

**Public Debt, Growth and Poverty Reduction in a Failed State: Nigeria,
1970-2011**

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Views expressed are those of the authors; the usual disclaimer applies.

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ABSTRACT

The paper examines the relationship between debt, growth and poverty in Nigeria for the period 1970-2011. Despite the enormous resources, Nigeria seems to accumulate external debts especially in periods of declining oil prices in order to finance the development of the economy. What has been the precise link between external debt and poverty reduction? Econometric analysis brings out the precise relationship among these variables. The econometric methodology used incorporates elements of a failing state such as corruption, ethnic violence and insecurity, among others. Furthermore, incidence of poverty is captured by examining the share of government spending on social services as well as the trend in per capita income. The results show that public debt had a negative impact on growth and poverty reduction. The results of the proxies for failed state indices were mixed.

1.0 Introduction

The growth – debt nexus debate has been a long standing discourse. Following the traditional neo-classical growth theory¹, it is believed that given the existence of savings – investment gap, particularly in poor countries, that external borrowing can help fill the gap and provide the necessary resources needed for growth and development purposes. But opponents of this view have argued that external debt beyond certain (established) threshold can affect growth adversely. In essence, large debt burden can slow down growth by hindering investment and productivity growth. The reason, according to Hameed et al. (2008), is that when greater percentages of reserves are consumed in meeting debt service, creditworthiness of the debtor nation erodes. This will cause a reduction in access to external financial resources. Moreover, external debt is also known to be accompanied by debt service obligations, which in itself has far-reaching negative implications on growth.

Various channels through which debt is translated to slower economic growth have also been identified in the literature. One of such channels is the debt overhang hypothesis. Theoretically, debt overhang hypothesis is based on the premise that if debt will exceed the country's repayment ability with some probability in the future, expected debt service is likely to be an increasing function of the country's output level (Karagöl, 2002). Another channel is the liquidity constraint effect or the crowding-out effect. The liquidity effect

¹ For instance, Harrod-Domar growth model.

stresses the fact that external debt has negative effect on growth in that the resources used to service the debt constitute resource drain which could have been available for investment, hence the crowding – out effect.

In Nigeria, episode of high level of debt was not alarming in the 1960s and early 1970s. But towards the tail end of 1970s, the country started accumulating heavy debts. The shortfall in revenue following the decline in crude oil exports as a result of the glut in the international oil market, coupled with large fiscal deficits and disequilibrium in the external sector, put pressure on the government. This generated the need for external aid by means of foreign debt to help finance growth and development activities and to support the deteriorating external position of the country. This led to the procurement of the so called ‘jumbo debt’ of N1252.1 billion in 1978. An attempt to reverse the dwindling situation of the economy led to the adoption of the IMF engineered austerity programme in 1986. As one of its conditions, Nigeria was forced to obtain huge loan from the IMF to add to the already accumulated debt burden. By 1990, external debt had reached an alarming level of N298614.40 billion representing 111.6% of the country’s GDP. This was clearly unsustainable. And between 1999 and 2005, the level of debt had gone wild, which also demanded concerted efforts from all and sundry on how to tame the situation. Following the debt deal with the Paris and London club of creditors resulting in the debt relief of 2005, the level of external debt declined sharply to N451461.70 million

in 2006. But beginning from 2008, the level of external debt started rising raising concerns about the current trend.

Meanwhile, domestic debt which was only N30 million in 1960 and remained relatively stable over the period preceding the debt relief rose astronomically from ₦1,275.077 billion in 2005 to ₦5,622.844 billion in 2011, representing about 341 percent increase. Between 2005 and 2006, domestic debt increased by 63.3 percent, from ₦1,275.077 billion in 2005 to ₦2,082.007 billion in 2006.

Interestingly, it appears the incidence of social unrest and poverty also witnessed phenomenal increase beginning from the 1980s when public debt burden began to assume monstrous posture. The rates of terrorists' activities, insecurity and bombing in recent times have raised serious concerns with the country being described in some quarters as a failed state². There are contending views as to whether the country is a 'failed state' or a 'failing state'. Social infrastructure is in a deplorable condition and capacity utilization in manufacturing and other productive sectors with huge employment potential have remained low. Consequently, poverty incidence deepened from 27.2 percent in 1980 to 69 percent in 2010. Thus, given the present deteriorating economic and social conditions in the country at present, it is doubtful whether the procurement of public debt has any significant positive effect on economic growth and poverty reduction in Nigeria.

² Table A1 in the appendix shows the various incidence of insecurity and bombing since 1986.

The objective of this study is to investigate empirically the relationship between public debt, economic growth and poverty reduction in Nigeria. Unlike previous studies, such as Iyoha (1999), Udejaja and Okeke (2005), this study takes a holistic approach in terms of scope in analysing the problem at hand by going beyond external debt and economic growth to examine the impact on poverty. In addition, the paper tries to incorporate elements of a failed state in the analysis. The paper is organized as follows. Section two reviews previous empirical studies and theoretical underpinnings. Section three presents analysis of debt sustainability and external debt performance in Nigeria. Research methodology is the main focus of section four. Section five analyzes the empirical results, and section six offers policy recommendations and conclusion.

2.0 Literature Review and Theoretical Considerations

2.1 External Debt versus Economic Growth

Numerous empirical studies have been carried out in an attempt to establish the relationship between external debt and economic growth. Findings from these studies have failed to reach a common ground on the precise impact of debt on growth. While some studies found positive impact of debt on growth, others found negative relationship between them. The common belief, however, is that debt below a certain (established) threshold can promote economic growth while debt well above this threshold could retard growth. Early studies

in this regard include Geiger (1990); Warner (1992); Cohen (1993) ; Cunningham (1993); Chowdhury (1994); Rockerbie (1994); Fosu (1996); Elbadawi et al. (1996); and lyoha (1999); among others. Conclusions from majority of these studies show that external debt has an adverse effect on growth. This study, however, intends to review recent studies on the relationship between external debt and economic growth.

Using an error correction model, Were (2001) analyzed the debt overhang problem in Kenya and tried to find evidence for its impact on economic growth using time series data from 1970-1995. The empirical results of the estimated model did not find any adverse impact of debt servicing on economic growth; however, the results confirmed some crowding-out effects of debt servicing on private investment.

Udejaja and Okeke (2005) in their study investigate external debt management in Nigeria and its impact on economic growth and investment in Nigeria. Employing the ordinary least squares (OLS) regression technique on the Nigerian data spanning from 1980-2000, the empirical results from the error correction model show that a rise in the current debt flows as a ratio of GDP leads to a decline in economic growth, hence debt flows hamper economic growth. On the other hand, the positive impact of debt servicing on economic growth was rather contrary to expectation.

Osinubi and Olaleru (2006) examine how the use of budget deficits as an instrument of stabilization leads to accumulation of external debt with its

attending effects on growth in Nigeria using data from 1970 to 2003. The ordinary least squares (OLS) estimates show that there is a positive relationship between debt below a given threshold and economic growth. The regression results show that the coefficient of debt overhang is negative, indicating that low levels of debt above the threshold value contributes negatively to growth in Nigeria. This result shows the existence of debt Laffer curve in Nigeria.

Ayadi and Ayadi (2008) investigate the impact of the huge external debt, with its servicing obligations, on economic growth in Nigerian and South Africa. The study utilizes annual time series data for the sample period from 1980 through 2007. The empirical results obtained from both ordinary least squares (OLS) and the Generalized least squares (GLS) techniques show that debt servicing has negative impact on economic growth in both Nigeria and South Africa. The paper, however, indicates that the current debt profile for Nigeria portrays a good picture than in South Africa but that South Africa has utilized their external debt better than Nigeria.

