



Research Paper

Effect of External Debt on Poverty Rate In Nigeria

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ABSTRACT

This paper explores the relationship between external debt and poverty. A number of observers have argued that high external indebtedness is a major cause of poverty. Using the first-differenced general method of moments (GMM) estimator, this project models the impact of external debt on poverty in Nigeria, measured by life expectancy, infant mortality, and gross primary enrollment rates, while duly taking into account the impact of external debt on income. The project thus endeavors to bring together the literature that links external debt with income growth and poverty in Nigeria. The main conclusion is that on the effect of income on poverty has been taken into account, external indebtedness indicators have a limited but important impact on poverty.

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1.1 Background to the Study

Several observers, notably international nongovernmental organizations (NGOs), have long argued that a large external debt burden is a major cause of poverty through its effects on economic growth and human development in Nigeria. Some have even advanced the hypothesis that external debt is the cause of poverty. While there is a substantive literature on the relationship between growth and poverty, and on that between external debt and growth, In Dollar and Kraay (2001) and Moser and Ichida (2001), they are of the view that a systematic study of the linkages between external debt and poverty are relevant for studies. Links between external debt and poverty are complex, because there are several social, economic and cultural factors reflecting, among other things these have contributed to the multidimensional aspects of poverty.

There is increasing empirical evidence that economic growth plays a key role in poverty reduction. Dollar and Kraay (2001) summed it up best with the title of their paper, "Growth IS Good for the Poor." However, there is still an ongoing debate on the extent to which growth actually affects poverty. For example, Ghura and others (2002) question the extent to which the income of the poorest one-fifth of the population grows in direct proportion to average income. Using fairly robust statistical methods, they identify what they call "super pro-poor" conditions on top of growth itself. Thus, contrary to Dollar and Kraay, they find that the average growth of income does not lead to a one-to-one increase in the income of the poorest quintiles.

The links between growth and poverty have been long debated by economists and social scientists. One view is represented by "trickle-down" growth optimists who believe that growth eventually benefits the poor. The other view focuses on reducing income inequality to combat poverty (Barro, 2000; Galor and Moav, 2000). For example, using a headcount ratio of poverty, based on the US\$1 a day cutoff, Ravallion and Chen (1997) find that poverty falls systematically with higher

GDP per capita, with an average elasticity of -3.1. A number of studies have found income to be a key determinant of non-income poverty indicators, such as the infant mortality rate and education levels (Deaton, 1999). At the same time, several studies have also found that better health and education increase growth (Ranis and others, 2000), suggesting a two-way relationship between economic growth and poverty. Therefore, it would seem that growth normally reduces poverty, but that its effects vary significantly across countries in a given period and across periods in a given country (Ravallion, 2001).

There is also evidence that external debt may affect growth. Most studies suggest that the impact of external debt on growth occurs mostly through the investment channel. First, the servicing of heavy debt

may directly divert budgetary resources from investments necessary to stimulate economic growth (Krugman, 1988; Sachs, 1989). Second, high indebtedness discourages private sector-led investment and employment (and therefore growth) owing to uncertainty about government actions in servicing the large external debt (Serven, 1997). Third, high indebtedness may lead to capital flight (Ajayi and Khan, 2000). Finally, a country with high indebtedness is often perceived by international financial markets and donors as exhibiting problems of economic mismanagement and bad governance, and therefore to be risky for investment. New flows of external resources to countries faced with large external debts could be thus curtailed.

The available empirical evidence thus indicates that the level of external debt has an impact on economic growth, which, in turn, is found in many studies to be a key determinant of poverty. Hence, external debt is likely to affect poverty through its impact on economic growth. However, the explicit link among indebtedness, growth, and poverty has generally been lacking in the empirical literature. This paper is an attempt to partially fill this void.

This paper empirically explores the links through which external indebtedness has an effect upon poverty, measured by life expectancy, the infant mortality rate, and the primary gross enrollment rate. High debt service can directly reduce government resources that are available for the poor, for example, health and education expenditures and expenditures on social safety nets. Even if two countries consistently have the same growth rate, the country with a high debt service is likely to spend less on provision of social services, thereby having a negative effect on non-income poverty indicators (Gupta, Verhoeven, and Tiongson, 2001).

