# Does Debt Relief enhance Growth in Third World Countries?

Catherine Isabelle Cax

Department of Economics, University of Copenhagen

Supervisor: Carl-Johan Dalgaard

Opponent: Abdulaziz Shifa

24th of November 2005

# Table of Contents

# Introduction

The HIPC initiative launched in 1996 by the World Bank and IMF had for main purpose to increase growth in third world countries by granting debt relief.
By midst 2004, 28 countries had received debt relief. However, the effects of debt relief on growth have not been as intended. Moreover, empirical studies do not support unanimously a positive outcome of debt relief.

Hence, the question I address in this paper is whether debt relief in fact does enhance growth? In an attempt to shed light on this matter I will investigate theoretical predictions and withhold the outcome with empirical findings. I must although admit that given the vast body of literature concerning this subject, the reader shall keep in mind that this paper solely attempt to shed light on the subject based on the presented model.

The remainder of this paper will be structured as follows: In section 2, I will present a model by Jeffrey D. Sachs (2002) that depicts the relationship between debt relief and growth in low-income countries. A discussion of the model and its assumptions will follow as well as a brief review of empirical findings. Finally the last section of the paper will comprise a conclusion summing up the main findings.

# 2. Theoretical Approach

In this section I have chosen to present a model by Jeffrey D. Sachs (2002) suggests that debt relief given some assumptions, enhance growth when a country caught in a poverty trap. The basic idea of poverty traps is that non-linearities in savings, investments and production can cause growth in GNP per capita to stagnate or even fall in low-income countries.

## 2.1 A Model by Jeffrey D. Sachs[1]

The model is as follows:
*All variables are in per capita terms*

(1) $s = 0$ if $y < m$

$s = \sigma (y - m)$ if $y \geq m$

(2) $y = q + f - d$

(3) $q = Ak$

(4) $dk/dt = s - (n + \delta)k$

Equation (1) states that savings equal zero when income $y$ is less than a minimum real level of consumption $m$ defined to meet basic needs. Hence, when income exceeds $m$ the household will save a fraction $\sigma$ of excess income. Equation (2) sets the income level equal to output $q$ plus foreign aid minus the service on foreign debt $d$. Output is assumed to be a linear function of reproducible capital $k$ given by equation (3). Finally, equation (4) states that capital accumulation follows a standard capital accumulation pattern, where $n$ is the rate of population growth and $\delta$ the rate of depreciation of capital.

Assumptions:

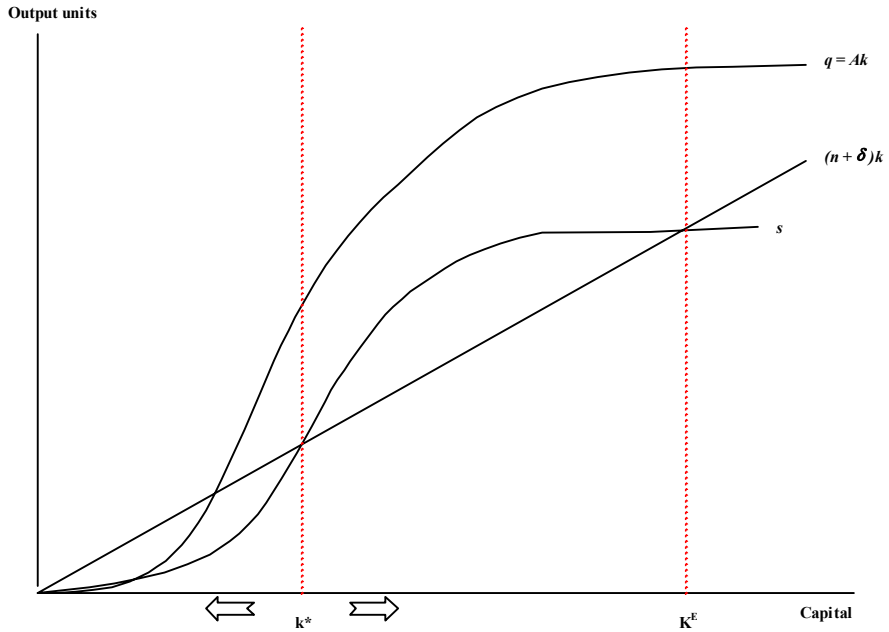
[1] Jeffrey D. Sachs 2002: "Resolving the Debt Crisis of Low-Income Countries" *Brookings Papers on Economic Activity,2002* 1-28

(a) $f - d < m$

(b) $A\sigma - \delta - n > 0$

Assumption (a) implies that foreign aid net of debt service does not cover basic needs $m$.
Assumption (b) ensures that the economy maintains a positive level of growth when the level of income exceeds the threshold level $y > m$.