Hameed et al (2008) analyze the long-run and short-run relationship between external debt and economic growth in Pakistan for the periods covering from 1970-2003 using the co-integration and Granger causality tests. The long-run co-integration estimate show that debt service affects gross domestic product (growth) negatively in the long run. In the similar manner, the Granger causality test shows that there is short-run and long –run causality running from debt service to output, thereby confirming the earlier co-integration results. The

overall result from the study indicates that debt overhang is an important factor in overall debt scenario in Pakistan.

Adesola (2009), attempts to establish the relationship between poor economic growth and debt servicing in Nigeria focusing on the impact of debt payments to creditors. The study employed time series data for the period spanning from 1981 to 2004 with the ordinary least squares (OLS) regression technique as the estimation method. The empirical results show that debt payments to other creditors and London club creditors have significant negative influence on gross domestic product and gross fixed capital formation in Nigeria.

Adofu and Abula (2010) investigate the empirical relationship between domestic debt and economic growth in Nigeria using time series data for the periods from 1986-2005. Employing the ordinary least squares (OLS) regression method the empirical results show that domestic debt has significant negative impact on economic growth in Nigeria during the study period.

Using panel data for 20 Asian and Latin American countries, Hwang et al (2010) investigate the financial sector development-debt-growth nexus over the period 1982-2004. Employing the first differenced generalized method of moment (GMM) and the panel least squares (POLS), the results show that external debt as percent of GDP is significantly negatively correlated with economic growth rate, indicating that excessive debt is detrimental to the growth of an economy. The results also show that the coefficient of debt service

to exports of goods, services and income ratio is negative and significant for the 20 Asian and Latin American countries.

Malik et al (2010) in their studies explore the relationship between external debt and economic growth in Pakistan for the period of 1972- 2005, using time series econometric technique. The OLS results show that external debt is negatively and significantly related with economic growth. This means that an increase in external debt will lead to decline in economic growth. Similarly, the empirical results also show that debt servicing has significant and negative impact on GDP growth. This implies that as debt servicing tends to increase, there will be fewer opportunities for economic growth.

Ogunmuyiwa (2011) examines the debt-growth nexus for Nigeria using co-integration test, Granger Causality test and error correction mechanism (ECM) as relevant methodologies for testing the relationship between external debt and economic growth. The Granger Causality test shows that there is no strict causality between external debt and economic growth in Nigeria. This according to the study means that external debt is not a specific factor determining the rate of economic growth in Nigeria. This result corroborates those of Afxentiou and Serletis (1996a) and Bullock and Rogoff (1990). However, the long-run and short run estimates show that there exists a relationship between external debt and economic growth in Nigeria. Specifically, the short-run dynamics show that the debt variable is correctly signed indicating a positive relationship between debt and growth.

Amassoma (2011) examined the causal relationship between external debt, domestic debt and economic growth in Nigeria between 1970 and 2009 using annual data between 1970 and 2009 under the framework of Vector Autoregressive (VAR) and Vector Error Correction (VEC) models. The results of the error correction model indicate that external debt has contributed significantly to economic growth in Nigeria. The study, therefore, advocates that domestic rather than external debts should be incurred, since the repayment of such loans together with the principal connotes re-investment in the domestic economy with the attendant positive impact on growth.

Ezike and Mojekwu (2011) examine the impact of external debt on macroeconomic performance in Nigeria, utilizing time series annual data for the periods covering from 1980-2004. Employing the ordinary least squares (OLS) regression technique, the results show that provided appropriate domestic macroeconomic policies are adopted and implemented alongside debt reduction packages, debt reduction would provide the needed impetus to enhance macroeconomic performance in Nigeria.

Rais and Anwar (2012) apply a simple OLS regression technique for Pakistan economy over the period 1972 to 2010 and found that both domestic debt as a ratio of GDP and external debt as a ratio of GDP have negative effect on growth per capita real growth. The paper concludes that since both types of debt are not well managed and efficiently used they have adverse impact on growth of the nation. The study however, recommends that beneficial results

could be achieved if debt is well managed and used in productive sectors only, and kept away from corrupt people.

From the foregone review of the literature, it can be shown that majority of the studies have concluded that external debt has an adverse effect on economic growth, while domestic debt may have positive effect on growth. However, it is not clear what the cumulative impact of public debt, both domestic and external as a whole, would have on economic growth and poverty reduction.

2.2 Theoretical Considerations

The relationship between debt and economic growth can be explained through traditional neo-classical growth model. This theory assumes that with perfect capital mobility (which allows countries to borrow and lend), external borrowing contributes positively to economic growth. Under the neoclassical growth –cum- debt framework, it is postulated that debt is procured for investment purpose and that the investment will generate multiplier effect on economic growth (Nyong, 2005). The growth-cum-debt model also considers debt capacity in terms of the benefits and costs of borrowing in the process of economic growth. The basic argument is that a country will maintain its capacity to service debt provided that additions to its debt over time contribute sufficiently to growth. The model states that, to maintain debt service capacity over time, the growth rate of output should equal or exceed the cost of borrowing, measured by the rate of interest (Hjertholm, 1999). The model

concludes that any debt strategy will only work, ultimately, if there is sufficient economic growth to support it. However, the model has been criticized for concentrating more on savings-investment gap. The theory also suffers from conceptual problems relating to its theoretical underpinnings and the rigidity of its basic assumptions. For instance, the assumption of perfect capital mobility is unrealistic, since countries may not be able to borrow freely because of the risk of debt repudiation or moral hazard (Gertler and Rogoff, 1990).

Another theoretical exposition linking debt to poor growth in developing countries is the dependency theory. According to the dependency theory, international economic exchanges and unequal power relationships between rich and poor nations are detrimental to the poor nations of the world. Concerning debt crisis in developing countries, dependency theory holds that high levels of foreign debt and interest repayment can adversely affect economic and social conditions of poor nations. This is because debt and interest payments constitute a drain in the already scarce capital and, as a result, inhibit economic development. The resulting capital drain reduces government spending on social, educational, and health programs, slow decline in mortality (Shen and Williamson 1999). This capital drain reduces the strength and flexibility of the government, making it difficult to take action when faced with social or economic crises. Furthermore, dependency theory stresses the inability of many poor nations to generate enough revenue to make payments on large foreign debts. When this happens, the World Bank and the IMF do respond by offering

structural adjustment loans aimed at resolving the balance-of-payment issues by rescheduling payments, renegotiating loan terms, and providing new loans (McMichael 2004). However, the implication of structural adjustment requires nations to cut government spending to correct budgetary imbalances (Peet 2003). This has grave effect on an economy as cuts in government spending involves reductions in the infrastructural, health, education, and other welfare spending with its attendant negative impact on growth and development.

There is also the profligacy theory of debt crisis focussing on institutional arrangement under which loans are contracted. Profligacy theory recognizes that the debt crisis arose from weak institutions and policies that have wasted resources through unbridled official corruption and damaged living standards and development. These policies led to distortions in relative prices and encouraged capital flights as can be seen in substantial external liquid funds of private citizens of debtor countries in foreign banks (Nyong, 2005). According to this theory, many factors are identified as being responsible for the negative relationship between debt and growth in low income countries. These include: waste of resources due to policy deficiencies, poor governance and weak institutions in the public sector dominated economies, inadequate debt management reflected in unrestrained borrowing at unfavourable terms, etc.

From the review of the competing theories, it is found that while one strand of the theories suggests that debt has a positive relationship with growth, others perceive that debt has a negative impact on growth. But a cursory look at

debt situations of most seriously indebted countries shows consistency with the discussed theoretical underpinnings.