1.2 Research Objectives

The aim of this project is to model the effect of external debt on poverty rate in Nigeria with the following objectives

- i. To analyze the poverty rate in Nigeria from 2007 to date
- ii. To analyze the external debt in Nigeria
- iii. To use the first-differenced general method of moments (GMM) estimator to model the impact of external debt on poverty in Nigeria as in (i) and (ii)
- iv. Analysis of Result

1.3 Model Specification

This project models the impact of external debt on poverty in Nigeria, measured by life expectancy, infant mortality, and gross primary enrollment rates, while duly taking into account the impact of external debt on income

2.1 Previous Work

Studies investigating the link between external debt and growth place a strong emphasis on the role of investment. Large debt stocks are typically expected to lower growth through the channel of reduced investment which is usually described by the debt overhang hypothesis (Krugman, 1988; Sachs, 1989). Outstanding debt ultimately becomes so large that investment will be inefficiently low without sizeable debt or debt service reduction (Claessens and Diwan, 1989; and Claessens and others, 1989 and 2000). The burden of large debt sooner or later can lead to extreme scarcity in liquidity, negatively impacting upon capital formation, growth, and consumption. The incentive effect of this hypothesis refers to the low public and private investment because a larger and larger share of resources is transferred abroad for debt servicing. In other words, some of the returns from investing in the domestic economy are effectively taxed away.

Another strand of the debt overhang theory emphasizes the point that large debt stocks increase expectations that debt service tends to be financed by distortionary measures (inflation tax or cuts in public investment) as in Agenor and Montiel (1996). Under such uncertainty, private investors will prefer to exercise the option of waiting (Serven, 1997) and may choose to invest less, or divert their resources towards quick, financial returns with high risk, or resort to transfer their money abroad (capital flight).

The original Laffer debt curve (Cline, 1995) graphs the expected repayment against the face value of debt service. It shows that as outstanding debt increases beyond a threshold level, the expected repayment begins to fall due to the adverse effects mentioned above. Pattillo and others (2002) discuss the possible nonlinear relationship between debt and growth.

2.2 Overview of the Project

In this project the first-differenced general method of moments (GMM) estimator will be used to model the impact of external debt on poverty in Nigeria, measured by life expectancy, infant mortality, and gross primary enrollment rates, while duly taking into account the impact of external debt on income. The project thus endeavors to bring together the literature that links external debt with income growth and poverty.

2.3 Theoretical Framework

Most of the empirical studies find one or more debt variables to be significantly and negatively correlated with investment or growth, for example, Borensztein (1990) for the Philippines, Iyoha (2000) for sub-Saharan African countries, Elbadawi and others (1997) for sub-Saharan African countries, Were (2001) for Kenya. Similar results were found by Degefe (1992), Osei (1995), Mbire and Atingi (1997), and Ajayi and Khan (2000). The debt-to-long-run growth relationship was analyzed by Cohen (1993, 1997), and Cohen and Sachs (1986).

Notwithstanding the attractiveness of the debt overhang hypothesis as an explanation for high debt low growth nexus, empirical evidence of the effects of a debt overhang has been mixed. Claessens (1990) found that five of the 29 middle-income countries in his sample were on the wrong side of the Laffer debt curve, suggesting that partial debt reduction would increase the expected repayment to the creditors. For middle-income countries, Warner (1992) concludes that the debt crisis did not depress investment, while Cohen (1993) found that it was the crowding-out effect of current debt servicing that was significant. Oks and van Wijnbergen (1995) concluded that overhang did not exist for Mexico.

Several other studies concluded that it is difficult to disentangle the impact of debt variables on growth and the role of debt overhang from other factors on growth and that debt burden can negatively impact other factors (for example, debt can affect domestic real interest rates which can impact on investment and growth).

3.1 Model Specification and Estimation Methodology

The guidance from the theoretical literature is not very clear as to the exact nature, intensity, and transmission mechanisms through which external indebtedness affects growth and poverty.