**Figure 1. Growth Model with Minimum Capital Stock Threshold**




The fundamental idea behind the theory is that the economy grows or shrinks depending on the level of the capital stock *k*.

The implications of the model are as follows:

A threshold between output growth and output decline occurs when

- $k^* = \sigma (m + d - f) / (A\sigma - \delta - n)$

$k^*$ is depicted in figure 1 as the level of capital where savings equals capital widening, the term

i.e. $s = (n + \delta)k$. At this infliction point there is no growth.

Negative growth occurs when the stock of per capita capital is below $k^*$, due to the fact that the amount of per capita savings needed to hold the capital to labour ratio constant in relation to population growth and depreciation is not sufficient. This is obviously given by figure 1, where the savings curve $s$ falls below $(n + \delta)$.
Depending on how much below the actual level of capital $k$ is from $k^*$ two scenarios exist.

When the initial level of capital is not sufficient to cover basic needs savings per capita will equal zero and the economy will experience negative growth at the rate of $-(n + \delta)$.

$$k < (m + d - f) / A < k^* \Rightarrow s = 0 \Rightarrow dk/dt = -(n + \delta)k$$

The other scenario occurs when the initial level of capital is below the infliction point $k^*$, however still enough to cover basic consumption needs. Output will decline till the point where savings equal zero and the same outcome of negative growth will occur similarly to the path demonstrated in the first scenario.

$$(m + d - f) / A < k < k^* \Rightarrow dk/dt = \sigma (Ak + f - d - m) - (n + \delta)k < 0$$

Finally, given that $k > k^*$ the economy will grow towards the steady state $K^E$ at a positive rate that asymptotically approaches $A\sigma - \delta - n$.

Hence, the main idea of the model is that when the economy's actual capital stock $k$ is below $k^*$, the economy is caught in a poverty trap i.e. growth is undermined by debt payments, basic consumption needs in the face of population growth and depreciation of the capital stock.

To get out of this poverty trap Sachs argues that debt relief defined as a rise in foreign debt $f$ or a decrease in debt service $d$. If the outcome of debt relief is sufficient to move initial level of capital stock $k$ *above* the infliction level of capital $k^*$ the economy will start to grow.