2.3 Public Debt versus Poverty Reduction

While theoretical and empirical literature have provided some guide on the relationship between government debt and economic growth, there are no clear theoretical models linking government debt and poverty. The link between government debt and poverty is often indirectly presented in the assumption that overall growth leads to poverty reduction. This assumption is in general based on the study by Dollar and Kraay (2001), which finds that economic growth benefits the poor as well as those with wealth.³

The direct impact of government debt on poverty, however, is rarely explicitly modelled and tested. However, a few studies have investigated the consequences of external indebtedness on poverty. Schinke (1994) analyses the impact of debt on poverty through the change in relative prices of traded to non-traded goods in a factor endowment framework. In another empirical study, Loko, Mlachila, Nallari and Kalonji (2003) estimated the relationship between external debt and three human development indicators (life expectancy, mortality rate and primary school enrolment rate). They found a negligible

³ Before the study by Dollar and Kraay (2001), the Kuznet hypothesis postulated that growth and inequality are correlated in a U-shaped curve. In the initial phase, economic growth increases inequality but after the country has reached middle income status, inequality narrows as the economy grows. (Kuznets, S. (1955) Economic Growth and Income Inequality. AER, 45, 1-28.)

negative effect of the debt indicators on non-income poverty after controlling for the effect of income.⁴

3.0 Debt Sustainability and External Debt Performance in Nigeria

3.1 Analysis of Debt Sustainability in Nigeria

The concept of debt sustainability has been used frequently to mean the level of debt that allows a debtor country to meet its current and future debt service obligations in full, without resorting to debt relief or rescheduling, with no further accumulation of arrears, while at the same time allows an acceptable level of economic growth to occur. In another definition, European Council (2011) considers debt as being sustainable when a borrower is expected to be able to continue servicing its debts without an unrealistically large correction to its income and expenditure. And within the framework of debt sustainability, several debt ratios have been devised and used in measuring a country's solvency in the sense that they consider the stock of debt at certain time in relation to the country's ability to generate resources to repay the outstanding balance. Debt burden indicators in this category include:

- i. The ratio of external debt to GDP;
- ii. The ratio of external debt to exports;
- iii. The ratio of external debt to government revenue.

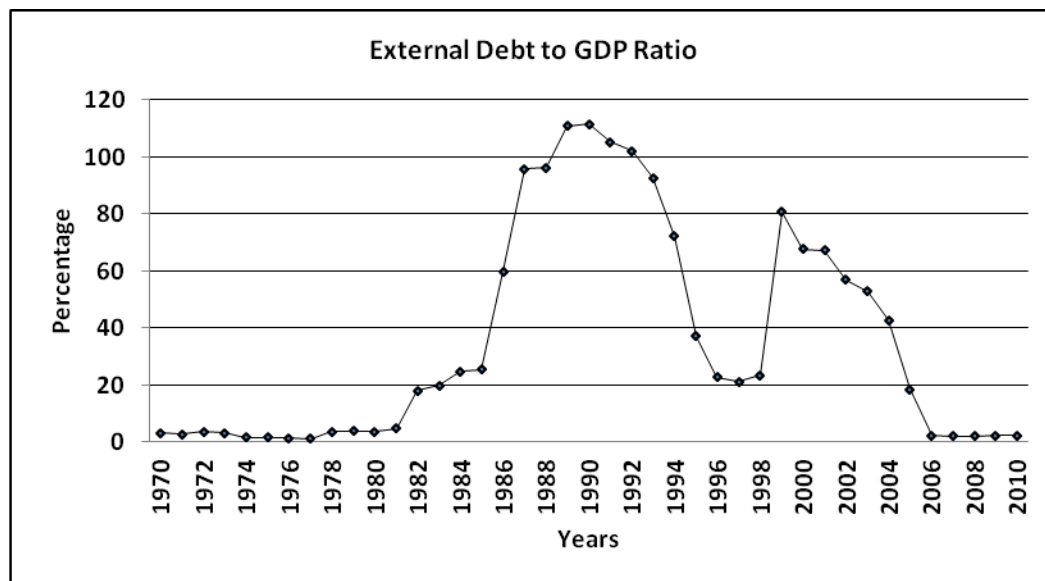
⁴ See Maier, Rolf (2005) : External Debt and Pro-Poor Growth, Proceedings of the German Development Economics Conference, Kiel 2005 / Verein für Socialpolitik, Research Committee Development Economics, No. 23, <http://hdl.handle.net/10419/19816>

The ratio of external debt to GDP measures the health of an economy. It relates the debt burden to the broadest measure of the income-generating ability of the economy (IMF, 2004). A low debt to GDP ratio indicates that the economy can produce sufficient output and generate enough income to pay back the debt. The ratio of external debt to exports relates the debt burden to the availability of foreign exchange earnings of the economy. In other words, it is used to calculate the total amount of debt in comparison to its total amount of exports. A very high debt to exports ratio indicates the weakness of the external accounts and its vulnerability to foreign capital flows. For debt to government revenue ratio, it relates debt burden to the availability of domestic resources. This ratio is used as a measure of sustainability in those countries with a relatively open economy facing a heavy fiscal burden of external debt. An increase in this ratio shows that the country has difficulties in servicing her debts.

Figures 1,2 and 3 present external debt indicators in Nigeria for the period 1970 to 2010. Figure 1 shows trend analysis of the ratio of external debt to GDP in Nigeria for the periods 1970-2010. With the threshold established at 30%, the figure shows that external debt to GDP ratio was well below the fixed threshold between 1970 and 1985. However, following the adoption of SAP in 1986 and the subsequent procurement of the IMF ‘engineered’ loan, the ratio of external debt to GDP overshot its established threshold of 30% beginning from 1986 till 1995. This period reflects non-sustainability of debts in Nigeria. The rate however, fell below the threshold between 1996 and 1998 before

overshooting again between 1999 and 2004. From 2005, this ratio showed sustainability, following the Paris Club debt exit deal. Meanwhile, with external debt to GDP ratio well below at 40% from 2010, it shows that Nigerian debt is still sustainable.

Figure 1: External Debt to GDP ratio in Nigeria (in %), 1970-2010.