Nonetheless, there seem to be direct and indirect linkages between debt and growth, and between growth and poverty. The relationship between debt and poverty is likely to be both direct and indirect, and nonlinear. In the absence of a solid theoretical framework, we hope to shed some empirical light on this issue, while guarding against what Sala-i-Martin (1997) calls "creative theorizing". In order to investigate the impact of external debt on poverty, we use a model of the form.

$$Plc_{t+1} = a + bYc_t + cDc_t + dXc_t + \mu c_t + v_t + e_t \quad (1)$$

Where:

- Plc_t , represents the measure of poverty in country c at time t
- Yc_t , per capita income in country c at time t
- Dc_t , the measure of external indebtedness in country c at time t
- Xc_t , a set of control variables in country c at time t .
- The disturbance term represents a country-specific effect (μ), a time-specific effect (v) and a common error term (e).

Our empirical specification allows us to identify the relationship between external debt and poverty. First, we estimate equation (1) without control variables ($a = 0$) using the simple ordinary least squares (OLS), with the different measures of poverty (life expectancy at birth, infant mortality rate, primary gross enrollment rate) and indebtedness. Real per capita GDP might be endogenous, and failing to control this would lead to inconsistent estimates. As we have already indicated, real per capita GDP is likely to be a cause as well as the result of poverty. It is possible to estimate equation

(1) using instrumental variables (IV) to correct for endogeneity. However, this estimator corrects only for endogeneity, but not the omitted variable bias, which could also lead to inconsistent estimates.

The first-differenced generalized method of moments (GMM) estimator (Blundell and Bond, 1998) is usually used to address simultaneously both omitted variable bias and issues of endogeneity. This method consists of taking the first differences of the equation to remove unobserved time-invariant country-specific effects, and then instrument the right-hand-side variables with the levels of the variables lagged two periods or more. Nonetheless, Blundell and Bond (1998) have shown that the first-differenced GMM estimators are biased when the instruments used are weak. Moreover, the previous methods do not account for the presence of country-specific effects, while it is likely that poverty may be correlated with the unobserved country-specific effects.

To address simultaneously omitted variable bias, issues of endogeneity, while not entirely removing the country-

specific effects (Bond, Hoeffler, and Temple, 2001), Blundell and Bond (1998) have suggested to use the system GMM method that jointly estimates the equation in levels (1) and in first difference (2), imposing the restriction that the coefficients in the level and differenced equation are equal:

$MIC_t = \alpha + \alpha_1 Y_{c,t} + \alpha_2 W_{c,t} + \alpha_3 MC_{c,t} + \alpha_4 ec_{c,t} + \dots + \alpha_n I_{c,t} \dots \dots \dots (2)$

$L(IPlc, H, 6.Yc, t-1, j,]Jc.1-1), D(Pfc, I'''Pfc, I-2, Yc, I'''Yc, I-2, Dc, i \dots Dc, I-2)$

The instruments used in the level equation (L) are the lagged first differences of the variables. The GMM-type instruments for the differenced equation (D) are the lagged levels of the variables. The equation in levels allows one to exploit the large cross-country variation in the variables, whereas in the differenced equation, time-invariant, country-specific, sources of heterogeneity are removed. In addition, the use of appropriate Jags of right-hand side variables as instruments allows one to address the three problems of measurement error, omitted variables, and endogeneity (Dollar and Kraay, 2001). In what follows, we estimate equation (1) using also the system GMM method. To ensure that our results are not driven by time-specific effects, we estimate all regressions with time

dummies. The validity of the GMM instruments are tested using Sargantestsof over-identifying restrictions.

The basic specification allows us to capture through the income variable the impact of a number of macroeconomic policies. We nonetheless expand the basic model by introducing two control variables: openness, and a country-risk indicator. Trade openness is expected to affect positively human development. Wei and Wu (2002), report several pieces of evidence suggesting that higher trade openness is associated with a longer life expectancy and a lower infant mortality rate. An improvement in the country risk indicator, measured by the overall International Country Risk Guide (ICRG) index, is expected to have a positive impact on human development. The latter allows us to assess the possibility that bad institutions, corruption, and economic mismanagement and bad governance may lead to lower flow of foreign resources, low level and efficiency of investment in social sectors.

