly.

Similarly, a black market premium is considered to be detrimental for maintaining a sustainable external balance position. A high black market premium is often an indicator of financial repression, which among other things, leads to low or negative real interest rates. This may ultimately discourage savings and lead to further external borrowing to finance investment projects and maintain the level of consumption. Here again, the empirical results suggest that the black market premium was not significantly different for HIPCs compared to their Non-HIPCs counterparts. (See tables (2.13) and (2.27)). Real interest rates do not seem to be the core factor behind HIPCs indebtedness. The impact of high real interest rate seems to be significant in the second and third period rather than the first period (1982-87). (See tables (2.12) and (2.26)).

The ratio of M2 to GDP is another important macroeconomic variable that provides a broader picture of the degree of financial liberalization and the openness of the economy. The higher this ratio, the less the degree of financial repression and the higher would be the subsequent economic growth that ultimately leads to less external borrowing. Turning to the empirical results, both the cross-section and panel approaches indicate that there was a sluggish improvement in HIPCs financial liberalization and overall openness relative to the other group. The time dummies indicate that this situation for the whole group under consideration was particularly bad in the first period (1982-87). This is also consistent with the empirical finding of Easterly (2002) (see tables (2.14) and (2.28)).[42]

[41] Obviously, as always, overvaluation should not always be a bad thing since it helps to decrease the prices of imports (if the major part imports consists of technological goods and other inputs that are inevitable to the expansion of the export sector). Indeed, this had been one of the development strategies, known as ”import –substitution development” that was followed by developing countries notably Latin America, but turned out to be a failure as opposed to the ”export promotion strategy” followed by East Asian countries.

[42] The debt overhang effect hypothesis argues in this line, where indebted countries loose the incentive to formulate and exercise good policies since part of the success will be eaten up by creditors

2. External factors

Now turning our attention to the contribution of external factors, it appears that HIPCs had been hit by external shocks more seriously than their respective non-HIPCs counterparts. I start with the growth of industrialized countries. There are several reasons as why the growth in industrialized countries should matter for HIPCs growth. First, a slow growth in industrialized countries reduces the amount of aid flows to poor countries. Second, such a sluggish growth may lead to the fall in the demand for poor countries' exports in industrialized countries, which by the way are the major trade partners of most HIPCs countries. The fall in foreign aid and export revenue should ultimately drive the economy to serious internal and external indebtedness. Finally, a recession in industrialized countries may substantially jeopardize the amount and timing of the debt relief that HIPCs are badly in need of.[43] The new challenges to the international community have also led to the diversion of resources and overall attention away from HIPCs in general and Sub-Saharan Africa in particular towards other parts of the world.[44]

The empirical results of both the cross-section and panel data indicate that HIPCs have indeed been significantly affected by the deterioration in the growth of the industrialized world. The time specific dummies suggest that the impact has been more acute in the second (1988-93) and third (1994-99) periods. (See tables (2.15) and (2.29)).

Violent crisis and war (both calculated as percentage of period in violent crisis and war) capture the extent to which political instability may undermine growth and push to

[43] Eichengreen and Portes (1986, p.612) argue that "in the 1930s, one of the principal channels through which these deflationary pressures were transmitted to developing countries was via primary commodity prices". Moreover, Eaton, et al (1981, p. 301), conclude that "despite lack of long-run data, much borrowing by poor country governments during the 1970s has been motivated by short-term adjustment associated with oil price increases and OECD recessions". On the other hand, as McFadden et al (1985, in Smith, et al (1985) have argued, high growth rate in high-income countries may also reflect the level of investment in these countries, which may crowd out the amount of loans left for developing countries loans.

[44] After the 1989, former communist countries like Russia, that used to be a donor, now turned out to be a rival competitor against developing countries for foreign aid and loans. The collapse of communism and the transition of former Eastern block countries to a market economy demanded that resources were diverted towards these countries. Moreover, the 1990s witness the intensified preoccupation of the international community with the restoration of peace across the developing world which put further pressure on global financial resources.

external indebtedness and dependence. The empirical results in the panel data indicate that HIPCs had been the victim of war and violent crises. The results I found here are consistent with other empirical studies on the economic causes of civil war and violent crisis. Elbadawi and Sambanis (2000), for example, identify that over the last 40 years, nearly 20 African countries (40% of SSA) have experienced at least one civil war. They also added that 20% of SSA's population now lives in countries which are formally at war; and that the prevalence of civil war increased in the past two decades, which is also the period of deepest external indebtedness, and I believe that this definitely is not a mere coincidence. On the empirical front, Collier and Hoeffler (1998), indicate that there are strong economic reasons behind a civil war. [45] (See table (2.30) and (2.31)).

One widely recognized factor behind the external indebtedness of LDCs is the severe deterioration in the terms of trade of mainly primary commodities. The justification is linked to the loss in export revenue and an increase in export bills that lead to serious financial discrepancy, which must be filled by overseas borrowing. As in Easterly's case, the empirical results in this study do not suggest that HIPCs had been especially negatively affected by swings in their export revenue. In other words, while it is recognized that HIPCs have experienced serious deterioration in their terms of trade, but this turned out to be true for other LDCs too. (See tables (2.16) and (2.32)).

3. External financing

A short run current account deficit should not be a serious obstacle if it is financed through non-debt creating sources (foreign direct investment, portfolio investment, official transfers, gold sales, and so on). But the experiences of most poor countries indicate that this has not been the case. Foreign direct investment accounted for only a smaller proportion of the foreign direct investment in the world. The empirical analysis in this paper indicates that HIPCs have failed to attract foreign direct investment in the past

[45] Collier and Hoeffler (1998), conclude that higher income reduces the duration of civil war and the probability of its occurrence, that the possession of primary commodities is bad unless there are plenty of them, that high populous countries are prone to civil war, and that ethnic fractionalization increases the probability of civil war. Obviously HIPCs fulfill the majority of these criteria.

two decades, controlling for income and time specific events. The coefficients on the time dummies also suggest that the inflow of foreign direct investment was worst in the last period (1994-99). The reasons are complicated than one may assume. Some, for example, Easterly (2002), relate this to poor economic policies in HIPCs, emphasizing that the fall in the supply of foreign direct investment in these economies is simply the reaction to their huge macroeconomic-policy distortions. But one has to add that despite the fact that some countries have managed to minimize economic-policy distortions, the flows of foreign direct investment have still been constrained by other non-economic bottlenecks, political instability, for instance. Therefore, to conclude that only policy matters for the inflows of foreign direct investment to HIPCs, I assume, is rather a gross generalization (see tables (2.17) and (2.33)).

Financing from the international financial institutions has been vital for the vast majority of LDCs. As private creditors withheld loans in the late 1980s and 1990s, especially the IMF becomes, as it is often called, the ”last resort” for poor countries to borrow overseas. This has been particularly true since the vast majority of HIPCs have undertaken the Structural Adjustment Program (SAP) orchestered by the IMF. The results indicate that HIPCs have not become HIPCs by borrowing from the World Bank (IBRD), but rather from the IMF (disbursements from the IMF).[46] To see the contribution of the World Bank's and IMF's joint financing for HIPCs' indebtedness, I took the summation of funds from both of these institutions. The results now indicate that the two international financial institutions worked together for HIPCs to be become HIPCs, though the coefficient is not statistically significant. (See, tables (2.18), (2.19), (2.20); and (2.34), (2.35), and (2.36)). Table (2.37) presents Easterly's (2002) results.

[46] This makes sense since I use disbursements from the IRBD that is non-concessional, hence borrowing at market interest rates; and HIPCs could hardly afford to take such expensive loans as opposed to Non-HIPCs counterparts. In contrast, loans from IMF, though not significant in terms of their size, but continued to be inevitable to sign the SAPs with the IMF if countries were to get debt relief and further borrowing even from other multilateral and governmental sources. This gives the IMF its popular name the ”Gatekeeper” and ”Watchdog” of the international debt management (Wayne, 1993).

What have we learnt so far from the analysis?

From the analysis so far one may draw several conclusion on HIPCs external indebtedness: First, though it has been widely argued that one of HIPC's root cause of external indebtedness is the deterioration in the terms of trade, the results of Easterly and this paper indicate that this group was not affected differently by the shocks in the terms of trade compared to other developing countries. Second, HIPCs have indeed been suffering from high external account imbalance compared to the non-HIPCs counterpart. This may be a reflection of the savings-investment gap that is argued by the two-gap model. Moreover, HIPCs have exercised more distorted policies, including less openness, overvalued exchange rates, and higher black market premium, among other things, compared to non-HIPCs. Third, HIPCs have failed to attract foreign investment compared to its non-HIPCs counterpart. Though this may imply, as Easterly argues, that HIPCs are suffering from their own bad policies, one should be careful of rushing into conclusion. The reason is that there is a reverse causality (endogeneity) problem. Fourth, as the result of the first three reasons, HIPCs become dependent on multilateral sources of financing, particularly that of the IMF. The results both in Eastery's study and in this work indicate that in fact HIPCs got indebted mainly with the help of the IMF.

Nevertheless, Easterly's strategy does not encompass the broader debate on the determinants of external debt. That is, while his approach gives a general framework about the behavior of HIPCs, one needs to further investigate the motives of developing countries to borrow overseas in a more comprehensive way. That is what I intend to do in the next section.

2.3. A further empirical exploration into the causes of LDCs external indebtedness in the 1980s and 1990s

2.3.1. Determinants of demand for overseas borrowing: *A theoretical model*

Here I first summarize the theoretical framework that justifies the need for external overseas borrowing by developing countries.[47] The framework is adapted from McFadden, et al (1983, pp. 203-204). The model begins by summarizing the determinants of the current account (CA) surplus, where CA is the difference between items that generate foreign exchange and those that require foreign-exchange expenditure.

$$CA = X - M - ILF - OTP \qquad (1)$$

Where,

X = export; M, imports; ILF, interest paid on loans from foreigners; and OTP, other net factors payments and transfers to foreigners.

$$CA = \Delta NIR + \Delta BF - \Delta LF - FDI \qquad (2)$$

Eq. (2) is another way of writing the current account surplus of equation (1). This time, the current account is the difference between changes in the international reserves (ΔNIR) and foreign bonds placed domestically (ΔBF)), and an increase in loans from foreigners (ΔLF) and foreign direct investment (FDI). Then, the change in loans from foreigners (ΔLF) is basically the difference between new foreign loans (N) and payments of foreign loan principal (PLF). Then, demand for new foreign loans (N) would be:

$$N = PLF + ILF + \Delta NIR + \Delta BF - FDI + OTP - X + M \qquad (3)$$

Eq. (3) implies that the demand for new foreign loans is an increasing function of payments of foreign loan principal due (PLF); interest paid on loans from foreigners

[47] Dornbusch (1985, in Smith, et al (1985, p. 214) links the increase in gross external debt to (current account deficit - direct and long-term portfolio capital inflows) + (official reserve increases + other private capital outflows).

(ILF); ΔNIR; ΔBF; OTP; and imports; and a decreasing function of exports (X) and foreign direct investment (FDI).

Now, the sum of interest (ILF) and principal (PLF) payments paid is nothing other than total debt service paid (DSP). The DSP is also nothing else other than the difference between total debt service due (DSD), which incorporates also past arrears outstanding and current arrears (A). Substituting these relationships into equation (3), they found equation (4), which represents the demand for new foreign loans.

$$N + A = DSD + \Delta NIR + \Delta BF - FDI + OTP - X + M \qquad (4)$$

The assumption they follow here is that countries prefer to protect their reputation by rolling over their external debt rather than by arrears. This gives an equation for a one-period –ahead ex ante demand for new loans, which satisfies:

$$N^D = DSD^e + \Delta NIR^e + \Delta BF^e - FDI^e + OTP^e - X^e + M^e \qquad (5)$$

Where, N^D stands for new loan demanded, and the superscripts e stands for expectations and other variables are as defined above.

From eq. (5) it implies that the demand for overseas borrowing is an increasing function of total debt service (DSD), the change in international reserves, the change in foreign bonds placed domestically (which partly reflects capital flight), net transfers to foreigners, and imports of goods and services. In contrast, capital inflows in the form of foreign direct investment and export revenues reduce the demand for external borrowing.

2.3.2. A summary of previous empirical studies

There are several empirical studies that investigated the determinants of external borrowing. Although they all have the same fundamental arguments, they deviate with respect to the choice of covariates that determine the demand for external loans and their methodological approaches. Eaton, et al (1981) was among the first to look at this issue. The theoretical model and its corresponding empirical counterpart are based on the following assumptions: First, the amount of a country's debt is determined by its willingness to borrow and a credit ceiling. Second, a rise in income variability (measured by the standard deviation exports) boosts the demand for borrowing. Third, while a rise in the growth rate of GDP leads to higher demand for borrowing, it decreases or increases the credit ceiling depending of the degree of risk aversion.[48] Finally, provided that the utility function exhibits constant relative risk aversion, then the income elasticities of both the ceiling and willingness to borrow are one. They also empirically show, using logit model and data for 81 countries for the periods 1970 and 1974, that the demand for borrowing is positively related with income variability, ratio of import to GDP, and initial income.

Eichengreen and Portes (1986), using both annual cross-section from 1930-38 for 16 to 23 countries and panel data indicate that while export instability and degree of openness are positively correlated with government external debt, they are not statistically significant. The only explanatory variable that was always significantly different from zero is the log of GDP per capita (LGDP). Shifting their approach to panel data, they indicate that all the variables but export variability turned out to be statistically significant. Though they recognized the problem of potential simultaneity, they have done little to resolve this problem.

On the other hand, in a different approach, Hajivassiliou (1987), using data for 79 developing countries in the period 1970-82, and treating the demand for and the supply of

[48] Following Eaton, et al (1981), "a negative effect of growth on the ceiling is more likely the more risk averse is the country, the more rapidly its risk aversion falls with increase in income, and possibly, if the percent variability of income falls as income increases" (p. 301).

loans separately, finds out that the demand for borrowing is positively determined by total debt service to export ratio, growth of GDP per capita, import to GDP ratio, interest and principal to export ratios and negatively by real GDP per capita (in contrast to both Eichengreen's and Eaton's, who used GDP). Similar results were obtained by McFadden, et al (1983), which shall be discussed more in the context of a debt service crisis in just a moment.

2.3.3. The empirical model, data description and results

Recognizing that previous empirical studies have produced fruitful results, there seems to be a room for extending those studies by considering the following:

- The 1980s and partly 1990s witness that capital flight has been a disastrous phenomena for developing countries. I, therefore, include this variable in this regression.
- The role of the fall in the terms of trade that has been ignored by previous studies should be given an appropriate attention.
- One needs to separately deal with whether the demand for external borrowing for HIPCs differ from those of other LDCs. This has been taken care of by two approaches. One approach is simply by putting a dummy for HIPCs in the regression for all samples and the second one is by running a separate regression for HIPCs alone. Since the number of HIPCs with full data is around 21, sometimes even less, I run a cross-section pooled time-series rather than a fixed effects model. Otherwise, there would just be not enough degrees of freedom.
- Thirdly, for all observations, I run annual cross-section pooled time-series and random and fixed effects model to control for country and time-specific effects.[49]

[49] The panel data approach is particularly important when analyzing the causes of indebtedness. As Hajivassiliou (1987) correctly puts it, except the traditional advantage of the panel data approach that will be discussed broadly in the fourth chapter of this work, developing countries seem to differ from each other due to colonial histories, political and financial institutions, and degree of creditworthiness. Therefore, the problem of heterogeneity might be substantially reduced by allowing country-specific factors. Moreover, the time-specific dummy may help to control for swings in international economic policies and indebtedness and debt relief over time.

- Finally, to my knowledge, except Easterly's 2002, there is no fresh empirical work in this area to explore the demand for indebtedness in the 1980s and 1990s

.

$$LEDT\left(LEDTGDP\right) = \alpha + \underset{(+)}{SDX} + \underset{(+)}{MGDP} + \underset{(+)}{CFLX} + \underset{(+)}{TDSX} + \underset{(-)}{LTOT} +$$

$$+ \underset{(+)}{LGDP} + \underset{(-)}{GRGDP} + \underset{(+)}{LPOP}$$

The basic empirical model that captures the covariates and their expected signs is just above. The dependent variable is the logarithm of total external debt (and its ratio to GDP). The variables, their definitions and sources are presented in (2.3). Tables (2.3a) and (2.3b) in the appendix present the results for the annual regression. Tables (2.38) and (2.39) present the annual cross-section regressions of log of total external debt (LEDT) and its ratio to GDP (LEDTGDP) on selected variables. Tables (2.40a), (2.40b), and (2.40c) present descriptive statistics and correlation matrices, respectively. Tables (2.41a) and (2.41b) present fixed effects and random effects models results for LEDT and LEDTGDP, respectively. Table (2.42) contains cross-section pooled time series regression results for all observations. Table (2.43) presents differences in the mean values of the covariates for HIPCs and non-HIPCs, while table (2.44) presents the impact of each covariate on the difference in the level of log of total external debt to GDP ratio (LEDTGDP). Tables (2.45a) to (2.45c) present descriptive statistics and correlation matrices for HIPCs panel data. Finally, tables (2.46a) and (2.46b) present cross-section pooled time series results for HIPCs.

Table 2.3

Definitions of variables used in the regression (1982-98)[1]

Variable	Definition	Source
LTEDT	logarithms of total external debt (LEDT) (average 1982-98)	Global Development Finance, CD-ROM, 2000
LEDTGDP	LEDT to GDP ratio	Global Development Finance, CD-ROM, 2000
SDX	Standard deviation of exports (1995 constant prices)	World Development Indicators, 2001
TDSX	Total debt service due to exports ratio	Global Development Finance, CD-ROM, 2000
CFLX	Capital flight to export ratio. The "sources and uses" methodology: (Capital flight = (change in debt + foreign direct investment)-(current account deficit + change in reserves)	Global Development Finance, CD-ROM, 2000 and World Development Indicators, 2001
LTOTG	The logarithms of the percentage change in the terms of trade	Easterly William and Mirvat Sewadeh (2002)[2]
MGDP	Imports to GDP ratio	World Development Indicators, 2001
LGDP	Log of GDP (PPP-adjusted)	World Bank, Easterly William and Mirvat Sewadeh (2002)
GRGDP	Growth rate of GDP (PPP-adjusted)	World Bank, Easterly William and Mirvat Sewadeh (2002
LPOP	Log of population	World Development Indicators, 2001

1. all covariates are initial values to minimize possible simultaneity
2. Database for Global Development Network, World Bank

Turning to my own analysis, the regression results indicate the following: First, I start with the log of total external debt as a dependent variable (see table 2.38). Higher standard deviation of exports (SDX) used as a proxy for income stability, though not statistically significant, increases the demand for external borrowing. This seems to suggest that countries with higher income instability are dependent on external financing and are therefore not prone to defaulting because of fear of sanctions by creditors.

However, the coefficient of this covariate has not been significant in any of the years considered, except 1996. Countries with higher ratios of imports to GDP (MGDP), which is also a measure of openness and the price of penalty, have a greater tendency to borrow

overseas more than those with lower MGDP ratio. In the annual cross-section regression, this variable turned out to be positive and significant between the years 1982 and 1986. The coefficient for capital flight (CFLX) while remains positive in all the periods (except 1984 and 1997), it has been statistically significant only in 1983, 1987, 1989, 1990. The positive signs for capital flight suggest that countries with higher capital flight tend to borrow more than those with less capital flight. The log of the percentage change in the terms of trade used as a proxy for welfare gain or loss in international trade, indicates that in 1983, 1986, 1988 and 1997, it was negatively and statistically significantly related to the demand for external borrowing. This indicates that countries with the worsening terms of trade should find themselves on the front door of the borrowing market. Total debt service payments to exports ratio (TDSX) seems to indicate that countries with higher debt service payments tend to borrow more in order to finance their past accumulated debt. This is consistent with the vicious circle of financing or simply "circular financing" phenomena poor countries have come across.[50] The log of GDP (LGDP) and the growth rate of GDP (GRDPG) are key indicators of creditworthiness.[51] The log of GDP (LGDP) in particular seems to be the main factor behind external borrowing. The results suggest that relatively larger economies had a greater tendency to borrow overseas and pay back their debts afterwards. The relationship is almost one-for - one across the 1980s and 1990s with the exception of 1988, 1996 and 1997. This may also mean that richer countries have better collateral to borrow overseas and have generally higher creditworthiness.

The results are very similar to those of Eichengreen and Portes (1986) who also found the same empirical evidence for the debt crisis in the 1930s. Their findings also indicate that the level of GDP was the key determining factor that shaped the behavior of debtors in the 1930s. The regression for the growth of GDP (GRGDP) has given mixed results, though the coefficients are not significant in most of the periods under consideration. For

[50] Kanbur (2000, pp. 688; in: UNCTAD, 2001, pp. 123) argue that "...official donors, who are also creditors, are putting money in so that the debt can be serviced". Similarly, Killick and Stevens (1997, pp. 165; in: UNCTAD, 2001, pp. 123) conclude that "creditor governments have been taking money with one hand what they have given with the other".

[51] As McFadden, et al (1985, in Smith, et al (1985, p. 188) put it, both the level of income and its growth rate may reflect the ability to pay and the presence of government infrastructure adequate to control trade and exchange activities.

example, in 1982, this variable has a positive and statistically significant coefficient perhaps indicating that countries with poor growth performance tend to have a greater desire to borrow overseas. The positive coefficients for HIPCs' dummy suggest that this group has been affected more seriously than the non-HIPCs countries that are under investigation in this study. The coefficients, however, are significant only for selected years (1986, 1989, 1992, 1994 and 1997).

One of the shortcomings of taking the absolute value of total external debt as a dependent variable is that it is not possible to appropriately control for country and economy size differences across countries. I, therefore, deflated the total external debt by GDP and used it as an alternative dependent variable. The results for the annual cross-section regression are in table (2.39) in the appendix. It appears that while there was no dramatic change in the results, it is now worthwhile to notice that the income (LGDP) variable that has always been positive and significant in the previous analysis now becomes insignificant or negative. The negative sign on this variable indicates that smaller economies have a greater desire to borrow overseas.

Switching to a panel data approach presented in table (2.41a), the regression results suggest that now the significance of the income stability indicator (SDX) becomes stronger both in the random effects and fixed effects models. The capital flight to exports (CFLX), total debt service (TDSX) and the change in the terms of trade (LTOTG) continue to have the right signs and remain significant, except the last two variables that are not significant in the fixed effects model. The import to GDP ratio (MGDP) suggests that higher share of imports to GDP matters for external indebtedness only if we leave out CFLX, TDSX and LTOT. The log of GDP both in the random effects and fixed effects models suggest that relatively larger economies have higher desire to borrow overseas and also tend to payback their past debt. As opposed to the annual cross–section model, in the panel analysis, countries with higher growth rate have a tendency to borrow less. The coefficients on HIPCs dummy suggest that things have gone worst for this group when all the variables are included (column 4 of table 2.41a) in the random effects

model. The cross-section pooled-time series analysis is very similar to that of the random effects model (see, table 2.42).

Similarly, deflating the total debt stock by GDP in the framework of a panel data, the results for income per capita variable (LGDP) changed significantly. In both the random and fixed effects models, the LGDP variable has now negative and statistically significant coefficients (see, table 2.41b). This seems to suggest that, controlling for the independent variables, country-specific and time-specific factors, it is smaller economies rather than larger ones that have a greater desire to borrow overseas. This result is consistent with the gap models, and other theoretical justification about the determinants of demand for overseas borrowing by poor countries that has been discussed earlier.

A separate cross-section pooled time-series regressions for HIPCs that are in tables (2.48a and 2.48b) in the appendix, indicate that SDX is negatively related to the demand for external debt. This suggests that countries with higher income instability tend to demand less borrowing overseas, a result that must be interpreted rather as anomalous. On the other hand, such a result may also be the outcome of a credit ceiling. This may be for example because countries with unsustainable export revenue do have less incentive to pay back their past debt or simply do no posses enough collateral and this may worsen their access to the borrowing market. Capital flight seems to have contributed to HIPCs external indebtedness. This may indicate that resources obtained by borrowing from overseas are diverted to foreign bank accounts, leaving external debt vitually unproductive and further increasing the demand for new loans. The total debt service payment and the loss in the terms of trade have also stimulated further external borrowing. HIPCs that are relatively open (higher share of imports to GDP (MGDP) borrowed more than their less-open HIPCs counterparts. In addition, more open HIPCs have a tendency to payback their past debt since the penalty (trade embargo, for instance) of default is higher for these countries. The LGDP indicates that relatively larger HIPCs had higher demand for external debt and this has been almost one for one. This also indicates that relatively larger HIPCs had a tendency to payback their debt as they want to borrow in the future. The other variables have not been significant.

3. Conclusion and the policy implication of this study

This paper made an attempt to empirically address one of the most important questions of the contemporary world: Why developing countries frequently find themselves on the front door of borrowing market?

To answer those questions, several empirical strategies have been employed. The first attempt was to check the robustness of previous other empirical results in this area. The most relevant and recent in this case was that of Easterly (2002), who empirically addresses HIPCs external indebtedness. It appears that though in general his studies are robust, the implementation of a cross-section pooled time series approach rather than a simple cross-section one generates a more robust empirical results as it enables one to incorporate time-specific factors that allow to control for changes in the global macroeconomic-policy environment, which affect the development of external indebtedness over time.

Moving to a broader approach of empirically investigating the causes of external indebtedness, again using both annual cross-section, random and fixed effects models and cross-section pooled time series, the results suggest that capital flight, debt service payments, the imports to GDP ratio, the level of income, and the growth rate of GDP are the key determinants of the demand for overseas borrowing. A separate cross-section pooled times series analysis for HIPCs indicates that this group's demand for overseas borrowing was driven mainly by sluggish economic growth, high past debt service payments, the deterioration in their terms of trade, and demand for foreign exchange to finance their import bills (as most of them are holding currencies that are not freely convertible), which is partly the reflection of the foreign-exchange gap.

The policy implications of this study are relatively straightforward:

First, the fact that external factors are one of the causes of the external indebtedness of developing countries may imply that developed nations should bear part of the responsibility as they are part of the problem. Second, debt mismanagement and other forms of distortions in developing countries themselves might be responsible for the failure of massive inflows of scarce resources to get translated into sustainable economic growth. The paradox of this may be apparent given the amount of capital flight from developing countries which further widens the financial gap and calls for further demand for external loans. This may also be a reflection of poor investment strategies in poor countries.

As it is now apparent, given the scale of the debt crisis, indebted poor nations are not able to pay back their contractual debt; therefore, it is the moral obligation of developed nations to forgive part of their debt claim against these nations. Therefore, while developed countries should help their developing counterparts through debt relief and other forms of cooperation, developing countries should get their economy in order and make sure that external resources are not consumed but rather invested in projects, which generate higher returns compared with the cost the external debt. Finally, the developed world should stop providing any loan to those of African leaders who come to power unconstitutionally.

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Appendix to Chapter II.

1. Results of the cross-section and Panel regressions (1982-99): HIPCs' Indebtedness

Table (2.4)

List of countries included in the regression[1]

Heavily indebted poor countries (HIPCs)	**Non-heavily indebted less-developed countries (Non-HIPCs)**	
Bolivia	Argentina	Mauritius
Burkina Faso	Bangladesh	Mexico
Cameroon	Belize	Morocco
Chad	Botswana	Nigeria
Congo, Rep.	Brazil	Pakistan
Cote d'Ivoire	Chile	Panama
Ethiopia	Colombia	Papua New Guinea
Ghana	Costa Rica	Paraguay
Honduras	Dominican Republic	Peru
Kenya	El Salvador	Philippines
Madagascar	Gabon	Swaziland
Malawi	Gambia, The	Thailand
Mauritania	Guatemala	Togo
Mozambique	Haiti	Tunisia
Nicaragua	India	Uganda
Niger	Indonesia	Venezuela, RB
Rwanda	Iran, Islamic Rep.	Zambia
Senegal	Jordan	Zimbabwe
Sierra Leone	Korea, Rep.	
Trinidad and Tobago	Lesotho	
Uruguay	Malaysia	

[1.] the number of countries was dictated by data availability

Table (2.5)

Descriptive statistics for HIPCs' indebtedness (cross-section regression - 1982-99)

Variable	Observation	Mean	Std. Dev.	Min	Max
LWGDPI	60	7.448	0.763	6.032	8.952
CFLGDP	60	2.254	10.782	-22.441	41.366
CAGDP	60	-4.147	4.526	-26.299	6.250
LBMP	58	3.032	1.574	0.259	8.291
RINTR	50	8.051	8.285	-11.969	42.934
FDIGDP	60	1.542	1.537	-0.462	8.618
DEFGDP	45	-2.961	3.462	-10.187	9.788
INFL	60	4.239	0.189	3.635	4.576
OVERVAL	57	113.5	75.15	37.855	589.423
LTOTG	60	-0.443	2.043	-6.790	3.102
LM2/GDP	60	3.311	0.458	2.261	4.624
IMFGDP	60	0.682	0.840	0	2.173
IBRDGDP	60	0.450	0.429	0	1.614

Table (2.6)

Descriptive statistics for HIPCs' indebtedness (Panel regression -1982-99)

Variable	Observation	Mean	Std. Dev.	Min	Max
LWGDPI	180	7.717	0.827	6.032	9.553
CFLGDP	180	3.803	8.815	-22.44	56.818
CAGDP	180	-4.688	6.614	-37.112	10.549
LBMP	178	2.603	1.693	-0.877	9.446
RINTR	153	8.793	14.291	-60.848	100.938
FDIGDP	180	1.850	2.889	-4.68	27.226
DEFGDP	148	-2.978	4.311	-22.357	13.722
INFL	179	4.092	1.110	-0.538	5.754
OVERVAL	170	132.876	108.85	0	1342.871
LTOTG	180	-0.404	3.581	-14.728	14.395
LM2GDP	180	3.294	0.493	1.966	4.791
IMFGDP	180	0.682	0.840	0	5.445
IBRDGDP	180	0.501	0.592	-0.01	2.976

1.1. Cross-section results for HIPCs' Indebtedness (1982-99)

Table (2.7)
Dependent variable is Capital flight to GDP ratio (1982-98)

Variable	**Coefficient**	**t-Statistic**
Constant	7.889	0.42
LGDPI	-0.566	-0.24
HIPC	-4.051	-1.07
R^2	0.025	
N	60	

Table (2.8)
Dependent variable is Current Account balance to GDP ratio (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-0.370	-0.07
LGDPI	-0.246	-0.29
HIPC	-5.552***	-4.19
R^2	0.31	
N	60	

Table (2.9)
Dependent variable is Government budget deficit to GDP ratio (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-8.678	1.26
LGDPI	0.791	0.90
HIPC	-0.800	-0.55
R^2	0.06	
N	60	

- *. Significant at 10% level.
- **. Significant at 5% level.
- ***. Significant at 1% level.

- T-values are in parentheses, unless they are presented in separate columns. This is applicable for all regressions in this paper, except for the correlation matrices, where standard errors are presented in parentheses).