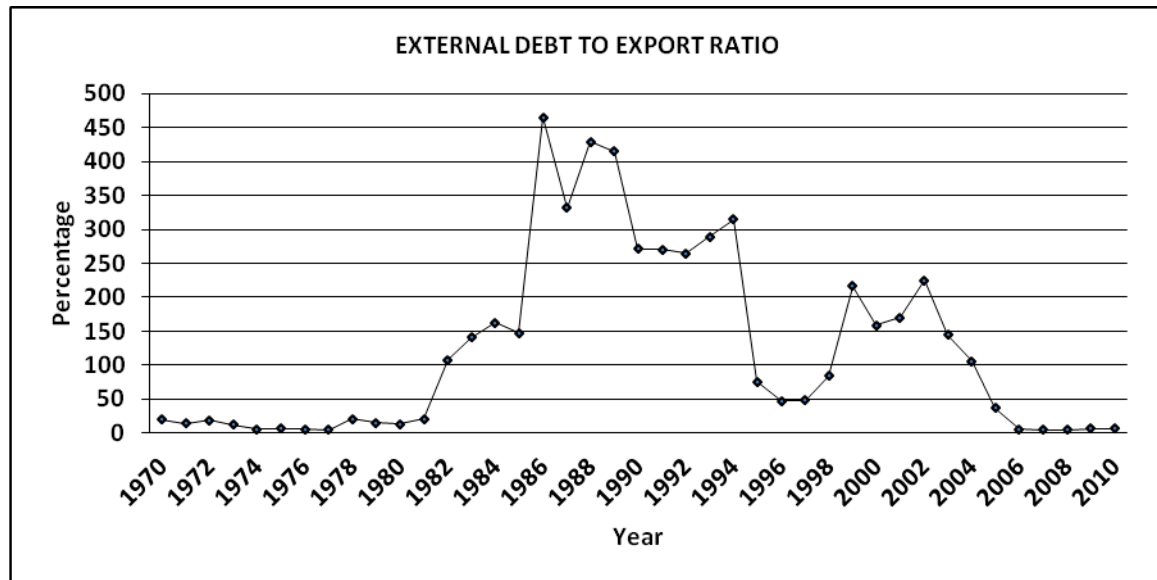


Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

Figure 2 shows the ratio of external debt to exports in Nigeria. From the figure, Nigeria’s debt burden was sustainable between 1970 and 1981. During this period, the external debt to exports ratio was below the established 100% threshold. However, between 1982 and 1994, the ratio overshoot the established threshold but subsequently fell below this threshold between 1995 and 1998. Meanwhile, the ratio was well above the threshold between 1999 and 2004, reflecting non-sustainable debts burden in the country. But beginning from 2005, after the exit from the Paris debt deal, the external debt to exports ratio continued at low levels, below the set threshold. With new threshold set at

150% in 2010, the ratio of external debt to export continued to fall below this established benchmark.

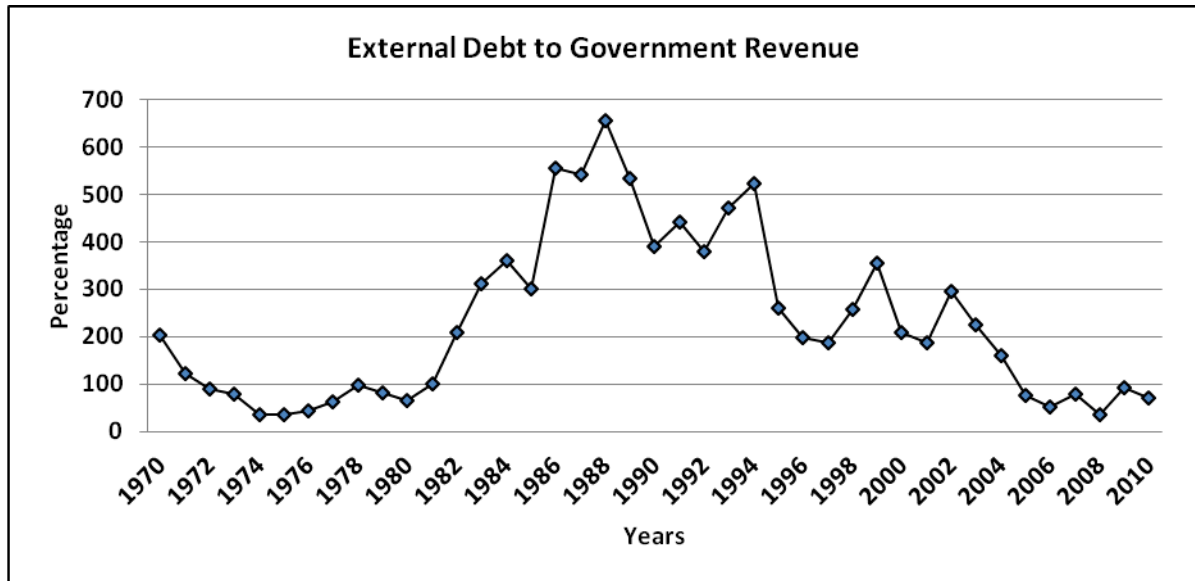
Figure 2: External Debt to Exports Ratio in Nigeria (in %), 1970-2010



Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

External debt to government revenue is depicted in figure 3. As shown in the figure, the debt to government revenue ratio was well below the established 250% threshold between 1970 and 1982 after which the ratio overshot the threshold between 1983 and 1995. The implication of this observed trend is that Nigeria’s debt burden was not sustainable during this period. The ratio however fluctuated between 1996 and 2002 before staying below the established threshold between 2003 and 2010.

Figure 3: External Debt to Government Revenue Ratio (in %), 1970 -2010



Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

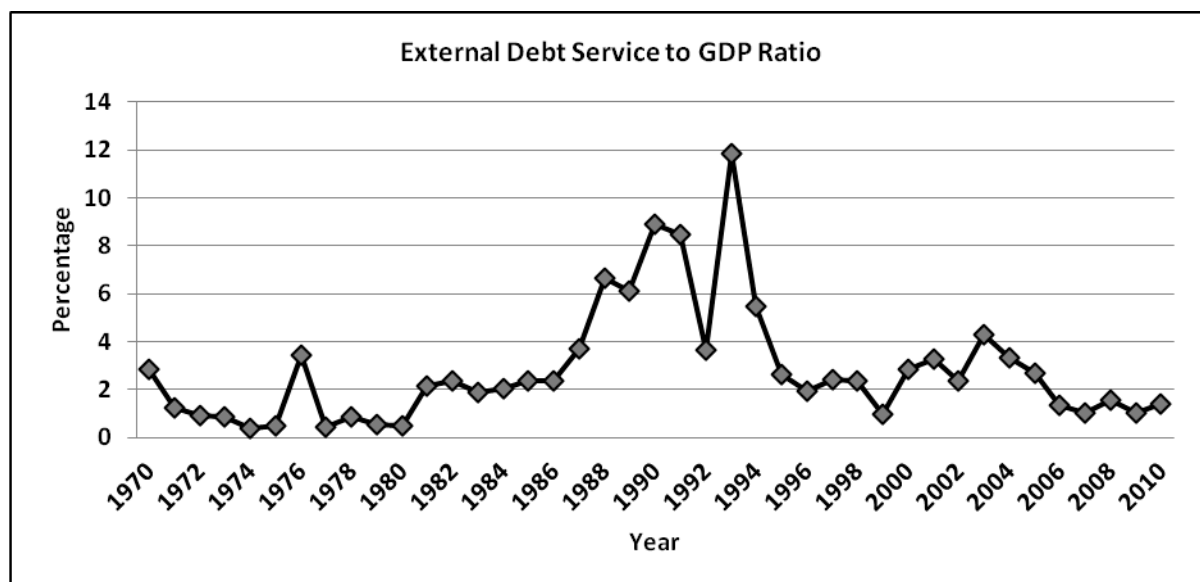
Apart from the above three debt solvency indicators, there are also a set of indicators focusing on the short-term liquidity requirements of the country with respect to its debt service obligations. These indicators not only provide useful early-warning signs of debt service problems, they also highlight the impact of the inter-temporal trade-offs arising from past borrowing decisions. Indicators in this group include:

- i. External Debt Service to GDP Ratio;
- ii. External Debt Service to Exports Ratio;
- iii. External Debt Service to Government Revenue ratio

As evidenced in figure 4 below, external debt service as a ratio of GDP was relatively low throughout the period under review. The low values of the ratio indicate the income-generating ability of the Nigerian economy to pay back its debts. From 2.9% in 1970, the ratio fell to 0.4% in 1974 before rising to 3.5% in 1976 but fell again to 0.4% in 1977. The ratio thereafter rose slowly and

steadily between 1978 and 1992 before reaching a peak of 11.9% in 1993. Between 1994 and 2005, it fluctuated further and eventually averaged 1% between 2006 and 2010.