**Figure 2. The effects of Debt Relief on growth**

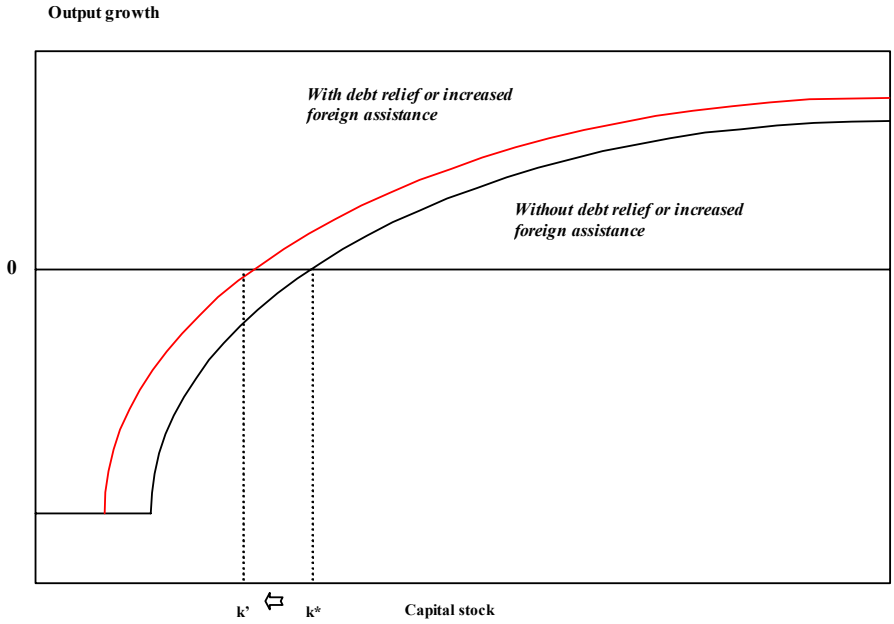


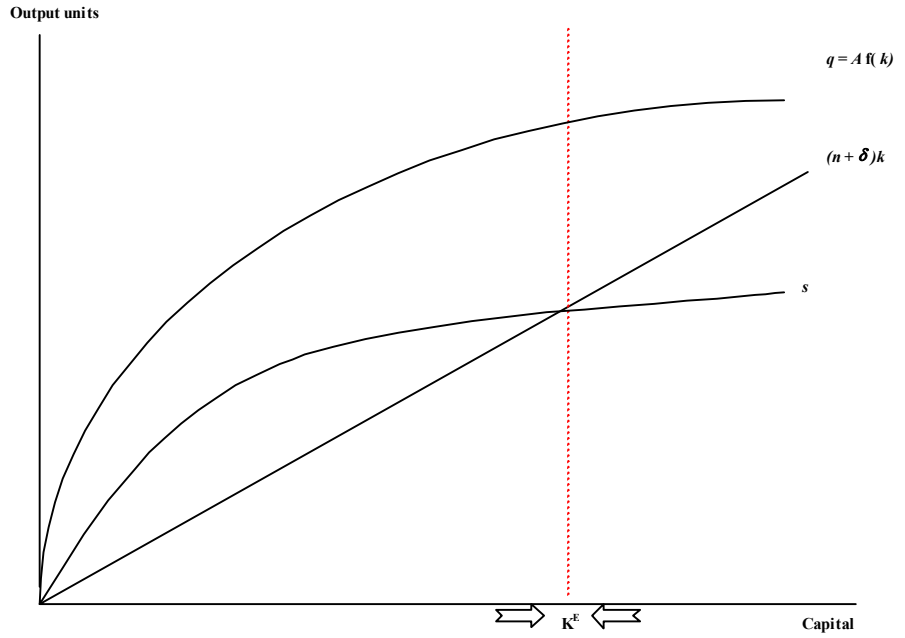

Figure 2 graphs the capital stock against output growth. Hence, a rise in foreign aid or a reduction in debt service of size $\Delta$ reduce the threshold level of capital by $dk^* = -\sigma\Delta / (A\sigma - \delta - n)$ to a new threshold level $k'$. It is hence assumed that $\Delta$ is sufficient to reduce the threshold level to a level where actual stock of capital $k$ is above $k'$. Consequently, the outcome of debt relief will as seen in figure 2 shift the growth curve upward by the amount $\Delta/\sigma k$.

## 2.2 Discussion of the Model

The dynamics in Sachs' model differ from standard neoclassical growth theory given that the economy when caught in a poverty trap experiences no growth or even negative growth. Figure 3 illustrates the dynamics according to standard neoclassical growth theory. [2]

[2] Standard Solow growth model

**Figure 3. Standard Neoclassical Growth Model**




As seen from equation (5) capital evolves over time given the same equation of standard capital accumulation as it was the case in Sachs' model.

(5) $dk/dt = s - (n + \delta)k$

(6) $s = \sigma\, q(k)$, where $\sigma$ is constant

However, a central point of divergence from Sachs' model is that the Inada conditions apply to the production function in the Solow framework:

$q'(k) \to \infty$ when $k \to 0$

$q'(k) \to 0$ when $k \to \infty$

Hence, according to Solow the economy will experience growth even at very low levels of capital which in turn implies that no threshold level of capital exists. This is clearly seen in figure 3, where the slope of the savings curve when $k \to 0$ is steeper than the sloe of the $(n + \delta)k$ ray.

Moreover, in Sachs' model the savings rate can become very low or even negative at low levels of *k*. In the standard Solow model the savings rate is held constant and positive. Empirical studies investigating the relationship between savings rates and income in poor countries show support of Sachs' theory of increasing savings rates after a certain capital threshold has been met.[3]

However, other factors may undermine Sachs theory. One could question the strict assumption that debt relief will increase savings, given that poor countries often tend to experience a high level of corruption. There exists no guarantee that debt relief indeed will increase savings and be canalized into productive investments.
Furthermore, Sachs' omits to look at perverse incentives to save. Households could choose to save very little since they know that the amount of debt relief needed to bring them above the threshold level of capital will just increase. This critic point is similar to the one conducted at the Harrod-Domar model of financing gaps.