Table (2.10)
Dependent variable is log (1+inflation rate) (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	4.523***	13.75
LGDPI	-0.035	-0.84
HIPC	-0.058	-0.88
R^2	0.016	
N	60	

Table (2.11)
Dependent variable is overvaluation (1992 constant Dollars) (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-145.69	1.21
LGDPI	30.823**	2.01
HIPC	81.891***	3.34
R^2	0.17	
N	60	

Table (2.12)
Dependent variable is real interest rate (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-29.764*	1.94
LGDPI	4.835***	2.45
HIPC	5.458*	1.85
R^2	0.11	
N	60	

Table (2.13)
Dependent variable is log of black market premium (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	3.692	1.36
LGDPI	-0.113	-0.33
HIPC	0.529	0.96
R^2	0.039	
N	60	

Table (2.14)
Dependent variable is Log of M2/GDP ratio (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	3.155***	4.86
LGDPI	0.040	0.45
HIPC	-0.415***	-2.91
R^2	0.23	
N	60	

Table (2.15)
Dependent variable is growth of real GDP per capita of OECD trade partners (1982-99

Variable	Coefficient	t- Statistic
Constant	3.005***	4.61
LGDPI	-0.155*	1.87
HIPC	-0.379**	-2.85
R^2	0.12	
N	58	

Table (2.16)
Dependent variable is log the percentage change in the terms of trade (1982-99)

Variable	Coefficient	t- Statistic
Constant	-2.329	-0.66
LGDPI	0.269	0.59
HIPC	-0.347	-0.49
R^2	0.027	
N	60	

Table (2.17)
Dependent variable is foreign direct investment to GDP ratio (1982-99)

Variable	Coefficient	t- Statistic
Constant	2.309	0.90
LGDPI	-0.053	-0.16
HIPC	-1.055**	-2.04
R^2	0.098	
N	60	

Table (2.18)
Dependent variable is disbursements from the IBRD to GDP ratio (1982-98)

Variable	Coefficient	t- Statistic
Constant	0.065	0.09
LGDPI	0.064	0.73
HIPC	-0.270*	-1.92
R^2	0.15	
N	60	

Table (2.19)
Dependent variable is use of IMF credit to GDP ratio (1982-98)

Variable	Coefficient	t- Statistic
Constant	0.489	0.59
LGDPI	-0.003	-0.03
HIPC	0.392**	2.33
R^2	0.14	
N	60	

Table (2.20)
Dependent variable is IBRD + IMF (1982-98)

Variable	Coefficient	t- Statistic
Constant	0.554	0.48.
LGDPI	0.061	0.42
HIPC	0.123	0.53
R^2	0.005	
N	60	

1.2. Panel results for HIPCs' indebtedness (1982-98)

Table (2.21)
Dependent variable is Dependent variable is Capital flight to GDP ratio (1982-99)

Variable	Coefficient	t- Statistic
Constant	12.340	1.38
LGDPI	-1.318	-1.17
PD2	1.502	0.91
PD3	4.208**	2.49
HIPC	-0.751	-0.39
R^2	0.038	
N	179	

Table (2.22)
Dependent variable is Current Account balance to GDP ratio (1982-99)

Variable	Coefficient	t- Statistic
Constant	-1.308	-0.28
LGDPI	-0.217***	-5.11
PD2	0.924	0.83
PD3	0.865	0.75
HIPC	-6.568***	-5.11
R^2	0.212	
N	180	

Table (2.23)
Dependent variable is Government budget deficit to GDP ratio (1982-99)

Variable	Coefficient	t- Statistic
Constant	-12.217***	-2.45
LGDPI	1.079*	1.71
PD2	1.029	1.18
PD3	1.044	1.11
HIPC	0.716	0.68
R^2	0.056	
N	148	

Table (2.24)
Dependent variable is ln(1+inflation)

Variable	**Coefficient**	**t- Statistic**
Constant	5.197***	5.91
LGDPI	-0.251**	-2.26
PD2	0.928**	5.75
PD3	1.831***	11.05
HIPC	-0.265	-1.43
R^2	0.415	
N	179	

Table (2.25)
Dependent variable is overvaluation (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-112.546	-1.05
LGDPI	31.379**	2.33
PD2	-38.722**	-1.95
PD3	-52.518**	-2.55
HIPC	94.307***	4.18
R^2	0.118	
N	170	

Table (2.26)
Dependent variable is real interest rate (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	-25.318	-1.63
LGDPI	3.695*	1.88
PD2	5.1269*	1.82
PD3	6.815**	2.27
HIPC	4.518	1.39
R^2	0.087	
N	153	

Table (2.27)
Dependent variable is log of black market premium (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	8.039***	5.44
LGDPI	-0.595***	-3.19
PD2	-0.212	-0.78
PD3	-1.656***	-5.93
HIPC	-0.602**	-1.92
R^2	0.288	
N	178	

Table (2.28)
Dependent variable is Log (M2/GDP) ratio (1982-99)

Variable	**Coefficient**	**t- Statistic**
Constant	2.737***	6.08
LGDPI	0.084	1.48
PD2	0.015	0.18
PD3	0.085	1.01
HIPC	-0.361***	-3.79
R^2	0.219	
N	180	

Table (2.29)
Dependent variable is growth of GDP per capita in OECD trade partners (1982-99)

Variable	Coefficient	t- Statistic
Constant	3.799***	11.32
LGDPI	-0.169***	-4.02
PD2	-0.488***	-8.11
PD3	-0.132**	-2.15
HIPC	-0.265***	-3.77
R^2	0.39	
N	171	

Table (2.30)
Dependent variable is percent of period a country is at war (1982-99)

Variable	Coefficient	t- Statistic
Constant	1.471***	4.03
LGDPI	-0.161***	-3.50
PD2	0.008	0.12
PD3	0.100	1.45
HIPC	-0.212***	-2.74
R^2	0.072	

Table (2.31)
Dependent variable is percent of period at war (1982-99)

Variable	Coefficient	t- Statistic
Constant	1.749***	5.22
LGDPI	-0.199***	-4.72
PD2	0.065	1.07
PD3	0.051	0.82
HIPC	-0.263***	-3.71
R^2	0.118	
N	180	

Table (2.32)
Dependent variable is log of the percentage change in the terms of trade (1982-99)

Variable	Coefficient	t- Statistic
Constant	-2.021	-0.45
LGDPI	0.222	0.39
PD2	-0.866	-1.07
PD3	0.157	0.19
HIPC	0.163	0.17
R^2	0.012	
N	180	

Table (2.33)
Dependent variable is foreign direct investment to GDP ratio (1982-99)

Variable	Coefficient	t- Statistic
Constant	0.713	0.26
LGDPI	0.073	0.21
PD2	0.527	1.05
PD3	2.355***	4.58
HIPC	-1.117**	-1.93
R^2	0.165	
N	180	

Table (2.34)
Dependent variable is disbursements from IBRD to GDP ratio (1982-98)

Variable	Coefficient	t- Statistic
Constant	0.238	0.43
LGDPI	0.073	1.04
PD2	-0.191*	-1.83
PD3	-0.395***	-3.75
HIPC	-0.302**	-2.56
R^2	0.16	
N	180	

Table (2.35)
Dependent variable is disbursements IMF to GDP ratio (1982-98)

Variable	Coefficient	t- Statistic
Constant	1.08	1.32
LGDPI	-0.046	-0.45
PD2	-0.314**	-2.08
PD3	-2.420	-1.57
HIPC	0.423**	2.43
R^2	0.16	
N	180	

Table (2.36)
Dependent variable is (IBRD + IMF) to GDP ratio (1982-98)

Variable	Coefficient	t- Statistic
Constant	1.320	1.23
LGDPI	0.026	0.19
PD2	-0.505**	-2.57
PD3	-0.638***	-3.16
HIPC	0.120	0.53
R^2	0.06	
N	180	

Table (2.37)

Easterly (2002) results

Regression results for policies in LDCs 1980-97, controlling for income (sample of all LDCs)

Dependent variable, average 1980-97	**current account balance/GDP**		**budget deficit, excl. grants/GDP**	
	coefficient	t-Statistic	coefficient	t-Statistic
Log of income, 1979	0.08	0.11	1.47	2.08
Dummy for HIPCs	-5.58	-4.36	-4.26	-3.67
R^2	0.25		0.32	
No. of Observation	77		81	

Dependent variable, average 1980-97	**budget deficit incl. grants/GDP**		**M2/GDP**	
Log of income, 1979	-0.34	-0.46	1.5	0.48
Dummy for HIPCs	-4.97	-3.94	-15.65	-2.96
R^2	0.19		0.15	
No. of Observation	84		83	

Dependent variable, average 1980-97	**log (1+inflation rate)**		**index of overvaluation**	
Log of income, 1979	0.13	2.6	9.07	1.13
Dummy for HIPCs	0.15	1.79	64.19	4.92
R^2	0.08		0.3	
No. of Observation	82		68	

Dependent variable, average 1980-97	**Real interest rate**		**Log(1+black market premium)**	
Log of income, 1979	-0.01	-0.47	0.04	0.6
Dummy for HIPCs	-0.05	-1.79	0.09	0.78
R^2	0.05		0.01	
No. of Observation	74		77	

Dependent variable, average 1980-97	**CPIA (1-5 scale)**		**FDI/GDP**	
Log of income, 1979	0.07	0.72	0.11	0.66
Dummy for HIPCs	-0.33	-2.15	-0.84	-2.92
R^2	0.11		0.17	
No. of Observation	77		77	

Dependent variable, average 1980-97	**World Bank Financing/GDP**		**IMF Financing/GDP**	
Log of income, 1979	-0.4	-3.76	0.05	0.41
Dummy for HIPCs	0.96	5.35	0.73	3.4
R^2	0.53		0.15	
No. of Observation	83		83	

Dependent variable, average 1980-97	**World Bank share of disbursement/GDP**		**IMF share of disbursement/GDP**	
Log of income, 1979	-8.1	-5.72	0.69	0.79
Dummy for HIPCs	7.17	3.14	4.37	3.12
R^2	0.54		0.13	
No. of Observation	76		76	

Dependent variable, average 1980-97	**Log growth in the terms of trade**		**percent of period at war**	
Log of income, 1979	0.00	-0.79	-0.04	-0.75
Dummy for HIPCs	0.00	-0.05	-0.09	-1.1
R^2	0.02		0.02	
No. of Observation	77		76	

Source: Easterly William (2002), "How Did Heavily Indebted Poor Countries Become Heavily Indebted? Reviewing Two Decades of Debt Relief", World Development, Vol. 30, No. 10, (pp. 1685-1686).

2. Empirical results on determinants of external indebtedness (1982-99)

Table (2.38)
Annual Cross-section (All developing Countries)[1]

	1982	1983	1984	1985	1986	1987	1988	1989	1990
CONS	-1.06	0.494	-0.822	-0.676	-2.361	0.581	4.172	-1.375	-0.191
	(-0.43)	(0.19)	(-0.33)	(-0.28)	(-1.09)	(0.22)	(1.56)	(-0.48)	(-0.05)
SDX	0.000	0.000	0.000	0.000	0.000	0.001	0.000	-0.000	0.000
	(0.19)	(1.44)	(0.34)	(0.38)	(0.32)	(1.04)	(1.50)	(-0.17)	(0.73)
MGDP	0.009**	0.012**	0.010*	0.011**	0.012**	0.007	0.000	0.007	0.006
	(2.13)	(2.15)	(1.97)	(2.15)	(2.28)	(1.29)	(0.05)	(1.15)	(0.99)
CFLX	0.001	0.003***	-0.002	0.000	0.001	0.002***	0.002	0.002*	0.002*
	(0.70)	(2.77)	(-1.17)	(0.99)	(1.52)	(2.89)	(1.51)	(1.67)	(1.63)
LTOT	0.005	-0.019***	0.006	0.000	-0.009**	0.016***	-0.014**	0.027***	0.007
	(-0.95)	(-3.01)	(0.81)	(0.08)	(-2.69)	(3.21)	(2.22)	(3.13)	(0.89)
TDSX	0.018***	0.023***	0.032***	0.030***	0.024***	0.022***	0.019***	0.012*	0.021**
	(3.61)	(3.99)	(4.92)	(4.14)	(4.58)	(3.63)	(3.02)	(1.62)	(2.37)
LGDP	1.110***	0.942***	1.012***	1.035***	1.256***	1.054***	0.826***	1.193***	1.064***
	(6.72)	(5.39)	(5.76)	(6.12)	(8.65)	(6.11)	(4.87)	(6.23)	(4.64)
GRGD	0.032**	-0.020*	0.006	-0.024*	-0.013	-0.03***	-0.018	-0.009	-0.007
	(2.26)	(-1.65)	(0.48)	(-1.91)	(-1.08)	(-3.35)	(-1.23)	(-055)	(-0.42)
LPOP	-0.248*	-0.111	-0.132	-0.165	-0.39***	-0.247*	-0.125	-0.333**	-0.227
	(-1.92)	(-0.82)	(-0.96)	(-1.21)	(-3.19)	(-1.85)	(-0.88)	(-2.04)	(-1.24)
HIPC	0.314	0.307	0.271	0.261	0.619***	0.408	0.089	0.655**	0.400
	(1.30)	(1.35)	(1.12)	(1.09)	(2.78)	(1.59)	(0.32)	(2.29)	(1.14)
N	56	57	57	59	59	59	60	60	60
R^2	0.90	0.91	0.91	0.90	0.93	0.91	0.88	0.86	0.81

[1.] Dependent variable is log of total external debt (annual)

Table (2.38) continues

	1991	1992	1993	1994	1995	1996	1997	1998
CONS	0.350	0.629	0.303	-2.084	-3.059	2.578	2.004	1.174
	(0.11)	(0.24)	(0.17)	(-0.71)	(-1.20)	(1.08)	(0.88)	(0.41)
SDX	0.000	0.002	0.001	0.000	-0.000	0.0001*	0.000	0.000
	(0.32)	(0.55)	(0.59)	(0.04)	(-0.25)	(1.81)	(1.53)	(0.61)
MGDP	0.004	0.004	0.005	0.008	0.007	0.003	0.005	0.002
	(0.63)	(0.76)	(0.84)	(1.48)	(1.46)	(0.68)	(1.23)	(0.45)
CFLX	0.000	0.000	0.000	0.001	0.001	0.000	-0.003*	0.000
	(0.11)	(0.02)	(0.05)	(1.23)	(0.58)	(-0.33)	(-1.79)	(0.23)
LTOT	-0.003	-0.001	-0.008	-0.004	0.010	0.021***	-0.016**	-0.005
	(-0.54)	(-0.13)	(-0.63)	(-0.52)	(1.23)	(3.87)	(-2.17)	(0.22)
TDSX	0.011**	0.018*	0.013	0.021***	0.016**	0.033***	0.029***	0.021**
	(1.98)	(1.89)	(1.48)	(3.13)	(1.99)	(3.77)	(3.45)	(2.37)
LGDP	0.955***	0.949***	0.955***	1.142***	1.204***	0.859***	0.874***	0.921***
	(4.57)	(5.21)	(4.87)	(5.64)	(6.84)	(5.23)	(5.11)	(4.65)
GRGD	0.007	-0.001	-0.005	-0.009	0.014	-0.0100	-0.008	-0.029
	(0.38)	(-0.07)	(-0.26)	(-0.94)	(1.33)	(-0.52)	(-0.59)	(-1.42)
LPOP	-0.08	-0.100	-0.082	-2.226	-0.266*	-0.097	-0.080	-0.083
	(-0.48)	(-0.63)	(-0.50)	(-1.39)	(-1.77)	(-0.75)	(-0.59)	(-0.55)
HIPC	0.492	0.567*	0.578	0.553*	0.728**	0.472*	0.466*	0.441
	(1.51)	(1.72)	(1.61)	(1.79)	(2.51)	(1.85)	(1.83)	(1.53)
N	60	58	57	57	57	56	55	52
R^2	0.85	0.86	0.85	0.89	0.89	0.92	0.92	0.90

Table (2.39)
Annual Cross-section (All developing Countries)[2]

	1982	1983	1984	1985	1986	1987	1988	1989	1990
CONS	4.351*	5.620**	2.878	4.143**	3.581*	4.827**	7.419***	2.463	2.899
	(1.78)	(2.39)	(1.33)	(2.21)	(1.73)	(2.11)	(3.16)	(0.96)	(0.99)
SDX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.31)	(1.03)	(-0.16)	(-0.35)	(-0.17)	(0.16)	(0.38)	(-1.22)	(-0.88)
MGDP	0.007*	0.006	0.011**	0.011***	0.010**	0.005	0.003	0.008	0.010*
	(1.68)	(1.42)	(2.49)	(3.01)	(2.08)	(1.05)	(0.65)	(1.58)	(1.91)
CFLX	0.002	0.000	-0.001	-0.000	0.000	0.002***	0.001	0.002**	0.003***
	(1.36)	(0.55)	(-0.59)	(-0.35)	(-0.24)	(2.98)	(0.96)	(2.39)	(3.14)
LTOT	-0.006	-0.009	-0.002	0.007	-0.003	0.015***	-0.016***	0.021***	0.009
	(-0.97)	(-1.59)	(-0.26)	(1.46)	(-0.92)	(3.38)	(-2.99)	(2.65)	(1.19)
TDSX	0.016**	0.026***	0.031***	0.032***	0.022***	0.015***	0.011**	0.012	0.021**
	(3.16)	(4.76)	(5.47)	(5.69)	(4.39)	(2.95)	(2.02)	(1.61)	(2.62)
LGDP	0.018	-0.132	0.066	0.021	0.081	0.035	-0.176	0.184	0.086
	(0.11)	(-0.87)	(0.044)	(0.02)	(0.58)	(0.23)	(-1.18)	(1.05)	(0.43)
GRGD	0.016	-0.009	-0.005	-0.015	0.002	-0.021**	-0.03**	-0.003	0.000
	(1.12)	(-.79)	(-0.43)	(-1.53)	(0.22)	(-2.36)	(-2.32)	(-0.22)	(-0.01)
LPOP	-0.112	0.025	-0.098	-0.075	-0.151	-0.122	0.049	-0.207	-0.113
	(-0.87)	(0.20)	(-0.83)	(-0.72)	(-1.27)	(-1.06)	(0.39)	(-1.40)	(-0.71)
HIPC	0.299	0.268	0.291	0.168	0.251	0.198	0.024	0.518**	0.277
	(1.24)	(1.25)	(1.40)	(0.91)	(1.16)	(0.88)	(0.10)	(2.00)	(0.99)
N	55	56	57	59	59	59	60	60	60
R^2	0.36	0.43	0.49	0.54	0.39	0.46	0.44	0.36	0.44

[2.] Dependent variable is log of total external debt as a ratio to GDP (LEDTGDP)

Table (2.39) continues

	1991	1992	1993	1994	1995	1996	1997	1998
CONS	5.275**	6.034***	5.221**	3.556	2.419	8.731***	7.531***	6.00**
	(2.06)	(2.69)	(2.01)	(1.32)	(1.01)	(3.91)	(3.35)	(2.07)
SDX	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(-0.45)	(-0.02)	(-0.11)	(-1.05)	(-1.31)	(0.98)	(0.86)	(0.39)
MGDP	0.008*	0.009*	0.011**	0.011**	0.013***	0.009**	0.010***	0.011
	(1.66)	(1.86)	(2.01)	(2.05)	(2.77)	(2.37)	(2.66)	(2.14)
CFLX	0.001	0.002*	0.002	0.001*	0.000	-0.001**	-0.002	0.000
	(0.57)	(1.71)	(0.94)	(1.64)	(-0.68)	(-2.37)	(-1.50)	(-0.11)
LTOT	-0.001	0.002	-0.004	0.001	0.006	0.010*	-0.011	0.002
	(-0.24)	(0.33)	(-0.37)	(0.22)	(0.78)	(1.98)	(-1.63)	(0.30)
TDSX	0.019***	0.025***	0.015*	0.014**	0.016**	0.033***	0.024***	0.016*
	(4.29)	(3.06)	(1.87)	(2.22)	(2.18)	(4.01)	(3.02)	(1.89)
LGDP	-0.172	-0.234	-0.235	-0.084	-0.034	-0.439***	-0.344**	-0.291
	(-0.98)	(-1.48)	(-1.30)	(-0.44)	(-0.21)	(-2.83)	(-2.14)	(-1.47)
GRGD	-0.014	0.000	-0.007	0.002	0.009	-0.009	-0.010	-0.027
	(-0.86)	(-0.01)	(-0.44)	(0.23)	(0.91)	(-0.48)	(-0.45)	(-1.31)
LPOP	0.142	0.164	0.227	0.109	0.091	0.305**	0.243*	0.234*
	(0.98)	(1.18)	(1.49)	(0.72)	(0.64)	(2.49)	(1.92)	(1.73)
HIPC	0.241	0.351	0.463	0.725**	0.811***	0.339	0.496**	0.527*
	(0.87)	(1.23)	(1.40)	(2.53)	(2.98)	(1.41)	(2.02)	(1.83)
N	60	58	57	57	57	56	55	52
R^2	0.52	52	0.50	0.62	0.47	0.67	0.54	0.50

2.1. Panel results on determinants of external indebtedness (1982-99)

Table (2.40a)

Descriptive Statistics (All developing countries)

Variable	Observation	Mean	Std. Dev.	Min	Max
LEDT	180	22.29	1.60	18.47	25.93
LEDTGDP	180	4.12	0.64	2.59	6.45
SDXI	179	885.41	2113.67	0.06	14380
CFLXI	179	26.08	84.97	-242.69	812.09
TDSXI	180	23.54	15.45	0.22	81.75
LTOTGI	178	-0.68	12.80	-83.19	48.75
MDGDPI	180	36.22	21.71	2.98	126.18
LGDPI	180	23.22	1.70	19.64	28.08
GRGDPI	179	6.51	7.63	-49.64	27.42
LPOP	180	16.05	1.55	19.77	28.24

Table (2.40b)

Correlation Matrix (standard errors in parenthesis) (All developing countries)

Variables	LEDT	SDX	CFLX	TDSX	LTOTG	MDGDP	LGDP	GRGDP
LEDT	1.00							
SDX	0.546* (0.000)	1.00						
CFLX	0.105 (0.16)	-0.049 (0.52)	1.00					
TDSX	0.413* (0.000)	0.032 (0.642)	-0.042 (0.56)	1.00				
LTOTG	-0.082 (0.27)	-0.018 (0.81)	-0.013 (0.72)	-0.026 (0.72)	1.00			
MDGDP	-0.452* (0.000)	-0.072 (0.32)	0.063 (0.39)	-0.357* (0.000)	-0.023 (0.75)	1.00		
LGDP	0.917* (0.000)	0.557* (0.000)	0.014 (0.85)	0.283* (0.000)	-0.018 (0.80)	-0.535* (0.000)	1.00	
GRGDP	0.053 (0.48)	0.081 (0.27)	-0.017 (0.82)	0.014 (0.85)	0.073 (0.33)	0.028 (0.70)	0.069 (0.35)	1.00

- Significant at 5 % level
- Numbers in parentheses are standard errors

Table (2.40c)

Correlation Matrix (standard errors in parenthesis) (All developing countries)

Variables	LEDT-GDP	SDX	CFLX	TDSX	LTOTG	MGDP	LGDP	GRGDP
LEDTG	1.00							
SDX	-0.210* (0.004)	1.00						
CFLX	0.364* (0.000)	-0.049 (0.515)	1.00					
TDSX	0.307* (0.000)	0.031 (0.673)	0.042 (0.569)	1.00				
LTOTG	-0.168* (0.024)	-0.018 (0.810)	-0.013 (0.863)	-0.026 (0.721)	1.00			
MGDP	0.192* (0.009)	-0.073 (0.326)	0.063 (0.399)	-0.357* (0.000)	-0.023 (0.755)	1.00		
LGDP	-0.287* (0.000)	0.557* (0.000)	0.014 (0.849)	0.289* (0.000)	-0.018 (0.803)	-0.532* (0.000)	1.00	
GRGDP	-0.083 (0.268)	0.081 (0.279)	-0.017 (0.816)	0.013 (0.854)	0.073 (0.330)	0.028 (0.703)	0.069 (0.355)	1.00

- = significant at 5 %
- Numbers in parentheses are standard errors

Table (2.41a)

Panel regression results (1982-98)[3]

	Random Effects Model				**Fixed Effects Model**			
Variable	1	2	3	4	5	6	7	8
Const	2.844** (2.01)	2.968** (2.31)	2.64** (2.13)	2.361* (1.90)	21.46 (2.79)	16.61** (2.38)	17.89** (2.53)	18.36** (2.53)
SDX	0.0001*** (3.42)	0.0001*** (3.59)	0.0001*** (3.34)	0.00006*** (3.19)	0.00007*** (3.35)	0.0001*** (3.47)	0.0001*** (3.40)	0.0001*** (3.29)
CFLX		0.0008** (2.96)	0.001** (2.94)	0.0008*** (2.90)		0.0007** (2.38)	0.0007** (2.37)	0.0007** (2.34)
TDSX			0.003* (1.74)	0.0029* (1.85)			0.0017 (1.13)	0.0018 (1.23)
LTOTG				-0.0024* (-1.65)				-0.002 (-1.55)
MGDP	0.0042** (2.11)	0.0017 (0.92)	0.0022 (1.15)	0.0023 (1.17)	0.004* (1.86)	0.0014 (0.78)	0.0017 (0.84)	0.0017 (0.88)
LGDP	0.725*** (7.45)	0.757*** (8.28)	0.790*** (8.73)	0.815*** (8.90)	0.350*** (2.72)	0.478*** (4.00)	0.464*** (3.87)	0.474*** (3.75)
GRGDP	-0.006* (-1.92)	-0.008*** (-2.79)	-0.007** (-2.47)	-0.0069** (-2.01)	-0.0026 (-0.82)	0.006* (-1.92)	-0.005* (-1.70)	-0.004 (-1.29)
LPOP	0.129 (1.28)	0.079 (0.82)	0.044 (0.48)	0.024 (0.25)	-0.458 (-1.06)	-0.343 (0.78)	-0.405 (-1.02)	-0.449 (-1.12)
PD1	-0.072 (-1.06)	-0.007 (-0.109)	0.002 (0.03)	0.007 (0.11)	-0.509 (-3.27)	-0.339** (-2.36)	-0.371** (-2.54)	-0.379** (-2.51)
PD2	0.065 (1.29)	0.091* (1.98)	0.078 (1.58)	0.070 (1.39)	-0.134* (-1.64)	-0.060 (-0.80)	-0.084 (-1.09)	-0.099 (-1.22)
HIPC	0.253 (1.25)	0.248 (1.27)	0.264 (1.45)	0.295* (1.63)				
N	178	177	177	177	178	177	177	176
R^2	0.84	0.85	0.86	0.87	0.01	0.52	0.37	0.28
Prob(chi 2)[a]	0.001	0.009	failed	failed				

3. Dependent variable is log of total external debt (LEDT)

a. the Hausman test in the first two columns is in favor of the fixed effects model.

Table (2.41b)

Panel regression results for all developing countries (1982-98)[4]

	Random Effects Model				**Fixed Effects Model**			
Variable	1	2	3	4	5	6	7	8
Const	6.222*** (4.15)	6.753*** (4.79)	7.121*** (5.39)	6.848*** (5.26)	-5.366 (-0.43)	-13.721 (-1.23)	-9.112 (-0.83)	-10.145 (-0.90)
SDX	0.00005* (1.79)	0.00005** (2.09)	0.00005* (1.93)	0.00004* (1.68)	0.0001** (2.85)	0.0001*** (2.95)	0.0001*** (2.87)	0.0001*** (2.78)
CFLX		0.0014*** (3.47)	0.0015*** (3.59)	0.0014*** (3.58)		0.001** (2.26)	0.001** (2.29)	0.001** (2.29)
TDSX			0.0095*** (4.16)	0.0098*** (4.32)			0.0062** (2.68)	0.006*** (2.69)
LTOTG				-0.004** (-2.19)				-0.0064 (-1.35)
MGDP	0.0056** (2.02)	0.0025 (0.98)	0.0037 (1.51)	0.0039* (1.61)	0.0071** (2.14)	0.0032 (1.04)	0.0039 (1.30)	0.0038 (1.25)
LGDP	-0.218** (-1.99)	-0.213*** (-2.05)	-0.236** (-2.44)	-0.214** (-2.25)	-0.661** (-3.18)	-0.454** (-2.39)	-0.502*** (-2.70)	-0.447** (-2.28)
GRGDP	-0.011** (-2.07)	-0.011*** (-2.69)	-0.009** (-2.20)	-0.007* (-1.73)	-0.0043 (-0.84)	-0.009** (-2.00)	-0.007 (-1.58)	-0.0064 (-1.34)
LPOP	0.173* (1.68)	0.137 (1.36)	0.136 (1.48)	1.118 (1.33)	1.154** (2.22)	1.762** (2.81)	1.540** (2.49)	1.521** (2.45)
PD1	-0.279** (-3.11)	-0.187** (-2.18)	-0.234*** (-2.78)	-0.23*** (2.77)	-0.237 (-0.95)	0.044 (0.19)	-0.072 (-0.32)	-0.046 (-0.19)
PD2	0.074 (0.98)	0.115* (1.68)	0.040 (0.57)	0.020 (0.28)	0.118 (0.90)	0.241** (2.02)	0.151 (1.25)	0.151 (1.19)
HIPC	0.415** (2.19)	0.362** (1.97)	0.256 (1.51)	0.281 (1.71)				
N	178	177	177	176	178	177	177	176
R^2	0.24	0.30	0.40	0.43	0.0004	0.006	0.001	0.003
Prob(chi 2)[b]	0.39	0.16	0.56	0.37				

4. Dependent variable is Log total external debt to GDP ratio (LEDTGDP)

b. The Hausman test is in favor of the random effects model

Table (2.42)

Regression results of cross-section pooled time series for all (1982-98)[5]

Variables	**1**	**2**	**3**	**4**
Const	-2.88** (-2.05)	-2.564* (-1.84)	-0.724 (-0.54)	-0.609 (-0.46)
SDXI	9.06e-06 (0.32)	0.00001 (0.44)	0.00003 (1.14)	0.00003 (1.12)
CFLXI		0.0014** (2.46)	0.0013*** (2.59)	0.0014** (2.58)
TDSXI			0.0165*** (5.25)	0.0162*** (5.19)
LTOTGI				-0.007** (-2.29)
MDGDPI	0.009*** (3.16)	0.0014*** (2.75)	0.0086*** (3.20)	0.0083*** (3.08)
LGDPI	1.176*** (12.57)	1.174*** (12.69)	1.050*** (11.79)	1.051*** (11.92)
GRGDPI	-0.006 (-0.88)	-0.0053 (-0.81)	-0.0037 (-0.62)	-0.0019 (-0.31)
LPOP	-0.203*** (-2.56)	-0.221*** (-2.79)	-0.170** (-2.29)	-1.759** (-2.40)
PD1	0.205* (1.64)	0.293** (2.28)	0.157 (1.28)	0.150 (1.28)
PD2	0.144 (1.21)	0.181 (1.52)	0.054 (0.47)	0.026 (0.28)
HIPC	0.761*** (5.29)	0.698*** (4.84)	0.445*** (3.12)	0.450*** (3.18)
N	178	177	177	176
R^2	0.86	0.86	0.88	0.88

5. Dependent variable is log of total external debt (LEDT)

Table (2.43)

Differences in covariates between HIPCs and Non-HIPCs (1982-98)

Average values	Heavily Indebted Poor Countries (HIPCs)			Non-Heavily Indebted countries (NON-HIPCs)			Differences between the means		
	1982-87	**1988-93**	**1994-98**	**1982-87**	**1988-93**	**1994-98**	**1982-87**	**1988-93**	**1994-98**
LEDTG	4.12	4.62	4.82	3.97	3.95	3.84	0.15	0.67	0.98
LPOP	15.74	15.91	16.05	16.02	16.15	16.26	-0.28	-0.25	-0.21
CFLX	-10.63	52.99	119.26	-1.36	9.86	24.19	-9.26	43.13	95.07
SDX	53.25	27.88	46.88	1580.95	772.20	1641.75	-1527.7	-744.33	-1594.8
MGDP	32.67	30.12	38.92	37.20	35.84	39.38	-4.54	-5.72	-0.46
LGDP	22.34	22.75	22.92	23.64	24.15	24.49	-1.30	-1.40	-1.58
GRGDP	4.18	11.33	2.63	2.60	10.90	6.66	1.58	0.43	-4.03
TDSX	23.95	32.03	27.06	23.15	23.79	17.02	0.79	8.24	10.04
LTOTG	2.70	-4.50	1.60	-3.72	0.61	0.39	6.42	-5.11	1.21

Table (2.44)

The impact of each variable on the difference in the log of total external debt to GDP ratio between HIPCs and Non-HIPCs (1982-98)

	Random effects model			**Fixed effects model**		
	1982-87	**1988-93**	**1994-98**	**1982-87**	**1988-93**	**1994-98**
LPOP	0.70	0.60	0.50	12.60	0.11	9.59
CFLX	1.30	6.00	13.30	1.00	4.31	9.50
SDX	6.10	3.00	6.40	15.20	7.41	15.94
MGDP	1.80	2.20	0.20	1.00	1.00	0.07
LGDP	27.70	29.90	33.70	58.00	62.31	70.48
GRGDP	1.10	0.30	2.80	1.00	0.17	1.61
TDSX	0.80	8.10	9.80	0.47	4.97	6.02
LTOTG	1.50	1.20	0.30	1.00	1.00	0.24

The effects of each variable on the difference in total external debt to GDP ratio between HIPCs and Non-HIPCs was calculated as follows (I follow Klasen (2002): First, I take the difference in each covariates between the two groups as shown in table (2.43) . Second I take the regression coefficients of each covariate from column 4 and 8 of table 2.3d for the random and fixed effects models, respectively. Finally I multiplied the coefficients by the differences.

2.2. Panel results for determinants of indebtedness (HIPCs') (1982-99)

Table (2.45a)
Descriptive Statistics (for HIPCs)

Variable	Observation	Mean	Std. Dev.	Min	Max
LEDT	63	21.70	0.93	19.29	23.57
LEDTG	63	4.52	0.69	2.99	6.45
LPOP	63	15.89	0.76	14.37	17.88
MGDP	63	33.90	16.99	2.98	90.91
GRGDP	62	8.50	9.73	-16.5	49.2
LGDP	63	22.66	0.79	20.71	24.1
SDX	63	64.75	139.81	0.15	1020.71
CFLX	62	54.74	127.24	-85.80	812.09
LTOG	62	-0.06	19.28	-83.19	48.37

Table (2.45b)
Correlation Matrix (standard errors in parentheses)-HIPCs

	LEDT	SDX	MGDP	CFLX	TDSX	LTOTG	LGDP	GRGDP
LEDT	1.00							
SDX	-0.124 (0.33)	1.00						
MGDP	0.069 (0.58)	-0.079 (0.54)	1.00					
CFLX	0.289* (0.02)	0.054 (0.67)	0.210 (0.10)	1.00				
TDSX	0.394* (0.001)	0.033 (0.79)	-0.061 (0.63)	-0.009 (0.94)	1.00			
LTOTG	-0.215 (0.09)	0.152 (0.23)	-0.084 (0.517)	-0.046 (0.72)	0.046 (0.72)	1.00		
LGDP	0.641* (0.000)	0.036 (0.77)	-0.466* (0.000)	0.164 (0.20)	0.179 (0.16)	-0.0009 (0.99)	1.00	
GRGDP	0.021 (0.87)	0.130 (0.31)	0.449* (0.000)	-0.083 (0.52)	0.027 (0.83)	-0.072 (0.58)	-0.260* (0.04)	1.00

- *. Significant at 5 % level
- Numbers in parentheses are standard errors

Table (2.45c)

Correlation Matrix (Standard errors in parenthesis) HIPCs

	LEDTG	SDX	MGDP	CFLX	TDSX	LTOTG	LGDP	GRGDP
LEDTG	1.00							
SDX	-0.209 (0.09)	1.00						
MGDP	0.528* (0.000)	-0.079 (0.54)	1.00					
CFLX	0.444* (0.000)	0.054 (0.67)	0.210 (0.10)	1.00				
TDSX	0.219 (0.08)	0.033 (0.79)	-0.062 (0.63)	-0.009 (0.94)	1.00			
LTOTG	-0.314* (0.01)	0.153 (0.24)	-0.084 (0.52)	-0.046 (0.73)	0.046 (0.72)	1.00		
LGDP	-0.027 (0.83)	0.063 (0.78)	-0.467* (0.000)	0.164 (0.20)	0.179 (0.16)	-0.0009 (0.99)	1.00	
GRGDP	0.103 (0.43)	0.130 (0.31)	-0.449* (0.000)	0.083 (0.52)	0.028 (0.83)	-0.072 (0.58)	-0.260* (0.04)	1.00

- *. Significant at 5% level
- Numbers in parentheses are standard errors

Table (2.46a)

Regression results for HIPC Panel (Cross-section pooled-time series) (1982-98)[6]

Variable	1	2	3	4
CONST	-3.024 (-1.01)	-2.407 (-0.80)	-1.441 (-0.52)	-1.062 (-0.39)
SDX	-0.001* (-1.78)	-0.0011* (-1.97)	-0.001 (-2.15)	-0.0009* (-1.83)
CFLX		0.0011 (1.51)	0.011* (1.68)	0.0011* (1.66)
TDSX			0.014*** (3.26)	0.0155*** (3.50)
LTOTG				-0.008** (-2.13)
MDGDP	0.0215*** (3.26)	0.0174** (2.42)	0.0175** (2.65)	0.0166** (2.60)
LGDP	1.219*** (6.55)	1.268*** (6.58)	1.176*** (6.55)	1.149*** (6.59)
GRGDP	0.0099 (0.94)	0.013 (1.22)	0.0127 (1.25)	0.0117 (1.19)
LPOP	-2.368 (-1.23)	-0.344 (-1.64)	-0.299 (-1.54)	-0.281 (1.49)
PD1	0.115 (0.52)	0.258 (1.07)	0.237 (1.08)	0.227 (1.04)
PD2	0.175 (0.86)	0.206 (1.00)	0.119 (0.62)	0.049 (0.26)
N	62	61	61	61
R^2	0.62	0.63	0.70	0.72

6. Dependent variable is Log of total external debt (LEDT) 1982-98

Table (2.46b)

Regression results for HIPC Panel (Cross-section pooled-time series) (1982-98)[7]

Variable	1	2	3	4
CONST	2.025 (0.82)	2.891 (1.21)	3.381 (1.45)	3.879* (1.73)
SDX	-0.0007 (-1.42)	-0.0008* (-1.81)	-0.0008* (-1.84)	-0.0006 (-1.46)
CFLX		0.0013** (2.17)	0.0013** (2.25)	0.0012** (2.31)
TDSX			0.0075* (1.96)	0.082** (2.27)
LTOTG				-0.0086*** (-2.83)
MDGDP	0.0285*** (5.21)	0.0244*** (4.28)	0.0244*** (4.40)	0.023*** (4.51)
LGDP	0.046 (0.29)	0.060 (0.39)	0.0134 (0.09)	-0.016 (-0.11)
GRGDP	-0.022** (-2.49)	-0.020** (-2.28)	-0.0204** (-2.39)	-0.0214*** (-2.67)
LPOP	0.054 (0.34)	-0.0198 (-0.11)	0.0033 (0.20)	0.022 (0.14)
PD1	-0.582*** (-3.19)	-0.402 (-2.12)	-0.413** (-2.24)	-0.423** (-2.44)
PD2	0.123 (0.73)	0.167 (1.03)	0.1234 (0.77)	0.048 (0.32)
N	62	61	61	61
R^2	0.52	0.56	0.59	0.65

7. Dependent variable is Log of total external debt to GDP ratio (LEDTG)

A. The Magnitude of External Debt

Table A1
Total external debt (Millions of USD)[12]

Years	All	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	808,321	87,254	110,587	129,376	354,834	49,431	76,838	74,450
1983	878,046	90,362	114,749	145,064	385,220	55,726	86,925	81,777
1984	919,499	105,863	116,507	153,088	395,485	57,505	91,050	87,113
1985	1,033,583	139,396	135,672	175,105	408,536	67,781	107,092	104,732
1986	1,132,428	157,362	153,532	193,144	428,523	79,040	120,827	117,447
1987	1,284,462	185,821	175,702	213,688	469,128	92,374	147,750	139,600
1988	1,286,654	185,986	179,195	214,979	456,324	99,912	150,257	142,675
1989	1,355,837	198,706	188,932	241,223	453,286	116,619	157,072	168,754
1990	1,460,343	220,428	183,205	274,071	475,867	129,899	176,873	189,854
1991	1,547,010	239,050	187,258	308,182	493,051	136,096	183,374	195,531
1992	1,621,514	253,198	188,321	344,546	509,798	142,961	182,689	200,908
1993	1,777,528	308,939	193,661	383,106	548,994	148,012	194,817	205,512
1994	1,969,044	326,029	208,223	463,076	588,279	162,129	221,308	216,923
1995	2,139,456	352,457	211,182	530,546	652,539	157,371	235,360	223,914
1996	2,229,400	369,566	204,844	591,348	676,286	155,522	231,833	217,957
1997	2,326,457	390,507	194,438	648,931	714,256	155,259	223,067	205,076
1998	2,536,046	480,539	208,059	667,522	786,019	163,775	230,132	213,960