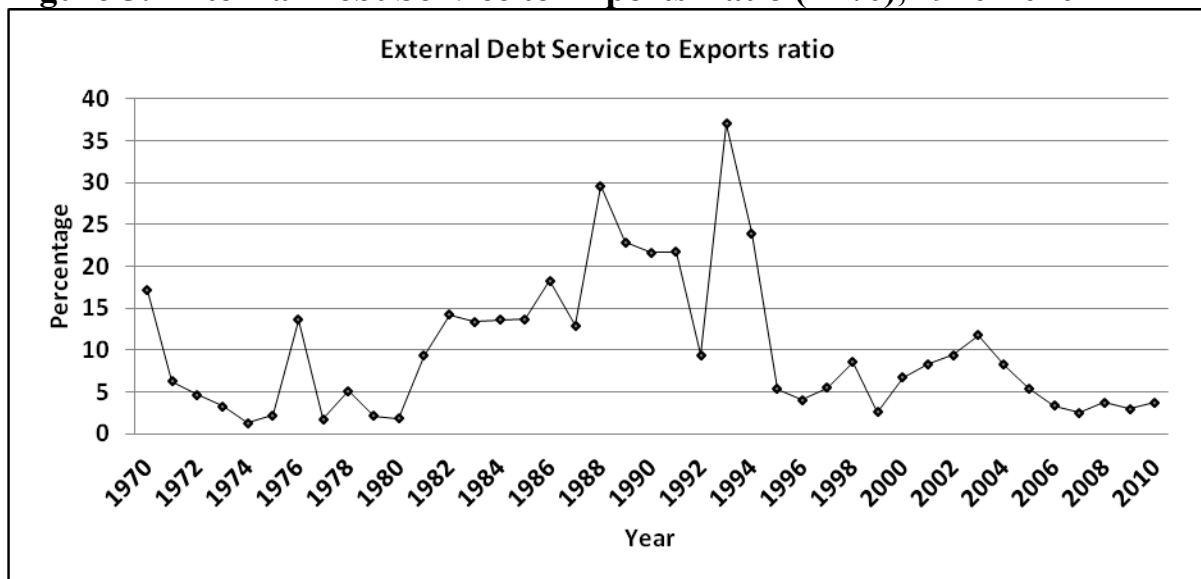
Figure 4: External Debt Service to GDP Ratio (in %), 1970-2010



Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

Figure 5 shows that external debt service to exports ratio was relatively low, below the threshold of 15% between 1971 and 1985. The ratio was however greater than the established threshold between 1988 and 1991, indicating signs of non-sustainability of debt during this period. But beginning from 1995, the ratio of external debt service to exports was well below the fixed threshold of 15% and later at 20% in 2010, respectively. This result indicates substantial external borrowing space created after the debt relief secured by Nigeria between 2005 and 2006 as well as the relatively low levels of debt accumulation thereafter (DMO, 2012).

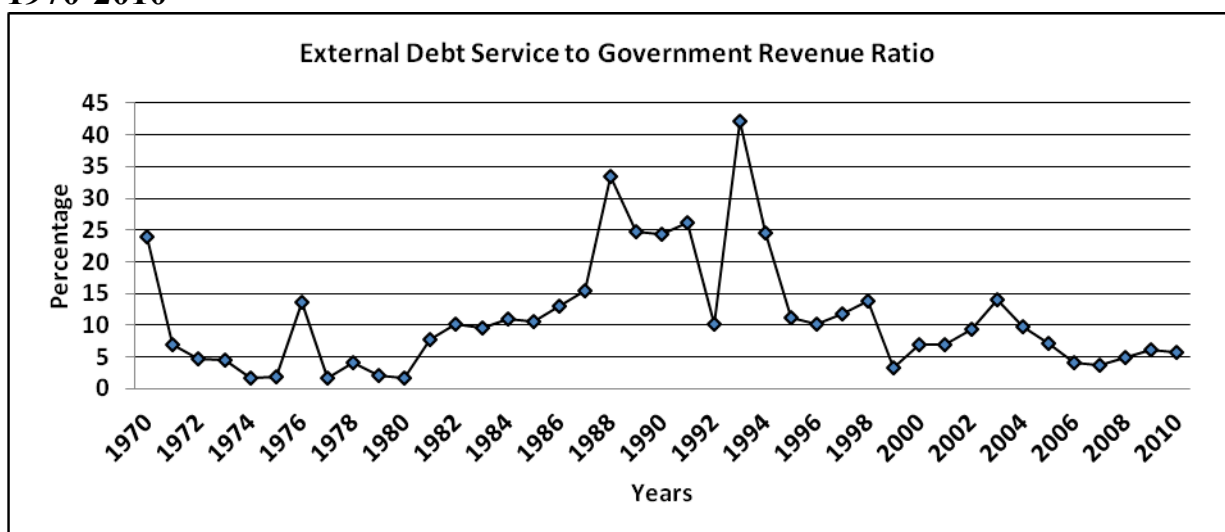
Figure 5: External Debt Service to Exports Ratio (in %), 1970-2010



Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

Just like the external debt service to exports ratio analyzed above, the external debt service to government revenue was well above the established threshold of 20% in 1970 (figure 6), but afterward remained relatively lower than the threshold between 1971 and 1987, but fluctuated to 10.2% in 1992. The ratio, however, peaked at 42.1% in 1993 and then remained at low levels below the established threshold of 30% between 1995 and 2010.

Figure 6: External Debt Service to Government Revenue Ratio (in %), 1970-2010



Source: Central Bank of Nigeria Statistical Bulletin, 2010 and Authors compilation

4.0 Methodology

4.1 Model Specification

From the literature, both empirical and theoretical, it is obvious that economic growth depends on public debt amongst other variables. However, the exact nature of the relationship is an empirical issue. It may also be the case that public debt, especially external debt, depends on the level of economic growth. Poor economic growth rate may lead to low income, poverty, and insufficient resources for investment; therefore warranting the borrowing of foreign resources to aid the provision of basic needs of the people. Lastly, both economic growth and public debt may affect poverty reduction. Thus, a simultaneous equations model is most appropriate for capturing the interrelationship among the variables. The model is specified as follows:

$$debt_t = a_1 + a_2 pov_t + a_3 int_t + a_4 fisd_t + a_5 debt_{t-1} + u_{1t} \quad (1)$$

$$growth_t = b_1 + b_2 pov_t + b_3 debt_t + b_4 fisd_t + b_5 open_t + b_6 ethviol_t + b_7 debtser_t + b_8 psenr_t + u_{2t} \quad (2)$$

$$pov_t = c_1 + c_2 growth_t + c_3 debt_t + c_4 debtser_t + c_5 psenr_t + c_6 socexp_t + u_{3t} \quad (3)$$

$$a_2 < 0, a_3 > 0, a_4 > 0, b_2 > 0, b_3 > / < 0, b_4 > 0, b_5 > 0, b_6, b_7 < 0, b_8 > 0,$$

$$c_2, c_5, c_6 > 0, c_3, c_4 < 0$$

Where debt is external debt outstanding, pov is poverty reduction index measure as the real per capita GDP, int is the rate of interest, fisd is the fiscal balance, growth is the growth rate of GDP, open is the measure of trade openness, ethviol is an index of state failure, debtser is the total debt service payment, psenr is the primary school gross enrolment rate, socexp is government expenditure on social services, u_{it} is the error term for the i th equation ($i=1,2,3$)⁵.

Equation (1) is derived from the present value budget constraint (PVBC) approach to debt sustainability analysis. The critical relationship in the PVBC approach is:

$$B_t - B_{t-1} = -(R_t - G_t) + rB_{t-1} \quad (4)$$

Where B_t is the stock of public debt at period t , R_t is government revenue at period t , G_t is government expenditure at period t and r_t is the return on government debt at time t . According to the PVBC approach, if a government runs substantial primary surplus, the stock of debt will shrink over time. But if the government runs a primary deficit, the stock of debt will grow at a rate exceeding the interest rate (see Ekpo, 2012). Thus, the stock of debt depends on the budget balance, interest rate and previous stock of debt⁶.

