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Research Report

Relationship between external debt and economic growth in the West African Monetary Zone: A panel data analysis

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**WEST AFRICAN
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WAMI OCCASIONAL PAPER SERIES

NO.12

**RELATIONSHIP BETWEEN EXTERNAL DEBT AND
ECONOMIC GROWTH IN THE WEST AFRICAN
MONETARY ZONE: A PANEL DATA ANALYSIS**

DECEMBER 2016

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THE RELATIONSHIP BETWEEN EXTERNAL DEBT AND ECONOMIC GROWTH IN THE WEST AFRICAN MONETARY ZONE: A PANEL DATA ANALYSIS

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DECEMBER 2016

Abstract

This study analyzes trends and investigates the relationship between external debt and economic growth in the WAMZ using descriptive trend analysis and panel data analysis. The trend and descriptive analysis assessed the behavior of external debt and economic growth while the empirical analyses employed panel data regression in which a fixed effect model was estimated after the implementation of the Hausman test to verify its appropriateness over the random effect model. The fixed effect model and the dynamic version show that the relationship between external debt and growth in the WAMZ is non-linear “Laffer curve” shaped, confirming the debt overhang theory that the accumulation of external debt beyond a certain threshold adversely affects economic growth. The results also confirm the crowding-out effect of rising external debt stock as the co-efficient of external debt service was negative and statistically significant, indicating that rising debt service associated with high levels of external debt stock limits the use of limited resources (revenue) from being channeled to productive public investments that would accelerate economic growth.

Key Words: *External Debt, Economic Growth, Panel Data Analysis, WAMZ*

Jel Classification- *E60, B22, C33, R23*

1.0 INTRODUCTION

The benefits of external credit and the adverse effects of excessive external debt accumulation on economic growth have received a lot of attention in economic literature. Among the key arguments for external borrowing is the need to finance essential social and economic infrastructure in the context of inadequate or deficit national savings. The positive impact of external credit on national capital stock and its ultimate effect on economic growth are explained by various models of economic growth, as much as, the liquidity and debt overhang theories emphasize the negative impact of excessive external debt accumulation on aggregate output. The consensus in the literature suggests that foreign debt can enhance investment and growth up to an optimal limit; beyond which the impact is adverse. That is, high external debt could result in a situation where returns from investing in the domestic economy would be effectively eroded away by higher taxes to service the rising stock of debt, resulting in low domestic and foreign investment and slow output growth. Empirical findings however, lack consensus. For instance, whilst Greene and Villanueva (1991), Deshpande (1997) Fosu (1999) and Chowdhury (2001) observed the adverse effects of external debt on growth, Warner (1992) found that debt did not depress investment and growth as found in other literature.

The West African Monetary Zone (WAMZ) make an obvious case for this study in view of the experiences of WAMZ economies prior to their sign up to the Heavily Indebted Poor Countries

(HIPC) Initiative and other multilateral debt relief arrangements, the impact of debt reliefs and the concern about the recent high rate of external debt accumulation among most members of the Zone. The excessive external borrowing-from both commercial and concessionary sources- which characterized fiscal policies of WAMZ economies in the 1980s and 1990s, failed to ensure sizeable output growth or close the huge economic and social infrastructural deficit leading to debt accumulation by the countries. Deficit and debt situations rather, worsened in the economies and rendered the Zone insolvent and poor due to political instability, inconsistent policies and mismanagement, vulnerability of the economies to external shocks and absence of vibrant private sector. Unfortunately, most WAMZ countries in recent years seem to have reverted to the unfavorable conditions prior to HIPC (IMF,2014), despite substantial reduction in debt burdens, favourable fiscal developments, improved debt situations and growth performance enjoyed under the HIPC and other initiatives, which enabled the countries to pursue poverty-reducing expenditures.

In the context of renewed concern about the possible external debt crisis in the Zone and the inability of WAMZ member states to attain and/or maintain the WAMZ convergence criteria relating to fiscal deficit and public debt, many continue to bemoan the weaknesses in fiscal policy regimes particularly, in the areas of revenue mobilization, public expenditure and debt management. From

the growing concern about the debt situation in the zone, the study derives motivation to investigate and highlight external debt trends, weaknesses in fiscal and debt management policies of member countries, in an attempt to provide useful recommendations for policy formulation. In addition, the study seeks to enrich the understanding of debt dynamics relating to WAMZ economies, as most empirical studies on the subject have focused on advanced economies, with limited number bringing into limelight the concerns of developing economies. The specific objectives of the paper are as follows :

- To analyze trends in external debt and economic growth from 1980s to 2014.
- To investigate the relationship between external debt and economic growth in the zone.
- To offer recommendations that could guide fiscal policies and programmes towards debt sustainability and growth.

The study uses both descriptive and panel data analysis with datasets from 2000 to 2014. The Panel data analysis adopts a reduced-form growth model with a quadratic term to investigate the non-linear relationship between external debt and economic growth. The econometric models in static

specification form are estimated using fixed effect and random effect estimators.

The general conclusion from the study provides further support to earlier findings and the debt-overhang theory that external debt accumulation beyond a certain threshold hurts economic growth. The results also confirm the crowding-out effect of rising external debt stock, indicating that rising debt service associated with high levels of external debt stock reduces the resources available for productive public investments needed to accelerate economic growth WAMZ economies. Finally, it was observed that the productive efficiency of public investments in WAMZ economies is low and constrained by political instability and policy failure.

The paper is organized thus: following this introduction, section two discusses theoretical and empirical literature whilst section three reviews the pattern and trends of external debt and growth in the WAMZ. The methodology and the estimation methods are discussed in section four whilst section five discusses the estimation results. The conclusion and the recommendations are found in section six.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature Review

The general conclusion from models of economic growth, the Debt-Overhang Theory and the Liquidity Theory of Debt, suggest a non-linear relationship between external debt and economic growth, indicating that external debt enhances output growth at lower levels but have contractionary effect if accumulated excessively beyond an optimal level.

Economic growth theories generally identify investment or capital accumulation as the main channel through which external debt positively impacts output growth, as it augments domestic savings or closes aggregate domestic savings gap. A saving deficit or capital-constrained nation which gets access to external credit can accelerate economic growth, if the external credit is utilized for investments with higher marginal productivity than the interest cost of servicing the debt.

The debt-overhang and liquidity theories of debt in contrast, highlight the contractionary effects of unrestrained external borrowing, which

emanate from the “*overhang*” of heavy external debt stock and the “*crowding-out*” effects of debt service. The channels of the contractionary effects of external debt according to these theories are the high debt service associated with heavy accumulation of external debt, the uncertainty associated with governments’ ability to repay and the fear of future increase in taxes to service the debt, which depress investments and consequently, slowdown economic growth. Thus, excessive external debt adversely affects economic growth through the effects of total external debt stock (*debt-overhang effect*) and the effects of debt service (interest payments and the amortized principal payments) or the “*crowding-out effects*”.

This section provides theoretical framework to highlight the positive and the adverse effects of external debt and the possible non-linear relationship between external debt and economic growth. The section provides theoretical explanations on the role of debt relief in a situation of debt crisis.

2.1.1 Positive Effects of External Debt and Economic Growth

The utilization of external debt to accelerate the rate of accumulation of capital stock, or technological innovation and knowledge should drive the rate of output growth rate according to growth theories. The three broad theoretical explanations on economic growth namely: i) the neo-Keynesian Harrod-Dormar model ii) the Solow-Swan neoclassical model and iii) the Romer-Lucas-inspired endogenous

growth models highlight a number of determinants of economic growth. These models provide theoretical framework for analysis of the relationship between external debt and economic growth.

The Harrod-Dormar model shows that the overriding driver of economic growth is investment or capital accumulation which is determined by savings. In the Harrod-Dormar model,

external debt like foreign aid, helps close the savings gap of a country. Thus, desired growth target could be achieved by external borrowing or foreign aid, where there is national savings gap to finance investment or accelerate capital accumulation. Thus, within the Harrod-Dormar model, external debt, through its impact on investment, should positively affect economic growth.

The model stated as equation 1 below explains that the growth rate (G) of GDP is jointly determined by the savings ratio s (national savings S, as percentage of national output, Y), the capital-output ratio v , (national capital stock, K as percentage of national output Y) and rate of depreciation δ .

$$G = \frac{s}{v} - \delta \dots\dots\dots (1)$$

In the model, the higher the savings rate, the higher the rate of growth of real GDP. However, capital-output ratio (v) and the rate of depreciation (δ) affects rate of growth of real GDP negatively. Given that the inverse of capital output ratio ($1/v$) is the productivity of capital, then the model implies that productivity of capital is positively related to growth rate of real GDP. The model assumes that capital-output ratio, v is constant whilst savings (S) is equal to

investments. The assumption implies that all national savings goes into investments and also productivity of investment is constant.

Similar to the Harrod-Domar model, savings (and investment) play important role in the Solow model. However, in the Solow model, an increase in the savings ratio cannot permanently increase the long-run rate of growth. A higher savings ratio does temporarily increase the growth rate during the period of transitional dynamics to new steady state and it also permanently increases the level of output per worker. Thus, without technological progress the ability of an economy to raise output per worker via capital accumulation is limited by the interaction of diminishing returns, the willingness of people to save, the rate of population growth and the rate of depreciation of capital stock.

In this sense, external debt contracted to close the financing gap and utilized to boost investments and promote technological advancement will impact positively on economic growth and long run growth respectively. In the endogenous growth models, external debt should promote long-term growth to the extent that it is utilized to promote advancement of technology and knowledge.

2.1.2 Excessive External Debt Adversely Affects Economic Growth.

Aside the possible positive impact of external debt on economic growth; economic theory also highlights the adverse effects of excessive external debt. The effects of heavy debt service associated with large external debt, the uncertainty associated with governments' ability to repay and the

fear of future increase in taxes to service the debt, are the broad channels through which external debt might slow down investments and economic growth. Thus, over borrowing by governments impair the ability of the state to deliver essential services, and also creates uncertainty which depresses

investments and economic growth. This situation is defined by Krugman (1988) as “debt overhang,” a situation in which the expected repayment on external debt falls short of the contractual value of the debt.

Krugman (1988) suggests that in a “debt overhang” situation, where the country’s debt level is expected to exceed its ability to repay, a country’s debt service is likely to increase as its output increases. Several explanations have been offered to explain this situation. First, it is explained that the creditworthiness of the country is reduced if creditors do not expect that debt will be fully repaid, leading to lower capital inflows including foreign direct investment (FDI). In addition, debt-overhang leads to lower private investment in general, as investors fear that the returns to this investment will accrue to the government through higher taxes (Corden, 1989; Deshpande, 1997).