[12.] Total external debt is the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt.
Source: Global Development Finance

Table A2

Share of each group's debt in total developing countries' debt (%)

	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	10.79	13.68	16.01	43.90	6.12	9.51	9.21
1983	10.29	13.07	16.52	43.87	6.35	9.90	9.31
1984	11.51	12.67	16.65	43.01	6.25	9.90	9.47
1985	13.49	13.13	16.94	39.53	6.56	10.36	10.13
1986	13.90	13.56	17.06	37.84	6.98	10.67	10.37
1987	14.47	13.68	16.64	36.52	7.19	11.50	10.87
1988	14.46	13.93	16.71	35.47	7.77	11.68	11.09
1989	14.66	13.93	17.79	33.43	8.60	11.58	12.45
1990	15.09	12.55	18.77	32.59	8.90	12.11	13.00
1991	15.45	12.10	19.92	31.87	8.80	11.85	12.64
1992	15.61	11.61	21.25	31.44	8.82	11.27	12.39
1993	17.38	10.89	21.55	30.89	8.33	10.96	11.56
1994	16.56	10.57	23.52	29.88	8.23	11.24	11.02
1995	16.47	9.87	24.80	30.50	7.36	11.00	10.47
1996	16.58	9.19	26.52	30.33	6.98	10.40	9.78
1997	16.79	8.36	27.89	30.70	6.67	9.59	8.81
1998	18.95	8.20	26.32	30.99	6.46	9.07	8.44

Source: own calculations based on Global Development Finance, 2000 (CD-ROM)

Table A3
Total debt (EDT)/GNP (%)[13]

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	26.10	26.81	..	..	45.16	27.66	19.09	32.19
1983	28.98	28.34	..	..	57.19	27.06	20.34	38.57
1984	30.38	27.64	..	71.54	60.89	27.20	21.12	44.20
1985	32.77	29.13	..	81.15	60.65	30.56	22.92	56.37
1986	34.40	32.26	..	63.51	60.16	33.69	25.24	58.48
1987	38.24	35.08	..	85.80	64.84	43.54	26.56	60.98
1988	35.03	29.43	..	88.78	55.22	46.70	26.80	59.55
1989	33.88	28.72	16.06	106.10	48.71	48.18	31.02	61.41
1990	34.19	29.81	18.56	118.78	44.35	42.84	32.02	63.01
1991	35.50	30.24	20.78	123.45	43.49	44.46	37.61	63.68
1992	35.89	30.65	24.78	137.32	39.55	41.89	39.94	62.91
1993	38.00	31.58	31.28	141.91	39.68	43.15	38.99	70.99
1994	39.42	32.07	37.86	166.59	37.83	47.57	37.38	82.57
1995	37.58	30.18	36.27	147.79	38.24	44.57	32.60	77.57
1996	35.72	29.95	33.57	129.77	37.55	38.34	29.74	73.82
1997	36.03	32.92	34.70	113.45	37.28	33.74	28.30	67.74
1998	42.14	40.16	48.59	114.64	40.83	36.05	29.22	72.32

[13.] Total debt to gross national product ratio (%)
Source: Global Development Finance 2000, CD-ROM

Table A4
Total debt (EDT)/XGS (%)[3]

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	127	117	-	252	278	60	209	121
1983	146	129	-	289	313	74	214	142
1984	148	121	-	286	289	84	210	145
1985	175	142	-	350	311	111	262	171
1986	209	148	-	393	369	168	289	215
1987	203	128	-	447	360	172	296	227
1988	181	106	-	437	308	173	296	222
1989	174	108	-	487	274	160	311	219
1990	162	108	-	501	256	114	327	210
1991	165	107	-	544	261	117	315	225
1992	159	105	129	556	251	113	317	223
1993	165	105	148	579	249	123	285	246
1994	158	103	135	552	230	135	262	273
1995	140	93	115	459	213	121	216	243
1996	132	95	108	391	201	103	195	218
1997	128	94	107	350	192	97	183	205
1998	148	105	134	378	210	129	189	239

[14.] Total debt to exports of goods and services ratio (%)

Source: Global Development Finance, 2000 (CD-ROM)

B. The Costs of External debt

Table B1
Debt service (TDS)/Exports of goods and services (XGS) (%)[15]

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	19.17	18.01	..	21.06	46.68	9.32	14.70	12.11
1983	19.27	18.27	..	20.16	41.03	12.35	17.24	13.32
1984	19.93	18.28	..	20.41	38.70	13.27	17.67	15.83
1985	23.03	23.84	..	22.49	36.97	14.62	22.17	17.58
1986	26.53	23.92	..	26.22	41.88	20.85	28.84	17.25
1987	24.23	24.74	..	25.39	36.02	17.44	27.81	13.52
1988	23.26	18.90	..	24.72	36.90	19.43	26.28	14.86
1989	20.63	16.72	..	21.92	30.19	19.03	26.49	13.12
1990	18.27	15.73	..	21.14	24.50	15.10	29.00	12.92
1991	17.36	13.35	..	21.63	24.20	15.31	25.61	12.46
1992	16.40	13.51	11.34	17.10	26.11	15.54	25.01	12.28
1993	16.24	14.06	10.01	17.70	27.71	14.60	22.84	9.20
1994	15.89	12.09	11.88	18.95	25.29	14.53	25.23	14.57
1995	15.76	11.43	12.20	20.73	26.46	13.72	24.96	15.29
1996	16.46	12.11	11.46	15.87	31.49	12.64	20.80	14.22
1997	17.15	11.21	11.54	15.41	35.93	12.55	20.99	14.72
1998	18.43	13.32	14.72	16.41	33.56	14.04	18.92	14.68

[15.] Total debt service is the sum of principal repayments and interest actually paid in foreign currency, goods, or services on long-term debt, interest paid on short-term debt and repayments (repurchases and charges) to the IMF

Table B2
Interest (INT)/Exports of goods and services (XGS) (%)[16]

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	11	11	-	12	30	4	8	7
1983	11	10	-	11	28	4	9	7
1984	11	10	-	11	26	5	10	8
1985	12	10	-	11	27	6	11	8
1986	12	10	-	11	26	8	12	7
1987	11	8	-	10	22	6	12	6
1988	11	7	-	10	22	8	11	7
1989	9	7	-	9	16	8	14	6
1990	8	6	-	9	12	5	16	6
1991	8	6	-	9	13	5	14	6
1992	7	5	5	7	11	6	12	6
1993	6	5	4	8	11	6	11	4
1994	6	4	4	8	11	6	10	6
1995	7	5	5	7	12	6	9	6
1996	6	5	5	6	12	5	8	5
1997	6	5	5	6	11	5	8	5
1998	7	5	5	6	12	6	8	5

[16.] payments made to domestic sectors and to nonresidents for the use of borrowed money.
Source (for tables B1 and B2): Global Development Finance 2000, CD-ROM

Table B3
Interest (INT)/GNP (%)

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	2.26	2.42	-	-	4.82	1.89	0.71	1.77
1983	2.17	2.17	-	-	5.18	1.63	0.83	1.82
1984	2.33	2.27	-	2.70	5.46	1.65	0.96	2.37
1985	2.30	2.14	-	2.46	5.20	1.54	0.96	2.49
1986	2.05	2.08	-	1.84	4.27	1.53	1.05	1.97
1987	1.98	2.15	-	1.94	3.97	1.63	1.09	1.53
1988	2.05	1.92	-	2.04	4.03	2.05	1.04	1.87
1989	1.81	1.83	0.97	1.96	2.79	2.33	1.40	1.78
1990	1.65	1.66	1.04	2.07	2.13	2.01	1.53	1.89
1991	1.66	1.65	1.05	2.14	2.13	1.91	1.64	1.82
1992	1.52	1.47	0.89	1.80	1.79	2.17	1.53	1.58
1993	1.47	1.45	0.91	1.85	1.76	1.98	1.44	1.22
1994	1.57	1.39	1.17	2.30	1.84	1.96	1.41	1.78
1995	1.77	1.53	1.50	2.16	2.20	2.13	1.36	1.77
1996	1.71	1.47	1.46	1.96	2.21	1.84	1.16	1.86
1997	1.75	1.63	1.56	1.86	2.21	1.59	1.20	1.55
1998	2.00	2.03	1.93	1.96	2.41	1.55	1.20	1.65

Source: Global Development Finance, 2000 (CD-ROM)

C. The Structure of External Debt

Table C1
The share of short-term debt in total external debt (%)[17]

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	23.39	27.19	16.36	12.39	25.77	29.89	7.43	14.88
1983	18.61	25.56	15.94	11.47	16.23	27.19	8.44	15.52
1984	16.78	25.19	13.68	13.07	12.94	25.33	8.69	17.11
1985	15.83	22.35	15.63	14.22	11.17	24.46	8.96	16.60
1986	13.62	17.37	17.06	10.31	8.52	23.92	9.07	11.10
1987	13.24	15.73	17.00	10.85	9.58	21.67	9.04	9.14
1988	14.30	17.03	19.24	11.59	10.77	21.36	9.48	9.77
1989	15.70	16.42	21.52	12.02	13.14	23.13	9.27	10.47
1990	16.75	17.94	18.54	12.64	16.27	23.96	9.52	11.81
1991	17.16	19.23	16.44	12.81	17.61	24.69	8.74	11.97
1992	18.34	20.89	16.69	13.98	18.49	27.64	7.89	13.95
1993	18.37	22.05	13.69	14.39	20.18	27.60	4.09	15.10
1994	18.31	24.66	11.38	13.36	20.05	23.10	4.32	16.31
1995	19.84	28.97	12.94	13.83	20.03	21.11	5.77	17.32
1996	20.67	31.51	14.39	14.26	18.52	21.01	6.64	18.42
1997	20.17	28.31	14.89	13.20	19.18	21.21	5.30	18.37
1998	16.24	17.84	16.36	13.14	15.71	19.70	4.37	18.47

[17.] Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt.

Source: Global Development Finance, 2000(CD-ROM)

Table C2
Concessional debt (Millions of USD)[18]

Years	All	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	137,304	8,586	23,624	19,403	31,379	31,758	22,554	27,440
1983	149,514	8,768	26,775	21,044	34,423	33,889	24,615	30,667
1984	148,644	8,384	27,478	21,259	31,108	34,079	26,336	32,902
1985	174,342	12,632	31,492	26,095	33,229	39,225	31,670	39,640
1986	196,588	10,881	35,683	31,919	35,461	45,077	37,567	46,853
1987	235,494	12,370	41,491	41,695	41,434	52,597	45,907	56,354
1988	247,020	12,173	43,299	44,657	44,070	54,678	48,142	59,451
1989	284,320	11,104	45,074	65,828	45,549	66,299	50,467	79,724
1990	313,755	12,652	44,206	76,918	48,373	73,147	58,460	91,548
1991	333,579	13,296	47,962	82,802	51,554	74,960	63,006	95,471
1992	354,173	22,619	48,308	85,757	53,338	78,186	65,964	99,531
1993	374,676	23,748	50,163	93,462	55,573	82,147	69,583	104,156
1994	402,529	23,451	53,915	100,511	58,052	90,748	75,852	111,453
1995	414,838	25,529	57,133	102,695	59,670	89,034	80,777	115,315
1996	405,916	25,034	61,092	99,056	57,264	80,730	82,740	115,212
1997	374,195	21,859	58,063	78,037	56,419	76,893	82,925	98,523
1998	377,925	24,087	59,964	91,141	30,804	82,824	89,105	106,730

[18.] Concessional debt is defined as loans with an original grant element of 25 percent or more
Source: Global Development Finance 2000 (CD-ROM)

Table C3
Ratio of concessional debt to total external debt (%)

	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	6.25	17.21	14.13	22.85	23.13	16.43	19.98
1983	5.86	17.91	14.08	23.02	22.67	16.46	20.51
1984	5.64	18.49	14.30	20.93	22.93	17.72	22.13
1985	7.25	18.06	14.97	19.06	22.50	18.17	22.74
1986	5.54	18.15	16.24	18.04	22.93	19.11	23.83
1987	5.25	17.62	17.71	17.59	22.33	19.49	23.93
1988	4.93	17.53	18.08	17.84	22.13	19.49	24.07
1989	3.91	15.85	23.15	16.02	23.32	17.75	28.04
1990	4.03	14.09	24.52	15.42	23.31	18.63	29.18
1991	3.99	14.38	24.82	15.45	22.47	18.89	28.62
1992	6.39	13.64	24.21	15.06	22.08	18.62	28.10
1993	6.34	13.39	24.94	14.83	21.92	18.57	27.80
1994	5.83	13.39	24.97	14.42	22.54	18.84	27.69
1995	6.15	13.77	24.76	14.38	21.46	19.47	27.80
1996	6.17	15.05	24.40	14.11	19.89	20.38	28.38
1997	5.84	15.52	20.85	15.08	20.55	22.16	26.33
1998	6.37	15.87	24.12	8.15	21.92	23.58	28.24

Source: Global Development Finance, 2000 (CD-ROM)

Table C4
Share of multilateral debt in total debt (%)[19]

	All	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	8.46	7.22	6.18	9.30	5.54	26.38	13.69	16.17
1983	8.96	7.94	6.79	10.17	5.69	26.75	13.98	16.94
1984	9.10	6.60	6.82	10.15	5.97	28.52	14.47	17.31
1985	10.38	7.28	7.19	11.48	7.59	28.82	15.58	17.44
1986	12.06	8.49	7.87	12.98	9.54	28.81	18.57	20.04
1987	13.34	9.30	8.46	14.68	11.04	29.13	19.72	21.20
1988	13.36	8.39	8.28	14.42	11.14	29.58	20.04	21.84
1989	13.31	7.36	8.17	13.50	11.57	28.19	20.73	19.93
1990	14.26	7.59	8.59	14.15	12.72	29.47	21.60	20.64
1991	14.57	7.78	9.14	13.75	12.79	31.41	22.67	21.71
1992	14.30	7.61	9.35	12.54	12.24	32.29	23.66	22.02
1993	14.01	6.75	9.81	12.34	12.00	33.80	23.66	22.82
1994	13.97	7.25	10.13	11.40	11.80	35.13	23.13	24.02
1995	13.59	7.47	10.84	10.64	11.24	36.28	23.23	24.94
1996	12.85	7.29	11.39	9.10	10.53	36.39	23.59	26.07
1997	12.45	7.43	11.36	8.99	9.89	36.01	24.01	27.73
1998	12.87	6.61	11.44	10.67	10.51	36.57	24.78	28.53

[19]. Public and publicly guaranteed multilateral loans include loans and credits from the World Bank, regional development banks, and other multilateral and intergovernmental agencies. Excluded are loans from funds administered by an international organization on behalf of a single donor government

Source: Global Development Finance 2000 (CD-ROM)

D. Other indicators of external balance sustainability

Table D1
Reserves to Total External debt (%)

	All	EAP	ECA	HIPCs	LAC	MENA	SA	SSA
1982	20.98	26.90	-	4.51	11.45	60.97	23.58	12.13
1983	17.80	24.91	-	4.32	10.32	45.08	22.58	9.99
1984	17.14	25.24	-	3.77	12.14	37.41	20.50	8.58
1985	15.84	20.80	-	3.61	12.25	35.83	18.47	7.85
1986	13.87	20.35	-	3.75	10.25	27.40	17.21	7.69
1987	14.61	23.52	-	3.13	10.84	28.43	16.48	7.83
1988	13.87	28.06	-	3.10	9.17	24.42	12.77	6.75
1989	13.83	28.14	-	2.78	9.57	21.07	9.59	7.55
1990	15.27	31.47	-	2.70	12.26	21.37	6.85	8.72
1991	17.62	35.05	-	3.16	15.04	23.44	8.83	9.78
1992	17.81	28.94	-	3.05	18.90	23.41	10.16	7.72
1993	20.48	31.65	13.07	3.07	21.46	24.74	14.52	7.80
1994	21.77	35.15	14.71	3.93	19.34	25.25	21.02	7.91
1995	25.16	37.81	25.52	5.05	21.31	26.97	19.51	8.91
1996	27.82	41.84	25.26	6.30	24.34	29.54	19.89	10.04
1997	27.91	37.80	25.49	6.73	24.47	33.58	22.40	13.23
1998	27.59	44.64	21.45	6.09	21.03	31.60	22.82	13.17

Source: Global Development Finance, 2000 (CD-ROM)

Table D2
External Balance on Goods and services (Resource balance) (% GDP)[20]

	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	-	0.53	-1.00	0.31	-5.09	-4.25	-7.95
1983	-	-3.04	-1.49	3.45	-4.51	-1.24	-5.33
1984	-	-7.92	-0.14	4.83	-4.23	-0.55	-3.71
1985	-	-5.58	-1.39	4.66	-5.07	3.11	-3.93
1986	-	-7.36	0.47	2.39	-4.52	2.38	-4.54
1987	-	-4.45	2.49	2.68	-3.91	1.87	-6.05
1988	-	-4.51	1.81	3.11	-4.41	0.65	-6.52
1989	0.80	-5.41	0.26	3.04	-3.76	1.03	-5.58
1990	-0.90	-1.78	0.26	2.12	-3.96	1.50	-5.90
1991	-0.45	-4.17	-0.09	0.39	-2.17	0.28	-5.21
1992	0.93	-2.81	0.11	-0.20	-2.87	-1.27	-6.35
1993	-0.76	-3.84	-1.04	-0.93	-2.90	-1.64	-7.60
1994	0.31	1.18	-0.20	-1.35	-3.46	-1.41	-6.66
1995	-0.84	0.77	-0.76	-0.90	-4.00	-1.59	-6.06
1996	-1.77	3.65	-1.22	-0.86	-4.78	0.59	-6.36
1997	-2.63	2.85	1.39	-2.16	-4.39	-1.26	-6.24
1998	-1.59	-2.91	8.69	-3.05	-3.24	-2.70	-7.10

[20.] The difference between exports of goods and services and imports of goods and services

Table D3
Share of each group (region) in total portfolio equity inflow (%)[21]

	EAP	ECA	HPC	LAC	MNA	SA	SSA
1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1981	28.19	0.00	0.00	71.81	0.00	0.00	0.00
1982	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1983	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1984	100.00	0.00	0.00	0.00	0.00	0.00	0.00
1985	100.00	0.00	0.00	0.00	0.00	0.00	0.00
1986	5.23	0.00	0.00	0.00	0.00	32.38	0.00
1987	46.36	0.00	0.00	11.37	0.00	0.00	0.00
1988	44.31	0.00	0.00	16.01	0.00	5.10	0.00
1989	77.79	2.11	0.00	12.87	0.00	4.98	0.00
1990	61.18	6.28	0.00	29.68	0.00	2.81	0.05
1991	15.88	0.00	0.13	83.79	0.00	0.30	0.03
1992	37.72	0.46	0.00	59.11	0.00	2.70	0.01
1993	40.67	1.93	0.17	53.39	0.00	3.97	0.04
1994	35.87	6.26	2.49	37.43	0.30	17.70	2.45
1995	50.68	7.57	1.22	21.20	0.56	6.49	13.50
1996	36.79	16.97	1.21	28.25	3.32	10.57	4.09
1997	30.45	15.93	-0.07	32.94	7.48	8.20	4.99
1998	57.85	18.65	0.31	11.23	5.64	2.25	4.37

[21.] Portfolio equity flows are the sum of country funds, depository receipts (American or global), and direct purchases of shares by foreign investors.

Source: Own calculations based on data from Global Development Finance 2000

Table D4
Gross Domestic Savings (% GDP)

	World	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	23.19	NA	27.30	29.70	21.87	17.02	17.07	9.57
1983	22.70	NA	24.41	30.33	21.35	16.27	16.19	10.06
1984	23.40	NA	21.79	31.07	22.18	16.35	16.72	10.63
1985	23.22	NA	18.87	30.59	23.64	17.76	18.36	11.31
1986	22.86	NA	16.02	31.81	21.00	17.58	17.72	10.50
1987	23.31	NA	18.62	33.63	23.70	17.76	17.06	9.08
1988	24.08	NA	18.49	34.20	25.26	18.47	17.98	9.69
1989	24.64	31.43	21.27	34.01	25.01	19.10	17.88	8.93
1990	23.99	26.01	22.70	34.89	21.46	19.72	16.21	9.16
1991	23.54	27.50	20.95	35.46	19.86	19.61	15.41	9.90
1992	23.25	28.34	23.18	35.17	19.42	20.15	13.55	8.73
1993	22.77	24.68	21.08	36.83	19.76	18.23	14.52	8.71
1994	23.09	24.40	24.13	37.37	20.21	19.28	16.28	11.64
1995	23.21	23.97	25.25	37.10	20.38	20.88	16.69	12.18
1996	23.11	22.83	24.20	36.14	19.95	16.73	18.08	12.13
1997	23.43	21.45	24.28	36.53	19.85	18.11	15.96	12.40
1998	23.07	19.87	19.19	37.59	18.77	18.14	16.10	12.46

Source: World Development Indicators 2001, World Bank

Table D5
Gross domestic investment as a share of GDP (%)

	World	ECA	MENA	EAP	LAC	SA	SSA	HIPCs
1982	23.13	NA	26.83	28.13	21.40	19.88	22.83	16.34
1983	22.28	NA	27.73	28.82	17.81	19.09	21.11	14.95
1984	22.20	NA	26.46	28.23	16.93	19.13	19.13	13.90
1985	22.10	NA	23.88	27.56	17.22	19.92	18.20	13.41
1986	22.10	NA	22.94	27.76	18.79	20.28	17.65	14.24
1987	22.45	NA	22.11	28.36	20.60	20.76	17.03	14.19
1988	22.98	NA	21.21	28.94	21.38	20.53	18.52	14.39
1989	23.32	26.59	20.93	27.90	21.73	21.31	18.34	13.80
1990	23.17	24.83	20.92	30.16	19.30	21.78	17.92	14.48
1991	22.48	21.89	21.62	31.43	18.01	21.05	17.63	14.03
1992	22.20	22.59	22.23	32.41	18.64	21.56	16.52	14.29
1993	21.92	21.73	22.69	35.23	19.25	21.03	16.72	15.32
1994	21.99	22.28	22.02	34.72	20.36	21.32	17.16	17.78
1995	21.99	22.16	22.42	34.64	19.45	23.22	16.96	17.65
1996	22.18	22.59	21.06	34.68	18.96	22.09	16.90	18.26
1997	22.13	22.28	21.75	33.18	19.85	21.74	17.17	18.19
1998	21.87	21.44	20.90	30.10	20.32	20.69	18.51	18.72

Source: World Development Indicators 2001, World Bank

Table D6

Net resource flows and transfers of HIPCs and other developing countries (1984-98)[22]

	Heavily indebted poor countries (HIPCs)		All developing countries	
Resource flows and transfers	1984-90	1991-98	1984-90	1991-98
Net flows on debt, total (% of GNP)[a]	4.928	2.852	1.377	2.182
Net transfers on debt, total (% of GNP)[b]	2.783	0.850	-0.646	0.504
Aggregate net resource flows (% of GNP)[c]	8.405	10.536	2.117	4.433
Aggregate net transfers (% of GNP)[d]	6.291	8.299	0.155	2.651
Official net resource flows (% of GNP)[e]	7.485	8.273	1.167	0.948
Official net transfers (% of GNP)[f]	6.612	7.099	0.747	0.454
Portfolio equity flows (% of GNP)	0.000	0.175	0.025	0.550
Private net resource flows (% of GNP)[g]	0.920	2.263	0.950	3.485
Private net transfers (% of GNP)[h]	-0.321	1.199	-0.592	2.197

[22] data for GNP for HIPCs is available only since 1984

[a]. Net flows on debt is disbursements on long-term debt and IMF purchases minus principal repayments on long-term debt and IMF repurchases up to 1984. Beginning in 1985 this line includes the change in stock of short-term debt (including interest arrears for long-term debt).

[b]. Net transfers on debt are net flows minus interest payments (or disbursements minus total debt service payments).

[c]. Aggregate net resource flows are the sum of net resource flows on long-term debt (excluding IMF) plus net direct foreign investment, portfolio equity flows and official grants (excluding technical cooperation). Net flows (or net lending or net disbursements) are disbursements minus principal repayments

d. Aggregate net transfers are equal to aggregate net resource flows minus interest payments on long-term loans and foreign direct investment profits.

e. Private net resource flows are the sum of net flows on debt to private creditors (PPG and PNG) plus net direct foreign investment and portfolio equity flows

[f]. Official net transfers are equal to official net resource flows minus official interest payments on long-term loans.

[g]. Private net resource flows are the sum of net flows on debt to private creditors (PPG and PNG) plus net direct foreign investment and portfolio equity flows

[h]. Private net transfers are equal to private net resource flows minus private interest payments on long-term loans (PPG and PNG) and foreign direct investment profits.

Source: Own calculations based on data from Global Development Finance 2000, (CD-ROM)

III. Factors Affecting the Debt-Repayment Capacity of Indebted Countries:

An Empirical Investigation

Abstract

The failure of indebted developing countries to meet their contractual debt obligations has been one of the major concerns of the international community since the outset of the debt crisis in 1982. While poverty and external factors seem to be the most profound factors behind the external indebtedness of poor nations, there is still an ongoing debate as to why indebted countries have failed to manage servicing their external debt.

This paper, using cross-section pooled logit, probit and fixed effects logit models empirically explores the determinants of rescheduling contractual debt service payments by developing countries in the past two decades. The results seem to suggest that past external debt, the level of income per capita, the growth rate of GDP, openness, the levels of international reserves and capital inflows to be the core determining factors behind the behavior of borrowers towards meeting their contractual debt obligations.

From the empirical strategy perspectives, as in the case of debt determinants, the application of a panel data approach seems to be highly preferred, as it allows to control for time-specific events that are linked to overseas borrowing, particularly given the rapid changes in the global macroeconomic environment in the past years. Moreover, this strategy helps to produce a more robust explanation by allowing to incorporate country-specific factors as developing countries themselves are heterogeneous in terms of their colonial heritages, geopolitical and strategic significance, and creditworthiness, all affecting the level of indebtedness and the potential bargaining power to manage the subsequent debt crisis.

1. Introduction

"The debt crisis can be studied as a problem in epidemiology. A powerful virus, high world interest rate, hit the population of capital importing developing countries in the 1980s. Some countries succumbed to the virus, having to reschedule their debt on an emergency basis, while others did not. And of those countries that arrived for emergency treatment, some recovered sufficiently to enter the period of quiet convalescence, while others are still suffering from febrile seizures in the IMF's intensive care unit", Sachs and Berg (1988, pp. 1)

The external debt crisis of developing countries' is believed to be one of the major challenges of the new millennium. As Eatwell and Taylor (2000, in: Dymski, 2002) express it, "international debt crisis has become a defining feature of the contemporary world economy".[52] In this regard, McFadden, et al (1985, in Smith, et al (1985)), among others, argue that the primary question in international debt crisis is why indebted countries failed to meet their debt-service obligations. The late 1980s and the 1990s witness that developing countries in general and HIPCs in particular have suffered from chronic debt-servicing difficulties.[53]. Though it is generally believed that external debt helps countries that are suffering from capital deficiency to achieve accelerated economic growth, once this financial gap becomes unmanageable, the past accumulated external debt is likely to provoke further external borrowing, creating a vicious circle problem. This obviously creates a gloomy picture on future growth prospects and reduces the likelihood of developing countries to meet their debt-service obligations, which is exactly the current experience of the poorest nations of the world, earning the new name "heavily indebted poor countries" (HIPCs).

The debt-servicing difficulties of indebted poor countries are remarkable. For instance, based on the Global Development Finance, 2000, interest arrears as a ratio to total long-term debt outstanding for SSA and HIPCs in 1989 represent 5.3% and 7%, respectively.

[52] As they put it, "the past 8 years, a period of virtually unregulated cross-border financial flows, have witnessed 8 major episodes of international debt and financial crises: the 1994-95 Mexican "Tequila" crisis, the 1997-98 Asian financial crises, the 1998-99 run on Brazilian real, the 1998-99 Russian ruble (long-term credit crisis, the 2000 Turkish crisis, the 2001-02 meltdown of the Argentine economy, the 2002 attack on the Brazilian real, and the 2002 Uruguayan collapse".

[53] The debt-servicing difficulty in fact became apparent already in August 1982, after Mexico's official announcement that it could no longer manage to continue servicing its external debt. This was the beginning of the end to the creditworthiness of most poor countries. Fafchamps (1996) defines debt crises in terms of ability to pay, where he argues that a country defaults on its debt because it has run out of foreign exchange (pp. 315).

In 1998, this ratio increased to 11% and 9% respectively. In 1989, principal arrears as a share of total long-term outstanding for SSA and HIPCs were around 10% and 13% respectively. In 1998, this ratio rose to 11% for SSA and nearly 24% for HIPCs. This is in contrast to 3% for EAP and 1.2% for LAC. (See, table 3.1).

Table (3.1)

Arrears and rescheduling (% of total external debt (EDT) and GNP)

	Heavily indebted poor countries		All developing countries	
Debt crisis indicators	1984-90	1991-98	1984-90	1991-98
Total amount of debt rescheduled (% of EDT)	3.05	2.12	4.75	2.68
Principal rescheduled (% of EDT)	1.60	0.98	1.46	0.90
Principal forgiven (% of EDT)	0.65	1.01	0.22	0.20
Interest rescheduled (% of EDT)	NA	0.57	NA	0.54
Interest forgiven (% of EDT)	0.07	0.26	0.03	0.04
Debt stock rescheduled (% of EDT)	0.38	0.21	2.78	1.08
Debt stock reduction (% of EDT)	0.08	0.65	0.61	0.50
Interest arrears on LDOD (% of EDT)	4.77	8.34	1.91	2.21
Principal arrears on LDOD (% of EDT)	8.25	19.22	2.87	4.37
Total amount of debt rescheduled (% of GNP)	2.65	2.80	1.66	1.00
Principal rescheduled (% of GNP)	1.38	1.31	0.50	0.33
Principal forgiven (% of GNP)	0.65	1.36	0.08	0.07
Interest rescheduled (% of GNP)	NA	0.76	NA	0.20
Interest forgiven (% of GNP)	0.07	0.34	0.01	0.01
Debt stock rescheduled (% of GNP)	0.33	0.27	0.99	0.41
Debt stock reduction (% of GNP)	0.08	0.82	0.21	0.18
Interest arrears on LDOD (% of GNP)	4.36	11.30	0.65	0.82
Principal arrears on LDOD (% of GNP)	7.65	25.96	0.99	1.64
Total external debt (EDT) to GNP ratio	87.95	134.36	34.13	37.53

Source: Own calculations based on: Global Development Finance, 2000 CD-ROM and World Development Indicators, 2001 CD-ROM

From table (3.1), it is also apparent that HIPCs average principal arrears on loans reached more than 8% of its total external debt in 1984-90, which rose to nearly 20% in the 1991-98 period. Other developing countries have by far lower problems compared to those of the HIPCs. Similarly, this ratio on average reached about 26% of HIPCs' GNP, a clear indication that this group has not managed to pay back its international debt obligations. This ratio for other developing countries, again, on average, was around 1% in (1984-90) and around 1.5% in the (1991-98) periods, respectively. Similarly, interest arrears on

loans are quite higher for HIPCs relative to other low and middle income countries. The ratio of interest arrears to GDP reached around 5% in the 1984-89, which even nearly doubled in the 1991-98 period. The difference is quite apparent that I need not to elaborate that further.

The objective of this chapter is to empirically address the reasons behind the failure of indebted countries in the 1980s and 1990s to fully service their contractual external debt obligations.[54] To answer the above question, the remainder of the paper is divided into seven parts: Part 2 presents a brief summary of the factors that drive countries to debt crises situations. Part 3 summarizes the past empirical studies in this area. Part 4 discusses the empirical specification of the model used to figure out the factors that cause debt crisis. Part 5 briefly introduces the data and variables that are included in the regression. Part 6 presents results and the discussion. Finally part 7 concludes and presents the possible policy implications of the study.

Now, reiterating the question, the main issue I intend to address here is what are the main factors that drive countries into a debt crisis situation? In other words, why have indebted poor countries failed to service their external debt and instead opted for rescheduling? Bearing this question in mind, and before I myself address these issues, I will briefly summarize most relevant previous researchers results.

2. Factors affecting debt-repayment capacity: A theoretical review

Following McFadden, et al (1985, in Smith, et al (1985)), among others, generally a country is said to be in a debt repayment crisis situation if it has arrears on principal or interest, higher-tranche IMF arrangements, or rescheduling requests (p.188). From the figures in table (3.1) it is apparent that HIPC's have failed to convert the resources they obtained through overseas borrowing into growth and ultimately service their external debt. However, although many of the indebted poor countries were in extremely difficult

[54] Most of the theoretical explanations on the debt crisis in the preceding chapter are relevant to this chapter. I will mainly focus on the empirical counterpart of the explanation for the debt payment difficulties of indebted nations in the past two decades.

situations, they in principle remained committed to repay their external debt obligations. This is in contrast to the debt crisis in the 1930s, where virtually every Latin American country unilaterally suspended servicing its external bond obligations (Sachs, 1986).[55]It appears that rescheduling rather than default is mutually beneficial both for debtors and creditors. Marchesi (2000) argues in this line. The rescheduling is "a mechanism which not only allows debtors not to default on their loans and remain in the international financial system but also prevents creditors from facing the whole consequences of a financial crisis" (p. 3). However, it appears that the hidden reason behind rescheduling rather than default is something more than that. As Sachs (1986) argues, the rescheduling in the 1980s was indeed in the interest of creditors, where he stresses that creditors during these periods used the leverage of multilateral financial institutions to make sure that debtors wouldn't interrupt servicing their debt. In effect, the creditor governments have endorsed debt rescheduling rather than debt relief (p.398).

While this is generally true, the main thing left unexplained is why developing countries fail to pay back their external debt in the first place. Most of the reasons have already been dealt with in the preceding chapter of this dissertation. The factors that are chosen vary from author to author. McFadden, et al (1985, in Smith, et al (1985, p. 186) summarize the broader group of factors, which I base my empirical analysis:

A. Factors in the world economy

These are factors identified as beyond the help of developing countries that may to a great extent increase the likelihood of indebted countries to reschedule their contractual debt obligations. Following McFadden (1983) such factors may include but not limited to a price increase in "noncompressible" imports, the deterioration in the terms of trade of developing countries' major export items, recession in industrialized countries, and volatility in trade.

[55] Sachs (1986, p.410) points out that the major difference between the 1930s and 1980s seems to be the absence of "hegemonic" power in the 1930s, while this gap was filled by United States in the 1980s. In this context default in the 1980s would mean sanctions, seizure of assets and other forms of punishments (a cut in foreign aid and trade sanctions, for instance).

B. Domestic factors

These are factors that are in the full control of indebted countries themselves. These may include shock to the productive capacity of developing nations as the result of economic or non-economic factors, poor economic management by the government of an indebted country (which may include all forms of economic distortions), poor investment strategies, where the returns of the investment are by far lower than the cost of foreign capital, unsustainable growth strategies, and speculation and capital flight.[56] These factors may directly or indirectly disrupt production, decrease export revenues, and ultimately wipe out the repayment potential of indebted countries.

C. Factors affecting the supply of credit

These are factors that directly or indirectly affect the supply of credit to indebted countries. Such factors include: A rise in interest payments due to higher real interest rates in industrialized countries, an increase in amortization due to a decline in maturities and an increase in the ratio of the short term debt, an increase in competition from other developed and oil exporting countries, limited capacity of governments to guarantee debt, and erratic behavior of creditors induced by institutional rules on exposure, and distortion in incentives of loan managers and panics are all believed to be detrimental to the repayment capacity of indebted nations.