⁵ Detailed definition of the variables and data sources are provided in the appendix

⁶ To see this, rearrange equation (4) to obtain: $B_t = (1 + r_t)B_{t-1} - (R_t - G_t)$

Recent literature on growth regression have focused on a set of core explanatory variables along the line of approach adopted by Bosworth and Collins (2003) following earlier studies on growth regression Sala-i-Martin, 1997 and Levine and Renelt (1992). In this approach, a core set of variables that have been found consistently to explain growth included in the model and the importance of other variables are evaluated conditional on inclusion of the core set of variables (Kumar and Woo, 2010).

In specifying economic growth, equation (2), several combinations of the explanatory variables were considered and tested before a parsimonious specification was chosen. The core set of variables chosen in this study are primary school enrolment, fiscal balance, poverty index and trade openness. In addition to the core set of growth determinants, the estimation uses a set of state failure variables, such as ethnic violence, and a composite index of polity computed from 26 variables including civil violence, civil war, ethnic violence and war. The government debt variables used in this study are debt to GDP ratio and debt service to GDP ratio.

Specification of the poverty reduction model in equation (3) is eclectic though guided by empirical literature and authors understanding of the workings of the Nigerian economy.

4.2 Overview of Data and Stylized facts

Data for the study were obtained from different sources. GDP, population, and openness to trade were obtained from Penn World Table (PWT) version 7.1 of Heston et al (2012)⁷. The debt data were primarily from the CBN Statistical Bulletin and the World Bank's African Database 2011. Primary school enrolment rate was obtained from World Bank *African Database 2011*. The indicators for state failure and political instability were obtained from the Polity IV Project⁸. The major indicator of state failure chosen is ethnic violence. Episodes of ethnic violence are graded on a scale of 1 (lowest) to 10 (highest). Magnitude scores for multiple major episodes of political violence are summed and 0 denotes no episodes. The ethnic violence score which was zero before 1990, rose to 2 thereafter.⁹

Apart from the episodes of ethnic violence, there governance generally deteriorated. The corruption perception indexes for the period 1996 to 2012 clearly attest to this. The country's score has been relatively low since 1996, thus ranking the country among the most corruption countries of the world like Somalia, North Korea and Burma (see Table 1).

⁷ Heston, A., R., Summers and B. Aten, 2012, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August.

⁸ The database was downloaded from <http://www.systemicpeace.org/polity/polity4.html>

⁹ See table A2 in the appendix.

Table 1: Corruption Index: the Ranking of Nigeria from 1996-2012

S/N	Year	No. of Countries	Nigeria's Rank Among Countries	No of Countries Below Nigeria	No of Countries Tied with Nigeria	CPI Score
1	1995 (first Year of CPI Index)	41	Nigeria not featured	n.a.	n.a.	n.a.
2	1996	54	54	0	0	0.69
3	1997	52	52	0	0	1.76
4	1998	85	81	3	1	1.9
5	1999	99	98	1	0	1.6
6	2000	90	90	0	0	0.6
7	2001	91	90	1	0	1.0
8	2002	102	101	1	0	1.6
9	2003	133	132	1	0	1.4
10	2004	146	144	2	0	1.6
11	2005	159	152	5	2	1.9
12	2006	163	142	13	8	2.2
13	2007	180	147	31	2	2.2
14	2008	180	121	55	4	2.7
15	2009	180	130	42	8	2.5
16	2010	180	134	38	8	2.4
17	2011	183	143	32	8	2.4
18	2012	176	139	23	4	27/100

Source: Transparency International, 2012.

The analysis is based on data covering the period 1970 to 2010. Different periods of time are represented in this sample. There were years of low debt stock, followed by unsustainably high levels of debt and finally, period following the debt settlement deal of 2005 and 2006. Figure 1 shows the trend in public debt in Nigeria for the period 1970 to 2011. As can be seen, public debt is presently on the rise. Coincidentally, this period also witnessed rapid increase in poverty incidence. Poverty incidence increased from 27.2 percent of

the population in 1980 to 69 percent in 2010. Figure 2 captures the trend in poverty incidence between 1980 and 2010. From the available statistics presented in table 2, estimated population living in poverty rose from 17.1 million to 112.47 million between 1980 and 2010, respectively. However, due to the scarcity of annual data on poverty incidence per capita income is adopted in this paper as a proxy for poverty. It is assumed that poverty incidence and per capita income are closely associated.

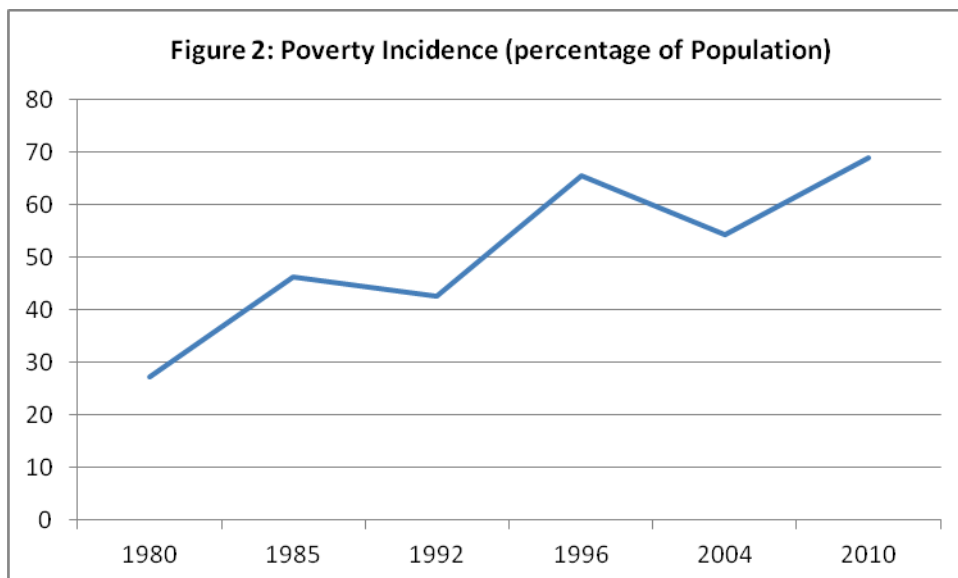
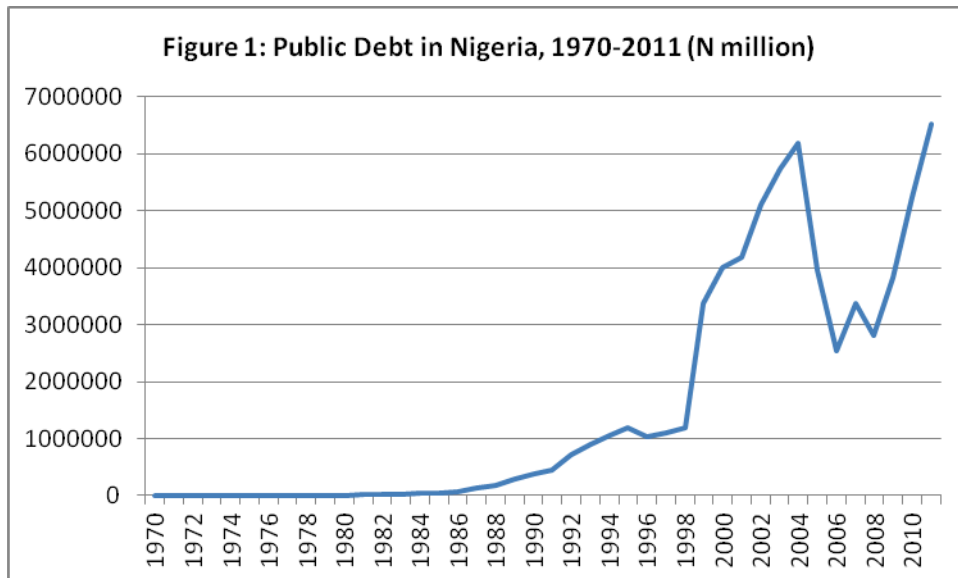
Table 2: Poverty Incidence in Nigeria, 1980 -2010