Secondly, it is argued that debt overhang depresses investment and growth by increasing uncertainty about actions and policies. In particular, as the stock of external debt increases, there may be expectations that the government will resort to distortionary measures (inflation tax, for example) in order to meet its debt-servicing obligations which might have adverse effects on investments (Agenor and Montiel, 1996). Under circumstances of uncertainty, potential private investors will prefer instead to exercise their option of waiting whilst other investments that take place are likely to be diverted to activities with quick returns rather than to long-term, high risk, irreversible projects. Rapid accumulation of debt can also be accompanied by increasing capital flight if the private sector fears imminent devaluation and/ or increases in taxes to service the debt (Serven, 1997).

2.1.3 Non-linear “Laffer Curve” Relationship Between External Debt And Economic Growth

In spite of these varied explanations, the general consensus seems to suggest that external debt may have a positive impact on investment and growth but only up to a certain threshold, beyond which the impact becomes adverse to growth. In line with this view, Cohen (1993) argues that the relationship between the face value of debt and

investments can be represented as a variant of “Laffer curve”, demonstrating that as outstanding debt increases beyond a level, factors such as uncertainty about governments’ ability to service the debt and diversion of resources to less productive investments slow down economic growth.

2.1.4 Debt Relief

Following from the non-linear “Laffer Curve” relationship between debt and economic growth, Dijkstra (2011) argues that in debt crisis situation or “debt-overhang” situation, debt relief should have positive effect on economic

growth. Theoretically, the positive effect of debt relief has been identified to occur through three channels namely: *the stock channel*, *the flow channel* and *the conditionality channel*. From the standpoint of the stock channel, debt

relief leads to decrease in the size of the outstanding debtor or the debt stock. The reduction or absence of high debt burden in future may lead to renewed access to international private capital, increased investment and improved policies for growth. The effect of debt relief through the flow channel relates to reduction of the debt service. Lower debt service creates fiscal space for

public investment in critical physical and social infrastructure for sustainable economic growth. The conditionality effect operates through the policy condition attached to a debt relief agreement. The reform conditions attached to debt relief may lead to policy improvement and create right conditions that may stimulate economic growth and poverty reduction. (Dijkstra, 2011).

2.2 Empirical Literature Review

Many studies have been conducted to determine the impact of external debt on growth, with a number of them focusing on ascertaining whether “debt-overhang” or “crowding out” effects exist.

Elbadawi, et al (1996) used a non-linear fixed effects panel estimation to establish the linkages between external debt and investment and growth. Using cross-section data for 99 developing countries, including Sub-Saharan African (SSA) countries they estimated a growth and investment equation model. Their conclusions supported theory that, current debt inflows spur GDP growth while past (lagged) accumulated debt works against growth. This implies that beyond a certain level, debt accumulation will discourage investment and retard growth .The results showed that there is evidence of both debt overhang and crowding out effects from excessive external debt burdens on growth and investment in developing countries. Studies by UNECA (1998) and Iyoha (1999) supported the conclusions of Elbadawi et al (1996).

Mwaba and Were (2001) also estimated the external debt impact on growth for Uganda and Kenya based on Elbadawi's debt - growth - investment model formulation with specific country modifications to test the results from Elbadawi et al (1996). Mwaba (2001) used a basic growth equation model in a simple Ordinary Least Squares (OLS) regression to test the hypothesis that accumulated debt negatively affects growth in Uganda. The estimations re-turned the expected hypothesis for the debt variable in Uganda. While accumulated debt returned a negative and significant effect on GDP growth, current debt inflows had a positive impact in Uganda.

Were (2001) estimated the impact of Kenya's external debt on economic growth and private investments, employing a growth and investment equation model based on Elbadawi (1996) specifications. Using time-series data for the period 1970-1995, her results also indicated that debt accumulation has a negative impact on economic growth. This finding confirms the existence of a debt over-hang problem in Kenya.

Frimpong and Oteng-Abayie (2006) investigated the impact of external debt on economic growth in Ghana. The study determined the existence of “debt-overhang” and /or “crowding out effects” for the period 1970 to 1999 using a vector error correction model

(VECM). The results of the study showed that GDP growth is influenced positively by external debt inflows and negatively by debt servicing, indicating the presence of “debt overhang” effects through the negative impact on domestic investment.

3.0 REVIEW OF TRENDS AND RELATIONSHIP BETWEEN EXTERNAL DEBT AND ECONOMIC GROWTH IN THE WAMZ

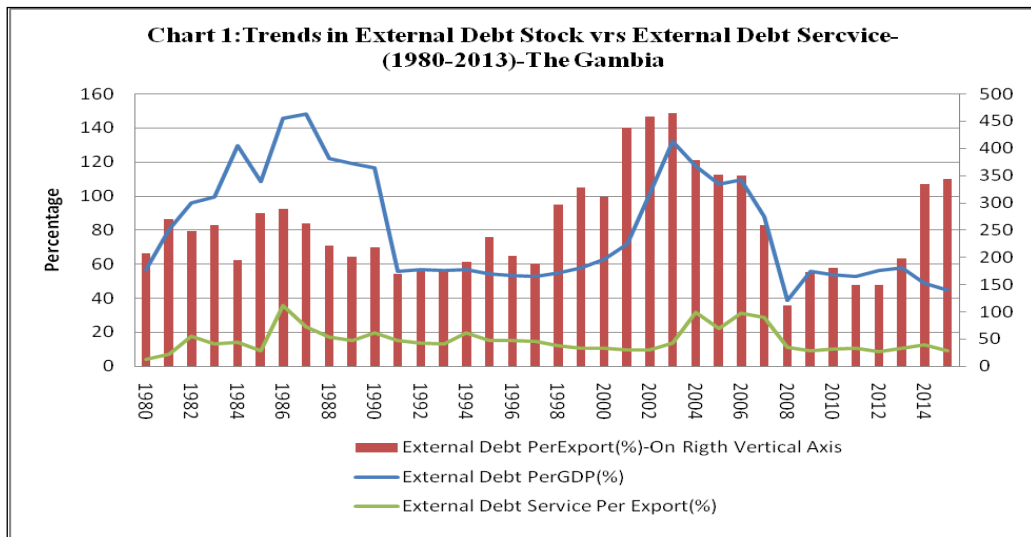
3.1 THE GAMBIA

3.1.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

The Gambian economy, since 1980s, have been characterized by volatile external debt trends, with long periods of upward trend and brief periods of downward trajectory in the country's external indebtedness. The country's fiscal and external account performances, the financing methods used, its growth performance and external interventions in the form of debt relief have been the major drivers of the dynamics of the different episodes in the country's external debt trends.

External debt in the early 1980s (between 1980 and 1987) trended upwards but declined continually between 1988 and 1991. The period between 1992 and 2003 also witnessed

another upward trend in external debt stock which was followed by a downward trend between 2004 and 2008 as a result of the HIPC initiative. The period between 1995 and 2004 was one of the most volatile moments in the fiscal developments of the Gambia. This was largely driven by increase in government expenditure in early part of the period as a result of increased expenditure on goods and services, the presidential, parliamentary and local government elections, among others. Debt conditions during the period deteriorated as external debt-to-GDP ratio increased from 52.2 percent in 1995 to 132.1 percent in 2003 and down to 117 percent in 2004. Chart 1 below illustrates the above developments.



Source: World Development Indicators.

Between 2009 and 2014 external debt maintained an upward trend but the

level of external debts stock was at lower levels compared to previous

episodes. External debt-to GDP averaged 55.5 percent during the period between 2011 and 2014. External inflows fell drastically during this period due to weather related conditions that affected the agricultural sector and the adverse effects of the EBOLA outbreak on tourism and related services in the Gambia, leading to reduction in foreign

exchange receipts and the depreciation of the domestic currency. The bail-out of some key state-owned enterprises (SOEs) which were faced with liquidity distress due to accumulated financial losses also worsened the fiscal situation and put further pressure on the fiscal position and external resources of the country.

3.1.2 Trends in the Composition of External Debt (2000-2015)-The Gambia

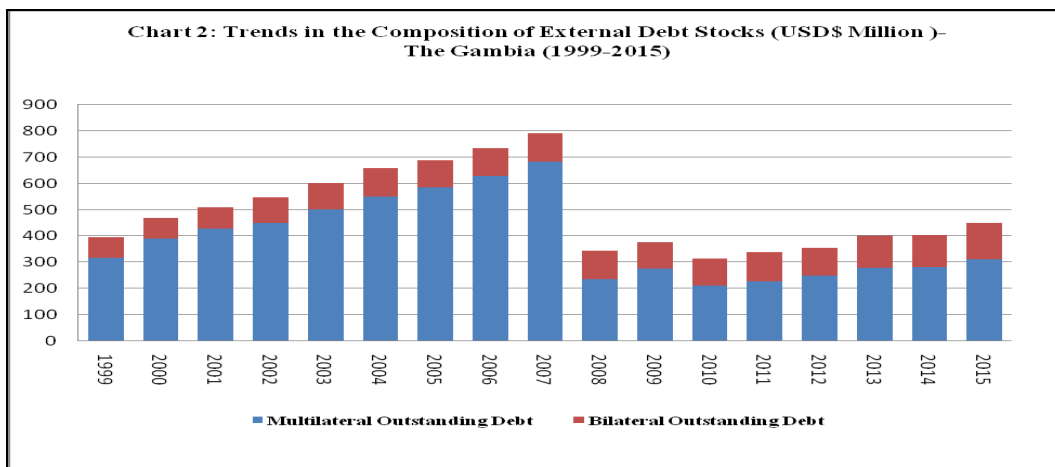
The external debt composition of The Gambia during the period was made up of Multilateral and Bilateral loans. Multilateral debt dominated the country's external debt stock throughout the period. The share of multilateral debt in the country's total external debt

increased between 2000 and 2007 whilst bilateral loans declined. The average share of multilateral and bilateral debt to total external debt during the same period was 83.2 percent and 16.3 percent respectively.