There obviously are reverse causality issues across some of the factors that are just mentioned. For instance, among the external factors, the recession in industrialized countries may be the cause for the deterioration in the terms of trade of developing countries key export items. Similarly, this may also be the case that the fall in the terms of trade will force developing countries to reschedule rather than fully service their contractual debt obligation and demand for further borrowing, which may reduce the financial transfers to the industrialized countries. Under the assumption of substantially larger debtors, this may also cause economic slow down in industrialized countries

[56] For a broader discussion on capital flight, see chapter 4 of this dissertation.

themselves. Moreover, it is always easy to precisely differentiate some of the domestic and external factors, as external factors may also impact on domestic ones. However, this gives a good general theoretical background to the empirical part of the analysis concerning the repayment difficulties of indebted countries in the past two decades.

3. A summary of previous empirical studies

Sachs and Berg (1988) are among those who investigate the likelihood of default and the factors that cause a debt crisis. Their attempt was to find a structural explanation to the debt crisis in the 1980s. They argue that the change in the terms of trade, the structure of foreign trade (share of manufacturing vs. primary goods in total exports and the degree of commodity diversification), the level of per capita income, and geographical location of a country (to capture "contagion effect" in pure commercial bank lending), and openness, are the main factors that determine the likelihood of default. The dependent variable is rescheduling of external debt owed to commercial banks during the period 1982-87. They have 15 countries, which rescheduled their debt and 20 countries that did not in their regression.

Using a probit model, their findings indicate the following: [57] More open economies tend to have low ratio of total debt service to exports ratio due to rapidly growing export revenues, therefore are less likely to reschedule. Higher income inequality leads increases the probability of debt service difficulties. High income countries are less likely to reschedule since the costs of doing so (less access to new loans at friendly terms) are high. Moreover, high income countries have more effective political and institutional structures, which make them to manage their economies more efficiently (pp. 24). The surprising result is that the terms of trade turned out insignificant. This is constrast to the theoretical argument that a loss in the terms of trade may lead to debt repayment difficulties.

[57] for a broader discussion on the structural causes of the debt crisis, see, Sachs and Berg (1988).

Woller and Philips (1996) empirically investigate the debt-servicing difficulties of 29 developing countries, most of them from Latin America during the period between 1985 and 1993. The dependent variable is total debt reduction. Using a logit model, they show that debt reduction is inversely related to the rate of inflation, ratio of exports of goods and services to GDP, the change in the terms of trade, interest arrears, and positively to GDP per capita, ratio of exports to GDP, and ratio of current account balance to GDP. Some of their covariates appear to be suffering from a multicolinearity problem. For instance, taking the ratio of exports GDP and current account to GDP may lead to a serious problem as these variables are highly related.

McFadden, et. al. (1985, in Smith et al (1985)) examine the determinants of debt-service difficulties across 93 developing countries in the period 1971-82. Using a probit model, they find out that the probability of rescheduling is a decreasing function of total reserves to GDP ratio, GNP per capita, and its real growth. In contrast, the likelihood of rescheduling is an increasing function of imports to GDP ratio, debt service due to exports ratio, and the change in the real exchange rate.[58]

Marchesi's (2000) empirical strategy was aimed at testing the existence of an effect of adopting IMF programme on the subsequent concession of a debt rescheduling. The central hypothesis is that those countries that adopt an IMF programme will be more likely to obtain a debt rescheduling than those that do not.[59] The period under investigation is 1985-94 and this is because, as she puts it "international debt strategy has shifted towards a policy more oriented to concede restructuring (respect to one more oriented to providing new loans) only in the eighties" (p. 15). The dependent variable is chosen is total debt rescheduled. Using a bivariate probit model, Marchesi (2000) finds that rescheduling is negatively and strongly related to the rate of growth of the government consumption, the level of investment, the level of exports, and the

[58] The change in the real exchange was used as a proxy for capital flight, where they give the value of 0 for country observations with flexible exchange rate regime, while they take the growth of the real exchange rate for those with pegged exchange rate regime. See, also Hadjivassiliou (1987) for debt repayment problem discussion.

[59] Marchesi (2000) takes into account different kinds of IMF programme on the ground that these programmes were chosen because they have different objectives and cover different time horizons.

disequilibrium in the balance of payments. In contrast, there is a strong and positive relation between rescheduling and the two dummy variables that are included: The adoption of IMF programme and participation in the Baker and Brady Plan. Finally, the total external debt turns out to be negatively and significantly related to rescheduling, implying that "the more a country is indebted, the smaller the probability that it will obtain an arrangement with the Fund" (p. 23).

Ngassman (1992) using a logit model and 45 African countries during the 1976-87 period examines the determinants of rescheduling (or simply the factors that affect debt repayment capacity). His results seem to suggest that debt service ratio, reserve to imports ratio, the debt service payments to capital inflow ratio, the growth rate of GDP, the rate of domestic inflation, and the ratio of net government deficit to GDP ratio are important determinants of debt repayment capacity.

4. Econometric specification and data description

In order to measure the likelihood of debt service difficulties, I estimate the parameters using a logit model. For a comparison reason, a probit model is used alternatively.[60] Later I switch to a fixed effects logit model to control for country specific factors and time specific that account for debt service difficulties. The notations and procedure of estimation of the logit model that I use here is adapted from Pindyck and Rubinfeld (1998).[61] This method is basically a multivariate regression technique which is used to make predictions if we have a binary (dichotomous) dependent variable.

In the logit model, my focus is to figure out the probability of debt service difficulties (total debt rescheduled used as a proxy for debt servicing difficulties) and the factors that are responsible for this difficulty to occur. Like in Pindyck and Rubinfeld (1998), using a logit approach, the probability of rescheduling total external debt (P_i) can be estimated as

[60] The two models should produce similar results, except that the scale of the coefficients will differ.
[61] However, a broader discussion of this and other limited dependent variable can be found in Pindyck and Rubinfeld (1998) and Maddala (1983). Ngassman (1992) also follows exactly the same procedure.

$$p_i = \frac{1}{1+e^{-(\alpha+\beta X_i)}} \qquad (1)$$

Here the individual P_i cannot be observed but from the World Bank Global Development Finance (2000 CD-ROM), it is possible to have information about countries that have rescheduled their external debt and those that do not. Unfortunately, such data is available only between the periods 1989-98. X is a vector of variables that impact on the debt capacity of debtor countries and e is the base of natural logarithm of both sides of the equation. The dependent variable, Y_i, is composed of two values: 1 for a country that has for some reason rescheduled its total debt payment and 0 for the one that was lucky to escape rescheduling during a give year. α and β are unknown parameters that should be estimated by the model. Following Pindyck and Rubinfeld (1998), Maddala (1983) and Ngassam (1992), among others, if the logit model with individual observations has been chosen, the maximum likelihood estimation (MLE) would be the most appropriate estimation technique to be used.[62]

Using Pindyck and Rubinfeld (1998) notation, the sample here consists of n1 countries that have rescheduled their external debt and n2 countries that managed to pay back their external debt. Therefore, we have (n1 + n2 = N) countries in total. I ordered the data in such a way that n1 observations are associated with rescheduling and n2 countries with non-rescheduling. The maximum likelihood function that is subject to maximization will then have the following form:

$$L = Prob(Y1,\ldots., YN) = Prob(Y1)\ldots.Prob(YN) \qquad (2)$$

Recognizing that the probability of a country falling in the non-rescheduling group is simply 1 minus the probability of its being in the rescheduling group, and using n to stand for the product of a number of independent variables, the likelihood function reduces to

[62] All parameter estimators are consistent, and asymptotically efficient. In addition, all parameter estimators are known to be (asymptotically) normal, so that the analogy of the regression t test can be applied (Pindyck and Rubinfeld (1998)).

$$L = P_1 \ldots P_n(1-P_{n1+1}) \ldots (1-P_N) = \prod_{i=1}^{n1} P_i \prod_{i=n_1+1}^{N} (1-P_i) = \prod_{i=1}^{N} P_i^{Y_i} \left(1-P_i\right)^{(1-Y_i)} \qquad (3)$$

The last expression indicates that $Y_i = 1$ for the n1 observations, and 0 for the n2 observations.

It is now time to maximize the logarithms of L by substituting for the logistic probability function from equation (1). It is necessary to note first that

$$1-P_i = 1-\frac{1}{1+\ell^{-(\alpha+\beta x_i)}} = \frac{1+\ell^{-(\alpha+\beta x_i)}-1}{1+\ell^{-(\alpha+\beta x_i)}} = +\frac{\ell^{-(\alpha+\beta x_i)}}{1+\ell^{-(\alpha+\beta x_i)}} = \frac{1}{1+\left(1/\ell^{-(\alpha+\beta x_i)}\right)} = \frac{1}{1+\ell^{(\alpha+\beta x_i)}}$$

Following Ngassam (1992, p. 11), this implies that

$$\log L = \sum_{i=1}^{n1} \log P_i + \sum_{i=n1+1}^{N} \log\left(1-P_i\right)$$

In order to obtain the slope estimators of $\hat{\alpha}, and\, \hat{\beta}$ there is a need for a partial differentiation of log L with respect to the two unknown parameters ($\alpha, and \beta$), and setting the outcome equal to zero, and solve:

$$\frac{\partial(\ln L)}{\partial \alpha} = \sum_{i=1}^{n} \frac{\partial P_i / \partial \alpha}{P_i} - \sum_{i=n1+1}^{N} \frac{\partial P_i / \partial \alpha}{1-P_i} = 0$$

$$\frac{\partial(\ln L)}{\partial \beta} = \sum_{i=1}^{n} \frac{\partial P_i / \partial \beta}{P_i} - \sum_{i=n1+1}^{N} \frac{\partial P_i / \partial \beta}{1-P_i} = 0$$

To test the significance of all or a subset of the coefficients in the MLE logit model, we use the standard chi-square distribution and likelihood ratio tests.

5. Data description and samples

The data consists of 48 countries that have rescheduled during the 1989-98 period and 14 countries that have not rescheduled their external debt service obligation (see table 3.3).The number of countries chosen for this analysis purely depended on the availability of data. The dependent variable is total amount rescheduled in the 1989-98 period. The explanatory variables, their definitions and sources are in table (3.2). Unlike most previous researchers, I use lagged values of all the covariates to avoid the notoriously known simultaneity problem. Interest payments and total debt service payments are deflated by exports. While capital inflows are deflated by total debt services payments due, reserves are deflated by imports and imports are deflated by GDP to take account of heterogeneity in the size of developing countries. Tables (3.4) and (3.5) contain descriptive statistics and a correlation matrix for the covariates included in this study, respectively.

6. Results of the regression and discussion

In order to measure the likelihood of debt service difficulties, I estimate the parameters using a logit model. For comparison reasons, a probit model is used alternatively.[63]Later I switch to a fixed effects logit model to control for country and time specific factors that may account for debt service repayment capacity. The reason is that countries' debt repayment potential may also be influenced by factors other than those that current empirical literature focuses. The second reason is that in a simple cross-section approach it is not possible to control for time-specific factors that may hamper the repayment capacity of indebted countries. To my knowledge these have not been taken care of by a current empirical literature.

The empirical results for the causes of the debt crisis in the 1980s and 1990s have been presented in tables (3.6) to (3.9). In table (3.6), I presented the results for the cross-section pooled time series logit and probit models, where columns 1-4 stand for the logit

[63] The two models should produce similar results, except that the scale of the coefficient will differ.

while 5-8 stand for the probit model.[64] The results of table (3.6) suggest the following: Higher total debt service to exports ratio (TDSX) increases the probability of debt-service difficulties and leads to rescheduling. This is just because higher debt service exhausts the amount of resources and little is left over for investment and growth. Higher amount of reserves to imports ratio (RESIMP) decreases the probability of debt rescheduling since now an indebted country has enough foreign exchange to meet its external debt obligation. Higher real income per capita (LGDP) and growth in real income (GDPG) and import to GDP ratio (IMPGDP) decrease the probability of rescheduling. The reason is that higher income per capita and GDP growth that are indicators of creditworthiness, should enable an indebted country to generate resources to meet its foreign obligation.[65] On the other hand, the significance of IMPGDP variable is to a great extent linked to the degree of openness of an indebted country to international trade. An indebted country that is open to international trade is unlikely to default or demand for rescheduling as the penalty (trade sanction, embargo and trade credit) might be too damaging. In column 2, I added the growth of OECD trade partners (OECDG) to capture the impact of this on the debt-servicing behavior of indebted countries. The results suggest, though not statistically significant, that higher growth of OECD trade partners decreases the probability of rescheduling (debt-servicing difficulties).

Putting aside the statistically insignificance of the coefficient on OECDG for a moment, the result may be interpreted from two viewpoints: First, higher growth of OECD trade partners would mean higher export revenue for indebted countries which should enable them to pay their external debt back when due. Second, the growth of this group could also create a better economic environment for debt relief.[66] In column 3, I added the percentage change in the terms of trade (LTOTG) that captures the welfare loss or gain in international trade, which affects export revenue. The positive sign on LTOTG (though not statistically significant) may suggest that an improvement in the terms of trade

[64] All covariates are lagged by one year to minimize possible simultaneity problem.
[65] As McFadden, et al (1985, p. 188, in Smith, et al (1985)) rightly puts it,"the significance of income may reflect both the ability to pay and the presence of a government infrastructure adequate to control trade and exchange activities".
[66] However, as Hajivassiliou (1987) argues, higher growth in OECD countries may reflect the level of investment in these countries which may crowd out lending to developing countries.

increases the probability of debt–service difficulties, hence the demand for rescheduling, a result that should be interpreted rather as anomalous. Finally, the ratio of capital inflows to total debt service due (CAPTDS) may indicate that higher inflows of capital relative to the amount of scheduled debt service payment decreases the probability of rescheduling.

Table (3.7) is similar to that of table (3.6) except that I now use interest payments to exports ratio (INTX) instead of total debt service ratio (TDSX). The reason is that it is actually interest payments ratio that captures the pure (net) impact of swings in the interest rate and represents the actual cost of external debt. While most of the covariates remain the same as that of table (3.6), the results for INTX suggest that higher interest payments strongly increase the likelihood of rescheduling.

While the discussion so far suggests that the covariates in tables (3.6) and (3.7) (interest payments, total debt service ratio, income per capita and growth in income, capital inflows to scheduled debt service payments and reserves to imports ratio) are key determinants of external debt service difficulties, there are some caveats that need to be addressed. The crux of the matter here is that countries may encounter debt–service difficulties because of several other problems. As many argue, there are substantial economic, social and institutional differences across developing countries, which may affect their debt service capacities. Moreover, developing countries are different in their colonial heritage, geopolitical and strategic significance, political stability and other factors that may determine their creditworthiness and the potential bargaining power to manage debt–service difficulties.

The empirical strategy to address the issues mentioned above is to use the fixed-effects model and in this case the fixed-effects logit model that allows to control for country-specific factors. The results of the regression for the fixed–effects logit model are presented in tables (3.8) and (3.9). The results seem to suggest that TDXS, INTX, income per capita (LGDP) and IMPGDP are indeed major determinants of debt-service difficulties, hence the level of rescheduling across developing countries in the 1980s and 1990s. It is also important to note that INTX and income per capita (LGDP) continued to

be the strongest explanation for debt-service difficulty across countries. The marginal effects (table 3.10) also confirm that debt service (mainly interest payments), reserves to GDP ratio, income per capita and imports to GDP ratio be the core determining factors behind the failure of indebted countries to service their contractual debt obligations.

7. Conclusion and the policy implication of this study

This paper was aimed at empirically addressing the factoring accounting for the debt repayment difficulties of indebted developing countries in the 1980s and 1990s. In this respect, the main objective was to empirically explore the factors that increase the likelihood of debt rescheduling.

To answer this question, several empirical strategies have been employed. Using the cross-section pooled time series probit, and logit, models and fixed effects logit model, the empirical findigs suggest that the core factors behind the poor nations' debt–servicing difficulties are the scheduled external debt service payments (or interest payments), the amount of international reserves they have at disposal, the level of income per capita, the growth rate in income, the ratio imports to GDP, and the amount of capital inflows relative to the total debt service payments due ratio. It is important to note that the level of income per capita (which captures the level of poverty, among other things) and interest payments (which represent the actual cost of external debt and capture swings in international interest rates) are the most profound determinants of debt-servicing difficulties across developing nations in the 1980s and 1990s

The policy implications of this study are relatively straightforward:

The results here and other studies seem to suggest that poverty and past accumulated debt are the cardinal factors responsible for the failure of poor nations in meeting their contractual debt obligations. This may seem to support the call for debt relief for poor nations, as further supply of loans to these nations would simply lead them to a notoriously known problem of "circular financing", hence, taking more expensive fresh loans to pay cheaper old ones back, leaving the circle unbroken, and poor nations poor

forever. In this context, the new HIPCs' initiative by the IMF and World Bank should be recognized as a plausible start towards a real solution to the debt crisis of poor nations. Nevertheless, without a sincere policy change both in developing and developed countries, debt relief on its own will not guarantee a sustainable economic recovery across indebted poor nations.

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Appendix to Chapter III.

3. Regression results for the likelihood of debt rescheduling (1989-98)

Table (3.2)

Definitions of the variables and their sources

Variables	Definitions	Sources
TDSX	Total debt service (scheduled) to exports ratio (lagged by one year)	Global Development Finance, CD-ROM, 2000, World Bank
RESIMP	Reserves to imports ratio (lagged by year)	Global Development Finance, CD-ROM, 2000, World Bank
LGDP	Log of real GDP (PPP-adjusted) lagged by one year	Database for Global Development Network, World Bank, Easterly William and Mirvat Sewadeh (2002)
GDPG	Annual growth rate GDP (PPP, and deflated by 1990 US CPI) lagged by one year)	Database for Global Development Network, World Bank, Easterly William and Mirvat Sewadeh (2002)
IMPGDP	Ratio of imports to GDP (lagged by one year)	Global Development Finance, CD-ROM, 2000, World Bank
OECDG	Growth of OECD trade partners (lagged by one year)	Database for Global Development Network, World Bank, Easterly William and Mirvat Sewadeh (2002)
LTOTG	The percentage change in the terms of trade (lagged by one year)	Database for Global Development Network, World Bank, Easterly William and Mirvat Sewadeh (2002)
CAPTDS	The share of aggregate net resource flows to total debt service (a proxy for capital inflows) lagged by one year	Global Development Finance, CD-ROM, 2000, World Bank

Table (3.3)

Rescheduling of total external debt during the period (1989-98)[a]

Rescheduling countries during		**Non-rescheduling countries**
Argentina (7)	Korea, Rep.(1)	Bangladesh
Belize (1)	Madagascar (5)	Botswana
Bolivia (8)	Malawi (1)	Gambia, The
Brazil (9)	Mali (7)	India
Burkina Faso (6)	Mauritania (7)	Lesotho
Cameroon (8)	Mexico (4)	Malaysia
Chad (7)	Morocco (5)	Pakistan
Chile (7)	Mozambique (9)	Papua New Guinea
Colombia (1)	Nicaragua (10)	Sri Lanka
Congo, Rep.(10)	Niger (9)	Swaziland
Costa Rica (5)	Nigeria (4)	Thailand
Cote d'Ivoire (9)	Panama (6)	Tunisia
Dominican Republic (10)	Paraguay (1)	Zimbabwe
El Salvador (4)	Peru (9)	
Ethiopia (6)	Philippines (5)	
Gabon (10)	Rwanda (2)	
Ghana (2)	Senegal (9)	
Guatemala (3)	Sierra Leone (8)	
Haiti (2)	Togo (9)	
Honduras (9)	Trinidad and Tobago (4)	
Indonesia (1)	Uganda (7)	
Jamaica (7)	Uruguay (2)	
Jordan (9)	Venezuela, RB (1)	
Kenya (1)		

[a.] Numbers in parentheses indicate the number of times debt has been rescheduled during 1989-98
Source: Global Development Finance, 2000 (CD-ROM)

Table (3.4)

Descriptive statistics of the determinants on debt servicing difficulties (1989-98)

Variable	Observation	Mean	Std. Dev.	Min	Max
TDSX	600	21.22	13.42	0	152
RESIMP	594	3.25	3.15	0	25
LGDP	599	7.43	0.82	5.61	9.22
GDPG	600	3.67	5.61	-50.2	34.4
IMPGDP	600	36.67	20.83	4.6	129.8
OECDG	570	1.85	1.22	-1.67	4.78
LTOTG	599	0.01	2.72	-15.84	18.02
CAPTDS	600	341.91	2012.16	-210.54	45923

Table (3.5)

Correlation matrix

Variable	RESCDT	TDSX	RESIMP	LGDP	GDPG	IMPGDP	OECDG	LTOT	CAPTDS
RESCDT	1.00								
TDSX	0.1813* (0.000)	1.00							
RESIMP	-0.155* (0.000)	-0.08* (0.04)	1.00						
LGDP	-0.159* (0.000)	-0.053 (0.19)	0.215* (0.000)	1.00					
GDPG	-0.01* (0.009)	-0.017 (0.68)	0.136* (0.000)	0.131* (0.001)	1.00				
IMPGDP	-0.126* (0.002)	-0.331* (0.000)	-0.114* (0.08)	0.071 (0.14)	0.059 (0.14)	1.00			
OECDG	-0.032 (0.43)	0.044 (0.28)	-0.032 (0.43)	0.016 (0.69)	0.075 (0.07)	0.022 (0.59)	1.00		
LTOT	-0.002 (0.95)	-0.034 (0.40)	0.017 (0.67)	0.000 (0.99)	-0.024 (0.55)	-0.031 (0.44)	0.004 (0.30)	1.00	
CAPTDS	0.076 (0.06)	-0.109* (0.00)	-0.037 (0.36)	-0.152* (0.000)	-0.198* (0.000)	-0.016 (0.68)	0.028 (0.49)	0.068 (0.09)	1.00

- *significant at 5% level
- Numbers in parentheses are standard errors

Table (3.6)

Regression results for cross-section pooled analysis (1989-98)[8]

	Logit Model Estimates				Probit Model Estimates			
Variable	1	2	3	4	5	6	7	8
CONST	2.336*** (2.8)	2.34*** (2.8)	2.339*** (2.8)	1.266 (1.29)	1.44*** (2.8)	1.459*** (2.8)	1.453*** (2.8)	0.782 (1.3)
TDSX	0.022*** (2.9)	0.021*** (2.8)	0.218*** (2.8)	0.027*** (3.3)	0.014*** (3.0)	0.013*** (2.8)	0.013*** (2.9)	0.017*** (3.3)
RESIMP	-0.107 (-2.8)	-0.069 (-1.6)	-0.07* (-1.6)	-0.079* (-1.8)	-0.066*** (-2.9)	-0.043* (-1.6)	-0.044* (-1.6)	-0.049* (-1.9)
LGDPC	-0.301*** (-2.8)	-0.337*** (-3.1)	-0.336*** (-3.1)	-0.221* (-1.8)	-0.181*** (-2.8)	-0.209*** (-3.1)	-0.209*** (-3.1)	-0.137 (-1.8)
GDPG	-0.029* (-1.8)	-0.027* (-1.7)	-0.027* (-1.6)	-0.025 (-1.4)	-0.018* (-1.8)	-0.018* (-1.7)	-0.017* (-1.6)	-0.015 (-1.4)
IMPGDP	-0.01** (-2.1)	-0.0001 (-0.2)	-0.0001 (-0.00)	0.0001 (0.1)	-0.006** (-2.2)	-0.0002 (-0.0)	-0.0001 (-0.0)	0.0002 (0.0)
OECDG		-0.07 (-1.1)	-0.08 (-1.1)	-0.088 (-1.22)		-0.048 (-1.1)	-0.049 (-1.1)	-0.054 (-1.2)
TOTG			0.003 (0.52)	0.02 (0.6)			0.002 (0.53)	0.012 (0.6)
CAPTDS				0.0004** (1.9)				0.0003* (1.9)
Pseudo R^2	0.06	0.04	0.04	0.04	0.06	0.04	0.04	0.05
N	593	563	563	563	593	563	563	563

10. Dependent variable 1 for countries that rescheduled and 0 otherwise in all the regressions

Regressions 1-4 are logit model estimations, and 5-8 are probit model estimations
The asterisks *, **, and ***, represent significance at 10% level, 5% level, and 1% level, and are applied to all the regressions in this paper.

Note: except the annual GDP growth that was taken from Easterly, et al (2002), all the other covariates have been my own calculations. All the variables are lagged by one year

Table (3.7)

Regression results for the likelihood of debt-service difficulties (1989-98)[9]

	Logit Model Estimates				Probit Model Estimates			
Variable	1	2	3	4	5	6	7	8
CONST	2.269*** (2.7)	2.288*** (2.8)	2.291*** (2.8)	1.115 (1.1)	1.406*** (2.8)	1.421*** (2.8)	1.415*** (2.8)	0.697 (1.2)
INTX	0.11*** (5.6)	0.111*** (5.5)	0.111*** (5.6)	0.123*** (5.9)	0.068*** (5.7)	0.069*** (5.7)	0.069*** (5.7)	0.077*** (6.1)
RESIMP	-0.117*** (-2.9)	-0.085* (-1.9)	-0.086* (-1.9)	-0.099** (-2.2)	-0.07*** (-2.9)	-0.053** (-1.97)	-0.054** (-2.0)	-0.062** (-2.3)
LGDPC	-0.387*** (-3.4)	-0.426 (-3.7)	-0.427*** (-3.7)	-0.301** (-2.4)	-0.240*** (-3.5)	-0.265*** (-3.8)	-0.265*** (-3.8)	-0.188** (-2.4)
GDPG	-0.024 (-1.5)	-0.021 (-1.3)	-0.021 (-1.3)	-0.018 (-1.0)	-0.015 (-1.5)	-0.013 (-1.3)	-0.013 (-1.3)	-0.011 (-1.0)
IMPGDP	0.004 (-0.7)	0.007 (1.2)	0.007 (1.2)	0.008 (1.1)	-0.002 (-0.8)	0.004 (1.1)	0.004 (1.2)	0.005 (1.3)
OECDG		-0.091 (-1.2)	-0.094 (-1.3)	-0.010 (-1.4)		-0.055 (-1.2)	-0.057 (-1.3)	-0.062 (-1.4)
TOTG			0.018 (0.6)	0.027 (0.8)			0.003 (0.6)	0.016 (0.8)
CAPTDS				0.0005** (2.1)				0.0003** (2.2)
Pseudo R^2	0.10	0.08	0.08	0.08	0.10	0.07	0.08	0.09
N	593	563	563	563	593	563	563	563

Regressions 1-4 are logit model estimations, and 5-8 are probit model estimations.

[9.] Dependent variable is 1 for countries that have rescheduled and 0 otherwise.

Table (3.8)

Regression results for fixed-effects Logit model (1989-98)[10]

Variable	1	2	3	4	5	6	7	8
TDSX	0.039*** (2.5)	0.028* (1.79)	0.401*** (2.5)	0.028* (1.81)	0.042*** (2.6)	0.031* (1.92)	0.051*** (3.10)	0.039** (2.35)
RESIMP	0.152 (1.5)	0.302*** (2.62)	0.150 (1.4)	0.306*** (2.66)	0.135 (1.30)	0.291*** (2.51	0.130 (1.20)	0.279** (2.38)
LGDP	-3.533** (-2.3)	-3.151** (-2.01)	-3.509** (-2.3)	-3.091** (-1.98)	-3.379** (-2.20)	-2.992* (-1.93)	-2.319 (-1.50)	-1.798 (-1.10)
GDPG	0.017 (0.7)	0.023 (1.01)	0.017 (0.7)	0.022 (1.00)	0.019 (0.8)	0.025 (1.12)	0.047* (1.90)	0.049** (2.01)
IMPGDP	-0.043* (-1.7)	0.013 (0.47)	-0.042* (-1.9)	0.028 (0.77)	-0.039 (-1.50)	0.029 (0.94)	-0.059** (-2.20)	0.005 (0.15)
OECDG			-0.024 (-0.2)	-0.014 (-0.85)	-0.036 (0.40)	-0.014 (-0.85)	-0.055 (-0.60)	-0.009 (-0.56)
TOTG					0.036 (0.80)	0.009 (1.03)	0.036 (0.8)	0.009 (0.95)
CAPTDS							0.0006*** (2.60)	0.0005** (1.97)
1990		-1.313 (-0.26)		-0.139 (-0.27)		-0.117 (-0.83)		-0.128 (-0.24)
1991		-0.307 (-0.58)		-0.307 (-0.58)		-0.330 (-0.62)		-0.314 (-0.58)
1992		-0.354 (-0.65)		-0.366 (-0.67)		-0.344 (-0.63)		-0.342 (-0.61)
1993		-0.501 (-0.88)		-0.513 (-0.90)		-0.497 (-0.87)		-0.468 (-0.80)
1994		-1.645*** (-2.83)		-1.661*** (-2.86)		-1.638*** (-2.80)		-1.569*** (-2.63)
1995		-1.130* (-1.88)		-1.139* (-1.89)		-1.171* (-1.94)		-1.375** (-2.22)
1996		-1.272** (-2.08)		-1.191* (-1.93)		-1.237** (-1.98)		-1.174* (-1.87)
1997		-1.783*** (-2.84)		-1.745*** (-2.78)		-1.759*** (-2.79)		-1.719*** (-2.67)
1998		-1.69*** (-2.65)		-1.685*** (-2.64)		-1.717*** (-2.68)		-1.622** (-2.46)
No. Obs.	425	425	425	425	425	425	425	425

[10.] Dependent variable is 1 for countries that have rescheduled and 0 otherwise

Table (3.9)

Regression results for fixed-effects Logit model (1989-98)[11]

Variable	1	2	3	4	5	6	7	8
INTX	0.192***	0.153***	0.193***	0.154***	0.200***	0.157***	0.221***	0.179***
	(4.20)	(3.28)	(4.41)	(3.29)	(4.50)	(3.37)	(4.8)	(3.68)
RESIMP	0.171	0.277**	0.166	0.283**	0.141	0.264**	0.137	0.251**
	(1.6)	(2.34)	(1.5)	(2.39)	(1.3)	(2.19)	(1.2)	(2.05)
LGDP	-2.884*	-2.602*	-2.872*	-2.555	-2.722*	-2.449	-1.518	-1.246
	(-1.9)	(-1.63)	(-1.8)	(-1.61)	(-1.70)	(-1.55)	(-0.9)	(-0.75)
GDPG	0.015	0.019	0.016	0.019	0.019	0.022	0.048*	0.046*
	(0.6)	(0.86)	(0.7)	(0.85)	(0.8)	(1.0)	(1.9)	(1.88)
IMPGDP	-0.022	0.016	-0.022	0.026	-0.017	0.032	-0.038	0.007
	(-0.8)	(0.55)	(-0.8)	(0.84)	(-0.6)	(1.01)	(-1.3)	(0.21)
OECDG			-0.035	-0.014	-0.051	-0.015	-0.071	-0.009
			(-0.41)	(-0.87)	(-0.5)	(-0.87)	(-0.7)	(-0.56)
TOTG					0.010	0.01	0.047	0.009
					(1.1)	(1.1)	(0.9)	(0.97)
CAPTDS							0.0006***	0.0004*
							(2.4)	(1.93)
1990		-0.087		-0.098		-0.082		-0.094
		(-0.17)		(-0.19)		(-0.16)		(-0.18)
1991		-0.143		-0.139		-0.164		-0.122
		(-0.27)		(-0.26)		(-0.3)		(-0.22)
1992		-0.189		-0.199		-0.181		-0.173
		(-0.34)		(-0.36)		(-0.32)		(-0.3)
1993		-0.255		-0.263		-0.237		-0.191
		(-0.44)		(-0.45)		(-0.4)		(-0.32)
1994		-1.345**		-1.362**		-1.328**		-1.225**
		(-2.23)		(-2.26)		(-2.19)		(-1.97)
1995		-0.757		-0.767		-0.800		-0.998
		(-1.21)		(-1.22)		(-1.27)		(-1.55)
1996		-0.872		-0.783		-0.831		-0.741
		(-1.36)		(-1.21)		(-1.28)		(-1.13)
1997		-1.331**		-1.289**		-1.289*		-1.193*
		(-2.01)		(-1.95)		(-1.94)		(-1.75)
1998		-1.244*		-1.238*		-1.272*		-1.150*
		(-1.85)		(-1.84)		(-1.88)		(-1.65)
No. Obs.	425	425	425	425	425	425	425	425

[11.] Dependent variable is 1 for countries that have rescheduled and 0 otherwise.

Table (3.10)

Marginal effects after logit (Cross-section pooled time series) (1989-98)

Variable	1	2	3	4	5	6
INTX				0,029***	0,03***	0,031***
				(5,89)	(5,93)	(5,89)
TDSX	0,007***	0,007***	0,007***			
	(3,38)	(3,41)	(3,29)			
RESIMP	-0,028***	-0,028***	-0,022**	-0,031***	-0,031***	-0,027**
	(-2,92)	(-2,93)	(-1,95)	(-3,05)	(-3,07)	(-2,33)
LGDP	-0,047	-0,046	-0,006	-0,066**	-0,065**	-0,065**
	(-1,57)	(-1,54)	(-1,49)	(-2,16)	(-2,12)	(-2,04)
GDPG	-0,006	-0,007	-0,006	-0,005	-0,005	-0,005
	(-1,52)	(-1,54)	(-1,49)	(-1,17)	(-1,20)	(-1,13)
IMPGDP	-0,006**	-0,002**	0,002	-0,001	-0,001	0,004*
	(-1,98)	(-1,96)	(1,00)	(-0,68)	(-0,66)	(1,88)
CAPTDS	0,0001*	0,0001*	0,0001*	0,0001**	0,0001**	0,0001*
	(1,89)	(1,93)	(1,73)	(2,8)	(2,14)	(1,97)
LTOTG		0,004	0,004		0,005	0,006
		(0,52)	(0,6)		(0,67)	(0,78)
OECDG			-0,002			-0,02
			(-1,33)			(-1,40)

IV. Debt Overhang, Capital Flight and Economic Growth: *A Panel Data Approach*

Abstract

This paper looks at whether external debt and capital flight could be potential explanations for growth rate differences across the developing world. Although there is a wide-ranging of theoretical literature on this issue, there are only few empirical studies that show that there is an inverse relationship between growth and external imbalances. Moreover, all empirical studies on this area have focused on the impact of total external debt stock on growth of real GDP per capita, controlling for the traditional factors that appear in all growth regression in the framework of the augmented Solow model.

The critical innovation of this paper is the empirical exploration on the impacts of external debt on growth once total debt stock is decomposed according to source and maturity structures. The premise is that total debt stock is uninformative. The empirical findings in this paper suggest: First, it is the short term and not the long term component of the total external debt that retards growth. Second, it is interest payments and not total debt service that represent the actual (net) cost of foreign debt. Third, it is the public and publicly guaranteed debt and not the private non-guaranteed debt that penalizes long-term growth. Fourth, it seems that, while loans from IDA (International Development Association) have a favorable impact on growth, loans from the IMF are bound to be insignificant at best and counter productive at the worst, possibly reflecting the failure of the IMF adjustment program in developing countries in general and Sub-Saharan Africa in particular. This helps explain, despite long years of adjustment and foreign aid, the translation of the debt crisis into a growth crisis in the past two decades in Africa. Fifth, while concessional debt is positively associated with growth (though not significant), the unconcessional part of the external debt is harmful to long-term growth for developing countries. Sixth, while bilateral debt failed to help countries achieve accelerated growth, the external debt component from multilateral sources seem to be more productive for growth. Finally, in the framework of panel data estimation, I use cross-section pooled time series, random effects and fixed effects models, where debt dummies are included to control for indebtedness heterogeneity and country dummies to control for country-specific effects.