Furthermore, the fact that the model suggests non-convexities at the micro level does not induce them to exist at a macro level. One could imagine that a country would start out by building necessary infrastructure in one city and then expand to other cities. Such an approach would eliminate the non-convexities when scaling up to the macro level.

# 3. Empirical Approach: Does Debt Relief enhance Growth?

The empirical evidence with respect to debt relief is mixed and hence does not support unanimously the grant for debt relief.

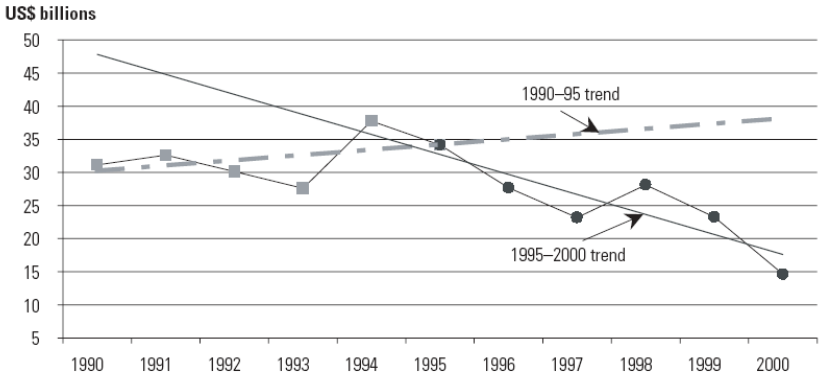
Evidence shows that some African countries do not experience positive growth when they attain the threshold level of capital as predicted by theory. This was the case for Gabon that after reaching the threshold point of capital GNP per capita fell from USD 3,870 in 1998 to USD 3,060 in 2002.

A main argument is that for debt relief to work it must not be considered in isolation. Net transfers to all developing countries grew at the rate of 2.3% from 1990 to 1995 hence declined at a rate of -13% from 1995 and onwards. For the HIPC countries the rates were respectively 0.5% and -

[3] see studies conducted by Norman Loayza, Klaus Schmidt-Hebbel, and Luis Serven or Ibrahim Elbadawi and Francis Mwega).

3.7%. The overall picture is alerting: USD 1.3 bio has been granted in debt relief and USD 14.0 bio has been cut in net transfers. The conclusion is that debt relief seems to crowd out existing aid flows and moreover have undesirable effects on the composition of existing aid. [4]

**Figure 6.6** **Sharply Declining Aggregate Net Transfers to All Developing Countries (excluding Asian crisis countries)**




*Source:* OECD, DAC database.

An implication of this evolution according to Sachs' theory is that the positive effect of debt relief will vanish if donor countries reduce transfers to a point where income do not allow for positive savings and hence the country will remain stuck in a poverty trap.

[4] Switching aid from multilateral to bilateral

# Conclusion

The main conclusion of this paper is that there exists no unambiguous answer to the question posed: Does debt relief enhance growth in third world countries? According to Sachs' theoretical model presented in section 2 the answer is indeed that if an economy in face of depreciation and capital growth can increase its capital stock above the level of threshold capital inducing by the poverty gap it will start to grow. However, as the discussion section of the paper states the theory is founded on some strict assumptions that may not hold in real life. Moreover, given the fact that debt relief tends to crowd out the outcome in the long run may be that the positive effects as predicted by Sachs be undermined.

To enhance growth in poor countries debt relief is not sufficient. Other aspects must be taken into consideration. The framework of HIPC initiative indeed lays out criteria of social and political character that must be fulfilled to qualify for debt relief. However, focus should also be on donor countries wit respect to the crowding effect. If the trend of decreasing aid in view of increasing debt relief persists, countries could remain caught in traps of negative, no or low growth.

# List of References

Jeffrey D. Sachs 2002: "Resolving the Debt Crisis of Low-Income Countries" *Brookings Papers on Economic Activity, 2002* 1-28

Sachs, McArthur, Scmidt-Traub, Kruk, Bahadur, Faye and McCord 2004: "Ending Africa's Poverty Trap" *Brookings Papers on Economic Activity, 2004* 117-134

Madhur Gautam, 2003:
"Debt Relief for the Poorest" *The World Bank* http://www.worlbank.org/oed

Serkan Arslanalp, Peter Blair Henry, June 2003: "The World's Poorest Countries: Debt Relief or Aid?" *Stanford Research Paper Series*