Table 1: External Debt (Millions Of Dollars)-(2010-2015)-The Gambia

Year	2010	2011	2012	2013	2014	2015
Multilateral Outstanding Debt	211.413	228.499	249.9	278.9	281.2	311.6
Bilateral Outstanding Debt	102.577	110.647	104.9	123.3	121.8	137.8
Total External Outstanding Debt	313.99	339.146	354.8	402.2	403	449.4

Table 1: External Debt (Millions Of Dollars)-(2010-2015)-The Gambia

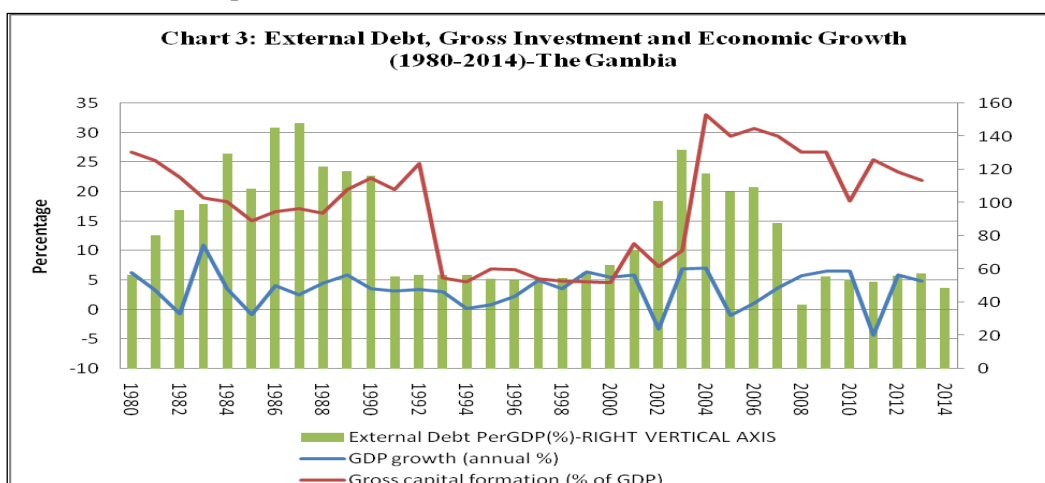


Source: WAMI Database

3.1.3 External Debt, Gross Investment and Economic Growth-The Gambia

The relationship between the Gambia's external debt and gross investment shows sub-optimal utilization of external credit for capital accumulation. Periods of upward trend in external debt witnessed rather declining gross capital investment, indicating the use of external credit for recurrent expenditure rather than capital expenditure. In spite of rising external debt witnessed by the country in the early 1980s (1980 to 1986), Gross Capital Investment as

percentage of GDP declined. During the same period, the country witnessed low and volatile growth. The country witnessed downward trend in external indebtedness between 1986 and 1994, while gross investment increased initially between 1986 and 1995 but declined sharply in 1992 and 1993. Gross capital investment remained low between 1994 and 2002. Chart below provides details.



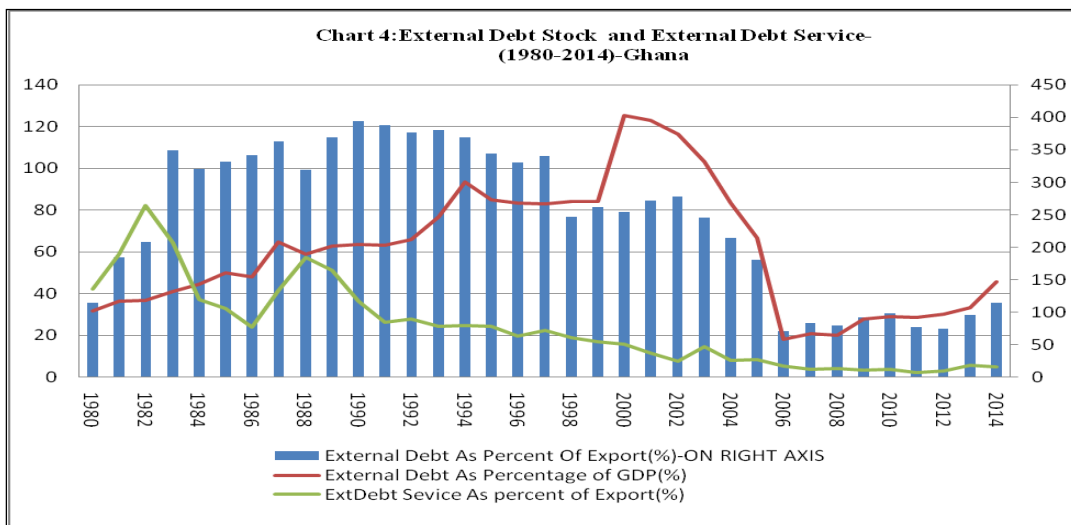
Source: World Development Indicators.

3.2 GHANA

3.2.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

The Ghanaian economy in the early 1980s suffered unfavourable macroeconomic conditions reflecting large fiscal deficits and high levels of public debt stock. The country's external debt indicators trended to unsustainable levels between 1980 and 2000. Ghana benefited from the Heavily Indebted Poor Countries (HIPC) initiative which changed its external debt trajectory, resulting in the country's external debt-to-GDP ratio trending downward between 2001 and 2006. The country reached the completion point in 2004 having ensured prudent fiscal and monetary policy. The period of the debt relief (2001-2006) marked the longest downward trend in Ghana's gross debt-GDP ratio. The ratio declined from 123.4 percent in 2000 to 26.2 percent in 2006, as the savings and the fiscal space created by the HIPC debt relief led to increased growth.

Despite the improved debt conditions resulting from the relief in early 2000s and sustained positive growth performance, Ghana's external debt stock in recent years has been on sharp upward drifts, rising to 70.6 percent of GDP at end 2015. From 2007 to 2015, Ghana has maintained an upward trend in external debt-to-GDP ratio as a result of persistent and rising fiscal deficits, which have been financed by continuous borrowing from the international capital market at high interest rates, and also from the depreciation of domestic currency resulting from adverse terms of trade (see chart 4 below). With the high interest payments associated with the rising debt, the external debt continues to constrain resources available for accelerating economic growth in critical sectors of the Ghanaian economy. Chart 4 below provides details.

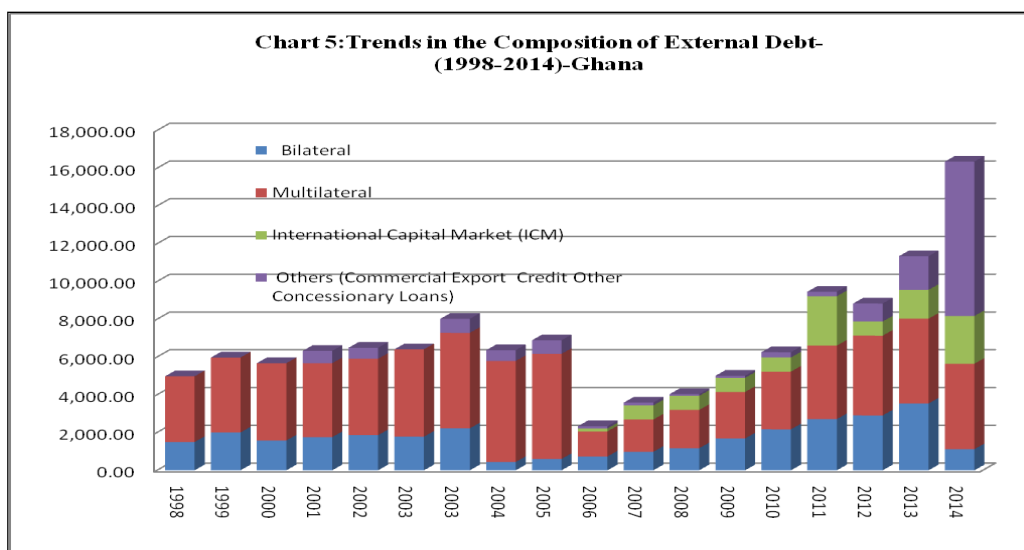


Source: World Development Indicators (WDI)

3.2.2 Trends in the Composition of External Debt (2000-2015)-Ghana

Until 2006, Ghana's external debt was composed of bilateral and multilateral credits with small percentage of other concessional loans. After reaching the HIPC initiative in 2006, the country in 2007 began accessing credit from the international capital market, resulting in a change in its external debt

composition. As at the end of 2014, the country's external debt was made up of 50 percent commercial export credit and other concessional loans, 28 percent multilateral credit, 15 percent from the international capital market and 7 percent bilateral loans.



Source: WAMI Database

Table 2: External Debt (Millions Of Dollars)-(2010-2015)- Ghana

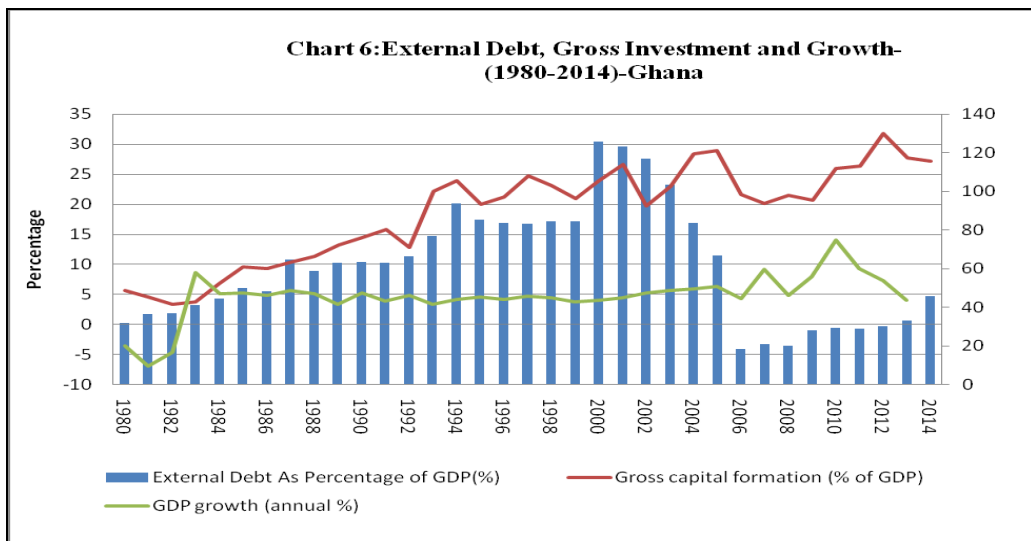
Category	2009	2010	2011	2012	2013	2014
Bilateral	1,687.20	2,169.20	2,712.30	2,906.50	3,538.93	1,119.52
Multilateral	2,461.80	3,057.70	3,891.80	4,225.10	4,490.72	4,525.69
International Capital Market (ICM)	750.00	750.00	2,617.30	750.00	1,530.51	2,530.59
Others (Commercial Export Credit Other Concessional Loans)	108.90	277.70	235.40	953.90	1,781.77	8,175.72
Total	7,016.90	8,264.60	11,467.80	10,847.50	13,354.93	18,365.52

Source :WAMI Database

3.2.3 External Debt, Gross Investment, and Economic Growth

A review of Ghana's external debt, gross investment and economic growth between 1980 and 2014 reveals varied trends and relationships. The country's external debt trended upward from 1980 to 2000, with external-debt-GDP, rising from 56.74 percent (1980) to 148 percent (1989), averaging 47.4 percent. Gross investments (measured as Gross capital formation as percentage of GDP) during the period was very low, recording an average of 7.2 percent. Real GDP growth during the same

period averaged 2.28 percent, though it improved from a contraction (between 1980 and 1983) to positive growth of 3.3 percent in 1989. The upward trend of Ghana's external debt resumed between 1990 and 2000, with external debt-to GDP increasing from 63.4 percent (in 1990) to 125.5 percent (2000). Gross investment improved significantly during the period, increasing from 14.4 percent (1990) to 24 percent (in 2000).