1. Introduction

„On average, real per capita GDP did not grow in Africa over the 1965-90 period, while in East Asia and the Pacific, per capita GDP growth was over 5 percent and Latin America grew at least 2 percent per year“, Easterly, et al., 1997, p. 1203)

It is now apparent that less developed countries (LDCs) in general and Sub-Saharan African countries (SSA) in particular have been marginalized and bypassed by the process of globalization. The deterioration in income per capita growth for SSA is remarkable. As was discussed in chapter 1 (table 3) of this dissertation, the growth in real per capita for SSA has been worsening from decade to decade, and becoming worst in the last two decades. What is crucial here to reiterate is that the growth rate of income per capita for SSA during the periods 1970-2000 and 1980-2000 were indeed negative. This is in contrast to a positive growth rate of income per capita for other developed and developing regions. Moreover, many empirical studies (including chapter one of this dissertation) show the phenomenon of divergence in real per capita growth across the world economy at large, hence the poor getting poorer while the rich getting richer, eventually increasing the dispersion of income per capita across countries and over time. Such empirical studies also point out that the degree of divergence in real income per capita was stronger in the 1980s and 1990s than the 1960s and part of the 1970s.

This question has drawn the attention of many economists across the globe. The poor performance SSA has been explained from various fronts. The potential factors range from bad policies and external shocks (Hadjimichael and Ghura, 1995; and Rodrik, 1999, among others), to ethnic fractionalization (Easterly and Levine, 2000), to gender inequality in education (Klasen, 2002), and to geographic location (Sachs and Warner, 1998), among others.

While the findings of the aforementioned studies yield fruitful results in explaining Africa's marginalization and divergence, they turn out to be insufficient when it comes to explaining why the rate of divergence of SSA was in particular so dramatic in the 1980s and 1990s compared with the 1960s and in part the 1970s. Said differently, though the

issues of policy, education, geography and ethnicity are important determinants of long-term growth, they fail to provide adequate explanations for why growth rate differences across countries were so dramatic in the 1980s and 1990s compared to earlier decades. In this context, there is widespread consensus that the 1980s have been considered by many as the „lost decade" for Africa and Latin America in terms of growth and development. Singer (1990, in: Healey, 1995), for example, expresses Sub-Saharan Africa as the region that is converging to acquire the character of a marginalized 'Fourth World', increasingly recognized as requiring special action and criteria. At the same time, the 1980s had been far from favorable for Latin American countries.[67] The prime suspects in this regard are external imbalances that in fact become cardinal issues in the entire developing world notably those in SSA. This issue becomes even more apparent given that 33 of the 41 countries characterized by the World Bank and IMF as heavily indebted poor countries (HIPCs) are located in Africa. Table (3.1) in Chapter 2 indicate that the growth rates of real income per capita for HIPCs were negative in the 1980s and 1980s compared to the previous two decades and other non-HIPCs developing countries.

This dissertation will, therefore, focus on the extent to which external imbalances have accounted for growth-rate differences across the developing world in the past two decades. The remainder of the chapter is divided into 7 parts: Part two looks at the theoretical considerations of the external imbalances-growth nexus. This part also summarizes the formal model of the debt overhang hypothesis, and theoretically discusses other avenues through which high external debt may turn out to be more harmful than useful for long term growth. Part three presents the review of some of the relevant empirical literature. Part four discusses the empirical strategy that is employed in studying the impact of external imbalances on per capita income growth across the developing world and over time. It mainly examines the advantages of the panel data approach over the simple cross-section regression in studying growth rate differences

[67] „Not long ago, Latin American countries seemed to be condemned to a life of despair. During the 1980s, after the onset of the debt crisis, growth rates, which during the 1970s oscillated around 6% collapsed to an average 1.8%. From the perspectives of the 1980s, even future growth prospects were clouded by a sharp drop in the share of capital formation from about 20% in the 1970s to about 16% in the years following 1982" (WEO, Oct. 1993, in: Kaminsky, et al. 1996, p. 1)

across countries and over time. Part five gives a short summary of the data and variables that are included in this study. Part six presents the regression results before part seven presents the conclusion and the possible policy implications of this study.

2. The External Imbalances-Growth Nexus: A theoretical review

"When economists consider the burden of the foreign debt, they usually think of the cost to the debtor country making a transfer to the rest of the world. The debt problem is measured simply as the discounted flow of resources that the debtor country must provide to its creditors. But over and above the transfer burden is enormous deadweight loss resulting from the way that the current debt overhang discourages investment in debtor countries" (Sachs 1986, p. 413).

The adverse impact of external debt on long run economic growth has now been acknowledged both by theoretical and empirical literatures. A case in point in this direction is the introduction by the international community of the heavily indebted poor countries (HIPCs) initiative that came into effect in 1996. The external imbalances situation of poor and middle income countries is so alarming that the first HIPCs initiative known as "HIPC-1" was replaced within three years by "HIPC-2", the initiative that is more generous than its previous counterpart in providing more debt relief to fund-starved nations. This obviously shows the full recognition by the international community of the adverse impact of HIPCs debt on their long term economic growth and overall development.

In general, it is quite clear that LDCs have strong incentives to borrow from overseas in order to finance their domestic investment, which is indispensable if economic growth is to be achieved.[68] Part of the reason is that since poor countries are far away from their steady states, any investment injection could lead them to have accelerated economic growth. Though this is generally true, it turns out that capital inflows in the form of external debt to LDCs enhance growth only to a certain point. Once debt grows bigger and unmanageable (unsustainable), it becomes a major destabilizing factor and a serious

[68] As many argue, the USA in the 19th Century, The Marshall Plan for a war-torn Germany and East Asian countries in recent periods are all cases in point where foreign capital was translated into long-run economic growth.

bottleneck to long-term economic growth. Moreover, as long as scarce resources are not wisely invested in projects that have the expected returns higher than the cost of foreign debt, they may endanger the long term growth prospect of the country under consideration and lead to low economic growth, higher demand for external debt and more external imbalances.

The external debt-growth literature points out various mechanisms through which debt is translated into sluggish economic growth. The first channel in this respect is the so-called debt overhang hypothesis. This theory suggests that once it becomes apparent that there is a real threat that the future total debt stock of a country will exceed the country's repayment potential, the expected debt service will be an increasing function of the country's output level (Pattillo, et al. 2002, Claessens, et al, 1996, among others). Consequently, the expected rate of returns from productive investments in such an economy will be low since a significant portion of any subsequent economic progress will be eaten up by creditors. This will further reduce both domestic and foreign investments and eventually downsize economic growth (Krugman, 1988, Sachs, 1989, among others).

The premise that debt to a certain limit, if wisely utilized and properly managed, plays a pivotal role in enhancing long-term economic growth but retards it if its level is increasing over time, is generally linked to the so-called the debt Laffer curve (see, figure (1)).[69] The debt overhang problem is linked to the transfer of resources from capital scarce to capital surplus countries. In this respect, Krugman (1988) defined debt overhang as "the presence of an existing inherited debt sufficiently large that creditors do not expect with confidence to be fully repaid" (p.254). Claessens and Diwan (1990) argue that "debt overhang is a situation in which the illiquidity effect, the disincentive effect, or both effects are strong enough to discourage growth in the absence of concessions by creditors" (p. 31). This is also known as a "narrow" definition of the debt overhang,

[69] The debt Laffer curve argument (which was apparently introduced by Jefrrey Sachs) is derived from the tax Laffer curve hypothesis introduced by Arthur Laffer (1981), who argues that if personal tax rates were raised, they generate a dreadful impact on government tax revenue. The reason is that high tax rates either simply discourages investment or leads to tax evasion.

where the impact of a high external debt that is linked to the tax disincentives argument and where any success in indebted country's economic performance is taxed away by creditors; ultimately, little is left over for domestic investment and subsequent growth (Hjertholm, 2001, among others).

Figure (1) indicates that the optimum level of external debt that enhances growth is the debt level at D^*. Any level to the right of D^* is converted into sluggish economic growth. Although this provides a good insight into how high debt may turn out to be more harmful than helpful, the level of external debt possibly depends on other issues including the productivity of investment, the proportion of external debt that is devoted to boosting investment versus sustaining domestic consumption, and the level of capital flight that accompanies the mounting external debt. Moreover, it is hard to pinpoint the amount of external debt that is growth enhancing because countries vary in terms of their degree of political risk, institutions, and general macroeconomic management.[70]

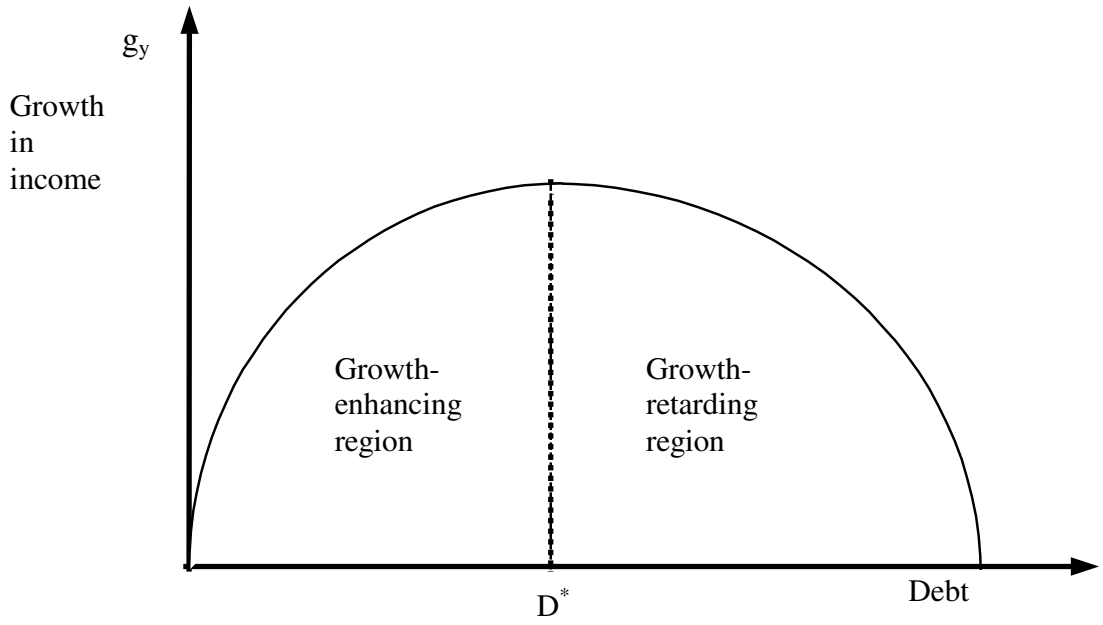

Figure (1): The debt Laffer curve

[70] There is, however, the rule of thumb, which signals the potential unfavorable impact of debt on growth. The rule of thumb ratios are: the ratio of the present value of total debt to exports is on the order of 200-250 and when the ratio of debt service to exports is on the order of 20-25 percent (Claessens, et al , 1996, p. 29).

2. 1. A formal theoretical model of the debt overhang hypothesis

All theoretical models of the debt overhang hypothesis start from the same assumption (a two period model) where a country is assumed to have carried over from the previous period some amount of external debt, D, which must be paid in the final period.[71]
Repayment (R) is given by:

$$R = \min\left(D, Y - \bar{C} \right),$$

Where
D = initial amount of debt,
Y = output, and

$\bar{C}$ = fixed amount of output that the debtor country can always keep for consumption

The model also assumes two states of nature: a favorable state (G) and an unfavorable one (B), where productivity is expected to be higher in the former and lower in the later states of nature, respectively. Assuming that Y is a function of investment carried out in the first period, given the state of nature: $Y^s = \theta^s f(I)$, where, s stands either for G or B alternatively. The model also assumes that there is a physical upper limit to investment, $\bar{I}$, and that there is no overlap of output as the two states are so different, which implies that $\theta^B f\left(\bar{I}\right) \prec \theta^G f(0)$. Then, a country experiences a debt overhang if $D \succ Y^B - \bar{C}$ because there are not enough resources to be surrendered for fully servicing the contractual debt obligation in a bad state (B). The debt overhang, therefore, creates a disincentive effect on domestic investment.

[71] This paper follows the debt overhang hypothesis model by Borensztein (1990a). Similar approaches may be found in Agenor and Montiel (1996), and Krugman (1988), among others.

If we have the situation whereby $y^B - \bar{C} \prec D \prec Y^G - \bar{C}$, then debt is serviced in full during favorable time. In contrast, during unfavorable time, debt is serviced by only the amount that is left over from the available output after the fixed consumption is taken out. Following this model for the debtor country, the marginal return that it receives for every additional investment is $p\theta^G f_I$, where p is the probability of the occurrence of a favorable situation for higher productivity. In contrast, if debt overhang was not at stake, the expected marginal return out of every unit of investment would be substantially larger: $p\theta^G f_I + (1-p)\theta^B f_I$. The model also suggests that if $D \succ Y^G - \bar{C}$, the return to investment would be zero and therefore, a debtor country does not have any reason whatsoever to commit additional resources for boosting investment.[72]

Apart from the debt overhang effect; there are several other avenues through which high external debt may impede economic growth. One way debt penalizes growth is through distortionary fiscal policy (crowding-out or liquidity effect). This is because once a country faces a large external debt, the only exit strategy of debt financing is through fiscal distortionary policies of any form (high tax rates, and cuts in productive investment, among other things).[73] This simply drives an indebted country to get stuck in a low or negative growth, high debt trap situation (Dijkstra and Hermes, 2001).[74] The fiscal impact could also be related to the crowding out effect of the external debt. The reason is that since high debt is accompanied by high debt service payments, it crowds out the public investment expenditure, thus reducing total investment directly and also indirectly by reducing complementary private expenditure (Diaz Alenjandro, 1984, among others).

[72] This is consistent with all the empirical and theoretical literatures on debt overhang (Deshpande, 1997), Claessens, et al. (1996), Elbadawi, et, al. (1997), among others. This is again linked to the moral hazard interpretation of the debt crisis in Third world countries in the 1980s and recent period (see, for example, Hofman and Reisen, 1990).

[73] See Hjertholm (2001), Pattillo et al. (2001), Agenor and Montiel (1996) and Were (2001), among others, for a further discussion.

[74] Debt overhang creates a disincentive environment for private investment that, through lower investment spending, leads to a slowdown in the ratio of economic growth, which further reduces future investment. As growth slows, the debt -to-income ratio also increases, reinforcing the disincentive effect (Seurieux and Samy, 2001). This is also consistent with the argument that links the impact of debt not only in punishing the volume of investment but also reducing its productivity and by creating poorer macroeconomic environment (Pattillo, et al. 2002).

Sachs (1986) argues in this line, where the debt overhang turns out to discourage private investments by the public sector even beyond its direct budgetary burden. This is because, as Sachs (1986, p. 416) argues, "a fragile government riding the storm of a downward spiral of living standards cannot shift spending from current consumption to investment without justifying the shift politically on the grounds that the citizens in the country will soon be much better off by the virtue of investment". Similarly, Claessens and Diwan (1990) argue that after years of austerity measures and low output, indebted countries' governments cannot afford to divert resources towards investment by lowering consumption and therefore, funds that could have been used for public investment are committed instead for debt servicing purposes.

Following Classens and Diwan (1990), high external debt may depress capital formation and economic growth through illiquidity effect as limited resources should be distributed among consumption, investment and external transfers to service existing debt. Reduction in investment should obviously be interpreted broadly to encompass both physical and human capital accumulation, which ultimately undermines growth and development.[75]

A recent UNCTAD's study on the impact of external debt on investment argues in this direction. Countries with a debt to GDP ratio of more than 80 indicated lower levels of investment and export performance than those with debt to GDP ratio of lower than 80. The study identifies three factors that explain how a high level of external debt may reduce the efficiency of economic returns (UNCTAD, 2001, p. 121-122). First, external indebtedness drives countries into conflict, since it is accompanied by stabilization measures that reduce public expenditure, among other things. Second, similar to other research, this study also concludes that high external debt punishes growth via low investment as a large proportion of resources are committed for debt servicing purposes. Finally, the study also identifies that external debt can have perverse effects on aid flows

[75] Following Sachs (1989), though the continuation of debt servicing by debtor countries prevented potential global banking crisis, but this has not produced any reverse in economic growth collapse in debtor nations.

because when aid flows are directly linked to the level of external debt, the diversion of aid directly or indirectly to service external debt reduces its development effectiveness.

Others argue that high debt service also leads to import compression, including imports of technological goods that are vital for the export sector to remain alive. Part of the reason, as Serieux and Samy (2001) argue, is that for an indebted country with inconvertible domestic currency, higher debt service payments, given vulnerable export earnings and absence of non-debt creating capital inflows, would mean a serious cut back in imports and leads to import compression either through price rationing (devaluation of the domestic currency) or non-price rationing (import restriction, for example). The joint effect may drive indebted poor countries to deep deindustrialization.

Another channel debt may get translated into sluggish growth is via its destabilizing effect. High external debt may create uncertainty and overall macroeconomic instability. This stems partly from the reluctant of policy makers in indebted countries to exercise growth-enhancing policies because they are aware that the larger proportion of the yields will be shared with the creditors. In this regard Edwards (1986) concludes that "the level of the country risk premium increases with the level of foreign indebtedness (i.e., the debt-GNP ratio)" (p.570). This reluctance may also retard growth because the government of an indebted country would not have access to domestic and international capital markets, making fiscal policy incapable of serving as an automatic stabilization instrument. The investment under uncertainty literature argues in this direction. Even if a debtor country demonstrates an improvement in its economic fundamentals, since the sustainability of such policies is questioned, this may punish current and future investments. Under such circumstances, as Servein, (1997, in: Dijkstra, et al. 2001), argues, the larger part of such investments would likely be in trading activities with quick returns, rather than long-term, high-risk, irreversible investments.[76] This, indeed,

[76] Dijkstra and Hermes (2001, p. 1) hypothesize that "it is the problem of the uncertainty of debt-service payment, rather than the level of the external debt as such- that may compromise the economic growth of heavily indebted countries. Deshpande (1997) argues that "in countries with a debt overhang, the pressure of debt repayment not only dominates policies which affect investment but also shape expectation (p. 180)".

confirms the current situation of HIPCs, where most of these countries are virtually cut off from the international financial markets.

2.2. Capital flight, external debt and growth

"LDC (Less developed country) capital outflows have to be tackled as part of the solution to the debt problem, not as something that needs to be addressed only later. If capital flight is given a free ride in the caboose of LDC debt train, the train has little hope of making the station" (Morgan Guaranty (1986): in: Lesssard and Williamson, 1987, p. 244).

Another way excessive external debt may trigger growth is via capital flight. As Alejandro (1984, p. 345) correctly puts it, one of the concerns of Latin America during 1980-89 could have been that "the public debt was financing not bad investment projects nor unsustainable consumption but private capital flight". While enormous amount of capital is flowing to developing countries in the form of external debt, paradoxically, at the same time huge amounts of resources are leaving these countries in the form of capital flight. From the perspectives of economic theory, the outflow of capital from capital poor to capital rich countries is rather anomalous and unjustified. The reality shows, however, that capital flight has become a series development bottleneck to enormous number of countries not only in Africa but also in Latin America."

The economic literature advances several reasons that explain why this have materialized. One of the fundamental causes of capital flight is macroeconomic instability (high inflation rate accompanied by low real interest rates (financial repression), high government budget deficit, among others). Other causes include high tax rates and other forms of fiscal policy distortions and asymmetries in incentives and information between foreign and domestic investors.[77] It appears that, in the context of poor countries, however, political instability and overall private-property insecurity are the main driving forces of capital flight.[78]

[77] While investment that favor more foreign relative to domestic investors provokes capital flight, differences in the availability of information between foreign and domestic investors may cause difference perception about the the prospect of the economy in the future.

[78] See, Erbe, 1985; Cuddington, 1986; Ajayi, 1997, Schneider, 1991; Williamson, 1987; Dooley, et al, 1994; among others, for a broader discussion on the causes of capital flight.

In the same fashion, Schneider (1991) argues that excessive supply of external debt is an important cause of capital flight for two reasons: First, large supply of credit to a country with a poor growth strategy may only overvaluate the domestic currency and helps citizens keep their wealth in foreign accounts by providing them with high foreign exchanges. Second, the correlation may go the other way around, where the flight capital may also be converted into foreign debt in such a way that some local capitalists reduce risks by investing in their own country behind the mask of external debt.

Other economists advance a different relationship between external debt and capital flight (Boyce, 1992; in: Ajayi, 1997). The first relationship is in terms of macroeconomic theory, where it is generally believed that, if resources held abroad were used at home for increasing investment that would increase the availability of foreign exchange, this would enable countries to invest and grow faster. In this context, others also argue that in the absence of capital flight the external debt of poor countries would have been much lower than with capital flight.[79]The second approach is a causal relationship between external debt and capital flight, which is classified into four categories (Ajayi, 1997,in: Menbere, 2000):

- debt-driven capital flight, where capital flight takes place as the results of subsequent distortions due to high external debt. Some of the reasons for this are associated with the expectation of currency devaluation, fiscal crisis, and avoidance of expropriation risk, among other distortions.
- debt-fuelled capital flight, where the availability of foreign exchange, which mainly comes through foreign borrowing, facilitates capital flight, which otherwise could not be possible.

[79] Following Erbe (1985), at the end of 1982, while the government had a serious problem of paying its debt service which stood at around USD 4.5 billion, the fabulous wealth of Mobutu (former President of Zaire) and his clan amounted between USD 4 and 6 billion invested in Swiss accounts and real estate (p. 268). Another example comes from Latin America, where different estimates puts the regions capital flight to be USD 50 billion (1978-82) or even as high as USD 120-130 billion (1975-83), while the region's total external debt in 1983 was USD 350 billion (Erbe, 1985, p. 268).).Moreover, Boyce and Ndikuman (2001) for 25 low-income Sub-Saharan countries find out that, while the accumulated capital flight in 1996 totaled more than 285 billion USD, the accumulated external debt stock in the same year was 178 USD, making the region as they call it, a 'net creditor' to the rest of the world

- flight-driven external borrowing, where as the result of capital flight, which dries up domestic resources, a gap between savings and investment rises and that this gap should be financed though overseas borrowing, and finally,
- flight-fuelled external debt, a situation where domestic currency leaves the country but re-enters in the form of foreign currency. This is often called as „round tripping“ or „ back -to -back loans“.

In this respect, Boyce (1992, in Chipalkatti, et al. (2001) analyzing the Philippines experience during the periods 1962 to 1986 concludes that “external debt did not simply scare-off domestic capital…nor did capital flight create a vacuum into which external capital was pulled; rather the same capital; circulated in both direction through the revolving door” (p. 36).

In addition, when a country is undergoing a high external debt service burden, both domestic and foreign investors will become suspicious of the government’s possible appropriation of their wealth for debt servicing purposes.[80] Under such circumstances, the straightforward means to escape such a threat is to place private capital out of the country when a country’s debt is mounting. One indication of this phenomenon is that capital flight has become more significant in the 1980s relative to its level in the previous decades (Deshpande, 1997, p. 172). This obviously worsens the overall economic environment and leads to further economic retardation. Eaton (1998) argues that capital flight largely escapes taxation by the borrowing-country governments and generates concern about the prospects for future debt servicing. This may call for additional foreign debt to finance older debt.

From the discussions so far, it is possible to formulate a hypothesis on the reverse causality between capital flight and external debt. As shown in figure (2) below, the first reverse causality may go from external debt to capital flight and to sluggish growth. If

[80] Sachs (1986) stresses that a country that is already suffering from the consequences of a debt overhang, „the private sector well understands that the public sector is starved for funds, no abstute wealtholder now leaves any sign of wealth lying to advertise a ready sources of revenues for the fiscal authorities. Wealth-holders then hold their assets outside of their country to avoid taxation with the result that new private savings simply spillover into capital flight, rather than into real new investment“ (p. 417).

there is high external debt, this may be accompanied by high debt service payments, and as the result of the debt overhang and other impediments linked to high external debt, this may be translated into low levels of imports and investments. All this ultimately leads to low economic growth. The second reverse causality shows that as the result of huge capital outflows in the form of capital flight, there are no resources available to finance imports and domestic investment, which may lead to external debt that again demands for being serviced, and ultimately gives rise to slow progress in economic growth. Nevertheless, the debate in this direction is not without dispute.[81]

Moreover, capital flight may directly undermine economic growth via several channels (See, Erbe, 1985; Cuddington, 1986; Ajayi, 1997, Schneider, 1991; Williamson, 1987; Dooley et al, 1994). First, capital flight retards growth by eroding the domestic tax base. Capital that is held abroad illegally cannot contribute to domestic economic growth as it is beyond the reach of tax authorities of the countries of origin. Second, capital flight may hinder growth by increasing the marginal cost of foreign debt. The central argument here is that if capital held abroad by citizens was legally recognized by creditors, this would serve as collateral and the marginal cost of foreign debt would have been much lower as creditors could seize that in case of default by a borrowing country. Third, capital flight may negatively contribute to growth by exacerbating the balances of payments problems. Finally, capital flight may reduce growth by destabilizing the financial system as sudden outflows of large resources would call for adjustment in interest and exchange rates policies.

[81] The discussion in this context is not only widespread but also heterogeneous. Despite the evident existence of such two-way flows of resources (capital inflows in the form of foreign debt and capital outflow in the form of capital flight), there is an argument that capital flight is a reaction to the unsustainable levels of external debt rather than its cause. For example, Dornbusch (1987), argues that „capital flight is a caboose, not a locomotive of financial repression and economic underdevelopment at the root than the cause of the debt crisis". Similarly, Sachs (1986), argues that „capital flight is a symptom of debt overhang, and not a cause as it initially was when it reflected the conversion of domestic assets into foreign financial assets in anticipation of devaluation of overvalued exchange rates".

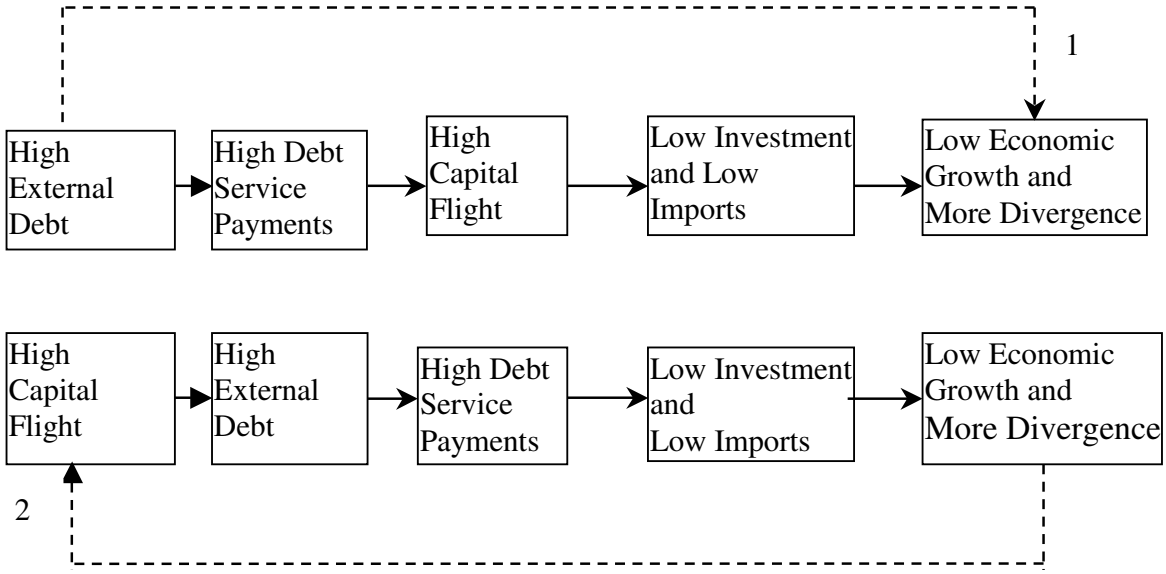

Figure (2): the reverse causality of external debt, capital flight, and growth
Source: Menbere (2000, p. 113)

2.3. The external imbalances-growth nexus: An extended empirical examination

Although all the above arguments are generally valid, one has to extend the debate on the negative impact of external debt on growth further. In most growth regression, growth is negatively related to high past external debt while it is positively related to current debt ratio. The negative coefficient on past debt stock is interpreted as an indication of the debt overhang, where the economy of an indebted country is on the wrong side of the debt Laffer curve in figure (2). However, there are several caveats that need to be explored. First, total external debt masks much important information that does not allow one to fully explore the accountability of debt on growth. In this context, taking total debt stock as a regressor might give rise to misleading results and conclusion, for various reasons:

- Total debt stock ignores to take into account the maturity structure of external debt (short term vs. long term). Total debt stock neglects the source structure of external debt (multilateral vs. bilateral).

- Total debt stock fails to provide any information about the concessionality of external debt. This is important given the absence of data on the present value of the external debt of developing countries.
- Total external debt stock masks the scarce resources that are channeled towards loss-making state enterprises versus the more profitable private sector.

These and other concerns may lead to an alternative way of empirically investigating the links between external debt and economic growth. This paper, therefore, argues that instead of taking total debt stock as an explanatory variable, it may be more informative if it was decomposed according to maturity and source structures and the terms of concessionality. In this respect, the central argument rests on the following hypotheses:

(A). External debt that has a long term maturity, provided that it is invested efficiently, should induce growth, while the component of total debt that is of short term nature is unproductive and therefore leads to a slowdown in economic growth.[82] I advance at least three arguments. One is linked to the nature of short term debt in developing countries, which is often borrowed at higher interest rates in order to finance old debt with lower interest rates. This is notoriously known as 'circular financing'. The second argument is linked to the phenomenon of capital flight that has been discussed earlier. While the external debt of developing countries was accumulated at a record pace, this has been often accompanied by capital flight. The argument here include that the very root cause and means of capital flight is short term capital movements. In addition, short term capital flows tend to appreciate the domestic currency and serves as an international tax on exports, which leads to the further worsening of the current account balance, and ultimately leads to further borrowing causing a sort of vicious circle situation. Last, short term capital flows are the favorable breeding place for corruption and a convenient means of wealth-building for government officials in most poor countries.

[82] As McFadden, et al (1985, in, Smith, et al (1985, p. 181) point out, the relative growth of short-term debt suggests a growing vulnerability of developing countries to the potential unwillingness of creditors to extend short-term lines of credit. Similarly, McFadden, et al (1985, in Smith, et al, 1985, p. 186) concludes that „falling maturities on long-term debt and an increasing share of short-term debt presummably reflect a diminished supply of new credit, imposition of more conditionality, or shifts away from traditional suppliers of long-term credit toward less-preferred sources".

(B). An alternative way of looking at the external debt issues is to decompose it according to debt sources. This helps to figure out the extent to which the sources of external debt matter for growth: private vs. public, bilateral vs. multilateral and loans from IDA, IBRD and IMF. The justification for such classifications is linked to the cost of borrowing and the conditions that accompany such debt inflows. Since private non-guaranteed debts are expected to be invested in productive investments, their contribution to growth should be in a positive direction.[83]While one would expect loans from IDA (International Development Association) to induce growth (since they bear very low interest rates), the loans from the IMF might be unequivocal at best and counter-productive at worst. Part of the justification is that these loans are highly linked to policy prescription, and the experiences of many African countries in the past two decades indicate that these policies were not highly effective.[84] The impact of loans from IBRD (International Bank for Reconstruction and Development) is not apriori clear at least for two reasons: Such loans are offered at market terms, and therefore are more expensive for poor countries. Consequently, many poor countries are not the beneficiaries of these loans.

(C). Finally, despite the persisting measurement problem, this paper makes an attempt to explain the impact of capital flight on growth.

2. 4. The Augmented Solow model: Revisiting Hadjimiachael and Ghura (1995)

Though the Mankiw, Romer and Weil (1992) (MRW) augmented Solow model remain valid in this analysis, I will use in this case the model introduced by Hadjimichael, et al

[83] Alejandro (1984), for example, argues that private non-guaranteed debt is supposed to to finance profitable investments and therefore, it imopses least risk on debt servicing payments. Similarly, Serieux (2001, p. 314) argues that when most of a debeleoping country's external debt is public and publicly guaranteed debt (consisting mostly of central government and its loss-making state-owned corporations) its social and economic condtions can negatively affect growth through budgetary policies, external accounts effects, and debt overhang effects.

[84] A broader analysis about the structural adjustment program and the causes of its success or failires are beyond the objective of this paper. For a broader discussion on the impact of the strucural adjustment programme and the role of IMF, see, Stglitz (2001).

(1995). The reason is that in the MRW model, policies and others factors that affect the level of technology in an economy are not directly captured by the model. This deficit (gap) has been filled by Hadjimichael and Ghura (1995) and I will summarize their model because it is very relevant to developing countries.

The model assumes a Cobb Douglas production function of the following form:

$$Y = A_0(A_p K_p)^{\alpha}(A_h K_h)^{\beta}(A_l L)^{1-\alpha-\beta} \qquad (1)$$

Where: Y = real output; L = labor; Kp and K_h are the physical and human capital stock, respectively; A_0 = an overall index of technology and efficiency in the economy; and $A_{p,}$ A_h, and A_L are the physical and human capital-augmenting and labor-augmenting technology respectively. They then defined:

$$A = A_L(A_0 A_p{}^{\alpha} A_h{}^{\beta})^{1/(1-\alpha-\beta)} \qquad (2)$$

Rewriting equation (1a):

$$Y = K_p{}^{\alpha} K_h{}^{\beta}(A.L)^{1-\alpha-\beta} \qquad (3)$$

Where A = encompasses all the factor-augmenting and the economic-wide levels of technology and efficiency.

Labor and labor-augmenting technology are assumed to grow according to the following functions,

$$L = L_0 e^{nt} \qquad (4)$$

and

$$A = A_0 e^{(gt+x\theta)} \qquad (5)$$

n = exogenous rate of the labor force

t = time index

g = exogenous rate of technological progress

X = which is the critical innovation of the model, represents a vector of policy and other factors that determine the level of technology and efficiency in the economy

θ = is a vector of coefficients related to these policies and other variables.

They then assume that S_p and S_h be the fraction of income invested in physical and human capital, respectively; and depreciate at the same rate, δ. Thus, physical and human capitals are accumulated according to the following functions:

$$\frac{dK_p}{dt} = s_p Y - \delta K_p \qquad (6)$$

$$\frac{dK_h}{dt} = S_h Y - \delta K_h \qquad (7)$$

Then taking k_p and k_h be the stock of physical and human capital in terms of effective labor units:

$$k_p = \frac{K_p}{A.L} \;\; ; \qquad k_h = \frac{K_h}{A.L} \qquad \text{and} \;\; y = \frac{Y}{A.L}$$

Rewriting the production function in terms quantities per effective labor unit gives:

$$y = k_p^{\alpha} k_h^{\beta} \qquad (3')$$

$$\frac{dk_p}{dt} = S_h y - (n + g + \delta)k_p \qquad (6')$$

and

$$\frac{dk_h}{dt} = S_h y - (n + g + \delta)k_h \qquad (7')$$

In the steady state, the levels of physical and human capital per effective labor are constant (this is similar to MRW, 1992). Thus, setting (6´) and (7´) to zero and solving the resulting equation, they obtain:

$$k_p^* = \left(\frac{S_p^{1-\beta} S_h^{\beta}}{n + g + \delta} \right)^{1/(1-\alpha-\beta)} \qquad (8a)$$

$$k_h^* = \left(\frac{S_p^{\alpha} S_h^{1-\alpha}}{n + g + \delta} \right)^{1/(1-\alpha-\beta)} \qquad (8b)$$

Substituting (8a) and (8b) into (3´) and taking natural logarithms, they arrived at the steady state output per effective labor unit, which is approximated as follows:

$$\ln(y^*) = -\left(\frac{\xi}{1-\xi} \right) \ln(n + g + \delta) + \left(\frac{\alpha}{1-\xi} \right) \ln(S_p) + \left(\frac{\beta}{1-\xi} \right) \ln(S_h), \qquad (9)$$

Where $\xi = (\alpha + \beta)$

They derived an empirical counterpart for equation (9) by taking the natural logarithm of y = Y/A.L, and substituting for A from equation (5):

$$\ln\left(\frac{Y}{L}\right) = \ln(A_0) + gt + x\theta - \left(\frac{\xi}{1-\xi}\right)\ln(n+g+\delta) + \left(\frac{\alpha}{1-\xi}\right)\ln(S_p) + \left(\frac{\beta}{1-\xi}\right)\ln(S_h) \quad (10)$$

The terms $\xi/1-\xi$, $\alpha/1-\xi$, and $\beta/1-\xi$ are the elasticities of per capita income with respect to population growth, and the fraction of income invested in physical and human capital, respectively. This model predicts that the sum of the elasticities with respect to S_p and S_h is equal to that on $(n+g+\delta)$.