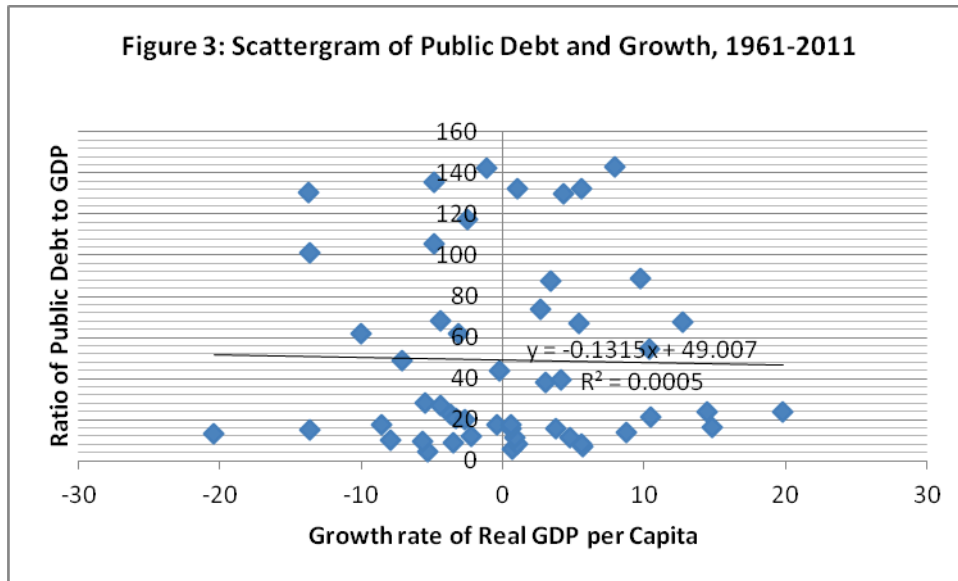
year	Poverty Incidence	Population in Poverty (million)	Estimated Population (million)
1980	27.2	17.1	65
1985	46.3	34.7	75
1992	42.7	39.2	91.5
1996	65.6	67.1	102.3
2004	54.4	68.7	126.3
2010	69	112.47	163

Source: National Bureau of Statistics, *National Poverty Profile, 2010*.

Preliminary analysis of the data on public debt and economic growth reveals some interesting trends. Specifically, total stock of public debt is negatively correlated with growth rate of real gross domestic product (GDP) per capita. Figure 3 shows a scattergram of government debt against growth of real per capita GDP over the period 1970 to 2011. The coefficient of government debt in the fitted trend-line is -0.1315. Imposing the strong assumption of all other things equal, this result suggests that a 10 percentage point increase in government debt to GDP ratio is associated with a decrease in per capita real

GDP growth 13.15 percentage points. Recall that this simple analysis is based on the assumption that there is no endogeneity problem and that no other variables determine growth other than debt.





4.3 Estimation Approach

To estimation the simultaneous equation model, the identification condition has to be established to know the best estimation method to apply. The result of the identification test indicates that the three equations of the model are all over-identified therefore the model is over-identified and cannot be estimated using ordinary least squares or indirect least square. When the model is over-identified it can be estimated using two stage least squares and other methods such as three stage least squares or the general method of moments (GMM).

In this study, equation 1 to 3 were estimated using the system General method of moments (GMM) techniques. The lagged and differenced values of the respective variables were used as instruments for the estimation. The advantage of this approach is that it solves the problem usually associated with

the search for appropriate instruments for each of the variables. It is believed that the lagged and differenced values would be highly correlated with the individual variable.

5.0 Empirical Results

The regression results for the simultaneous equations are presented in Table 3. From the regression results, it is revealed that for debt equation, poverty, fiscal balance, domestic interest rate and past level of external debt are the significant determinants of the current stock of public debt. The results show that reduction in poverty will increase the level of per capita income and reduce the need for public debt. The coefficient of poverty reduction variable was significant at 1 percent level and with the correct sign. With regards to domestic interest rate, it serves as the cost of borrowing. When the domestic interest rate is high, it discourages government borrowing but it may encourage external debt if it is found that the foreign interest rate is relatively lower. The coefficient of domestic lending interest rate has a negative sign in the debt equation and is statistical significant at 5 percent level.

The fiscal balance variable was equally significant at 1 percent level and negative. The negative sign of the coefficient indicates that when there is a fiscal surplus, external debt will decrease while a fiscal deficit will lead to accumulation of further government debt including foreign debt. The coefficient of determination, adjusted R-squared, indicates that 90.52 percent of

the variation in debt stock as a ratio of gross domestic product of Nigeria over the period 1970 to 2010 is explained by the explanatory variables selected for this equation.

In the second equation, economic growth equation, some interesting results were obtained. First, key variables such as primary school enrolment rate, budget balance, poverty variable, public debt and debt service are either not statistically significant at conventional level of statistical significance or with the wrong sign. The coefficients of debt stock and debt service payment as a ratio of GDP are positive contrary to theory but not statistically significant. Surprisingly, the coefficient of primary school enrolment has a negative sign contrary to theoretical expectation and other empirical findings that primary education improves the capacity of the population to lead a healthy lifestyle and improves the performance of non-income poverty indicators, such as access to sanitation, etc. The reason for this is not far-fetched. In developing countries like Nigeria where agriculture is still the main source of income and employment, primary school enrolment rate has negative effect on income. The traditional system of agricultural practice in the developing countries necessitates heavy reliance on family labour supplied by children and women. Increment in primary school enrolment implies a cut in labour supply and consequently a fall in output and income.

Fiscal balance and public debt have a positive but not statistically significant impact on economic growth. The state failure variable has a

negative and statistically significant impact on economic growth. This implies that for sustainable economic growth to be achieved, every effort should be put in place to eliminate corruption, insecurity and political violence. However, this equation has a very low coefficient of determination, 0.08, indicating that only 8 percent of the variations in growth are explained by the independent variables. This should not come as a surprise bearing in mind the fact that researchers are yet to exhaust the variables that explain economic growth. It is not possible to capture all the factors that determine growth in a single equation.

Lastly, the estimation of poverty equation also shows some interesting results. It corroborates the finding that social unrest, insecurity and ethnic violence have negative impact on social well-being. The coefficient of the state failure variable is both negative and statistically significant at 1 percent. The coefficients of both stock of debt and debt service payment have negative signs implying that debt has negative and statistically significant effect on poverty reduction. A percentage point increment in the ratio of debt to GDP leads to about ₦ 138.51 reduction in per capita income, and thus aggravates rather than alleviate poverty in Nigeria. Debt service payment further reduces per capita income by ₦25.81. The coefficient of the ratio of social expenditure to total government expenditure has a positive sign and is statistically significant at 1 percent. However, primary school enrolment has a negative sign although not statistically significant.

Economic growth as would be expected has a positive sign and statistically significant in poverty reduction. The coefficient of determination indicates that the independent variables jointly explain 72.5 percent of the variations in poverty reduction. However, these results should be interpreted with caution bearing in mind the low value of Durbin Watson statistics of 1.4677.