Source: World Development Indicators (WDI)

Gross investment increased from 24 percent (in 2000) to 29 percent (in 2005), recording an average of 24.5 percent. Within the same period (2001-2006), real GDP growth averaged 5.3 percent rising from 4.0 percent in 2001 to 6.4 percent in 2006. Real GDP per capita also increased from US\$452.43 in 2000 to US\$520.16 in 2006. Despite the improved debt conditions resulting from the reliefs in early 2000s and sustained

positive growth performance, from 2007 to 2015, Ghana maintained an upward trend in external debt-to-GDP ratio, rising to 70.6 percent of GDP at end 2015. This led to persistent and rising fiscal deficits, which was financed by continuous borrowing from the international capital market at high interest rate and depreciation of domestic currency resulting from adverse terms of trade. With the high

interest payments associated with the rising debt, the external debt continues to constrain resources available for

accelerating economic growth in critical sectors of the Ghanaian economy.

3.3 GUINEA

3.3.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

Prior to the adoption of the HIPC initiative by Guinea, the country's output growth and external debt fluctuated, largely reflecting the dynamic nature of the fundamental drivers of the economy such as mining and agricultural production and exports, movements in international commodity prices and the political crisis which confronted the country for a greater part of the period. The country embarked on ambitious economic and financial rehabilitation program in 1987 which led to structural reforms and its transition to market-based economy. Reforms were undertaken in a number of areas; lifting of price controls, liberalizing the exchange rate and trade systems, downsizing the public sector, introducing a value-added tax and improving the mining sector efficiency.

However, real growth slowed down subsequently between 1989 and 1991, from 4.3 percent in 1989 to 2.6 percent in 1991 due to severe decline in the terms of trade (which began in 1988 and continued through the period) which resulted in a prolonged downturn in mining revenues, with a resultant reduction in exports and revenue. The government adopted fiscal consolidation measures in 1997 which enhanced budget execution and fiscal discipline in terms of combating tax evasion (particularly customs evasion), scaling

back exemptions, and reducing government's rate of expenditure.

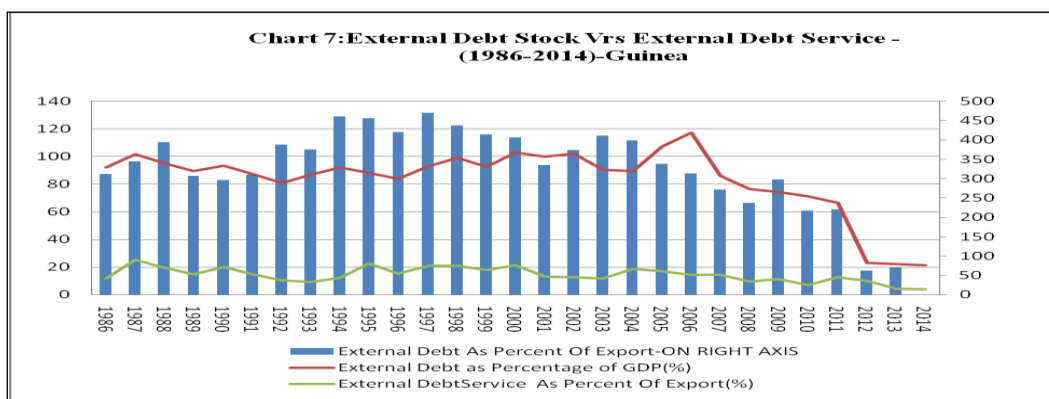
The serious external shocks at the end of 1998 which led to a drop in demand for its main export products (such as alumina and bauxite) and worsening security situation in neighboring countries affected the country's fiscal position and debt situation as, Guinea's external debt-GDP ratio increased to 99.1percent . In addition, the country's macroeconomic stabilization programs and market-oriented reforms initiated in the 1990s and the preparation for the completion point of the HIPC initiative were halted due to political crises and the military coup. The prolonged period of political crisis resulting from several years of intermittent civil unrest and a military coup in December 2008 led to collapse of fiscal control and deteriorating macroeconomic performance, stagnated growth and high levels of poverty.

The government's recovery efforts from the political and economic crisis resulted in rationalization of expenditures and revenue measures which saw reduction in fiscal deficit from about 13 percent of GDP in 2010 to less than 2 percent of GDP in 2011.

The implementation of the HIPC initiative which resulted in the cancellation of two-thirds (2/3) of

Guinea's recorded foreign debt, equivalent to US\$ 2.1 billion impacted favourably on Guinea's external debt situation. External debt-to-GDP ratio declined from 117.3 percent in 2006 to 22.9 percent in 2012 whilst growth improved from a contraction of 0.2 percent in 2009 to 3.9 percent in 2012.

Unfortunately, the Ebola epidemic that hit Guinea in 2014, claiming numerous lives, inflicted a heavy social and economic toll on the country. As a result, economic growth slowed to 1.1 percent, despite agricultural production growing strongly.

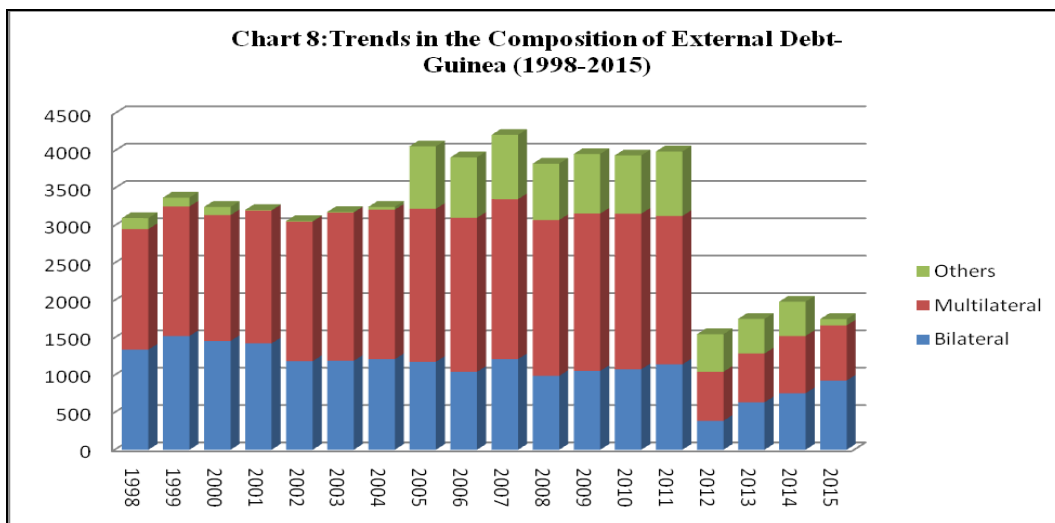


Source: World Development Indicators.

3.3.2 Trends in the Composition of External Debt (1998-2015)- Guinea

Guinea's external debt since 1998 consisted multilateral, bilateral and trade credits. Multilateral debt dominated the country's external debt composition during and after the period of debt relief. This was followed by bilateral debt and commercial credits. The average composition of multilateral debt between 2000 and 2005 was 59.45 percent whilst the average share of bilateral debt during the same period was 40.04 percent. Guinea's commercial foreign debt on average constituted 4.68

percent. Between 2006 and 2010, the share of Guinea's multilateral debt increased whilst bilateral and commercial debts decreased, with average composition of 65.4 percent, 33.48 percent and 1.14 percent respectively. Between 2011 and 2015, multilateral debt constituted 52.09 percent of Guinea's external debt whilst the average share of bilateral debt was 43.82 percent. The average share of debt on commercial credit between the period was 4.08 percent.



Source: WAMI Database

Table 3: Composition of External Debt- Guinea (Millions of USD)

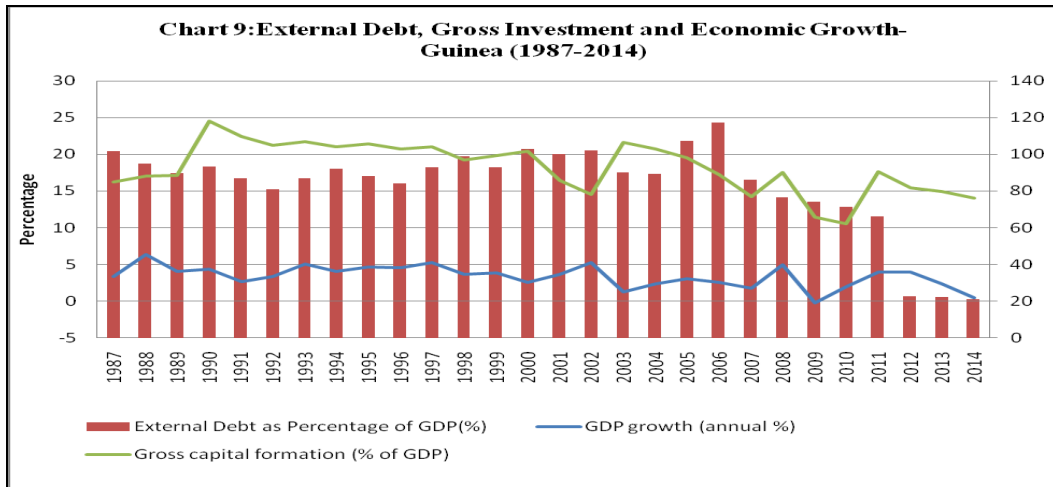
Year	2010	2011	2012	2013	2014	2015
Bilateral	1,077.30	1,142.43	387.90	635.22	756.54	926.52
Multilateral	2,082.10	1,985.80	655.07	652.32	766.22	737.46
Others (trade)	44.50	85.28	60.81	65.58	62.56	59.61
Others	-	778.40	442.90	398.70	396.60	370.40
Total	5,213.90	3,213.51	1,103.78	1,353.12	1,585.33	1,723.59

Source: WAMI Database

3.3.3 External Debt, Gross Investment and Economic Growth-Guinea

In view of the unfavourable political situation, the adverse terms of trade and fiscal mismanagement that characterized the Guinean economy in the 1990s, the country's gross capital investment trended downwards, declining from 24.5 percent of GDP in 1990 to 19.8 percent in 2000. The country also recorded an average growth rate of 4.1 percent for the period. Between 2001 and 2010, gross capital formation as a percentage of GDP averaged 16.4 percent, whilst GDP growth rate averaged 2.6 percent. Meanwhile, external debt-GDP ratio

remained high with an average of 93.7 percent. Though the country since 2007, has witnessed declining external-debt to-GDP ratio, gross investment and growth were very low. The country's external debt-to-GDP ratio declined from 66.3 percent in 2010 to 21.2 percent in 2014 while gross investment declined from 17.6 percent to 14.0 percent. During the same period, real GDP growth declined from 3.9 percent to 0.4 percent.