4.1 Data Analysis

One measure of poverty has been generally in terms of consumption or income. The most widely used income poverty indicators are the headcount index, per capita GNP, and per capita GDP corrected for purchasing power parity (PPP). However, new perspectives on the causes and manifestations of poverty have shown that poverty is a multidimensional phenomenon, and can be expressed in terms of income, and basic needs such as access to health services and education. We use three standard human development indicators to measure poverty: the life expectancy at birth, infant mortality rate and primary gross enrollment rate. Several studies have shown that these indicators could be used to measure the variations in the physical well-being of people (*World Development Report, 2000/2001*), and that in many countries health and education indicators are worse for the income-poor than for the income-non-poor. In South Africa, for example, the under-5

mortality rate is twice as high as the rate for the richest 20 percent, and in Northeast and Southeast Brazil, it is three times as high.

The theoretical literature is rather vague on the preferred definition of external debt indicators. In line with empirical practice, we are rather agnostic on what is the best indicator. Admittedly, each indicator is amenable to a different interpretation. We therefore use three different external debt indicators. First, we use the ratio of nominal debt to GDP, which is a useful indicator to assess the overall resource basis available to the country. However, the face value of the external debt stock is generally not a good measure of a country's debt burden when a significant part of the debt is concessional, i.e., contains a grant element, as is usually the case for debt contracted by low-income countries. We thus also use the ratio of NPV of debt to exports to assess the country's capacity to repay (solvency). This ratio is a key variable in debt sustainability analyses, especially within the HIPC (Highly Indebted Poor Countries) Initiative framework. These two ratios will help to isolate any debt overhang effect. To take into account the potential liquidity effect or crowding out effect, we used the ratio of debt service to exports.

The analysis uses annual data for 67 low-income countries⁸ (of which 41 are HIPCs⁹), over the period 1985-99. The main dataset comprises the three non-income poverty indicators (life expectancy, infant mortality rate, and gross primary school enrollment rate), GDP per capita PPP, and three external debt indicators (nominal debt to GDP, NPV of debt to exports, and debt service to exports).

Various sources are used together to get the data. Life expectancy at birth (years), infant mortality rate (number of deaths per 1,000 live births) and primary gross enrollment rate (gross percent) are from the *World Development Indicators* (World Bank). These data are available for 1985, 1987, 1990, 1992, 1995, 1997. Nominal stock of debt, total debt service, GDP and exports are from the *Global Development Finance* (World Bank). Net present value of debt data are from Easterly (2000). Real purchasing power parity GDP, terms of trade, openness ((import + export)/GDP) are from the WEO database of the IMF.

Table 1 shows the evolution of average per capita income, external debt and poverty indicators for the entire sample of countries for the period 1985 to 1997. First, during the period 1985-92 (and prior to the bilateral and multilateral debt relief), as average per capita income increased, the external debt indicators also increased rapidly, which indicates that new external borrowings may have been a key factor in economic growth and development. Second, since 1992, as debt relief under the aegis of Paris Club and other initiatives was accelerated, the external debt indicators have decreased. Third, perhaps due to averaging of indicators across the sample size, no systematic pattern is observed over time in the poverty indicators of infant mortality, primary education and life expectancy. Moreover, there appears to be a neither positive nor negative relationship between per capita income and the poverty indicators. These are the "original" HIPC. The current list of HIPCs that have obtained or are expected to require debt relief under the HIPC Initiative is somewhat shorter (about 36).