Following MRW (1992), the transition of actual output per effective labor unit to its steady state level is approximated by:

$$\frac{d\ln(y)}{dt} = \lambda\left[\ln(y^*) - \ln(y)\right] \quad (11)$$

Where $\lambda = (n+g+\delta)(1-\xi)$ is the speed of convergence, y is the actual output per effective labor unit.

Equation (11) implies that:

$$\ln(y) = 1 - e^{\lambda t})\ln(y^*) + e^{\lambda t}\ln(y_0) \quad (12)$$

Subtracting y(0) from both sides of (12) and substituting $\ln(y^*)$ from equation (10) gives:

$$\ln(y) - \ln(y_0) = (1 - e^{\lambda t})\left[\begin{array}{l} -\left(\frac{\xi}{1-\xi}\right)\ln(n+g+\delta) + \left(\frac{\alpha}{1-\xi}\right)\ln(S_p) \\ +\left(\frac{\beta}{1-\xi}\right)\ln(S_h) + x\theta - \ln(y_0) + gt + \ln(A_0) \end{array}\right] \quad (13)$$

Where, T is the length of time under consideration. Finally, they provide for an empirical counterpart of equation (13) for i-th developing country under consideration as follows:

$$LGDPG = \beta_0 \ln(LGDPI) + \beta_1 \ln(n + g + \delta) +$$
$$+ \beta_2 \ln(GCF) + \beta_3 (HCI) + \underset{-}{\gamma} x_{it}^{/} + \mu_i + \nu_i + \varepsilon_i \qquad (14)$$

Where,

LGDPG = the difference in the level of log of real GDP per capita,

LGDPI = log of initial real GDP per capita,

$\ln(n + g + \delta)$ = log of the growth rate of the population and the depreciation rate,

Ln(GCF) = log of gross domestic investment to GDP ratio,

Ln(HCI) = log of initial human capital accumulation index,

$x_{it}^{/}$= is a vector of debt variables of individual i in time t,

$\underset{-}{\gamma}$ = is the unknown parameter vector of the regressors, and

U_i, V_i, and ε_i are country-specific, time-specific and overall error terms.

$\lambda = -\ln(1 + T.\beta_0)/T$ = the speed of convergence

3. A Summary of previous empirical studies

Although there are many theoretical studies on the impact of debt on economic growth, there are relatively few empirical studies on this issue. Moreover, the existing empirical results generated mixed results. Claessens (1990), using a cross-section pooled regression, data for 29 developing countries, and the December 1986, 1987, and 1988 secondary market prices of the bank debt of these countries finds out that only Bolivia, Sudan, Peru, Zambia, and Nicaragua are on the wrong side of the debt Laffer curve. Cohen (1993) finds no evidence for the general existence of a debt overhang using data for a sample of 81 LDCs. He argues, that "the analysis of the correlation between the stock of the debt and investment is not the most appropriate way to analyzes whether the

debt overhang holds true" (p. 438).[85]Yet for the Latin American countries he shows that high debt had a negative impact on growth. Cohen (1997) concludes, however, that debt overhang is a series growth bottleneck for SSA. Deshpande (1997) shows that debt overhang might exist for 13 Severely indebted countries.

Elbadawi, et al (1997) is one of the first series empirical studies who looked into the impact of debt on growth of GDP per capita. Using a random effects model and fixed effects model, during the period 1960-94 and 99 developing countries, this paper discovers that while past accumulated external debt hampers growth, in contrast, the current debt ratio stimulates growth. They also apply both random and fixed effects models, their models more inclined to the fixed effects one. Were (2001) also found an evidence for a debt overhang effect on the Kenyan economy during the time period 1970-95. He concludes that debt negatively impacts both on growth and private investment. Other evidence of the debt overhang effect on growth is the study by Chowdhury (2001). Taking data for 35 HIPC countries and 25 low and middle-income countries in the period 1982-99 with three years averages, he finds that there is a negative impact of debt and debt service payments on growth of GDP per capita.

An empirical investigation by Pattillo, et al (2002) on 93 countries during the period 1969-98 to figure out the extent of external debt on growth yields sound results. Like in Chowdhury, they use three-year averages to net out short run fluctuations while maintaining the ability to utilize the time series dimension of the data. The results indicate that while the total debt to exports ratio negatively impacts on growth of GDP per capita, the total debt service to exports ratio has been weakly correlated with growth. Their results also suggest that the average impact of debt becomes negative at about 160-170 percent of exports or 35-40 percent of GDP. In addition, their study indicate that for a country with average indebtedness, doubling the debt ratio would reduce growth of per capita by half to a full percentage point. The results also imply that differential in GDP

[85] Cohen (1993, p. 438) adds that if a debtor country is large and does not expect to (be compelled to) service its debt, then obviously investment should not be crowded. Moreover, even assuming that such a country continues to service part of its debt the impact of debt on investment would depend on the efficiency of the rescheduling strategy.

per capita growth between countries with external indebtedness (as NPV) below 100% exports seems to be in excess of 2% per annum. Finally, their results also suggest that high debt reduces growth mainly by lowering the efficiency of investment rather than its volume. Ajayi (1997) shows that debt and capital flight jointly negatively impact on GDP growth on the Kenyan economy. His results are not very comparable to other studies as his dependent variable is GDP growth rather than per capita GDP, and he applied that to a single country. Moreover, his empirical specifications are not clear.

4. Specification of the empirical model and data description

4.1. The advantages of a panel data over a simple cross-sectional approach

It has become almost a tradition to use a cross-country framework to discuss the factors that account for growth-rate differences across countries. Though this strategy has produced quite useful initial results, it suffers from several drawbacks, which may distort the outcomes of any empirical analysis.

Studies identify at least three problems for a single cross-section regression (Islam, 1995; Hoeffler, 2000; Pattillo, et al (2001:

The first problem is linked to the so-called omitted variable bias. The single cross-country regression assumes that countries have identical production function, hence this strategy does not allow for heterogeneity, for example, in the initial level of technology across countries. Following Islam (1995, p. 1128), the country-specific aspect of the production function that is ignored could, however, be correlated with some of the covariates and this may lead to omitted variable bias. The second problem, as Hoeffler, 2000 argues, is that limiting the time series to a single cross-section regression would mean that not all available information is utilized. The third problem is linked to a single cross-section regression is the problem of reverse causality (endogeneity), where one or more of the explanatory variables may happen to be correlated with each other.

In this respect, the panel data approach is thought to be a remedy. Following Islam (1995), the panel data approach is a compromise that solves the conflict between endogenous growth theorists and neoclassical growth economists who advocate the Solow-Cass-Koopmans model. In this constant conflict regarding the determinants of long-run growth, while the empirical finding of convergence has been associated with the Solow-Cass-Koopmans model, its absence has been interpreted as a proof for the validity of the endogenous growth model. This ongoing controversy gave rise to the concept of a conditional convergence. The panel data approach allows for differences in the production function in the form of unobservable individual "country effects", which, to a great extent, helps to minimize the omitted variable bias that would otherwise generate distorted results.[86]

Moreover, as Islam (1995, p. 1128) argues, one of the major advantages of a panel data approach is that it allows researchers to distinguish the impact of 'capital deepening' versus technological and institutional differences in the process of convergence. Part of the reason is that variations in technology and institutional parameters could influence the standard determinants of growth more effectively. Following Islam (1995), if there had been no technological and institutional differences across countries, the rate convergence would have been much faster. Furthermore, one of the advantages of a panel data approach is that it allows to control for time-specific effects as the worldwide conditions for growth may not be equally advantageous for all countries over time (Chowdhury, 2001, p.6).[87] In addition, a panel data approach allows one to increase the number of observations and by doing so increases the degrees of freedom, which may generate more plausible results. Therefore, following Islam (1995) a panel data framework creates a bridge between development economics and neoclassical empirics of work.

[86] For a broad discussion of the panel data approach, see Greene (2000), Tsangarides (2000), Islam (1995), Hoeffler (2001); Caselli, et al (1996), among others.

[87] A similar argument has been advanced by Pattillo et al (2001), who pointed out that the time series dimension of the data is important, as an understanding of how debt affects economic growth over time (the within country variability of panel data) is at least as important as understanding how countries with different levels of debt experienced different growth patterns (the between-country variability of panel data).

There is, however, an ongoing debate about whether it is the random effects model or the fixed effects one that is more appropriate to employ in international growth comparison. Some argue that a random effects model may be more advantageous relative to a fixed effects one on the grounds that the fixed effects model destroys all variations across countries once country-specific effects are incorporated (Quah, 1996). Similarly, Elbadawi, et al (1997) argue that one advantage of a random effects model is that it enables one to estimate variables that are constant over time, and hence no information is lost. In other words, the random effects model captures all the information on all the individual units and all the variables, even those that do not vary over time (p. 56).

4.2. A Formal specification of the empirical model

The fixed effects model may be expressed as follows (see, Greene, 2003, among others):

$$Y_{i,t} = \chi'_{i,t}\,\underline{\beta} + \mu_{i,t} \qquad (15)$$

$$= \chi'_{i,t}\,\underline{\beta} + \alpha_i + \varepsilon_{i.t} \qquad (15a)$$

$$= \alpha_i + \chi'_{i,t}\,\underline{\beta} + \varepsilon_{i.t} \qquad (15b)$$

Where,

individuals: i = 1, ... n,

time t = 1,....., T, and

$\chi'_{it} = (\chi_{it1}\ \chi_{it2}\ ....\chi_{itk})$

- "i", indicates that a variable may vary over individuals,
- "t" indicates that it may vary over time
- Y_{it} : = endogenous variable of individual i in period t
- χ'_{it} = is a vector of K regressors of individual i in time period t
- μ_{it} = is the error term of individual i in time period t and is made up by two terms: a random component that varies over individuals and time (ε_{it}), which is iid (identically and independently distributed) and unknown individual-specific constant referred to as fixed effect (α_i), which does not change over time.
- $\underline{\beta}$ is the unknown parameter vector of the regressors

Assumptions about the error terms and the fixed effects

$$E(\varepsilon_{i,t}) = 0$$
$$V(\varepsilon_{i,t}) = \sigma^2$$
$$Cov(\varepsilon_{i,t}, \varepsilon_{j,t}) = 0$$
$$Cov(\varepsilon_{i,t}, \varepsilon_{i,s}) = 0$$
$$Cov\left(\varepsilon_{i,t}, \underset{-}{\chi}_{i,t}\right) = 0$$

5. Data description and samples

Any empirical research on developing countries almost always suffers from at least two problems. One problem is the absence of long period data for the vast majority of LDCs. The second problem is the reliability of the existing data since most developing countries data record is highly limited, which implies that the results of such analyses should always be interpreted with caution. Fortunately, the debt data are, exceptionally, among the most reliable ones, since they are recorded both by creditors and debtors. The most problematic data sources are the government budget deficit, private investment, and capital flight. Since data on private investment is missing for many of the countries under investigation (where the problem becomes even more serious in the last period, 1994-99), measuring the disincentive effects of the debt overhang was not possible.

The data comprises of 60 developing countries (the only criteria being data availability) and the time period considered is 1982-99 with three periods and five-year interval panel. The reason for beginning from 1982 and not earlier is linked to data problem for many developing countries in the early 1980s. For time-specific effects, the whole period is broken into the period of growing external debt (1982-87), the period of stagnating external debt (1988-93), and the period of declining external debt and the periods of financial crises (1994-99).This classification is almost consistent with that of Easterly's (2002). The data sources are Global Development Finance 2000 (CD ROM) and World Development Indicators 2001 (CD ROM).

In order not to lose too many countries, I take the closest period indicator for some countries if data for a particular year was missing. Debt, capital flight, investment, and total government consumption were all deflated either by GDP or export to overcome the variation in country sizes. Most of the debt variables are deflated by export rather than by GDP for two years (Eaton, 1981): First, exports are the major foreign-exchange revenue for developing countries and therefore capture the impact of debt on foreign resource transfers. Second, data on exports are by far more reliable than that of GDP. Probably for the same reasons, Pattillo, et al (2002) also scaled debt variables by exports rather than by GDP.

Tables (1) and (2) present lists of the countries according to regional and indebtedness classifications, respectively. Table (3) contains the variables that are incorporated in the regression, their definitions, sources and expected signs of the corresponding coefficients. Table (4) indicates descriptive statistics. All debt variables (except the average total external debt to GDP ratio (TEDX), are initial values to minimize endogeneity problem. While all debt variables are scaled by exports, concessional, nonconcessional and private non-guaranteed and public and publicly guaranteed debts are all deflated by GDP. The reason for doing so is that, while the coefficients carried the same signs when deflated by exports their significances were ambiguous both in the fixed effects and random effects models.

One of the basic problems in debt analysis is the absence of data on the net present value (NPV) of external debt. In this respect, IMF (2003, p. 19) points out that "debt-stock indicators based on the NPV are more meaningful than those based on face value for the purpose of measuring and comparing the streams of future debt payments". This may also imply that the actual impact of the debt overhang may be biased if one uses total debt stock rather than NPV of the external debt. Unfortunately, the Global Development Finance, 2000 (CD-ROM) does not provide such information, and it was not possible to obtain such data from other sources. To iron this constraint out, I always include either total debt service payments to exports ratio or interest payments to exports ratio together with other debt stock indicators. This is also important because, as Claessens, et al (1997,

p. 247) argue, “to separate the debt overhang effect from the crowding out effect of debt, both the contemporaneous debt service and a variable capturing the burden of future debt service (such as the debt stock or present value of future debt service) should be incorporated into the regression”.

6. Regression results and the policy implications of this study

Two kinds of strategies are employed to empirically investigate the issue of external debt’s accountability on growth. The first one is the fixed effects versus the random effects approach. To distinguish which of the two models is more appropriate, the Hausman test is used (see, the value for Chi2 at the end of each table). For regression results where the Chi2 is close to zero, the fixed effects model is chosen, and the random effects otherwise. The results of the random and fixed effects models are presented in tables (5) to (10). In each table, columns (1) to (5) stand for the random effects model results while the last three columns (6) to (8) represent for the fixed effects model. I will turn to the results in just a moment. The second strategy is to use a cross-section pooled regression, which allows one to control for time-specific and indebtedness factors. The results are presented in tables (11) to (16). Table (17) provides the effects of each debt variable on growth, and the correlation matrices are presented in tables (18) to (23).

In all the regressions, except the capital flight and debt variables, other covariates that always appear in the augmented Solow growth framework are added. The government behavior is captured by total general government consumption (GGC). Though the budget deficit would be a better indicator, this was not materialized due to lack of data. The percentage change in the consumer price index (CPI) is included to capture the impact of macroeconomic instability on growth. The percentage change in the terms of trade (TOTG) is included to control for the exogenous shocks resulting from changes in export prices and other patterns of international trade, which give rise to welfare gain or loss. Apart from education, population and labor force growth, the percentage of time a country was at violent crisis (VIOL) is added to control for the impact of political instability on growth.

Moreover, the growth in the volume of exports is included for various reasons. One reason is because developing nations are dependent on their export revenue for growth. Second, since most poor nations' export revenues are vulnerable to changes both in external and internal factors, this may affect growth of real GDP per capita. Finally, as Hadjimichael, et al (1995), and Ghura, et al (1999), who also included the growth in the volume of exports in their growth regressions, argue, the growth of exports is an indirect measure of "export-oriented trade policies". As they point out, "such policies are conducive to faster growth because they promote competition, encourage learning-by-doing, improve access to trade opportunities, raise the efficiency of resource allocations, and enhance positive externalities resulting from access to improved technology"(p. 7).Although this is generally true, one should be careful of interpreting the results as endogeneity (reverse causality) may turn out to be a serious issue. I, therefore, run regressions with and without this variable. As shall be discussed later, the subsequent drop in the R^2 whenever the export growth is removed from the equation is remarkable, and in fact, most covariates turn out to be insignificant in regressions where export growth is dropped.

Now, turning to the results themselves, in table (5), I present the regression results that are similar to other previous empirical studies to make my own work comparable. The results indicate that past accumulated debt is negatively related to growth of real GDP per capita, suggesting the existence of a debt overhang phenomenon across developing countries, controlling for other variables, though the significance disappears once export growth is excluded. Other studies also found an inverse relation between past accumulated debt and growth of real GDP per capita, which include (Elbadawi, et al 1997; Mbawa, 2001; Pattillo, et al 2002; Were, 2001). In contrast to other studies, this paper does not show a significant (though a positive) relation between current debt ratio and growth of real GDP per capita. Similarly, like in other studies, I have not found a statistically significant negative relationship between total debt service ratio and growth of real GDP per capita, though this variable always bears the expected sign. I, therefore,

alternatively use interest payments as a proxy for the actual cost of foreign debt, even though these have not been statistically significant.

The growth rate of exports that I incorporated as a proxy both for openness and a key source of foreign exchange has been strongly significant, indicating that countries with strong export performance have also enjoyed enormous economic growth, though this may also be an indication of endogeneity problem. For instance, past accumulated debt negatively impacts on growth only after controlling for the growth rate of exports. This is true both for the fixed effects (FE) and random effects (RE) models. I, therefore, run a separate regression with and without export growth. The drop in the R^2 is quite dramatic when the growth in the volume of exports is taken out from the regression. The variables CPI and GGC included to control for macroeconomic instability and the fiscal behavior of a government, indicate that while inflation discourages growth (though not significant), government consumption (GGC) hinder growth only when the growth of exports is excluded as a regressor. In contrast, while the TOT, included to control for exogenous shocks, negatively impacts on growth through the loss of the purchasing power of exports, it becomes statistically insignificant once the growth rate of exports is removed from the regression.

Apart from the level of investment that induces growth both in the RE and FE models, the impact of other traditional determinants of growth that appear in the framework of the Solow model has remained unequivocal. The growth rate of the population has a negative impact on growth both in the RE model and FE model, though it is insignificant in the later model. The growth of the labor force plays a significant positive role in growth in the RE while it turns insignificant in the FE model. The secondary school enrollment used as a proxy for human capital accumulation has no significant impact on growth, although it has the expected sign (except columns 3 and 4 of the RE models). This however, should not be interpreted to mean that schooling contributes negatively to growth. Rather, it may be due largely to the fact that education may be correlated with other regressors or measured with errors. The violent crisis incorporated as a proxy for political instability indicates that it harms growth of real GDP per capita. CFLGDP used

to capture the impact of capital flight on growth of real GDP per capita, indicates that its retards growth both in the RE and FE, despite the fact it is not statistically significant. This, to a large extent could be due to measurement errors and correlation between other regressors, although I used initial values. The dummy for HIPCs has a negative and statistically significant coefficient, suggesting that the HIPCs countries grew slower than those of no-HIPCs counterparts. Nevertheless, the R^2 has changed very marginally when HIPCs dummy is added or removed.

The time period dummies also suggest that the periods 1988-93 and 1994-99 were worse in terms of growth relative to the first period 1982-87. Hence, countries received resources in the first period, during which they experienced economic growth, while debt service stepped in the second and third periods, which penalizes growth, either through the debt overhang effect or liquidity effect or both. Moreover, the worsening situation of economic growth in the third period might also suggest that the financial crisis in Latin America, and especially in Asia, dramatically slowed down the then miraculously growing East Asian countries. Controlling for debt variables, log of initial income per capita, and other variables, there was evidence for conditional convergence across developing countries both in RE and FE models as indicated by a statistically significant inverse relationship between GDP per capita growth (LGDPG) and log of its initial level (LGDPI).

Turning to the main focus of this paper, the regression results, once total external debt stock is decomposed, suggest several things. Table (6) presents the results of regression whereby total external debt is decomposed according to maturity structure. From the regression results, while the initial short term debt to export ratio (STDXI) component of the total debt stock (TED) negatively impacts on growth, the initial long term debt to exports ratio (LTDXI) component of TED induces economic growth. This is true both in the RE and FE models, despite the insignificance of LTDXI in the later once the export growth is included. While long term debt helps countries that are suffering from capital deficiency and therefore, are away from their steady states to finance their long term investment, short term borrowing turns out to be unproductive. The STDXI variable is

indeed the most robust debt variable which bears the expected signs in all the regressions. As was argued earlier, this in fact, indicates that short term debt ruins growth through various channels: First, countries often borrow short term debt at higher interest rates to finance their long term debt with lower interest rates leading to the so-called "circular financing". Second, short term capital inflows often have a speculative character and in the context of developing countries, they are often the root cause of capital flight. Thirdly, short term capital flows might serve as tax on exports through the appreciation of the domestic currency.

The dummy for HIPCs has a negative and statistically significant coefficient in all regressions, again suggesting that this group of countries has done worse than than its non-HIPCs counterparts. This result then supports the recent heated debate about debt relief under HIPCs initiative. Debt relief for this group of countries might help them to reverse their sluggish growth performance.

Table (7) presents the regression results after total debt stock is decomposed according to the type of debtors. The results seem to indicate that debts that were channeled to the private sector enduce economic growth, while the part of the external debt used to inject the public sector punishes economic growth. This is consistent with what Alejandro (1984) argues; that debt used to finance the private sector ends up financing profitable projects and hence would not impose a debt service burden while the opposite holds for the public sector. Table (8) presents the results of the regression once total debt stock is decomposed according to concessionality The results indicate that while the non-concessional component of the external debt punishes economic growth (through a debt overhang and or liquidity effects), the concessional counterpart remains insignificant, though have the expected sign in the RE, but a wrong sign in the FE model.

In table (9) I present the regression results when debt is decomposed into various other sources. Borrowing from the International Bank for Reconstruction and Development to exports ratio (IBRDXI), is included to capture the impact of market based loans. Loans from International Development Association to exports ratio (IDAXI) is used as proxy

for foreign aid and partly concessional lending and loans from IMF to exports ratio (IMFXI) is included to capture loans in exchange for policy (which may also be an indirect measure of the impact the structural adjustment program).The results indicate that while both loans from the World Bank and IDA induce growth (the latter being highly significant in both RE and FE models, though it is insignificant in the FE model, when export growth is added), loans from the IMF retard growth probably indicating the failure of the IMF adjustment program in most developing countries, notably those in Sub-Saharan Africa.

The attempt was to decompose total external debt into bilateral and multilateral sources to ascertain whether the kind of creditors matters for growth. The regression results in table (10) suggest that while BLATX has failed to contribute positively to growth, having either a negative or insignificant signs, loans from multilateral sources have a positive and statistically significant impact on growth, despite their insignificance in the FE model once export is removed from the equation. Since in this case, the Hausman test is in favor of the RE model, this may suggest several things. First, bilateral debt is strategically and politically driven rather than policy or poverty focused. Therefore, its impact on growth should be ambiguous at best. In contrast, MLATX should promote growth because it is to a large extent policy or poverty driven and is often accompanied by low interest rates.[20]

The policy implications of this study

The results in this work suggest four implications for policy-makers: First, it may be in the interest of the national governments in developing countries to promote the private sector and channel more resources into it, if long-run economic growth is to be achieved. In addition, this may call for the privatization of inefficient state parastatals that are deemed to be loss-making for longer years in developing countries. Second, the results also indicate that loans from the IMF have been miserably ineffective in terms of

[20] For the broader discussion on the debate of the impact of aid on economic growth, see, Burside and dollar (2000), Hansen and Tarp (2001), and Alesina and Dollar (1998). Alesina and Dollar (1998) in particular indicate that bilateral aid is directed towards countries that are strategically more significant than towards those that excercise democracy or other policies.

achieving long-term growth. Although most of the LDCs have been undergoing these tough structural adjustment programs, the results of the past two decades indicate that the adjustment efforts have not been translated into growth. The IMF, therefore, as many argue, needs to adopt more flexible and workable approaches that are relevant to the economic and institutional parameters of LDCs. Third, a clear negative impact on growth of short-tern capital inflows seem to suggest that there is an urgent need for the adoption of better strategies in channeling scarce resources into projects that generate higher rate of returns. Neglecting the problem of massive short term flows could keep poor nations in a 'circular financing' vicious circle situation. Moreover, to prevent capital outflows in the form of capital flight, developing countries' policy makers need to exercise policies that lead to macroeconomic stability, sound debt management, property-right security, and transparency. Such polices may not only prevent capital flight but also may help achieve capital flight reversal. Finally, if the industrialized world was sincere in helping poor countries, there should be a shift from the current practice of foreign aid that is strategically and politically motivated towards an aid strategy that is aimed at poverty reduction and stabilization. Without genuine policy changes both in developing and developed countries, debt relief alone will not guarantee a sustainable global economic recovery in the decades ahead.

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Appendix to Chapter IV.

Table (1)

List of Countries included in the regression according to their regions

Africa	**Latin America and the Caribbean**	**Asia and the Pacific**
Botswana	Argentina	Bangladesh
Burkina Faso	Belize	India
Cameroon	Bolivia	Indonesia
Chad	Brazil	Jordan
Congo, Rep.	Chile	Korea, Rep.
Cote d'Ivoire	Colombia	Malaysia
Ethiopia	Costa Rica	Pakistan
Gabon	Dominican Republic	Papua New Guinea
Gambia, The	El Salvador	Philippines
Ghana	Guatemala	Sri Lanka
Kenya	Haiti	Thailand
Lesotho	Honduras	
Madagascar	Jamaica	
Malawi	Mexico	
Mauritania	Nicaragua	
Mauritius	Panama	
Morocco	Paraguay	
Mozambique	Peru	
Niger	Trinidad and Tobago	
Nigeria	Uruguay	
Rwanda	Venezuela, RB	
Senegal		
Sierra Leone		
Swaziland		
Togo		
Tunisia		
Uganda		
Zimbabwe		

Table (2)

List of countries included in the regression (according to their degree of indebtedness)

Non-Heavily Indebted Countries (Non-HIPCs)		**Heavily Indebted Countries (HIPCs)**
Argentina	Morocco	Bolivia
Bangladesh	Nigeria	Burkina Faso
Belize	Pakistan	Cameroon
Botswana	Panama	Chad
Brazil	Papua New Guinea	Congo, Rep.
Chile	Paraguay	Cote d'Ivoire
Colombia	Peru	Ethiopia
Costa Rica	Philippines	Ghana
Dominican Republic	Sri Lanka	Honduras
El Salvador	Swaziland	Kenya
Gabon	Thailand	Madagascar
Gambia, The	Trinidad and Tobago	Malawi
Guatemala	Tunisia	Mauritania
Haiti	Uruguay	Mozambique
India	Venezuela, RB	Nicaragua
Indonesia	Zimbabwe	Niger
Jamaica		Rwanda
Jordan		Senegal
Korea, Rep.		Sierra Leone
Lesotho		Togo
Malaysia		Uganda
Mauritius		
Mexico		

Table (3)

Definitions and sources of the variables included in the regression[a]

Variable	**Definition**	**Source**	**Expected sign**
LGDPG	Growth rate of log of real GDP per capita (PPP-adjusted and Calculated as: (Ln(GDPt/GDPt-1)/N)*100, where N is number of years.	World Bank World Development Indicators (WBWDI), 2001(CD-ROM)	Dependent variable
LGDPI	Log of Initial GDP per capita (PPP-adjusted)	WBWDI, 2001(CD-ROM)	(-)
LGCF	Log of average investment to GDP ratio	WBWDI, 2001(CD-ROM)	(+)
GGC	Average general government consumption to GDP ratio	WBWDI, 2001(CD-ROM)	(-)
LEXG	Log of export growth (constant 1995 prices)	WBWDI, 2001(CD-ROM)	(+)
POPG	The log of the growth rate of the population (ln(n+g+δ))	WBWDI, 2001(CD-ROM)	(-)
LFG	Log of the growth rate of the labor force	WBWDI, 2001(CD-ROM)	(+)
CPI	The percentage change in the Consumer price index	WBWDI, 2001 (CD-ROM)	(-)
TOT	The percentage change in the terms of trade	Database for Global Development Network, The World Bank	(+)
LSCHLI	Log of initial total secondary-school enrolments	WBWDI, 2001(CD-ROM)	(+)
CFLGDPI	Capital fight to GDP calculated using 'sources-uses' method: (change in debt + foreign direct investment)-(current account deficit + change in reserves)	WBWDI, 2001 and Global Development Finance (WBGDF) 2000 (CD-ROM)	(-)
TEDX	Total external debt to GDP ratio	WBGDF, 2001	(+)
TEDXL2	The square of initial TEDX	WBGDF, 2000	(-)
STDXI	Total short term debt to exports ratio (Short-term external debt is defined as debt that has an original maturity of one year or less.).	WBGDF, 2000 (CD-ROM)	(-)
LTDXI	Long term debt to GDP ratio (Long-term external debt is defined as debt that has an original or extended maturity of more than one year and that is owed to	WBGDF, 2000 (CD-ROM)	(+)

	nonresidents and repayable in foreign currency, goods, or services.).		
TPDGDPI	Total private non-guaranteed debt to GDP ratio (Private non-guaranteed long-term debt outstanding and disbursed (LDOD) is an external obligation of a private debtor that is not guaranteed for repayment by a public entity).	WBGDF, 2000 (CD-ROM)	(+)
PPGGDPI	Total public and publicly guaranteed debt to GDP ratio (Public debt is an external obligation of a public debtor, including the national government, a political subdivision (or an agency of either), and autonomous public bodies. Publicly guaranteed debt is an external obligation of a private debtor that is guaranteed for repayment by a public entity)	WBGDF 2000 (CD-ROM) and WBWDI 2001 (CD-ROM)	(-)
CONCGDPI	Concessional debt to GDP ratio (Concessional debt is defined as loans with an original grant element of 25 percent or more.)	WBGDF 2000 (CD-ROM) and WBWDI 2001 (CD-ROM)	(+)
NCONCGDPI	Nonconcesional debt to GDP ratio	Global Development Finance 2000 (CD-ROM	(-)
BLTXI	Bilateral debt to exports ratio (Public and publicly guaranteed bilateral debt includes loans from governments and their agencies (including central banks), loans from autonomous bodies, and direct loans from official export credit agencies)).	WBGDF, 2000 (CD-ROM) and WBWDI, 2001 (CD-ROM)	(-)
MLTXI	Multilateral debt to exports ratio (Public and publicly guaranteed multilateral loans include loans and credits from the World Bank, regional development banks, and other multilateral and intergovernmental agencies. Excluded are loans from funds administered by an international organization on behalf of a single	WBGDF 2000 (CD-ROM) and WBWDI, 2001 (CD-ROM)	(+)

	donor government)		
IBRDXI	Loans from the International Bank for Reconstruction and development to Exports ratio (IBRDX) and is nonconcessional	WBGDF 2000 (CD-ROM) and WBWDI, 2001 (CD-ROM)	(?)
IDAXI	Loans from the International development association to Exports ratio (Public and publicly guaranteed debt outstanding from the International Development Association (IDA) is concessional.)	WBGDF 2000 (CD-ROM) and WBWDI, 2001 (CD-ROM)	(+)
IMFXI	Use of IMF credit to exports ratio	WBGDF 2000 (CD-ROM) and WBWDI, 2001 (CD-ROM)	(-)
TDSXI	Total debt service to exports ratio	WBGDF 2000 (CD-ROM)	
INTXI	Interest payments to exports ratio	WBGDF 2000 (CD-ROM)	
HIPC	Heavily indebted poor country (=1 if HIPC and 0, otherwise)		(-)
VIOL	The percentage of period a country is at violent conflict.	The Stockholm international peace research institute (SIPRI) http://first.SIPRI.org	(-)
Period dummies	1982-87, 1988-93, and 1994-99		

[a.] Note: all debt variables except (TEDX) are initial values to minimize possible endogeneity problem.

Table (4)

Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
LGDPG	**180**	**3.205**	**3.246**	**-10.387**	**14.152**
LGDPI	**180**	**7.717**	**0.827**	**6.032**	**9.553**
CFLGDPI	**180**	**5.244**	**15.831**	**-37.352**	**113.468**
LEXPG	**180**	**0.184**	**0.244**	**-0.804**	**0.89**
TEDX	**180**	**297.938**	**332.475**	**18**	**3000**
TDSXI	**180**	**22.315**	**11.653**	**2.406**	**66.675**
GGC	**180**	**15.826**	**5.919**	**0.786**	**36.374**
LGCF	**180**	**3.133**	**0.381**	**1.954**	**4.198**
CPI	**179**	**54.919**	**223.227**	**-2.739**	**1792.04**
TOT	**180**	**-0.024**	**11.161**	**-34.148**	**114.325**
LPOP	**180**	**1.936**	**0.687**	**0.261**	**4.801**
LFG	**177**	**1.795**	**0.826**	**0.344**	**5.177**
LSCHLI	**180**	**3.371**	**0.742**	**1.099**	**4.582**
INTXI	**180**	**11.118**	**8.491**	**0.1**	**57.59**
STDXI	**180**	**41.638**	**59.842**	**0**	**479**
LTDXI	**180**	**303.85**	**380.996**	**25**	**2526**
TPDGDPI	**180**	**3.809**	**7.985**	**0**	**72.879**
PPGGDPI	**180**	**60.330**	**70.723**	**3.461**	**760.357**
BLATXI	**179**	**111.662**	**219.714**	**1.595**	**1666.061**
MLATXI	**179**	**87.651**	**162.688**	**0.753**	**1788.468**
IDAXI	**179**	**39.908**	**107.650**	**0**	**1124.79**
IBRDXI	**179**	**12.676**	**13.097**	**0**	**82.558**
IMFXI	**180**	**15.586**	**23.671**	**0**	**160.712**
CONCGDPI	**180**	**27.807**	**34.818**	**0.03**	**216.765**
NCONCGDPI	**180**	**34.818**	**36.239**	**0.329**	**316.085**
VIOL	**179**	**0.186**	**0.366**	**0**	**1**

A. Random and Fixed effects models (1982-99)

Table (5)
The impact of past and current total external debt on growth of real GDP per capita of (controlling for other variables)(1982-99)

	Random effects model					Fixed effects model		
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**2.987 (1.05)**	**6.619** (2.02)**	**2.645 (0.72)**	**8.798** (2.02)**	**5.822* (1.78)**	**50.23*** (4.83)**	**67.53*** (5.89)**	**49.88*** (4.73)**
LGDPI	**-0.692* (-1.87)**	**-1.02*** (-2.58)**	**-0.811* (-1.68)**	**-1.36*** (-2.66)**	**-0.923** (-2.31)**	**-7.127 (-5.33)**	**-9.88*** (-6.87)**	**-6.96*** (-5.08)**
CFLGDPI	**-0.016 (-1.29)**	**-0.014 (-1.12)**	**-0.006 (-0.39)**	**-0.003 (-0.20)**	**-0.012 (-0.99)**	**-0.013 (-1.01)**	**-0.011 (-0.69)**	**-0.011 (-0.84)**
LEXPG	**7.309*** (9.87)**	**7.086*** (9.59)**			**6.994*** (9.42)**	**4.968**** (5.80)**		**5.054*** (5.85)**
TEDX2	**-5.5e-07** (-1.99)**	**-5.12e-07* (-1.87)**	**-9.95e-08 (-0.29)**	**-5.36e-08 (-0.16)**	**-5.18e-07* (-1.90)**	**-5.68e-07* (-1.91)**	**-1.64e-07 (-0.44)**	**-6.6e-07** (-2.00)**
TEDX	**0.001 (1.13)**	**0.01 (1.38)**	**0.0005 (0.51)**	**0.0009 (0.86)**	**0.001 (1.46)**	**0.002 (1.33)**	**0.002 (1.26)**	**0.001 (0.91)**
TDSX	**-0.025 (-1.40)**	**-0.192 (-1.05)**	**-0.034 (-1.45)**	**-0.023 (-1.02)**		**-0.065* (-1.91)**	**-0.094** (-2.44)**	
INTX					**-0.036 (-1.44)**			**-0.052 (-1.30)**
GGC	**-0.021 (-0.65)**	**-0.019 (-0.58)**	**-0.095** (-2.26)**	**-0.087** (-2.11)**	**-0.026 (-0.79)**	**-0.091 (-1.50)**	**-0.099 (-1.42)**	**-0.095 (-1.74)**
LGCF	**2.145*** (3.64)**	**1.891*** (3.17)**	**3.395*** (4.57)**	**2.916*** (3.90)**	**1.940*** (3.31)**	**2.195** (2.19)**	**3.502*** (3.11)**	**2.179** (2.15)**
CPI	**-0.001 (-1.45)**	**-0.001 (-1.50)**	**-0.001 (-1.07)**	**-0.001 (-1.14)**	**-0.001 (-1.54)**	**-0.001 (-1.19)**	**-0.001 (-0.83)**	**-0.0009 (-0.94)**
TOTG	**0.026*** (2.83)**	**0.027*** (2.92)**	**0.006 (0.55)**	**0.008 (0.71)**	**0.027*** (2.94)**	**0.208** (2.07)**	**0.005 (0.52)**	**0.022** (2.19)**
POPG	**-1.47*** (-3.17)**	**-1.32*** (-2.84)**	**-1.62*** (-2.72)**	**-1.36*** (-2.30)**	**-1.29*** (-2.78)**	**-0.678 (-0.93)**	**0.128 (0.16)**	**-0.739 (-1.01)**
LFG	**1.212** (2.46)**	**1.142** (2.33)**	**1.612*** (2.57)**	**1.465** (2.38)**	**1.125** (2.31)**	**0.0461 (0.73)**	**0.060 (0.08)**	**0.480 (0.75)**
SCHL	**0.151 (0.38)**	**0.073 (0.19)**	**-0.0005 (-0.00)**	**-0.135 (-0.26)**	**0.064 (0.17)**	**1.112 (0.92)**	**1.121 (0.81)**	**0.664 (0.56)**
VIOL	**-0.298 (-0.62)**	**-0.510 (-1.05)**	**-0.239 (-0.38)**	**-0.579 (-0.93)**	**-0.527 (-1.11)**	**-1.446* (-1.82)**	**-1.697* (-1.85)**	**-1.432* (-1.78)**
PD2	**-1.025 (-1.30)**	**-1.003 (-1.28)**	**-0.632 (-0.63)**	**-0.624 (-0.64)**	**-1.091 (-1.40)**	**-0.372 (-0.39)**	**-0.178 (-0.16)**	**-0.217 (-0.23)**
PD3	**-3.23*** (-6.98)**	**-2.99*** (-6.35)**	**-3.36*** (-5.75)**	**-2.94*** (-4.99)**	**-3.11*** (-6.42)**	**-0.591 (-0.67)**	**0.655 (0.66)**	**-0.437 (-0.48)**
HIPC		**-1.264** (-2.14)**		**-2.15*** (-2.83)**	**-1.20** (-2.06)**			
N	**175**	**175**	**175**	**175**	**175**	**175**		**175**
R2	**0.58**	**0.60**	**0.33**	**0.38**	**0.60**	**0.69**	**0.59**	**0.69**
Chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**			

- The numbers in parentheses are t-Statistics (two-tailed).
- *. Significance at 10% level.
- **. Significance at 5% level.
- ***. Significance at 1% level
- Dependent variable is: log of the growth rate of GDP per capita and this applicable for all tables.