Source: World Development Indicators.

3.4 LIBERIA

3.4.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

Liberia’s external debt during the 1980s grew significantly, as external debt-to-GDP ratio increased from 80.2 percent in 1980 to 536.4 percent in 1990 and further to 1,846.6 percent in 1995. External debt service, however, remained low, as external debt service-to-export averaged 14.9 percent during the period. This was largely influenced by the protracted political instability suffered by the country during the period as well as external and other domestic shocks which hit the economy. The country’s external debt situation later improved as a result of economic recovery efforts that followed after temporary halt of the civil war in 1996 and the improvement of the Liberian economy. Substantial support from the international community helped to sustain the economy¹. The efforts

towards reconstruction of the economy (which began in 1997) impacted favourably on the country’s debt situation with external debt-to-GDP ratio declining sharply from 1,520 percent in 1996 to 582.7 percent in 2000. The external debt service also declined, with the external debt service-to-export averaging 1.86 percent for the period between 1997 and 2002.

¹Between 1997 and 2000, official grant inflows, estimated by the IMF totaled over US\$300 million, which is about 14 percent of GDP on average. Donor

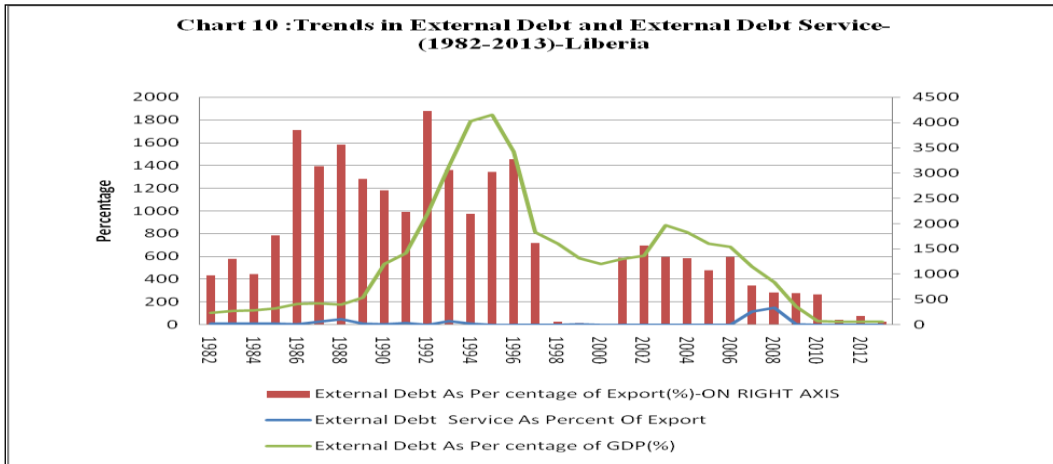
assistance in the form of resettlement, food aid, rebuilding of schools, clinics, restoration of civil aviation, revival of small holder farming and technical assistance facilitated economic recovery

Liberia's external debt stock and service between 2003 and 2007 trended downward largely on account of the signing of the peace agreement in 2003², the subsequent return to constitutional rule in 2005 and the IMF and World Bank-supported reform and reconstruction programmes. These led to economic reforms and recovery, particularly in the resource sector and saw the lifting of UN sanctions on diamond and timber exports and substantial private investment in the iron sector. Liberia signed up to the HIPC Initiative for debt relief, having reached the decision point in March 2008 and meeting the requirements for the HIPC completion Point in June 2010. Liberia's public and publicly-guaranteed debt decreased from US\$5.2 billion at the end of June 2007, much of which was in arrears, to US\$565 million at the end of September 2010. The stock of arrears at the end of 2011 stood at US\$49.4 million including the interest owed on the Saudi Arabian and Taiwanese loans. External debt-to-GDP ratio declined from 511.2 percent in 2007 to 32.4 percent in 2010. The country's economic performance strengthened in 2003, with real GDP growth rising from 5.3 percent in 2009 to 8.7 percent in 2013, reflecting increased iron ore production and an acceleration in private and public investments in various sectors (IMF, 2013). The country's external debt stock and service improved significantly during the period. External debt-to-GDP ratio decreased from 873.3 percent in 2003 to 28.1percent in 2012 whilst

external debt service to export ratio declined significantly from 147 percent to 0.6 percent during the period.

However, in 2014, the economic performance of the country was adversely affected by the Ebola Virus Disease (EVD) which devastated Liberia and other neighboring countries, as well as a decline in the international price of iron ore. The reduction in the activities of the United Nations Mission in Liberia (UNMIL) and the decline in foreign direct investment resulted to decrease in real GDP growth. The unforeseen expenditures related to the outbreak of the Ebola epidemic and the unanticipated fall in price of iron ore on the international market generally affected the country's fiscal position. The total public debt as percentage of GDP remained low but increased from 28.4 percent in 2013 to 34.6 percent, with external component rising from 21.0 percent to 23.9 percent in 2014. These were mainly on account of increased concessional lending from multilateral sources and government domestic borrowing to finance Ebola-related expenditures.

²The Accra Comprehensive Peace Agreement in 2003.

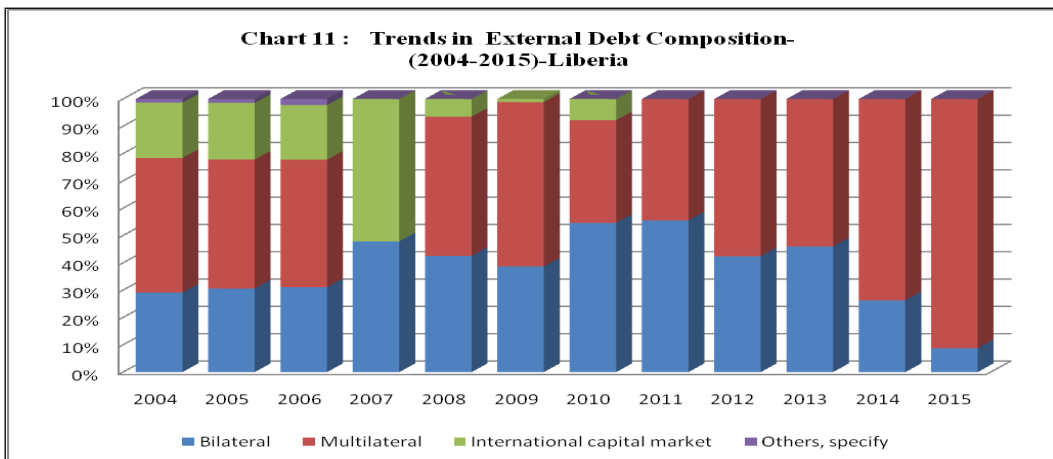


Source: World Development Indicators.

3.4.2 Trends in the Composition of External Debt (2004-2015)-Liberia

Available data on Liberia’s external debt composition revealed that the country’s external debt comprised multilateral, bilateral, debt on loans contracted from the international capital market and other commercial loans. Multilateral debt dominated the country’s foreign debt portfolio for most of the period under review. This was followed by bilateral debt, debt contracted from international

capital market and other foreign commercial loans respectively. On average, the share of multilateral debt in total external debt between 2004 and 2015 was 51.1 percent, whilst that of bilateral debt was 37.8 percent. The remaining 11.1 percent were debt contracted from the international capital market and other foreign commercial debt.



Source:WAMI Database

Table 4: External Debt Composition-(2004-2015)-Liberia

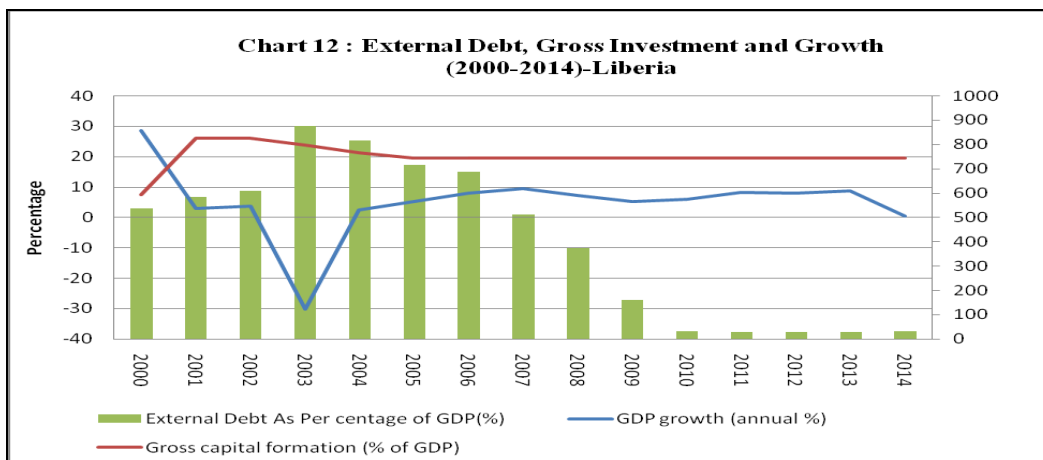
Year	2010	2011	2012	2013	2014	2015
Bilateral	143.90	123.70	130.71	134.53	120.53	33.81
Multilateral	99.00	99.00	177.28	157.93	338.26	352.18
International Capital Market	20.50	0.00	0.00	0.00	0.00	0.00
Others	0.00	0.00	0.00	0.00	0.00	0.00

Source: WAMI Database

3.4.3 External Debt, Gross Investment and Economic Growth-Liberia

The unsustainable external debt levels that characterized the Liberian economy in the 1980s and early 1990s resulting from the political instability and other domestic shocks adversely affected the country's rate of capital accumulation and economic growth during the period and thereafter. The reconstruction and recovery of the Liberian economy supported by the international community in the early 2000s led to improvement in the country's foreign debt profile. This together with debt relief from the HIPC initiative in the late 2000s freed up resources for other areas of capital investment. Gross capital formation as percentage of GDP increased from 7.5 percent in 2000 to 26.1 percent in 2002 but declined to 23.8 percent in 2003. Between 2004 and 2014, gross investment remained flat at

19.5 percent. Liberia's economic performance picked up after the war with real GDP growth reaching 8.7 percent in 2013 from 5.3 percent in 2009, reflecting increased iron ore production and an acceleration in private and public investments in various sectors (IMF, 2013). Real per capita GDP also increased from US\$192.17 in 2009 to US\$230.15 in 2013. However, in 2014, the twin effects of the Ebola Virus Disease (EVD) and fall in commodity prices (iron ore), coupled with the reduction in the activities of the United Nations Mission in Liberia (UNMIL) and the decline in foreign direct investment, resulted in a drastic fall in real GDP growth to 0.7 percent in 2014 from an impressive growth of 8.7 percent in 2013.