Table 3: Results of the GMM Estimation of the Simultaneous equations Model

Variables	Debt Equation	Growth Equation	Poverty Equation
Constant	0.4544*** (4.7250)	-0.0943 (-1.4760)	1764.19*** (25.3912)
Debt		0.0526 (1.6199)	-138.51* (-1.7589)
Lagged Debt	0.6899*** (15.4729)		
Debt Service Payment		0.0014 (0.4374)	-25.8145*** (-2.3289)
Lagged GDP Growth			1837.29*** (4.7035)
Poverty Reduction	-0.0002*** (-4.2284)	-0.000025 (-0.9044)	
Fiscal Balance	-0.0314*** (-9.6044)	0.0022 (0.6529)	
Expenditure on Social services			0.0004*** (4.2359)
Index of Ethnic Violence		-0.0450*** (-4.4792)	-181.5571*** (-7.8633)
Trade Openness		0.0046*** (7.1289)	
Primary School enrolment rate		-0.0011*** (-2.6066)	-0.6845 (-0.7165)
Domestic Interest Rate	-0.0038** (-2.0075)		
Adjusted R-Squared	0.9052	0.0829	0.6951
Durbin Watson Statistics	1.7883	1.6947	1.4677
J-statistics	0.2445		

Source: Authors' Computation

*** = significant at 5%; ** = significant at 1%.

6.0 Policy Recommendations and Conclusion

This paper examined the relationship between public debt, economic growth and poverty reduction in a country characterised by insecurity, social unrest, terrorism and deplorable social infrastructure. Over the period under investigation, the public debt profile of Nigeria showed that the stock of public debt was increasing, despite the debt relief of 2005. During the same period, poverty incidence was also on the increase, from 27.2 percent in 1980 to 69 percent in 2010.

The results of the empirical analysis showed that public debt had a negative impact on economic growth and poverty. The results also demonstrated the extent to which ethnic and political violence hindered rapid economic growth and poverty reduction in Nigeria over the period 1970-2010. In addition, the study confirmed that if government consistently run fiscal surpluses, the stock of debt could be reduced and the danger of debt overhang would be minimized. While running fiscal surplus may be required to curtail public debt accumulation, the study showed that expenditure on social services should not be neglected. Government expenditure on social services was found to be a key policy variable that can be utilized in reducing poverty in Nigeria. However, caution should be exercised to ensure that the quantity of expenditure is accompanied by the quality of service delivery.

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Appendix

SECURITY THREATS AND BOMB BLAST IN NIGERIA 1986-2011

S/N	DATE/YEAR OCCURRED	CASUALTY REMARKS
1.	May 30, 2011	Post democracy day blast killing 13 in bauchi and 40 injured.
2.	April 15, 2011	Blast in Maiduguri killing 2
3.	April 7, 2011	Explosion hit a polling booth at Unguwar Doki Maiduguri Borno state, injuring more than 10 people
4.	April 21, 2011	Two suspected bomb makers die in a blast in Kaduna
5.	April 25, 2011	Three bomb blast rip through Tudu Palace Hotel and Kano motor park in Maiduguri Borno state
6.	April 27, 2011	Foiled bombing at INEC office Oron Akwa Ibom State
7.	April 8, 2011	Bomb blast rock INEC office in Suleja on eve of parliamentary polls killing at least 5 people
8.	March 3, 2011	Bomb explosion at a PDP rally in Suleja killing 10 people
9.	December 31, 2010	Explosion at Mogadishu Mami Market Abuja claim 4 people
10.	December 24, 2010	Bomb explosion in Jos Plateau State killing 32 people
11.	November 4, 2010	Military grenade explosion at Dadin- Kowa area of Jos chops off the hand of 18 years old Mohammed leaving him with multiple bruises
12.	October 1, 2010	A twin car bomb blast killing 12 people ,injuring 36 in Abuja
13.	June 1, 2010	2 bombs exploded behind the perimeter fence of white eagle hotel in Yenegoa Bayelsa State
14.	May 3, 2010	Explosion device detonated at Mechanic Workshop along Melford Okilo Road Bayelsa State.
15.	March 15, 2010	Bomb blast rock post amnesty submit being organized by vanguard newspapers Killing 1.
16.	January 10, 2010	A twin car bomb at Eagle Square Abuja killing 12 people and injured 36
17.	December 22, 2009	A parcel bomb exploded in the premises of super screen a private TV station in the Onipanu area of Lagos reaping off the right hand of the conveyer of the explosive device
18.	July 12 ,2009	MEND attack Atlas Cov, an oil facility in Lagos with dynamite and guns killing 5 people.
19.	March 18, 2009	A bomb on a farm in the Ikeja military cantonment killed a student of government secondary school, Nasarawa
20.	December 13, 2006	Thugs attack Delta PDP secretariat in Asaba with Explosives
21.	December 23, 2006	MEND car bomb outside the office of River State government in Port Harcourt.
22.	December 11, 2006	Thugs attack Ndudi Elumelu Campaign office in Aniotcha/ Oshimili Federal Constituency with dynamites
23.	December 5 2006	Dynamite exploded at then Governor Goodluck Jonathan

		campaign office in Bayelsa state.
24.	November 28, 2006	Godwin Aigbekhai killed by a car bomb explosion in Owan east Local council, Edo State.
25.	November 26, 2006	Part of PDP secretariat destroyed by explosion in Bayelsa State
26.	May. 28, 2005	Bomb blast occurs at residence of Chairman of the Ikono council Area Akwa Ibom State
27.	January 27, 2002	Accidental detonation of explosives killing about 1,100 at the Ikeja depot of Nigeria army cantonment Ikeja
28.	December 13, 1997	Lt. Gen Oladipo Diya escape death at Nnamdi Azikiwe Abuja Airport
29.	May 12, 1997	Explosion rocks Ibadan in front of Fed Min of works at Eleyele Road near Jericho Hospital
30.	April 22, 1997	Blast in Evans square claim 3 lives injures several
31.	January 17, 1997	Bus belonging to Nigerian Army hit.
32.	December 18, 1996	Bus belonging to Lagos state task force on environmental sanitation hit
33.	December 16, 1996	Bomb blast rock Col. Mohammed Buba Marwa convoy Lagos .
34.	November 14, 1996	Explosion kills Chief Security Officer of Murtala Mohamed Airport Lagos.
35.	April 25, 1996	Explosions shake airport base Ikeja
36.	April 11, 1996	Explosion at Ikeja Cantonment Lagos
37.	January 20, 1996	Explosion at Aminu Kano International Airport Kano
38.	January 18, 1996	Bomb at Durbar Hotel Kaduna Killing the News Correspondent with suspected bomber killed
39.	May 31, 1995	Ilorin stadium rocked just before lunch of family support Programme
40.	October 19, 1986	A parcel bomb kill Dele Giwa , the founding editor of Newswatch Magazine in Lagos

Source: Compilation by the Authors from Several Newspapers.

Index of Ethnic Violence in Nigeria, 1970-2010

Year	Score	Year	Score	Year	Score	Year	Score
1970	0	1980	0	1990	2	2000	2
1971	0	1981	0	1991	2	2001	2
1972	0	1982	0	1992	2	2002	2
1973	0	1983	0	1993	2	2003	2
1974	0	1984	0	1994	2	2004	0
1975	0	1985	0	1995	2	2005	0

1976	0	1986	0	1996	2	2006	0
1977	0	1987	0	1997	2	2007	1
1978	0	1988	0	1998	2	2008	1
1979	0	1989	0	1999	2		

Source: Polity IV Project.