Table (6)

The Impact of Short term and long term debt debts on growth of real GDP per capita (controlling for other variables) (1982-99)

	Random effects model				Fixed effects model			
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**2.359** **(0.88)**	**5.425*** **(1.74)**	**-0.401** **(-0.12)**	**4.769** **(1.23)**	**5.044** **(1.63)**	**50.67***** **(4.87)**	**63.31***** **(5.60)**	**50.27***** **(4.79)**
LGDPI	**-0.534** **(-1.53)**	**-0.816**** **(-2.15)**	**-0.352** **(-0.80)**	**-0.825*** **(-1.74)**	**-0.784**** **(-2.05)**	**-6.54***** **(-4.80)**	**-8.47***** **(-5.78)**	**-6.43***** **(-4.68)**
CFLGDPI	**-0.015** **(-1.23)**	**-0.013** **(-1.05)**	**-0.009** **(-0.63)**	**-0.006** **(-0.42)**	**-0.012** **(-1.02)**	**-0.008** **(-0.62)**	**-0.004** **(-0.25)**	**-0.007** **(-0.57)**
LEXPG	**6.473***** **(8.81)**	**6.29***** **(8.58)**			**6.27***** **(8.48)**	**4.43***** **(5.16)**		**4.55***** **(5.25)**
STDXI	**-0.01***** **(-4.05)**	**-0.01***** **(-3.85)**	**-0.02***** **(-4.41)**	**-0.02***** **(-4.13)**	**-0.01***** **(-3.70)**	**-0.02***** **(-2.96)**	**-0.02***** **(-2.93)**	**-0.02***** **(-3.00)**
LTDXI	**0.016**** **(2.35)**	**0.001**** **(2.43)**	**0.003***** **(4.27)**	**0.003***** **(4.33)**	**0.001**** **(2.39)**	**0.002** **(1.40)**	**0.003**** **(2.50)**	**0.002** **(1.30)**
TDSX	**-0.018** **(-1.16)**	**-0.012** **(-0.75)**	**-0.033*** **(-1.68)**	**-0.023** **(-1.13)**		**-0.031** **(-1.09)**	**-0.058*** **(-1.84)**	
INTX					**-0.016** **(-0.67)**			**-0.011** **(-0.30)**
GGC	**-0.034** **(-1.13)**	**-0.031** **(-1.01)**	**-0.09***** **(-2.65)**	**-0.904**** **(-2.43)**	**-0.032** **(-1.04)**	**-0.115*** **(-1.89)**	**-0.136**** **(-2.01)**	**-0.113*** **(-1.83)**
LGCF	**1.903***** **(3.45)**	**1.688***** **(3.01)**	**2.961***** **(4.43)**	**2.574***** **(3.80)**	**1.738***** **(3.14)**	**1.649*** **(1.66)**	**2.930***** **(2.72)**	**1.601** **(1.59)**
CPI	**-0.001** **(-1.23)**	**-0.001** **(-1.21)**	**-0.001** **(-1.41)**	**-0.001** **(-1.36)**	**-0.001** **(-1.22)**	**-0.001** **(-1.29)**	**-0.001** **(-1.34)**	**-0.001** **(-1.20)**
TOTG	**0.025***** **(2.83)**	**0.026***** **(2.92)**	**0.007** **(0.70)**	**0.009** **(0.86)**	**0.026***** **(2.95)**	**0.018*** **(1.82)**	**0.002** **(0.27)**	**0.018*** **(1.85)**
POPG	**-1.39***** **(-3.15)**	**-1.27***** **(-2.87)**	**-1.52***** **(-2.78)**	**-1.318**** **(-2.43)**	**-1.25***** **(-2.82)**	**-0.791** **(-1.06)**	**-0.417** **(-0.50)**	**-0.858** **(-1.15)**
LFG	**1.116**** **(2.35)**	**1.062**** **(2.25)**	**1.382***** **(2.38)**	**1.275**** **(2.23)**	**1.051**** **(2.23)**	**0.411** **(0.66)**	**0.016** **(0.02)**	**0.426** **(0.68)**
SCHL	**0.409** **(1.09)**	**0.332** **(0.88)**	**0.449** **(0.95)**	**0.313** **(0.66)**	**0.302** **(0.81)**	**0.364** **(0.30)**	**0.177** **(0.13)**	**0.094** **(0.08)**
VIOL	**-0.167** **(-0.37)**	**-0.351** **(-0.76)**	**-0.013** **(-0.02)**	**-0.305** **(-0.53)**	**-0.382** **(-0.84)**	**-1.029** **(-1.28)**	**-1.130** **(-1.26)**	**-0.985** **(-1.22)**
PD2	**-1.441*** **(-1.87)**	**-1.393*** **(-1.82)**	**-1.561*** **(-1.61)**	**-1.445** **(-1.56)**	**-1.410*** **(-1.84)**	**-0.573** **(-0.59)**	**-0.752** **(-0.70)**	**-0.479** **(-0.49)**
PD3	**-3.57***** **(-7.75)**	**-3.36***** **(-7.14)**	**-4.02***** **(-7.24)**	**-3.65***** **(-6.45)**	**-3.37***** **(-6.98)**	**-0.842** **(0.91)**	**-0.218** **(-0.21)**	**-0.688** **(-0.72)**
HIPC		**-1.029*** **(-1.87)**		**-1.70***** **(-2.50)**	**-1.031*** **(-1.90)**			
N	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**
R2	**0.60**	**0.61**	**0.42**	**0.45**	**0.61**	**0.70**	**0.62**	**0.69**
Chi2	**0.000**	**0.004**	**0.000**	**0.000**	**0.019**			

Table (7)

The impact of private non-guaranteed debt (TPDGDP) and total public and publicly guaranteed debt (PPDGDP) on growth of real GDP per capita (controlling for other variables) (1982-99)

	Random effects model				Fixed effects model			
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**5.329** (1.98)	**8.513*** (2.65)	**-1.156** (-2.41)	**9.854** (2.43)	**7.814** (2.49)	**57.08*** (5.61)	**74.26*** (6.56)	**55.71*** (5.46)
LGDPI	**-1.112*** (-2.96)	**-1.381*** (-3.44)	**4.399** (-2.41)	**-1.611*** (-3.17)	**-1.286*** (-3.21)	**-8.024*** (-6.21)	**-10.78*** (-7.71)	**-7.757*** (-6.00)
CFLGDPI	**-0.017** (-1.24)	**-0.016** (-1.17)	**-0.0001** (-0.02)	**0.0006** (0.04)	**-0.015** (-1.12)	**-0.021** (-1.32)	**-0.014** (-0.74)	**-0.018** (-1.14)
LEXPG	**7.044*** (9.85)	**6.878*** (9.61)			**6.789*** (9.44)	**5.027*** (6.00)		**5.078*** (6.01)
TPDGDPI	**0.047*** (1.87)	**0.048*** (1.90)	**0.039** (1.21)	**0.040** (1.25)	**0.049** (1.98)	**0.074*** (1.82)	**0.044** (0.94)	**0.069*** (1.70)
PPDGDPI	**-0.006** (-2.11)	**-0.005*** (-1.70)	**-0.006** (-1.63)	**0.004** (-1.10)	**-0.005** (-1.59)	**-0.009** (-2.31)	**-0.006** -(.44)	**-0.009** (-2.39)
TDSX	**-0.024** (-1.37)	**-0.018** (-1.02)	**-0.030** (-1.37)	**-0.020** (-0.90)		**-0.045** (-1.63)	**-0.067** (-2.11)	
INTX					**-0.033** (-1.33)			**-0.037** (-1.07)
GGC	**-0.015** (-0.49)	**-0.013** (-0.42)	**-0.082** (-2.04)	**-0.075*** (-1.89)	**-0.020** (-0.61)	**-0.088** (-1.43)	**-0.100** (-1.41)	**-0.095** (-1.50)
LGCF	**2.041*** (3.51)	**1.787*** (3.00)	**3.333*** (4.62)	**2.855*** (3.86)	**1.821*** (3.13)	**2.009** (2.00)	**3.441*** (3.04)	**2.043** (2.01)
CPI	**-0.0008** (-1.11)	**-0.0007** (-1.04)	**-0.0007** (-0.74)	**-0.0006** (-0.64)	**-0.0008** (-1.06)	**-0.0006** (-0.75)	**-0.0001** (-0.16)	**-0.0006** (-0.79)
TOTG	**0.031*** (3.29)	**0.031*** (3.34)	**0.009** (0.84)	**0.011** (0.95)	**0.031*** (3.37)	**0.024** (2.47)	**0.007** (0.71)	**0.025** (2.53)
POPG	**-1.45*** (-3.16)	**-1.34*** (-2.90)	**-1.67*** (-2.87)	**-1.466** (-2.52)	**-1.30*** (-2.85)	**-0.751** (-1.06)	**0.183** (0.23	**-0.855** (-1.21)
LFG	**1.348*** (2.76)	**1.286*** (2.64)	**1.796*** (2.91)	**1.661*** (2.72)	**1.265*** (2.61)	**0.714** (1.14)	**0.188** (0.26)	**0.743** (1.18)
SCHL	**0.440** (1.08)	**0.351** (0.86)	**0.193** (0.38)	**0.046** (0.09)	**0.336** (0.84)	**1.074** (0.91)	**1.050** (0.76)	**0.740** (0.63)
VIOL	**-0.374** (-0.77)	**-0.529** (-1.08)	**-0.346** (-0.56)	**-0.607** (-0.98)	**-0.541** (-1.14)	**-1.205** (-1.53)	**-1.633*** (-1.80)	**-1.181** (-1.49)
PD2	**-0.525** (-0.67)	**-0.512** (-0.66)	**-0.083** (-0.08)	**-0.098** (-0.10)	**-0.604** (-0.77)	**0.767** (0.81)	**0.753** (0.69)	**0.796** (0.83)
PD3	**-2.94*** (-6.30)	**-2.75*** (-5.83)	**-3.04*** (-5.17)	**-2.73*** (-4.60)	**-2.87*** (-5.87)	**0.301** (0.37)	**1.558*** (1.70)	**0.299** (0.36)
HIPC		**-1.055*** (-1.78)		**-1.813** (-2.43)	**-1.011*** (-1.73)			
N	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**
R2	**0.59**	**0.60**	**0.33**	**0.37**	**0.60**	**0.70**	**0.59**	**0.69**
Chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**			

Table (8)

The impact of total concessional (CONCGDP) and total non-concessional (NCONCGDPI) debts on growth of real GDP per capita (controlling for other variables) (1982-99

	Random effects model				Fixed effects model			
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**2.394 (0.87)**	**5.348* (1.68)**	**1.437 (0.41)**	**6.403 (1.58)**	**5.209* (1.66)**	**54.87*** (5.25)**	**72.96*** (6.41)**	**53.68*** (5.14)**
LGDPI	**-0.696* (-1.85)**	**-0.934** (-2.35)**	**-0.758 (-1.57)**	**-1.153** (-2.29)**	**-0.897** (-2.24)**	**-7.778*** (-5.60)**	**-10.63*** (-7.17)**	**-7.514*** (-5.44)**
CFLGDPI	**-0.007 (-0.57)**	**-0.007 (-0.54)**	**0.010 (0.61)**	**0.009 (0.61)**	**-0..007 (-0.53)**	**-0.004 (-0.26)**	**-0.002 (-0.14)**	**-0.002 (-0.19)**
LEXPG	**6.877*** (9.57)**	**6.723*** (9.37)**			**6.698*** (9.28)**	**4.787*** (5.69)**		**4.849*** (5.73)**
CONCGDPI	**0.006 (0.90)**	**0.008 (1.17)**	**0.008 (0.92)**	**0.012 (1.30)**	**0.008 (1.18)**	**-0.009 (-0.72)**	**-0.008 (-0.54)**	**-0.007 (-0.54)**
NCONGDPI	**-0.01*** (-3.10)**	**-0.013*** (-2.83)**	**-0.017*** (-2.96)**	**-0.015** (-2.61)**	**-0.012*** (-2.70)**	**-0.014* (-1.84)**	**-0.011 (-1.20)**	**-0.016** (-2.12)**
TDSX	**-0.008 (-0.47)**	**-0.002 (-0.14)**	**-0.013 (-0.62)**	**-0.004 (-0.19)**		**-0.032 (-1.11)**	**-0.058* (-1.77)**	
INTX					**-0.01 (-0.42)**			**-0.021 (-0.61)**
GGC	**-0.012 (-0.39)**	**-0.011 (-0.37)**	**-0.075* (-1.90)**	**-0.071* (-1.82)**	**-0.014 (-0.45)**	**-0.106* (-1.73)**	**-0.113 (-1.62)**	**-0.107 (-0.61)**
LGCF	**2.127*** (3.77)**	**1.867*** (3.22)**	**3.310*** (4.79)**	**2.871*** (4.00)**	**1.858*** (3.26)**	**2.389** (2.35)**	**3.669*** (3.24)**	**2.371** (2.32)**
CPI	**-0.0008 (-1.13)**	**-0.0008 (-1.07)**	**-0.0006 (-0.69)**	**-0.0005 (-0.61)**	**-0.0008 (-1.08)**	**-0.0006 (-0.73)**	**-0.0001 (-0.17)**	**-0.0006 (-0.71)**
TOTG	**0.026*** (2.77)**	**0.026*** (2.82)**	**0.006 (0.53)**	**0.007 (0.61)**	**0.026*** (2.81)**	**0.024** (2.43)**	**0.008 (0.78)**	**0.025** (2.48)**
POPG	**-1.38*** (-3.06)**	**-1.27*** (-2.80)**	**-1.63*** -(2.85)**	**-1.424** (-2.50)**	**-1.26*** (-2.79)**	**-0.622 (-0.86)**	**0.229 (0.28)**	**-0.739 (-1.03)**
LFG	**1.176** (2.43)**	**1.109** (2.30)**	**1.658*** (2.74)**	**1.518** (2.53)**	**1.101** (2.29)**	**0.601 (0.95)**	**0.139 (0.19)**	**0.619 (0.97)**
SCHL	**0.365 (0.94)**	**0.281 (0.72)**	**0.214 (0.43)**	**0.074 (0.15)**	**0.281 (0.73)**	**1.045 (0.84)**	**1.026 (0.72)**	**0.730 (0.60)**
VIOL	**-0.345 (-0.73)**	**-0.489 (-1.02)**	**-0.335 (-0.56)**	**-0.568 (-0.94)**	**-0.469 (-1.00)**	**-1.357* (-1.71)**	**-1.721* (-1.90)**	**-1.306 (-1.64)**
PD2	**-0.981 (-1.25)**	**-0.997 (-1.28)**	**-0.471 (-0.48)**	**-0.529 (-0.54)**	**-1.041 (-1.33)**	**0.408 (0.43)**	**0.580 (0.53)**	**0.421 (0.44)**
PD3	**-3.323*** (-6.60)**	**-3.182*** (-6.29)**	**-3.449*** (-5.48)**	**-3.207** (-2.38)**	**-3.246*** (-6.24)**	**0.108 (0.12)**	**1.467 (1.48)**	**0.075 (0.08)**
HIPC		**-1.033* (-1.79)**		**-1.736*** (-2.38)**	**-0.998* (-1.74)**			
N	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**
R2	**0.58**	**0.59**	**0.34**	**0.38**	**0.59**	**0.69**	**0.59**	**0.69**
Chi2	**0.000**	**0.000**	**0.000**	**0.000**				

Table (9)

The impact of IBRD (IBRDX), International Development Association (IDAX), and IMF (IMFX) debts on growth of real GDP per capita (controlling for other variables) (1982-99)

	Random effects model				Fixed effects model			
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**4.672** **(1.52)**	**8.27**** **(2.36)**	**1.668** **(0.44)**	**7.420***** **(1.73)**	**4.234** **(1.41)**	**51.87***** **(4.89)**	**62.14***** **(5.36)**	**50.49***** **(4.70)**
LGDPI	**-0.719*** **(-1.90)**	**-1.041**** **(-2.56)**	**-0.464** **(-0.99)**	**-0.982**** **(-1.95)**	**-0.644*** **(-1.71)**	**-6.97***** **(-5.02)**	**-8.75***** **(-5.86)**	**-6.62***** **(-4.70)**
CFLGDPI	**-0.019*** **(-1.60)**	**-0.015** **(-1.30)**	**-0.004** **(-0.33)**	**0.000** **(0.02)**	**-0.017** **(-1.43)**	**-0.013** **(-0.98)**	**-0.008** **(-0.55)**	**-0.012** **(-0.87)**
LEXPG	**6.641***** **(8.42)**	**6.429***** **(8.17)**			**6.544***** **(8.26)**	**4.503***** **(5.01)**		**4.632***** **(5.09)**
IBRDXI	**0.003** **(0.18)**	**0.007** **(0.41)**	**0.040**** **(1.97)**	**0.044**** **(2.19)**	**0.003** **(0.20)**	**0.022** **(0.90)**	**0.057**** **(2.10)**	**0.013** **(0.54)**
IDAXI	**0.005**** **(2.31)**	**0.004**** **(2.27)**	**0.011***** **(4.66)**	**0.010***** **(4.50)**		**0.003** **(1.18)**	**0.006**** **(2.11)**	**0.003** **(1.15)**
IMFXI	**-0.016** **(-1.58)**	**-0.014** **(-1.44)**	**-0.006** **(-0.54)**	**-0.005** **(-0.38)**	**-0.017*** **(-1.72)**	**-0.031*** **(-1.95)**	**-0.021** **(-1.17)**	**-0.031*** **(-1.86)**
TDSX	**-0.023** **(-1.27)**	**-0.017** **(-0.94)**	**-0.051**** **(-2.26)**	**-0.040*** **(-1.78)**		**-0.060**** **(-2.05)**	**-0.091***** **(-2.86)**	
INTX					**-0.043*** **(-1.73)**			**-0.047** **(-1.32)**
GGC	**-0.018** **(-0.56)**	**-0.015** **(-0.48)**	**-0.079**** **(-1.98)**	**-0.072*** **(-1.82)**	**-0.027** **(-0.82)**	**-0.060** **(-1.01)**	**-0.102** **(-1.55)**	**-0.063** **(-1.01)**
LGCF	**1.916***** **(3.15)**	**1.668***** **(2.71)**	**3.284***** **(4.57)**	**2.858***** **(3.94)**	**1.929***** **(3.23)**	**1.548** **(1.48)**	**3.093***** **(2.77)**	**1.509** **(1.42)**
CPI	**-0.001** **(1.43)**	**-0.001** **(-1.40)**	**-0.001*** **(-1.64)**	**-0.001** **(-1.58)**	**-0.001** **(-1.45)**	**-0.001** **(-1.02)**	**-0.001** **(-1.09)**	**-0.001** **(-0.91)**
TOTG	**0.026***** **(2.77)**	**0.026***** **(2.84)**	**0.005** **(0.49)**	**0.006** **(0.62)**	**0.026***** **(2.82)**	**0.021**** **(2.13)**	**0.006** **(0.59)**	**0.023**** **(2.27)**
POPG	**-1.516***** **(-3.28)**	**-1.387***** **(-2.99)**	**-1.794***** **(-3.17)**	**-1.575***** **(-2.80)**	**-1.458***** **(-3.18)**	**-0.843** **(-1.09)**	**-0.463** **(-0.54)**	**-0.978** **(-1.26)**
LFG	**0.884*** **(1.77)**	**0.838*** **(1.69)**	**0.975** **(1.61)**	**0.894** **(1.51)**	**0.859*** **(1.73)**	**0.343** **(0.53)**	**-0.026** **(-0.04)**	**0.368** **(0.57)**
SCHL	**0.296** **(0.74)**	**0.186** **(0.46)**	**0.140** **(0.28)**	**-0.033** **(-0.07)**	**0.281** **(0.71)**	**1.095** **(0.89)**	**1.133** **(0.83)**	**0.581** **(0.48)**
VIOL	**-0.065** **(-0.14)**	**-0.308** **(-0.62)**	**-0.239** **(-0.40)**	**-0.592** **(-0.92)**	**-0.097** **(-0.20)**	**-0.762** **(-0.92)**	**-1.312** **(-1.43)**	**-0.709** **(-0.84)**
PD2	**-1.643**** **(-1.97)**	**-1.597*** **(-1.93)**	**-2.141**** **(-2.14)**	**-2.045**** **(-2.08)**	**-1.738**** **(-2.09)**	**-0.848** **(-0.83)**	**-1.219** **(-1.08)**	**-0.716** **(-0.69)**
PD3	**-3.729***** **(-7.25)**	**-3.495***** **(-6.69)**	**-4.556***** **(-.7.56)**	**-4.136***** **(-6.74)**	**-3.848***** **(-7.38)**	**-1.151** **(-1.18)**	**-0.727** **(-0.68)**	**-1.065** **(-1.05)**
HIPC		**-1.194**** **(-2.05)**		**-1.887***** **(-2.62)**				
N	**176**	**175**	**175**	**175**	**175**	**176**	**175**	**175**
R2	**0.60**	**0.61**	**0.45**	**0.48**	**0.60**	**0.69**	**0.62**	**0.69**
Chi2	**0.014**	**0.42**	**0.12**	**0.000**	**0.000**			

Table (10)

The impact of total bilateral (BLATX), and total multilateral (MLATX) debts on growth of real GDP per capita (controlling for other variables) (1982-99)

	Random effects model				Fixed effects model			
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CONST	**3.148** **(1.13)**	**6.684**** **(2.06)**	**0.539** **(0.16)**	**6.298** **(1.57)**	**6.097*** **(1.90)**	**51.71***** **(4.78)**	**63.07***** **(5.32)**	**50.85***** **(4.66)**
LGDPI	**-0.669*** **(-1.81)**	**-0.986**** **(-2.48)**	**-0.512** **(-1.10)**	**-1.023**** **(-2.06)**	**-0.910**** **(-2.28)**	**-7.213***** **(-5.05)**	**-8.955***** **(-5.76)**	**-6.997***** **(-4.82)**
CFLGDPI	**-0.017** **(-1.32)**	**-0.014** **(-1.15)**	**-0.008** **(-0.55)**	**-0.005** **(-0.37)**	**-0.013** **(-1.05)**	**-0.017** **(-1.26)**	**-0.013** **(-0.86)**	**-0.015** **(-1.12)**
LEXPG	**6.699***** **(8.60)**	**6.484***** **(8.35)**			**6.415***** **(8.21)**	**4.635***** **(5.16)**		**4.723***** **(5.20)**
BLAXI	**-0.0008** **(-0.84)**	**-0.0005** **(-0.52)**	**0.0001** **(0.08)**	**0.0005** **(0.46)**	**-0.0004** **(-0.48)**	**-0.001** **(-0.72)**	**0.0005** **(0.28)**	**-0.001** **(-0.90)**
MLAXI	**0.002*** **(1.84)**	**0.002*** **(1.82)**	**0.006***** **(4.09)**	**0.006***** **(3.96)**	**0.002*** **(1.78)**	**0.001** **(0.74)**	**0.003*** **(1.69)**	**0.001** **(0.73)**
TDSX	**-0.022** **(-1.36)**	**-0.015** **(-0.90)**	**-0.037*** **(-1.80)**	**-0.025** **(-1.22)**		**-0.045** **(-1.51)**	**-0.077**** **(-2.37)**	
INTX					**-0.029** **(-1.22)**			**-0.035** **(-0.96)**
GGC	**-0.013** **(-0.42)**	**-0.011** **(-0.34)**	**-0.072*** **(-1.82)**	**-0.065*** **(-1.65)**	**-0.017** **(-0.52)**	**-0.058** **(-0.98)**	**-0.084** **(-1.26)**	**-0.063** **(-1.01)**
LGCF	**2.178***** **(3.75)**	**1.911***** **(3.24)**	**3.447***** **(4.96)**	**2.975***** **(4.22)**	**1.941***** **(3.35)**	**1.931*** **(1.90)**	**3.172***** **(2.87)**	**1.938*** **(1.89)**
CPI	**-0.001** **(-1.41)**	**-0.001** **(-1.38)**	**-0.001** **(-1.40)**	**-0.001** **(-1.35)**	**-0.001** **(-1.41)**	**-0.0004** **(-0.49)**	**-0.0005** **(-0.51)**	**-0.0004** **(-0.44)**
TOTG	**0.025***** **(2.71)**	**0.026***** **(2.81)**	**0.006** **(0.57)**	**0.008** **(0.74)**	**0.026***** **(2.83)**	**0.022**** **(2.23)**	**0.008** **(0.78)**	**0.023**** **(2.30)**
POPG	**-1.512***** **(-3.25)**	**-1.369***** **(-2.93)**	**-1.744***** **(-3.05)**	**-1.505***** **(-2.65)**	**-1.334***** **(-2.88)**	**-0.629** **(-0.80)**	**-0.281** **(-0.32)**	**-0.728** **(-0.93)**
LFG	**0.984**** **(1.96)**	**0.927*** **(1.86)**	**1.039*** **(1.70)**	**0.941** **(1.57)**	**0.918*** **(1.85)**	**0.280** **(0.43)**	**-0.145** **(-0.20)**	**0.306** **(0.46)**
SCHL	**0.224** **(0.57)**	**0.143** **(0.36)**	**0.256** **(0.52)**	**0.113** **(0.23)**	**0.136** **(0.35)**	**1.043** **(0.84)**	**0.998** **(0.72)**	**0.670** **(0.55)**
VIOL	**-0.183** **(-0.38)**	**-0.392** **(-0.81)**	**-0.067** **(-0.11)**	**-0.382** **(-0.64)**	**-0.407** **(-0.86)**	**-1.256** **(-1.55)**	**-1.483*** **(-1.64)**	**-1.233** **(-1.51)**
PD2	**-1.407*** **(-1.73)**	**-1.366*** **(-1.69)**	**-1.740*** **(-1.77)**	**-1.661*** **(-1.72)**	**-1.428*** **(-1.77)**	**-0.433** **(-0.42)**	**-0.764** **(-0.66)**	**-0.356** **(-0.34)**
PD3	**-3.603***** **(-7.12)**	**-3.368***** **(-6.56)**	**-4.298***** **(-7.16)**	**-3.883***** **(-6.38)**	**-3.463***** **(-6.62)**	**-0.526** **(-0.52)**	**-0.161** **(-0.14)**	**-0.456** **(-0.43)**
HIPC		**-1.205**** **(-2.08)**		**-1.932***** **(-2.67)**	**-1.154**** **(-2.01)**			
N	**175**	**175**	**175**	**175**	**175**	**175**	**175**	**175**
R2	**0.58**	**0.60**	**0.42**	**0.45**	**0.60**	**0.68**	**0.60**	**0.68**
Chi2	**0.000**	**0.023**	**0.000**	**0.000**	**0.20**			

B. Cross-section pooled time series (1982-99)

Table (11)

The impact of past and current total external debt on growth of real GDP per capita of (controlling for other variables)(1982-99)

Variable	1	2	3	4	5
CONSTANT	2.351 (0.87)	5.440* (1.76)	1.704 (0.50)	6.734* (1.74)	4.830 (1.56)
LGDPI	-0.589* (-1.71)	-0.869** (-2.36)	-0.598 (-1.37)	-1.051** (-2.28)	-0.791** (-2.12)
LEXPG	7.385*** (9.84)	-0.015 (-1.19)			7.079*** (9.2)
CFLGDPI	-0.017 (-1.37)	7.189*** (9.59)	-0.007 (-0.48)	-0.004 (-0.28)	-0.013 (-1.06)
TEDX2	-5.37e-07* (-1.91)	-5.04e-07* (-1.81)	-9.21e-08 (-0.26)	-5.84e-08 (-0.17)	-5.13e-07* (-1.85)
TEDX	0.001 (1.05)	0.001 (1.27)	0.0003 (0.31)	0.0006 (0.62)	0.001 (1.37)
TDSXI	-0.023 (-1.40)	-0.017 (-1.04)	-0.029 (-1.35)	-0.0191 (-0.89)	
INTXI					-0.036 (-1.48)
GGC	-0.015 (-0.49)	-0.013 (-0.42)	-0.085** (-2.21)	-0.078** (-2.06)	-0.021 (-0.66)
LGCF	2.196*** (3.90)	1.967*** (3.45)	3.443*** (4.95)	3.019*** (4.30)	1.998*** (3.55)
CPI	-0.001 (-1.43)	-0.001 (-1.48)	-0.001 (-1.15)	-0.001 (-1.23)	-0.001 (-1.51)
TOTG	0.026*** (2.71)	0.026*** (2.81)	0.005 (0.46)	0.007 (0.64)	0.026*** (2.84)
POPG	-1.466*** (-3.25)	-1.133*** (-2.95)	-1.772*** (-3.11)	-1.541*** (-2.72)	-1.290*** (-2.87)
LFG	1.153** (2.38)	1.089** (2.26)	1.633*** (2.68)	1.508** (2.51)	1.074** (2.24)
LSCHL	0.048 (0.13)	-0.018 (-0.05)	-0.250 (-0.54)	-0.346 (-0.76)	-0.007 (-0.02)
VIOL	-0.182 (-0.40)	-0.378 (-0.82)	-0.023 (-0.04)	-0.348 (-0.60)	-0.406 (-0.90)
PD2	-0.182 (-1.40)	-1.081 (-1.39)	-0.574 (-0.58)	-0.573 (-0.59)	-1.167 (-1.50)
PD3	-3.233*** (-6.84)	-3.023*** (-6.31)	-3.369*** (-5.64)	-3.023*** (-5.02)	-3.145*** (-6.40)
HIPC		-1.092** (-2.01)		-1.768*** (-2.62)	-1.048* (-1.93)
N	175	175	175	175	175
R^2	0.61	0.62	0.38	0.40	0.63

Table (12)

The impact of short term and long term debt on growth of real GDP per capita (controlling for other variables) (1982-99)

Variable	1	2	3	4	5
CONSTANT	**2.074**	**4.807**	**-0.796**	**3.617**	**4.506**
	(0.81)	**(1.62)**	**(-0.26)**	**(1.01)**	**(1.51)**
LGDPI	**-0.489**	**-0.739****	**-0.257**	**-0.658**	**4.506**
	(-1.47)	**(-2.05)**	**(-0.63)**	**(-1.52)**	**(1.51)**
LEXPG	**6.521*****	**6.362*****			**6.326*****
	(8.82)	**(8.61)**			**(8.49)**
CFLGDPI	**-0.016**	**-0.014**	**-0.011**	**-0.008**	**-0.013**
	(-1.29)	**(-1.11)**	**(-0.74)**	**(-0.53)**	**(-1.07)**
STDXI	**-0.014*****	**-0.013*****	**-0.018*****	**-0.017*****	**-0.013*****
	(-4.07)	**(-3.89)**	**(-4.51)**	**(-4.25)**	**(-3.73)**
LTDXI	**0.001****	**0.001****	**0.003*****	**0.003*****	**0.001****
	(2.32)	**(2.40)**	**(4.15)**	**(4.21)**	**(2.36)**
TDSXI	**-0.018**	**-0.012**	**-0.013***	**-0.021**	
	(-1.18)	**(-0.77)**	**(1.66)**	**(-1.10)**	
INTXI					**-0.016**
					(-0.73)
GGC	**-0.031**	**-0.027**	**-0.091*****	**-0.082****	**-0.029**
	(-1.04)	**(-0.91)**	**(-2.59)**	**(-2.38)**	**(-0.98)**
LGCF	**1.937*****	**1.739*****	**2.994*****	**2.641*****	**1.780*****
	(3.61)	**(3.20)**	**(4.70)**	**(4.09)**	**(3.31)**
CPI	**-0.001**	**-0.001**	**-0.001**	**-0.001**	**-0.001**
	(-1.13)	**(-1.12)**	**(-1.27)**	**(-1.25)**	**(-1.14)**
TOTG	**0.025*****	**0.026*****	**0.007**	**0.008**	**0.026*****
	(2.78)	**(2.87)**	**(0.65)**	**(0.82)**	**(2.90)**
POPG	**-1.388*****	**-1.277*****	**-1.601*****	**-1.418*****	**-1.252*****
	(-3.20)	**(-2.93)**	**(-3.04)**	**(-2.70)**	**(-2.88)**
LFG	**1.082****	**1.030****	**1.401****	**1.310****	**1.021****
	(2.31)	**(2.21)**	**(2.47)**	**(2.33)**	**(2.19)**
LSCHL	**0.354**	**0.280**	**0.298**	**0.185**	**0.262**
	(0.98)	**(0.78)**	**(0.68)**	**(0.42)**	**(0.73)**
VIOL	**-0.113**	**-0.282**	**0.103**	**-0.171**	**-0.322**
	(-0.26)	**(-0.63)**	**(0.19)**	**(-0.32)**	**(-0.74)**
PD2	**-1.478***	**-1.441***	**-1.453**	**-1.395**	**-1.457***
	(-1.93)	**(-1.89)**	**(-1.56)**	**(-1.52)**	**(-1.90)**
PD3	**-3.560*****	**-3.371*****	**-3.968*****	**-3.654*****	**-3.385*****
	(-7.66)	**(-7.11)**	**(-7.05)**	**(-6.40)**	**(-6.98)**
HIPC		**-0.932***		**-1.467****	**-0.944***
		(-1.79)		**(-2.36)**	**(-1.82)**
N	**176**	**176**	**176**	**176**	**176**
R2	**0.64**	**0.65**	**0.47**	**0.49**	**0.65**