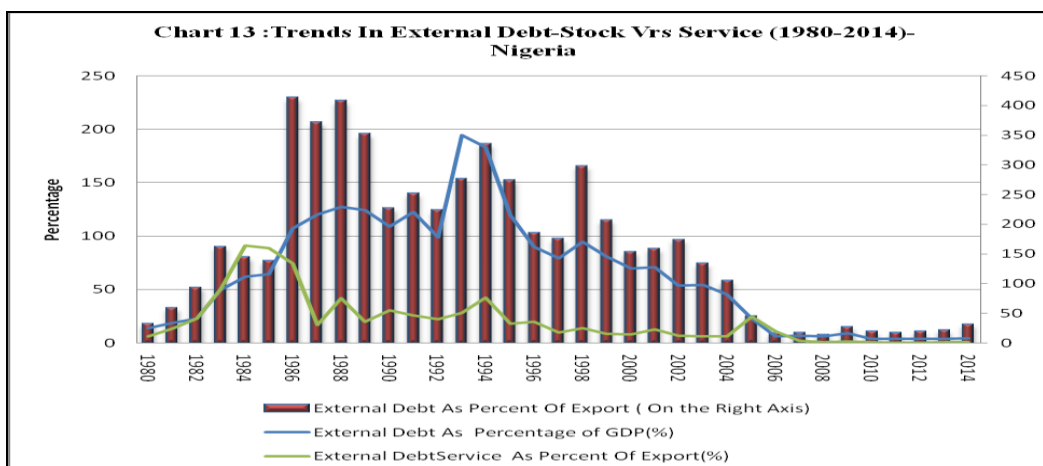
Source: World Development Indicators.

3.50 NIGERIA

3.5.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

Nigeria's external debt stock and debt service were major sources of concern until 2005, when the country received some debt relief. The debt service was highest in 1986, about 40 percent of exports whilst the debt to GDP ratio was highest in 1993. Nigeria's debt problem could be traced back to the late 1970s and early 1980s, when the country borrowed on a large scale due to high oil

prices which favoured its debt service ability. Dijkstra (2011) explains that when the oil price fell in 1982, macroeconomic policies did not adjust but the country continued borrowing, using new debt to service old ones. Consequently, the country's ability to service its debt weakened, leading to first rescheduling agreement with major creditors like the Paris Club in 1986.



Source: World Development Indicators.

The country continued accumulating arrears on other loan agreements in 1989 and 1996, accompanied with IMF programmes which were always “off-track” (Dijkstra, 2011). In 1992, Nigeria entered into a deal³ in relation to its private debt which led to a reduction of its debt by 62 percent from \$5.6 billion to \$1.2 billion (Rieffel, 2003). In 1993, the country limited its debt payments to 30 percent of oil revenues-making payments to multilateral and private creditors but accumulated arrears with the Paris Club. The outstanding debt did not decline despite the imposition of an embargo in 1994 on contracting new debt.

The country’s external debt stock (measured by external debt-to-GDP ratio) exhibited an upward trend between 1980 and 2008 with external debt-to-GDP rising from 13.9 percent in 1980 to 64.6 percent in 1988. The external debt in the 1990s, led to government’s inability to fully service it; consequently, making interest not paid and interest accruing on unpaid debt service becoming new debt. The external debt fluctuated between 1989 (122.4 percent) and 1999 (81.1 percent).

From 2000, the external debt as a percentage of GDP showed a declining trend, falling from an average of 76.3 percent in the period 1981-1984, to 73.8 percent in 1995-1999 and further down to 65.02 percent in the period 2000 to 2003. Nigeria, in 2005, concluded a debt relief agreement with Paris Club, comprising a debt cancellation of US\$18 billion (registered as Official Development Assistance (ODA) by creditor countries) and US\$12 billion paid by Nigeria and associated policy conditions. The debt relief agreement reduced the country’s debt stock from US\$36 billion in 2004 to US\$ 4 billion in 2006. Since the agreement with the Paris Club and multilateral organizations in 2006, Nigeria’s external debt-to-GDP ratio has been at relatively low levels.

³The Brady Deal

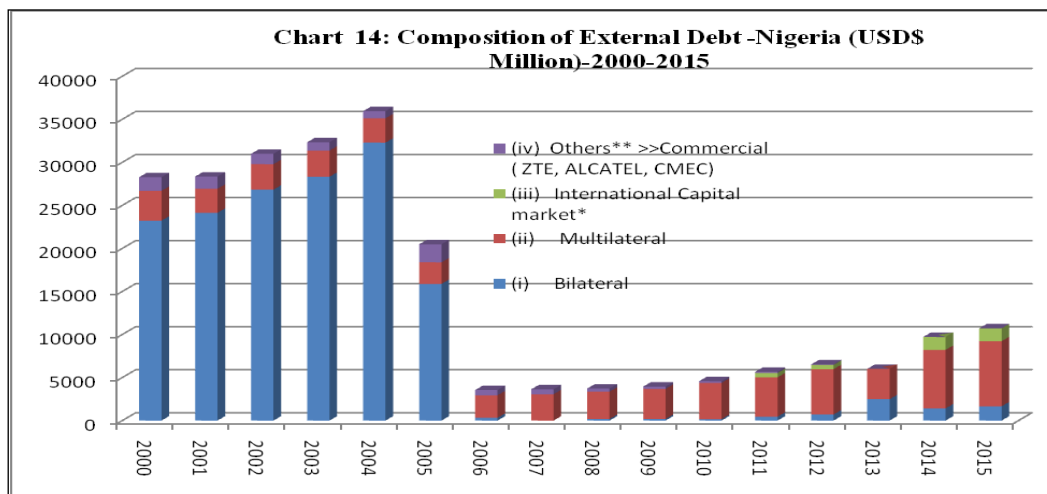
3.5.2 Trends in the Composition of Nigeria's External Debt (2000-2015)-Nigeria

Nigeria's external debt before 2005 was made up of multilateral, bilateral and commercial credits. Bilateral loans dominated the country's external debt composition (particularly between 2000 and 2004), constituting 86.3 percent on average during the period. This was followed by multilateral loans which constituted on average 9.8 percent of total debt during the same period whilst the average composition of commercial loans was 4 percent. After debt relief in 2005, the country's external debt changed both in terms of size and composition. Between 2006 and 2010, the country's external debt was dominated by multilateral loans followed by commercial loans and bilateral loans. The average share of multilateral loans during the period was 84.8 percent whilst those of commercial credits and bilateral loans were 10.8 percent and 4.5 percent respectively.

The composition of Nigeria's external debt further changed in 2011 when the country began borrowing from the international capital market. Consequently, Eurobond became a significant share of the country's external debt between 2011 and 2015 whilst the share of Multilateral and Commercial loans declined. During the period, the share of Bilateral loans increased initially but declined as the composition of Eurobonds became significant. The average share of Multilateral between 2011 and 2015 was 69.9 percent, whilst Bilateral loans constituted 20.6 percent. The share of Eurobonds and commercial loans during the period averaged 9.3 percent and 0.23 percent respectively. Table 4 and chart 11 below provide the details.

Source	2010	2011	2012	2013	2014	2015
Bilateral	163.20	453.83	703.03	2,487.61	1,412.08	1,658.00
Multilateral	4,217.72	4,568.92	5,267.41	3,518.20	6,799.36	7,560.43
Inter Capital Market ¹	0.00	500.00	500.00	0.00	1,500.00	1,500.00
Others ²	197.81	143.82	56.63	0.00	0.00	0.00
Total	4,578.73	5,666.57	6,527.07	6,005.81	9,711.44	10,718.43

Source: WAMI Database



Source:WAMI Database

3.5.3 External Debt, Gross Investment and Economic Growth-Nigeria

In spite of the high and rising levels of external debt which occasioned debt relief in 2005, the rate of capital accumulation declined continually during the period. Gross Capital Investment as percentage of GDP declined from 34 percent in 1981 to 5.5 percent in 2005. During the same period, the country suffered economic contraction as growth was negative in greater part of the period (between 1981 and 1991). After Debt relief in 2005, the country's gross investment exhibited positive trend. Gross capital accumulation (as percentage of GDP) increased from 5.5 percent in 2005 to 17.3 percent in 2010, though declined marginally between 2011 and 2015, with an average of 13 percent. Nigeria's

rate of economic growth remained appreciably high after debt relief in 2005. Real GDP growth rate averaged 6.3 percent between 2006 and 2014. Chart below provides details.

Despite the decline in crude oil production and prices in recent times, Nigeria's real GDP growth remained appreciably high. Real GDP growth increased from 5.5percent in 2013 to 6.2 percent in 2014. The non-oil sector continued to drive Nigeria's economic growth, led by the Services sector. The development indicates signs of the economy diversifying and evolving into more services-oriented, particularly through retail and wholesale trade, real estate, information technology and communication.



Source: World Development Indicators.