Table I. Evolution of Average Per Capita Income, Debt, and Poverty Indicators

Year	Per capita income (U.S. dollar, PPP)	Life expectancy (years)	Infant mortality rate (per 1000)	Primary Gross enrollment rate (percent)	Nominal debt (percent of GDP)	NPV of debt (percent of exports)	Debt service (percent of exports)
1985	1,160.2	54.6	106.3	83.1	85.8	330.5	23.6
1987	1,610.4	53.9	105.2	81.3	104.4	426.2	25.6
1990	1,721.3	54.3	120.5	83.6	134.6	408.9	21.0
1992	1,545.91	53.6	101.7	80.4	119.9	445.5	18.4
1995	1,471.8	54.4	92.9	80.8	121.0	267.2	19.6
1997	1,512.5	54.1	125.7	80.8	105.0	232.6	14.6

Two main findings could be drawn when analyzing the bivariate relationship between per capita GDP, non-income poverty indicators and debt indicators:

- First, there seems to be a relationship between real GDP per capita and health indicators. Table I shows that life expectancy increases with real per capita GDP. Infant mortality rate decreases with real per capita GDP (Figure 2). In contrast, Table 2 does not show a uniform link between primary gross enrollment rate and real per capita GDP. Table 2, which reports non-income indicators by income groups, confirms these findings. It shows that higher real GDP per capita is associated with better life expectancy and infant mortality rate. These results are similar to those

confirmed by Table 2, which compares poverty indicators for countries with NPV of debt less than 150 percent of exports and NPV of debt higher than 150 percent of exports, and for countries with nominal debt to GDP less and higher than 40 percent. Poverty indicators appear to be worse in countries with NPV of debt to export higher than 150 percent and in countries with nominal debt to GDP higher than 40 percent.

Table 2. Poverty Indicators, by External Indebtedness Groups (averages)

	NPV/X < 150%	NPV/X > 150%	Nominal debt to GDP < 40%	Nominal debt to GDP > 40%
Income (US\$)	1,591	1,492	1,578.2	1,498.2
Life expectancy (years)	57.0	53.5	56.1	53.8
Infant mortality rate (per 1000 birth)	86.3	113.5	85.0	113.1
Primary gross enrollment rate (%)	90.0	79.9	77.7	82.5

5.1 Discussion of Result

The key objective of this project was to establish whether external debt plays a crucial role in influencing poverty levels. A number of international NGOs have categorically stated that debt causes poverty. This work seeks to contribute to this debate as well as to the literature on growth and external debt. There is an extensive and growing literature on the impact of growth on poverty, and on the relationship between external debt and growth. However, there is a paucity of studies directly linking external debt and poverty. This project thus endeavors to bring together the two areas of study, while emphasizing the complex relationships.

External debt affects poverty not only through its negative impact on public investment and income growth but also through high debt service's crowding out of governments' social spending. High debt service directly reduces government budgetary allocations on health, education, social safety nets, and water and sanitation, in part because governments find it politically easier to cut back spending in such sectors because the poor are not usually organized to have a voice in such decisions.

In order to adequately examine the complex interlocking relationships in the external debt-growth-poverty nexus, this work has used the GMM methodology, which allows us to simultaneously address both the problems of endogeneity and omitted-variable bias.

The main findings of the work confirm that once the effect of income on poverty has been taken into consideration, high debt service and related external indebtedness indicators have an adverse, but limited impact on non-income poverty indicators, such as life expectancy, the infant mortality rate, and the education enrollment rate. The most statistically significant relationship is that between the debt service-to-exports ratio and life expectancy, where we find that a 20 percent increase in the debt-service ratio leads to a 1 percent decline in life expectancy at birth.

The main finding, while not contradicting other studies in the literature, such as Pattillo and others (2002) and Dollar and Kraay (2001), is that the impact of external debt on poverty is a relatively muted, albeit important, variable in the poverty-growth nexus.

From these results, in line with the findings of Abrego and Ross (2001), in order to reduce poverty, the key policy option is to focus on factors that impede growth, of which debt is but one. Focusing exclusively on external debt relief is probably not a very effective way to reduce poverty. In this context, a new consensus (as in the Monterrey Consensus and the Johannesburg Conference) is emerging among the members of the international community; the longer-term goal being focused on an accelerated poverty reduction, which needs to be supported by additional aid flows, which are increasingly being provided in the form of grants, combined with debt relief for countries that can demonstrate effective utilization of these resources and maximize the benefits to the poor.

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