Table (13)

The impact of private non-guaranteed debt (TPDGDP) and total public and publicly guaranteed debt (PPDGDP) on growth of real GDP per capita (controlling for other variables) (1982-99)

Variable	1	2	3	4	5
CONSTANT	**4.471***	**7.109****	**3.446**	**9.917****	**6.607****
	(1.77)	**(2.39)**	**(1.08)**	**(2.12)**	**(2.26)**
LGDPI	**-0.969*****	**-1.185*****	**-0.963****	**-1.328*****	**-1.115*****
	(-2.79)	**(-3.21)**	**(-2.20)**	**(-2.87)**	**(-2.99)**
LEXPG	**7.089*****	**6.948*****			**6.841*****
	(9.77)	**(9.56)**			**(9.39)**
CFLGDPI	**-0.017**	**-0.016**	**-0.0004**	**0.001**	**-0.157**
	(-1.27)	**(-1.19)**	**(-0.02)**	**(0.06)**	**(-1.14)**
TPDGDPI	**0.044***	**0.044***	**0.04**	**0.041**	**0.047****
	(1.84)	**(1.86)**	**(1.31)**	**(1.34)**	**(1.97)**
PPGGDPI	**-0.006****	**-0.005***	**-0.006***	**-0.005**	**-0.005**
	(-2.07)	**(-1.67)**	**(-1.77)**	**(-1.27)**	**(-1.54)**
TDSXI	**-0.023**	**-0.017**	**-0.028**	**-0.019**	
	(-1.39)	**(-1.05)**	**(-1.36)**	**(-0.91)-**	
INTXI					**-0.035**
					(-1.43)
GGC	**-0.009**	**-0.007**	**-0.072***	**0.066***	**-0.015**
	(-0.31)	**(-0.26)**	**(-1.90)**	**(-1.79)**	**(-0.50)**
LGCF	**2.107*****	**1.884*****	**3.359*****	**2.942*****	**1.898*****
	(3.82)	**(3.34)**	**(4.97)**	**(4.24)**	**(3.43)**
CPI	**-0.001**	**-0.001**	**-0.001**	**-0.0007**	**-0.001**
	(-1.11)	**(-1.06)**	**(-0.83)**	**(-0.77)**	**(-1.06)**
TOTG	**0.030*****	**0.030*****	**0.01**	**0.011**	**0.031*****
	(3.82)	**(3.23)**	**(0.80)**	**(0.93)**	**(3.26)**
POPG	**-1.431*****	**-1.332*****	**-1.785*****	**-1.607*****	**-1.292*****
	(-3.23)	**(-3.0)**	**(-3.21)**	**(-2.89)**	**(-2.92)**
LFG	**1.261*****	**1.204****	**1.807*****	**1.693*****	**1.187****
	(2.64)	**(2.53)**	**(3.02)**	**(2.85)**	**(2.50)**
LSCHL	**0.314**	**0.235**	**0.01**	**-0.112**	**0.244**
	(0.84)	**(0.63)**	**(0.02)**	**(-0.24)**	**(0.66)**
VIOL	**-0.260**	**-0.399**	**-0.169**	**-0.406**	**-0.421**
	(-0.57)	**(-0.86)**	**(-0.29)**	**(-0.70)**	**(-0.94)**
PD2	**-0.663**	**-0.665**	**-0.064**	**-0.087**	**-0.750**
	(-0.85)	**(-0.86)**	**(-0.07)**	**(-0.09)**	**(-0.97)**
PD3	**-2.966*****	**-2.822*****	**-3.067*****	**-2.822*****	**-2.944*****
	(-6.25)	**(-5.88)**	**(-5.12)**	**(-4.69)**	**(-5.95)**
HIPC		**-0.891***		**-1.498****	**-0.863**
		(-1.65)		**(-2.23)**	**(-1.61)**
N	**176**	**176**	**176**	**176**	**176**
R2	**0.62**	**0.63**	**0.40**	**0.42**	**0.63**

Table (14)

The impact of total concessional (CONCGDP) and total non-concessional (NCONCGDPI) debts on growth of real GDP per capita (controlling for other variables) (1982-99)

Variable	1	2	3	4	5
CONSTANT	2.018 (0.75)	4.831 (1.57)	0.924 (0.28)	5.391 (1.41)	4.740 (1.56)
LGDPI	-0.633* (-1.75)	-0.853** (-2.25)	-0.644 (-1.42)	-0.990** (-2.10)	-0.819** (-2.13)
LEXPG	6.993*** (9.55)				6.802*** (9.25)
CFLGDPI	-0.01 (-0.76)	-0.01 (-0.73)	0.008 (0.47)	0.008 (0.48)	-0.009 (-0.72)
CONCGDPI	0.003 (0.51)	0.006 (0.85)	0.003 (0.42)	0.007 (0.84)	0.006 (0.85)
NCONCGDPI	-0.014** (-2.41)	-0.012** (-2.17)	-0.017** (-2.35)	-0.015** (-2.04)	-0.012** (-2.01)
TDSXI	-0.009 (-0.59)	-0.004 (-0.24)	-0.014 (-0.69)	-0.004 (-0.24)	
INTXI					-0.013 (-0.57)
GGC	-0.01 (-0.34)	-0.009 (-0.32)	-0.069* (-1.82)	-0.665* (-1.76)	-0.013 (-0.44)
LGCF	2.226*** (4.03)	1.962*** (3.46)	3.457*** (5.15)	3.000*** (4.34)	1.946*** (3.48)
CPI	-0.001 (-1.29)	-0.001 (-1.24)	-0.0008 (-0.93)	-0.0008 (-0.88)	-0.001 (-1.24)
TOTG	0.025*** (2.64)	0.025*** (2.68)	0.005 (0.43)	0.006 (0.52)	0.025*** (2.69)
POPG	-1.347*** (-3.01)	-1.236*** (-2.76)	-1.685*** (-3.02)	-1.499*** (-2.70)	-1.227*** (-2.75)
LFG	1.103** (2.29)	1.034** (2.15)	1.647*** (2.75)	1.521*** (2.56)	1.029** (2.15)
LSCHL	0.226 (0.61)	0.146 (0.39)	-0.023 (-0.05)	-0.142 (-0.31)	0.150 (0.41)
VIOL	-0.272 (-0.59)	-0.413 (-0.88)	-0.202 (-0.35)	-0.425 (-0.73)	-0.398 (-0.87)
PD2	-1.037 (-1.31)	-1.066 (-1.36)	-0.413 (-0.42)	-0.480 (-0.49)	-1.115 (-1.41)
PD3	-3.271*** (-6.40)	-3.147*** (-6.15)	-3.365*** (-5.27)	-3.166*** (-4.98)	-3.222*** (-6.12)
HIPC		-1.001* (-1.82)		-1.576** (-2.32)	-0.972* (-1.78)
N	176	176	176	176	176
R2	0.62	0.63	0.40	0.42	0.63

Table (15)

The impact of IBRD (IBRDX), International Development Association (IDAX), and IMF (IMFX) debts on growth of real GDP per capita (controlling for other variables) (1982-99)

Variable	1	2	3	4	5
CONSTANT	3.648 (1.25)	6.758** (2.05)	-0.261 (-0.08)	4.662 (1.19)	3.455 (1.21)
LGDPI	-0.620* (-1.74)	-0.893** (-2.36)	-0.246 (-0.58)	-0.680 (-1.50)	-0.564 (-1.58)
LEXPG	6.775*** (8.51)	6.580*** (8.27)			6.655*** (8.34)
CFLGDPI	-0.022* (-1.83)	-0.017 (-1.46)	-0.007 (-0.53)	-0.001 (-.12)	-0.019 (-1.58)
IBRDXI	0.007 (0.05)	0.004 (0.27)	0.031 (1.62)	0.036* (1.86)	0.002 (0.11)
IDAXI	0.004** (2.18)	0.004** (2.16)	0.010*** (4.30)	0.01*** (4.20)	0.004** (2.17)
IMFXI	-0.014 (-1.43)	-0.012 (-1.29)	-0.003 (-0.27)	-0.001 (-0.12)	-0.015 (-1.60)
TDSXI	-0.021 (-1.17)	-0.015 (-0.84)	-0.043** (-2.03)	-0.033 (-1.57)	
INTXI					-0.041* (-1.70)
GGC	-0.014 (-0.45)	-0.011 (-0.35)	-0.068* (-1.83)	-0.061* (-1.67)	-0.023 (-0.73)
LGCF	2.026*** (3.49)	1.797*** (3.06)	3.421*** (5.09)	3.009*** (4.42)	2.01*** (3.49)
CPI	-0.001 (-1.44)	-0.001 (-1.42)	-0.001* (-1.71)	-0.001* (-1.68)	-0.001 (-1.44)
TOTG	0.025*** (2.67)	0.026*** (2.74)	0.004 (0.36)	0.005 (0.52)	0.026*** (2.72)
POPG	-1.474*** (-3.29)	-1.353*** (-3.02)	-1.822*** (-3.39)	-1.623*** (-3.04)	-1.420*** (-3.18)
LFG	0.847* (1.72)	0.803 (1.64)	1.035* (1.74)	0.958 (1.64)	0.822* (1.67)
LSCHL	0.213 (0.57)	0.115 (0.31)	-0.04 (-0.11)	-0.187 (-0.42)	0.217 (0.58)
VIOL	0.011 (0.02)	-0.215 (-0.46)	0.0009 (0.00)	-0.345 (-0.61)	-0.026 (-0.06)
PD2	-1.646** (-1.98)	-1.618** (-1.96)	-1.933* (-1.93)	-1.876* (-1.90)	-1.756** (-2.11)
PD3	-3.668*** (-7.03)	-3.471*** (-6.59)	-4.423*** (-7.14)	-4.087*** (-6.56)	-3.801*** (-7.22)
HIPC		-1.054** (-1.96)		-1.611*** (-2.53)	
N	175	175	175	175	175
R2	0.62	0.63	0.44	0.47	0.62

Table (16)

The impact of total bilateral (BLATX), and total multilateral (MLATX) debts on growth of real GDP per capita (controlling for other variables) (1982-99)

Variable	1	2	3	4	5
CONSTANT	2.583 (0.97)	5.701* (1.86)	-0.555 (-0.17)	4.358 (1.18)	5.265* (1.72)
LGDPI	-0.591* (-1.69)	-0.868** (-2.33)	-0.344 (-0.82)	-0.781* (-1.75)	-0.808** (-2.14)
LEXPG	6.803*** (8.68)	6.605*** (8.44)			6.519*** (8.30)
CFLGDPI	-0.018 (-1.39)	-0.015 (-1.21)	-0.01 (-0.62)	-0.006 (-0.41)	-0.014 (-1.10)
BLATXI	-0.0008 (-0.85)	-0.0005 (-0.54)	-0.0001 (-0.07)	0.0003 (0.29)	-0.004 (-0.80)
MLATXI	0.002* (1.74)	0.002 (1.74)	0.006*** (3.79)	0.005*** (3.73)	0.002* (1.70)
TDSXI	-0.022 (-1.35)	-0.014 (-0.89)	-0.032* (-1.66)	-0.021 (-1.06)	
INTXI					-0.029 (-1.25)
GGC	-0.011 (-0.34)	-0.007 (-0.25)	-0.066* (-1.77)	-0.059* (-1.61)	-0.014 (-0.45)
LGCF	2.227*** (3.98)	1.981*** (3.49)	3.525*** (5.40)	3.090*** (4.65)	1.995*** (3.56)
CPI	-0.001 (-1.45)	-0.001 (-1.44)	-0.001 (-1.54)	-0.001 (-1.51)	-0.001 (-1.44)
TOTG	0.025*** (2.61)	0.025*** (2.71)	0.004 (0.40)	0.006 (0.59)	0.026*** (2.74)
POPG	-1.487*** (-3.29)	-1.352*** (-2.98)	-1.793*** (-3.28)	-1.572 (-2.89)	-1.318*** (-2.92)
LFG	0.949* (1.92)	0.893* (1.82)	1.093* (1.83)	1.001* (1.70)	0.886* (1.81)
LSCHL	0.146 (0.39)	0.073 (0.20)	0.047 (0.11)	-0.059 (-0.14)	0.08 (0.22)
VIOL	-0.100 (-0.22)	-0.297 (-0.64)	0.135 (0.24)	-0.178 (-0.32)	-0.319 (-0.70)
PD2	-1.441* (-1.78)	-1.412* (-1.76)	-1.603 (-1.63)	-1.552 (-1.61)	-1.042* (-1.93)
PD3	-3.578*** (-7.01)	-3.371*** (-6.54)	-4.202*** (-6.87)	-3.857*** (-6.26)	-3.468*** (-6.61)
HIPC		-1.082** (-2.00)		-1.657*** (-2.57)	-1.042* (-1.93)
N	175	185	175	175	175
R2	0.61	0.62	0.43	0.45	0.62

Table (17)

Impacts of debt, capital flight, and terms of trade variables on growth-rate differences (1982-99)

	Differences in each variable between HIPCs and Non-HIPCs			Effects of each variable on the growth rate difference (%) [b]		
Variables	1982-87	1988-93	1994-99	1982-87	1988-93	1994-99
LGDPG	2.62	2.97	0.50			
CFLGDPNI	-0.44	8.41	19.13	0.48	3.06	21.04
TEDXL2	36950	584087	867519	2.44	38.61	57.34
TOT	0.96	2.78	3.92	2.11	6.12	0.09
INTXI	1.28	3.43	3.61	6.67	7.54	7.94
STDXI	0.90	32.85	47.43	1.54	55.84	80.63
LTDXI	122.86	384.54	561.78	24.57	76.91	112.36
TPDGDPI	0.91	0.08	2.92	6.26	0.57	20.14
PPGGDPI	19.22	42.46	111.38	17.30	38.21	100.24
BLAXI	65.86	246.75	259.05	6.59	24.67	25.90
MLAX	34.29	99.86	239.28	3.43	9.99	23.93
IBRDXI	2.20	4.54	-2.22	2.86	5.91	0.67
IDAXI	16.88	53.24	155.20	5.06	15.97	46.56
IMFXI	14.31	12.86	22.62	24.32	21.86	38.45
CONCGDPI	13.02	30.76	72.13	9.11	21.53	50.49
NONCONGI	6.64	10.00	31.12	10.63	16.00	49.79

[b.] Effeects are calculated as :differences of each debt variable between HIPCs and non-HIPCs multiplied by coefficients of debt variables in column 8 of the fixed effects model (%).

Table (18)

Correlation Matrix (total debt stock and other covariates)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	Tedx2	tedx	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl	viol
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.05)**	**-0.155* (0.03)**	**1.00**												
lepg	**0.509 (0.000)**	**0.09 (0.22)**	**0.119 (0.11)**	**1.00**											
tdx2	**-0.134 (0.07)**	**-0.125 (0.09)**	**0.468* (0.000)**	**0.017* (0.019)**	**1.00**										
tedx	**-0.187* (0.01)**	**-0.379* (0.000)**	**0.414* (0.000)**	**-0.05 (0.504)**	**0.66* (0.000)**	**1.00**									
tdsx	**0.062 (0.40)**	**-0.047 (0.52)**	**0.029 (0.69)**	**-0.055 (0.45)**	**0.152* (0.04)**	**0.38* (0.000)**	**1.00**								
ggc	**-.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**0.014 (0.85)**	**0.000 (0.99)**	**-0.168* (0.023)**	**1.00**							
lgcf	**0.326* (0.000)**	**0.391* (0.000)**	**0.027 (0.717)**	**0.255* (0.000)**	**-0.057 (0.44)**	**-0.354* (0.000)**	**-0.262* (0.000)**	**-0.023* (0.001)**	**1.00**						
cpi	**-0.121 (0.105)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.013 (0.86)**	**0.287* (0.000)**	**0.411* (0.000)**	**0.185 (0.012)**	**-0.092 (0.217)**	**-0.097 (0.21)**	**1.00**					
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**-0.038* (0.613)**	**0.003 (0.95)**	**-0.022 (0.76)**	**0.039 (0.596)**	**-0.019 (0.79)**	**-0.05 (0.506)**	**1.00**				
popg	**-0.156* (0.035)**	**-0.454* (0.000)**	**0.022 (0.76)**	**-0.046 (0.53)**	**0.046 (0.41)**	**0.158* (0.03)**	**-0.073 (0.32)**	**0.270* (0.000)**	**-0.172* (0.020)**	**-0.090 (0.215)**	**-0.061 (0.414)**	**1.00**			
lfg	**0.145 (0.05)**	**-0.05 (0.43)**	**0.052 (0.48)**	**0.062 (0.40)**	**0.02 (0.79)**	**-0.065 (0.38)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**0.132 (0.08)**	**0.054 (0.47)**	**0.446* (0.000)**	**1.00**		
lschl	**0.108 (0.14)**	**0.761* (0.00)**	**-0.09 (0.20)**	**0.08 (0.25)**	**-0.098 (0.19)**	**-0.309* (0.000)**	**0.05 (0.50)**	**-0.024 (0.74)**	**0.471* (0.000)**	**0.131 (0.92)**	**0.006 (0.92)**	**-0.450* (0.000)**	**-0.042 (0.57)**	**1.00**	
viol	**0.009 (0.89)**	**-0.155* (0.03)**	**-0.002 (0.97)**	**0.025 (0.73)**	**-0.046 (0.53)**	**0.005 (0.94)**	**0.153* (0.03)**	**-0.08 (0.27)**	**-0.016 (0.83)**	**-0.078 (0.29)**	**0.064 (0.39)**	**0.004 (0.94)**	**0.03 (0.67)**	**-0.079 (0.29)**	**1.00**

The numbers in parentheses are standard errors for all the correlation matrices.
*. Refers to significance at 5% level, and is applicable for all the correlation matrices.

Table (19)

Correlation matrix (Concessional and non-concessional debts and other covariates)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	concgdpi	nconcgdpi	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl	viol
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.05)**	**-0.155 (0.03)**	**1.00**												
lexpg	**0.509* (0.000)**	**0.090 (0.22)**	**0.119 (0.11)**	**1.00**											
concgdpi	**-0.171* (0.02)**	**-0.447* (0.000)**	**0.523* (0.000)**	**0.003 (0.63)**	**1.00**										
nconcgdpi	**-0.209* (0.004)**	**0.028 (0.70)**	**0.476* (0.000)**	**0.033 (0.65)**	**0.397* (0.000)**	**1.00**									
tdsx	**-0.062 (0.40)**	**-0.047 (0.51)**	**0.029 (0.69)**	**-0.055 (0.45)**	**-0.025 (0.731)**	**0.235* (0.001)**	**1.00**								
ggc	**-0.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**0.116 (0.11)**	**0.120 (0.10)**	**-0.168* (0.02)**	**1.00**							
lgcf	**0.326* (0.000)**	**0.391* (0.000)**	**0.027 (0.71)**	**0.255* (0.000)**	**-0.051 (0.49)**	**0.115 (0.12)**	**-0.262* (0.000)**	**0.233* (0.000)**	**1.00**						
cpi	**-0.121 (0.10)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.013 (0.86)**	**0.000 (0.99)**	**0.22* (0.003)**	**0.185* (0.01)**	**-0.092 (0.21)**	**-0.093 (-0.21)**	**1.00**					
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**0.106 (0.15)**	**-0.032 (0.67)**	**-0.022 (0.76)**	**-0.039 (0.59)**	**-0.019 (0.79)**	**-0.050 (-0.5)**	**1.00**				
popg	**-0.156* (0.03)**	**-0.454* (0.000)**	**0.022 (0.76)**	**-0.046 (0.53)**	**0.298* (0.000)**	**0.058 (0.43)**	**-0.073 (0.32)**	**0.27* (0.000)**	**-0.172* (0.02)**	**-0.093 (0.21)**	**0.061 (0.41)**	**1.00**			
lfg	**0.145 (0.05)**	**-0.059 (0.43)**	**0.052 (0.48)**	**0.062 (0.41)**	**0.129 (0.08)**	**0.014 (0.84)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**-0.132 (0.08)**	**0.054 (0.47)**	**0.446 (0.00)**	**1.00**		
lschl	**0.108 (0.14)**	**0.761* (0.000)**	**-0.095 (0.20)**	**0.084 (0.25)**	**-0.352* (0.000)**	**0.167* (0.025)**	**0.05 (0.50)**	**-0.024 (0.74)**	**0.471* (0.000)**	**0.131 (0.08)**	**0.006 (0.92)**	**-0.45* (0.00)**	**-0.04 (0.57)**	**1.00**	
viol	**0.009 (0.89)**	**-0.155* (0.03)**	**-0.002 (0.97)**	**0.025 (0.73)**	**-0.045 (0.54)**	**-0.121 (0.10)**	**0.153* (0.03)**	**-0.082 (0.27)**	**-0.016 (0.83)**	**-0.078 (0.29)**	**0.064 (0.39)**	**0.004 (0.94)**	**0.031 (0.67)**	**-0.08 (0.29)**	**1.00**

Table (20)

Correlation Matrix (Tpotal private non-gauanteed and public and publicly guaranteed debts and other covariates)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	tpdgdpi	ppggdpi	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl	viol
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.03)**	**-0.155* (0.03)**	**1.00**												
lexpg	**0.509* (0.000)**	**0.090 (0.22)**	**0.119 (0.11)**	**1.00**											
tpdgdpi	**0.091 (0.22)**	**0.048 (0.54)**	**0.254* (0.000)**	**0.081 (0.27)**	**1.00**										
ppdgdpi	**-0.230* (0.000)**	**-0.206* (0.005)**	**0.553* (0.000)**	**0.056 (0.45)**	**0.052 (0.48)**	**1.00**									
tdsx	**-0.062 (0.40)**	**-0.047 (0.52)**	**0.029 (0.69)**	**-0.055 (0.45)**	**0.296* (0.000)**	**0.103 (0.16)**	**1.00**								
ggc	**-0.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**-0.048 (0.51)**	**0.107 (0.152)**	**-0.168* (0.02)**	**1.00**							
lgcf	**0.326* (0.000)**	**0.391* (0.000)**	**0.027 (0.71)**	**0.255* (0.000)**	**0.031 (0.67)**	**0.031 (0.59)**	**-0.262* (0.000)**	**-0.233* (0.001)**	**1.00**						
cpi	**-0.121 (0.10)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.013 (0.86)**	**-0.026 (0.72)**	**0.142 (0.05)**	**0.185* (0.012)**	**-0.092 (0.21)**	**-0.093 (0.21)**	**1.00**					
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**-0.117 (0.11)**	**0.043 (0.56)**	**-0.022 (0.76)**	**-0.039 (0.59)**	**-0.019 (0.79)**	**-0.050 (0.051)**	**1.00**				
popg	**-0.156* (0.03)**	**-0.454* (0.000)**	**0.022 (0.76)**	**-0.04 (0.53)**	**-0.08 (0.25)**	**0.191* (0.01)**	**-0.073 (0.32)**	**0.270* (0.000)**	**-0.172* (0.02)**	**-0.093* (0.21)**	**-0.061 (0.41)**	**1.00**			
lfg	**0.145 (0.05)**	**-0.059 (0.43)**	**0.052 (0.48)**	**0.062 (0.41)**	**0.032 (0.66)**	**0.089 (0.23)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**-0.132 (0.08)**	**0.054 (0.47)**	**0.446* (0.00)**			
lschl	**0.108 (0.148)**	**0.761* (0.000)**	**-0.095 (0.20)**	**0.084 (0.25)-**	**0.057 (0.44)**	**-0.070 (0.34)**	**0.050 (0.50)**	**-0.024 (0.74)**	**0.471* (0.000)**	**0.131 (0.08)**	**0.006 (0.92)**	**0.45* (0.00)**	**-0.042 (0.57)**	**1.00**	
viol	**0.009 (0.89)**	**-0.155* (0.03)**	**-0.002 (0.97)**	**0.025 (0.73)**	**-0.038 (0.60)**	**-0.093 (0.211)**	**0.153* (0.03)**	**-0.082 (0.27)**	**-0.016 (0.83)**	**-0.078 (0.29)**	**0.064 (0.39)**	**0.004 (0.94)**	**0.031 (0.67)**	**-0.079 (0.29)**	**1.00**

Table (21)

Correlation matrix (short term (STD) and long term debts (LTD) to exports ratio and other covariates)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	stdxi	ltdxi	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl	viol
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.05)**	**-0.155* (0.03)**	**1.00**												
lexpg	**0.509* (0.000)**	**0.09 (0.22)**	**0.119 (0.11)**	**1.00**											
stdxi	**-0.25* (0.000)**	**-0.015 (0.84)**	**0.389* (0.000)**	**0.021 (0.77)**	**1.00**										
ltdxii	**-0.083 (0.26)**	**-0.37* (0.000)**	**0.52 (0.000)**	**0.215* (0.003)**	**0.548* (0.000)**	**1.00**									
tdsx	**-0.062 (0.40)**	**-0.047 (0.52)**	**0.029 (0.69)**	**-0.055 (0.45)**	**0.276* (0.000)**	**0.206* (0.005)**	**1.00**								
ggc	**-0.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**-0.127 (0.08)**	**-0.078 (0.29)**	**-0.168 (0.02)**	**1.00**							
lgcf	**0.326* (0.000)**	**0.391* (0.000)**	**0.027 (0.717)**	**0.255* (0.000)**	**-0.143 (0.05)**	**-0.209* (0.004)**	**-0.262* (0.000)**	**0.233* (0.001)**	**1.00**						
cpi	**-0.121 (0.10)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.013 (0.86)**	**0.360* (0.000)**	**0.281* (0.000)**	**0.185* (0.01)**	**-0.092 (0.21)**	**-0.093 (0.21)**	**1.00**					
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**0.004 (0.94)**	**-0.019 (0.79)**	**-0.022 (0.76)**	**-0.039 (0.59)**	**-0.019 (0.79)-**	**0.050 (-0.5)**	**1.00**				
popg	**-0.156* (0.03)**	**-0.454* (0.000)**	**0.022 (0.76)**	**-0.046 (0.53)**	**-0.021 (0.77)**	**0.184* (0.01)**	**-0.073 (0.32)**	**0.270 (0.000)**	**-0.172* (0.02)**	**-0.093 (0.215)**	**-0.061 (0.41)**	**1.00**			
lfg	**0.145 (0.05)**	**-0.059 (0.43)**	**0.052 (0.48)**	**0.062 (0.41)**	**0.047 (0.52)**	**0.019 (0.79)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**-0.132 (0.08)**	**0.054 (0.47)**	**0.446* (0.00)**	**1.00**		
lschl	**0.108 (0.148)**	**0.761* (0.000)**	**-0.095 (0.20)**	**0.084 (0.25)-**	**0.075 (0.31)**	**-0.318* (0.000)**	**0.050 (0.50)**	**-0.024 (0.74)**	**0.471* (0.000)**	**0.131 (0.08)**	**0.006 (0.92)**	**0.45* (0.00)**	**-0.042 (0.57)**	**1.00**	
viol	**0.009 (0.89)**	**-0.155* (0.03)**	**-0.002 (0.97)**	**0.025 (0.73)**	**-0.041 (0.57)**	**-0.018 (0.81)**	**0.153* (0.03)**	**-0.082 (0.27)**	**-0.016 (0.83)**	**-0.078 (0.29)**	**0.064 (0.39)**	**0.004 (0.94)**	**0.031 (0.67)**	**-0.08 (0.29)**	**1.00**

Table (22)

Correlation matrix (debts from IBRD, IDA, and IMF, and other covariates)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	ibrdx	idax	imfx	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.05)**	**-0.155* (0.03)**	**1.00**												
lexpg	**0.509* (0.000)**	**0.09 (0.22)**	**0.119 (0.11)**	**1.00**											
Ibrdx	**-0.083 (0.26)**	**0.112 (0.13)**	**0.022 (0.76)**	**0.063 (0.39)**	**1.00**										
Idax	**0.037 (0.62)**	**-0.382 (0.000)**	**0.199* (0.007)**	**0.247* (0.000)**	**-0.190 (0.01)**	**1.00**									
imfx	**-0.100 (0.16)**	**-0.427* (0.000)**	**0.111 (0.138)**	**0.057 (0.44)**	**-0.117 (011)**	**0.327* (0.000)**	**1.00**								
tdsx	**-0.062 (0.40)**	**-0.047 (0.52)**	**0.029 (0.69)**	**-0.055 (0.45)**	**0.395* (0.000)**	**-0.031 (0.67)**	**0.208* (0.004)**	**1.00**							
ggc	**-0.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**0.055 (0.46)**	**-0.138 (0.06)**	**-0.206* (0.005)**	**-0.168* (0.02)**	**1.00**						
lgcf	**0.326* (0.000)**	**0.391* (0.000)**	**0.027 (0.71)**	**0.255* (0.000)**	**0.047 (0.52)**	**-0.251* (0.000)**	**-0.421* (0.000)**	**-0.262* (0.000)**	**0.233* (0.001)**	**1.00**					
cpi	**-0.121 (0.10)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.012 (0.86)**	**0.308* (0.000)**	**-0.054* (0.000)**	**0.074 (0.32)**	**0.185* (0.01)**	**-0.092 (0.21)**	**-0.093 (0.21)**	**1.00**				
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**0.041 (0.58)**	**0.015 (0.84)**	**0.032 (0.66)**	**-0.022 (0.76)**	**-0.039 (0.59)**	**-0.019 (0.79)**	**-0.050 (0.50)**	**1.00**			
popg	**-0.156* (0.035)**	**-0.454* (0.000)**	**0.022 (0.76)**	**-0.046 (0.53)**	**-0.007 (0.92)**	**0.349* (0.000)**	**0.081 (0.28)**	**-0.073 (0.32)**	**0.270 (0.000)**	**-0.172* (0.02)**	**-0.093 (0.21)**	**-0.061 (0.41)**	**1.00**		
lfg	**0.145 (0.05)**	**-0.059 (0.43)**	**0.052 (0.48)**	**0.062 (0.41)**	**-0.112 (0.13)**	**0.224* (0.002)**	**-0.055 (0.46)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**-0.132 (0.08)**	**0.054 (0.47)**	**0.446* (0.00)**	**1.00**	
lschl	**0.108 (0.148)**	**0.761* (0.000)**	**-0.095 (0.20)**	**0.084 (0.25)-**	**0.234* (0.001)**	**-0.421* (0.000)**	**-0.328* (0.000)**	**0.050 (0.50)**	**-0.024 (0.74)**	**0.471* (0.00)**	**0.131 (0.08)**	**0.006 (0.92)**	**0.45* (0.00)**	**-0.04 (0.57)**	**1.00**

Table (23)

Correlation matrix (1982-99) for bilateral and multilateral debts and other variables (1982-99)

Variable	lgdpg	lgdpi	cflgdpi	lexpg	blatxi	mlatxi	tdsx	ggc	lgcf	cpi	tot	popg	lgf	lschl	viol
lgdpg	**1.00**														
lgdpi	**0.019 (0.79)**	**1.00**													
cflgdpi	**-0.142 (0.05)**	**-0.155* (0.03)**	**1.00**												
lexpg	**0.509* (0.00)**	**0.09 (0.22)**	**0.119 (0.11)**	**1.00**											
Blatx	**-0.137* (0.00)**	**-0.313* (0.00)**	**0.521 (0.00)**	**0.135* (0.00)**	**1.00**										
mlatx	**-0.002 (0.97)**	**-0.356* (0.00)**	**0.230* (0.00)**	**0.249* (0.00)**	**0.337* (0.00)**	**1.00**									
tdsx	**-0.062 (0.40)**	**-0.047 (0.52)**	**0.029 (0.69)**	**-0.055 (0.45)**	**0.159* (0.03)**	**0.008 (0.91)**	**1.00**								
ggc	**-0.015 (0.83)**	**-0.062 (0.40)**	**-0.053 (0.47)**	**-0.151* (0.04)**	**0.019 (0.79)**	**-0.012* (0.13)**	**-0.168 (0.02)**	**1.00**							
lgcf	**0.326* (0.00)**	**0.391* (0.00)**	**0.027 (0.717)**	**0.255* (0.00)**	**-0.133 (0.07)**	**-0.247* (0.00)**	**-0.262* (0.00)**	**0.233* (0.001)**	**1.00**						
cpi	**-0.121 (0.10)**	**0.124 (0.09)**	**0.145 (0.05)**	**0.013 (0.86)**	**0.274* (0.00)**	**0.021 (0.78)**	**0.185* (0.01)**	**-0.092 (0.21)**	**-0.093 (0.21)**	**1.00**					
tot	**0.055 (0.46)**	**-0.006 (0.93)**	**0.011 (0.88)**	**-0.190* (0.01)**	**-0.016 (0.82)**	**0.03 (0.68)**	**-0.022 (0.76)**	**-0.039 (0.59)**	**-0.019 (0.79)-**	**0.050 (-0.5)**	**1.00**				
popg	**-0.156* (0.03)**	**-0.454* (0.00)**	**0.022 (0.76)**	**-0.046 (0.53)**	**0.119 (0.11)**	**0.365* (0.00)**	**-0.073 (0.32)**	**0.270 (0.00)**	**-0.172* (0.02)**	**-0.093 (0.215)**	**-0.061 (0.41)**	**1.00**			
lfg	**0.145 (0.05)**	**-0.059 (0.43)**	**0.052 (0.48)**	**0.062 (0.41)**	**-0.031 (0.68)**	**0.235* (0.001)**	**-0.034 (0.65)**	**0.129 (0.08)**	**0.029 (0.69)**	**-0.132 (0.08)**	**0.054 (0.47)**	**0.446* (0.00)**	**1.00**		
lschl	**0.108 (0.148)**	**0.761* (0.00)**	**-0.095 (0.20)**	**0.084 (0.25)-**	**-0.231* (0.001)**	**-0.395* (0.00)**	**0.050 (0.50)**	**-0.024 (0.74)**	**0.471* (0.00)**	**0.131 (0.08)**	**0.006 (0.92)**	**0.45* (0.00)**	**-0.042 (0.57)**	**1.00**	
viol	**0.009 (0.89)**	**-0.155* (0.03)**	**-0.002 (0.97)**	**0.025 (0.73)**	**-0.01 (0.89)**	**0.153* (0.03)**	**0.153* (0.03)**	**-0.082 (0.27)**	**-0.016 (0.83)**	**-0.078 (0.29)**	**0.064 (0.39)**	**0.004 (0.94)**	**0.031 (0.67)**	**-0.079 (0.29)**	**1.00**

Curriculum Vitae

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II. Education

- Diploma: College of Teachers Education, Addis Ababa, Ethiopia (1987)- **Education.**
- B.Sc. Faculty of Economics, University of Mathias Belius, Banska Bystrica, Slovakia (June 1993)- **Economics**
- M.Sc. Faculty of Economics, University of Mathias Belius, Banska Bystrica, Slovakia (June 1995)- **Finance**
- Certificate: Professional Programme in **Applied Economics**, Institute for Advanced Studies (a postgraduate programme jointly run by Pittsburgh University and Vienna University of Technology) , Academia Istropolitana, Bratislava, Slovakia (June 1998).
- Ph.D.: University of Economics, Faculty of National Economy (June 2000)- **Economics**

III. Summary of relevant work experience

1. Two years service as technical assistant at Ambo College of Agriculture in Ethiopia (1987-89)
2. Graduate assistant at the University of Economics in Bratislava, Slovakia: International finance, monetary analysis and prognosis and macroeconomics (October 1997-June 2000)

3. Researcher and research– seminar coordinator (Institute of Slovak and World Economies, Slovak Academy of Sciences) from August 1997-December 2000.
4. MBA (Master of Business Administration) instructor at City University, European Programs in Bratislava (par time)
5. Teaching assistance to Professor Stephan Klasen, Ph.D. for the undergraduate course '**Economic Development of Africa'** at the University of Munich in Germany (Summer 2001 and 2003).