3.60 SIERRA LEONE

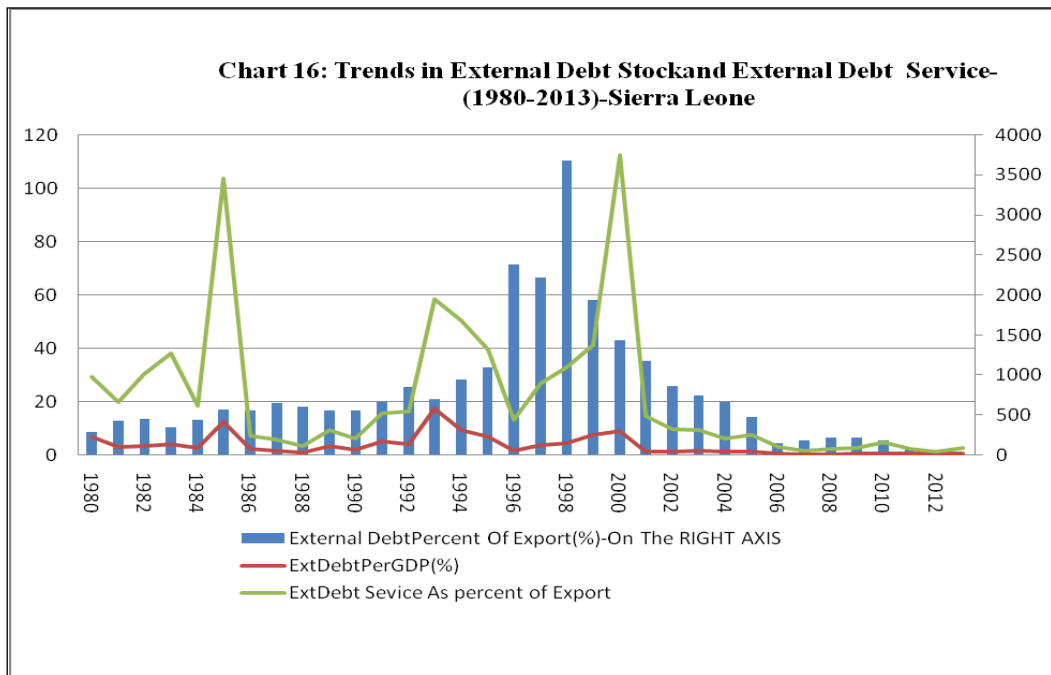
3.6.1 External Debt Stock, External Debt Service and the Impact of Debt Relief

Following the deteriorating economic situation which began in the 1970s through the mid-1980's, Sierra Leone adopted the Structural Adjustment Programme (SAP). The adjustment programme led to removal of subsidies on basic items and consequently, reduction in government expenditure during the period 1986-1990. The government's budget deficit declined from an average of 7.5 percent to 6.1 percent over the period 1991-1995, partly due to the implementation of the adjustment programme. The country's external debt-to GDP and external debt-to-export averaged 4.1 percent and 472.7 percent respectively between 1980 and 1991. External debt service-to-export ratio also averaged 25.3 percent during the same period. The country suffered a civil war between the period 1991 and 2001, which disrupted economic activities, effective

government operations and led to massive destruction of infrastructure and human resources as well as deterioration of the country's external debt portfolio. The unstable security and disruption of economic activities also resulted in a decline in government revenue and a widening of the budget deficit. Increased expenditure on arms to curtail the political impasse accounted for the huge expenditure and fiscal deficit during the war period. The immediate period after the war also witnessed high budget deficits as a result of high government expenditure in respect of resettlement, reconstruction and rehabilitation. The country's external debt-to GDP and external debt-to-export averaged 6.5 percent and 1,499.9 percent respectively between 1991 and 2001. External debt service-to-export ratio also averaged 37.8 percent during the same period.

Sierra Leone signed up to the Heavily Indebted Poor Country (HIPC) initiative⁴, for debt relief in 2002 and reached a completion point in 2006. The country also enjoyed multilateral debt relief during the period. As part of the requirements for the HIPC debt relief, the country implemented a

number of rehabilitation and recovery programmes and reforms⁵ with the support of the multilateral donors. These led to drastic improvements in the external debt profile of the country. External debt-to GDP fell from 1,184.3 percent in 2002 to 474.8 percent in 2006.



Source: World Development Indicators.

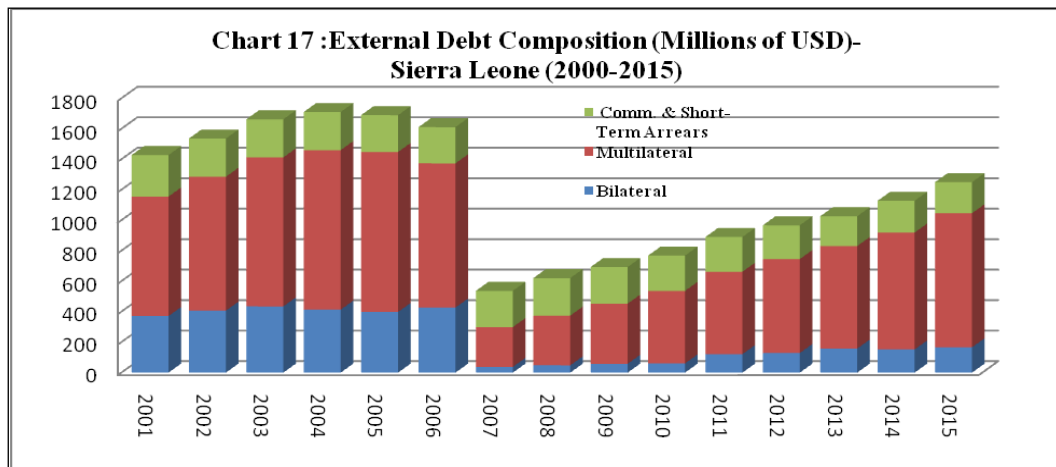
⁴At the decision point in February 2002, the programme aimed at reducing Sierra Leone’s NPV of debt-to-exports ratio to the HIPC threshold of 150 percent from 1,286.97 percent in 2002.

⁵ Reforms were aimed at sustaining the peace through disarmament, demobilization and reintegration programs, promoting macroeconomic stability and key structural reforms. With the sustained peace, the economic situation improved significantly as the disarmament and reintegration of ex-combatants gained momentum and private sector confidence revived..

3.6.2 External Debt Composition –Sierra Leone

Sierra Leone’s external debt composition since 2000 has been multilateral, bilateral and commercial credits. Multilateral debt dominated the country’s external debt composition during and after the period of debt relief. Between 2002 and 2006, multilateral debt on average constituted 59.6 percent during the period. This was followed by debt on bilateral loans which constituted an average of 25.7 percent during the same period whilst the average composition of commercial credits and

short-term arrears was 15 percent. After debt relief in 2006, the composition of the country’s external debt changed marginally. Debt on multilateral loans continued to dominate Sierra Leone’s foreign debt portfolio between 2007 and 2015, followed by commercial loans and bilateral loans. The average share of multilateral loans during the period was 61 percent whilst those of commercial credits and bilateral loans were 27.9 percent and 11.2 percent respectively.



Source:WAMI Database

Year	2010	2011	2012	2013	2014	2015
Bilateral	60.8	121.3	128.9	158	152.27	166.26
Multilateral	475.6	540.8	616.4	672.7	766.8	879.68
Comm. & Short-Term Arrears	231.5	228	221.4	195.4	208.7	203.8
Total	767.90	890.10	966.70	1,026.10	1,127.77	1,249.74

Source:WAMI Database

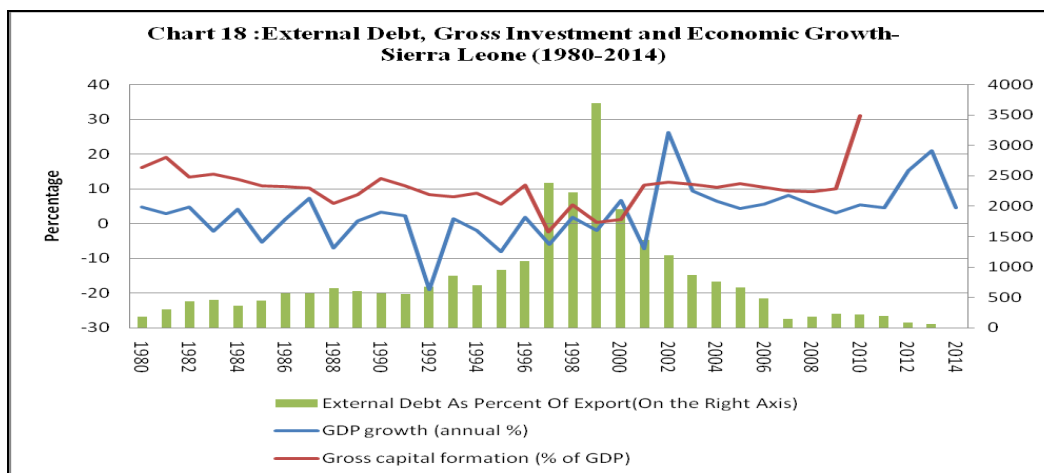
3.6.3 External Debt, Gross Investment and Economic Growth-Sierra Leone

A review of Sierra Leone's external debt, gross investments and economic growth between 1980 and 1991 reveals varied trends and relationships. The country's external debt trended upward from 1980 to 1991, with external-debt-to-GDP ratio rising from 175.6 percent (1980) to 654.1 percent (1988), but declined to 555.7 percent. Gross investments (measured as Gross capital formation as percentage of GDP) during the period, however, declined between 1980 and 1988, from 16.2 percent to 5.8 percent. Gross investment trended upward between 1989 and 1991.

Real GDP growth during the same period was highly volatile recording an average of 1.2 percent. The Sierra

Leonean economy contracted in 1983 by (2.1 percent), in 1985 (5.3percent) and in 1988 (7.1percent).

During the period of the civil war (1991 to 2001), the country's external debt-to-GDP ratio trended upward rising from 555.7 percent in 1991 to 3,689.4 percent in 1999, but declined to 1,436.1percent in 2001. Gross investment was volatile but largely declined. Gross Investment declined sharply from 10.9 percent in 1991 to -2.4 percent in 1997, but increased to 11 percent in 2001. The country's Real GDP growth in greater part of the period recorded contractions, averaging 2.7 percent.



Source: World Development Indicators.

Between 2002 and 2006, the HIPC and multilateral debt relief saw Sierra Leone's external debt burden indicators fall to levels significantly lower than the average of low-income countries (IMF, 2007). These led to drastic improvements in the external debt profile of the country. External debt-to-

GDP fell from 1,184.3 percent in 2002 to 474.8 percent in 2006. The country's gross investment, however, fluctuated during the period, recording an average gross investment-to-GDP of about 11.1 percent. The country, during the period of debt relief moved from economic contraction to growth, though growth

trended downward after the initial abrupt expansion of 25.3 percent in 2002 from a contraction of 7.4 percent.

The country's external debt after the completion point of HIPC declined initially between 2007 and 2009, maintained an upward trend between 2010 and 2011 but subsequently trended downward between 2012 and 2015. Gross investment during the period also maintained gradual upward trend between 2007 and 2009 and subsequently increased sharply between 2009 and 2010. Real GDP growth between 2007 and 2015 also fluctuated, declining initially between 2007 and 2009 but subsequently maintain an upward trend . The global financial crises (2007-2008) which resulted in lower demand from the advanced countries adversely affected world trade in Sierra Leone's major export commodities; cocoa, diamonds and other minerals.

Consequently, Sierra Leone's macroeconomic performance in 2009 weakened, with Real GDP growth slowing down, to 3.2 percent from 5.4 percent in 2008. The government, during 2008-2010, implemented a fiscal stimulus/ countercyclical fiscal policy⁶. Public expenditure increased from 21percent of GDP in 2008 to 22 percent in 2009, and then to over 23 percent in 2010. The stimulus effect reflected in the increase in the fiscal deficit,

excluding external grants as percentage of GDP, from 8.4 percent in 2008 to 10.4 percent in 2009.

Following the emergence of large-scale iron ore extraction as well as sustained expansion in agriculture, services, and construction, Sierra Leone's economic growth accelerated to 15.2 percent in 2012 and further improved to 20.1 percent in 2013. Real GDP per capita increased from US\$376.25 in 2011 to US\$513.4 in 2014. Unfortunately, the Ebola Virus Disease (EVD) which attacked the country, starting May 2014, changed the growth trajectory which had begun in 2012 following the emergence of iron extraction.

The EVD together with decline in international price of iron ore led to the closure of some mining companies⁷. Real GDP growth declined significantly, from 20.1 percent in 2013 to 4.6 percent in 2014. Output from the agriculture sector scaled down from 2.1 percent in 2013 to 0.8 percent in 2014, whilst growth in the industrial sector declined significantly from 97.8 percent in 2013 to 13.8 percent in 2014.

⁶ The Ministry of Finance and Economic Development (MFED), with support from the local office of the United Nations Development Programme, designed a macro response that was put into effect by the third quarter of 2009 which lasted only 18 months (extending into the first quarter of 2011).

⁷African Minerals Limited (AML), the largest mining company in the country, which exported USD 550 million worth of ore in 2014, and was shut down towards the end of 2014 The London Mining Company which exported USD 125 million worth of iron in 2014, was taken over by another investor.

4.0 METHODOLOGY

4.1 Econometric Model

The study uses panel data analysis with annual datasets from 2000 to 2014. The Panel data analysis adopts a reduced-form growth model with a quadratic term to investigate the non-linear relationship between external debt and economic growth. The econometric models in static specification form are estimated using fixed effect and random effect estimators.

We specify a reduced-form growth model based on Clements, Bhattacharya and Nguyen (2004). We augment their model by introducing a square of the external debt variable, (a quadratic term $EXTDEBT^2$) to capture the non-

linear (“laffer curve”) relationship between external debt and growth. As discussed under the theoretical literature section, the “laffer curve ” relationship between external debt and growth, suggests a positive relationship between the variables at low levels of external debt but a negative relationship when debt levels are high.

We also control for the impact of other important determinants of growth such as inputs (labour and capital), terms of trade, and degree of openness as important determinants of economic growth by including their proxies .

The reduced-form growth model is stated as follows:

$$g_{it} = \alpha_0 + \alpha_1 EXTDEBT_{it} + \alpha_2 EXTDEBT_{it}^2 + \alpha_3 DEBTSERV_{it} + \alpha_4 GROINV_{it} + \alpha_5 TOTGR_{it} + \alpha_6 POPGR_{it} + \alpha_7 OPEN_{it} + \mu_{it} \dots \dots \dots (1)$$

Where, g_{it} is the growth variable- either real GDP growth rate or real GDP per capita.

$EXTDEBT$ represents external debt as a percentage of GDP to capture debt stock.

The quadratic term, $EXTDEBT^2$, is to capture the non-linear relationship between external debt and growth. $DEBTSERVICE$ represents total debt service as a percentage of GDP. Both contemporaneous debt service (flow component of debt) and a measure of the stock of external debt (external debt

stock) are included to distinguish between crowding out effects and debt overhang respectively. For the shape of the non-linear “Laffer curve” between external debt and growth, the expected signs of $EXTDEBT$ and $EXTDEBT^2$ are positive and negative respectively.

$GROINV^8$ is gross domestic investment as percentage of GDP to capture the

⁸Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery,

rates of growth in capital as a factor input for production process. The co-efficient of **GROINV** is expected to have a positive sign since an increase in gross domestic investment should enhance growth.

TOTGR is terms of trade⁹ measured as the ratio of an index of a country's export prices to an index of its import prices. This is to capture external shocks to the economy as many countries in the WAMZ are heavily dependent on exports of primary commodities and are vulnerable to these shocks during the period. The co-efficient of **TOTGR** is

expected to have a positive sign because an improvement in terms of trade should enhance growth performance.

OPEN is degree of openness measured as the ratio of the sum of imports and exports to GDP.

POPGR represents population growth rate in percent, a proxy for rates of growth in labour¹⁰ as a factor input for the production process. The expected sign is positive.

and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. Data are in constant 2005 U.S. dollars

⁹The ratio of an index of a country's export prices to an index of its import prices. This suggests that a positive **TOTGR** means an improvement in terms of trade whilst a negative **TOTGR** means a deterioration of terms of trade.

¹⁰ All theoretical growth models recognize labour as an important factor of growth.

4.2 Estimation Technique

The paper employed panel econometric analysis to estimate the above model. The estimation procedure involves four main steps. We first perform panel unit root tests on the panels. Secondly, we estimate the fixed and random effects models to determine the impact of the variables, particularly external debt

variables on growth. The one-way error components models are used to account for individual effects. Thirdly, we conduct the Hausman test to distinguish between the two models and select the appropriate model. Finally, we perform panel diagnostic tests to check the robustness of our results.

4.2.1 Panel Unit Root Tests

The unit root test is performed because pooled time series data tend to exhibit a time trend much like univariate data and therefore could be non-stationary with means, variances and covariances that are not time invariant. The direct application of ordinary least square (OLS) or generalised least squares (GLS) to non-stationary data produces spurious results or misspecified regressions with inflated test statistics, such as high R^2 s and t-statistics (see Engle and Granger, 1987 and Granger and Newbold, 1974). It is therefore relevant to begin panel or pooled time series data analysis with unit root tests.

information in the time series is enhanced by the information contained in the cross-section data. Moreover, panel unit root tests lead to statistics with a normal distribution in the limit (see Baltagi, 2001), as opposed to individual unit root tests which have complicated limiting distributions.

- **Im, Pesaran and Shin Panel Unit Root Test**

The Im-Pesaran-Shin (IPS) test is not as restrictive as the Levin-Lin Chu test, since it allows for heterogeneous coefficients. The null hypothesis is that all individuals follow a unit root process:

$$H_0: \rho_i = 0 \quad \forall i$$

The alternative hypothesis allows some (but not all) of the individuals to have unit roots:

$$H_1: \begin{cases} \rho_i < 0 & \text{for } i = 1, 2, \dots, N_1 \\ \rho_i = 0 & \text{for } i = N_1 + 1, \dots, N \end{cases}$$

Following Im, Pesaran and Shin (2003), we carry out a panel-based unit root tests, similar to tests carried out on a single series. These researchers have shown that panel unit root tests are more powerful (less likely to commit a Type II error) than unit root tests applied to individual series because the

4.2.2 Fixed Effects and Random Effects

We estimated both the fixed effects (FE) and random effects (RE) models of equation (1). The Hausman Test was then used to determine the appropriate model.

a) Fixed Effects Model and Estimation
The FE model allows us to explore the relationship between predictor and outcome variables within an entity (in this case member countries of the WAMZ). Each country has its own

individual unobserved time-invariant characteristics that may or may not

influence the predictor variables (for example the political system etc)..

The equation for the fixed effects model becomes:

$$g_{it} = \beta_i X_{it} + \alpha_i + \mu_{it} \dots \dots \dots (2)$$

Where

- i = entity and t = time.
- g_{it} : is real GDP growth (dependent variable)
- α_i : ($i=1 \dots n$) is the unobserved country-specific factors or characteristics which influence economic growth (n entity-specific intercepts).
- X_{it} : is a vector of independent variables
($EXTDEBT, EXTDEBT_{it}^2, EXTDEBTSERV_{it}, GROINV_{it}, TOTGR_{it}, POPGR_{it}$)
- β_i is the coefficient vector for the independent variables.
- μ_{it} is the error term.

Using the FE estimator, we assume that unobserved country-specific factors may impact economic growth, hence the need to control for them. The FE estimator assumes that the time-

invariant unobserved country-specific factors are correlated with one or more of the explanatory variables as shown in equation (3)

$$cov(x_{it}, \alpha_i) \neq 0, \text{ for } t = 1, 2, \dots, T, \dots \dots \dots (3)$$

FE estimator removes the effects of those time-invariant characteristics from the predictor variables so we can assess the predictors' net effect. Another important assumption of the FE model is that those time-invariant characteristics (country-specific factors) are unique to the country and should not be correlated with other country characteristics. Each

country is different therefore the country's error term and the constant (which captures individual characteristics) should not be correlated with the others. The fixed effect estimation involves transformation of equation (1) as follows. Equation (1) is averaged over time to get equation (4) below.

$$\bar{g}_i = \beta_1 \bar{x}_i + \alpha_i + \bar{u}_i \dots \dots \dots (4)$$

where $\bar{g}_i = T^{-1} \sum_{t=1}^T g_{it}$

subtracting equation (4) from (1) for each t, we wind up with equation (5)

$$g_{it} - \bar{g}_i = \beta_i (x_{it} - \bar{x}_i) + (\mu_{it} - u_i), \quad t = 1, 2, \dots, T \dots (5)$$

In the fixed effect estimation, pooled OLS estimator is used to estimate Equation (5), the time-demeaned transformation of equation (1).

Any explanatory variable that is constant over time (time-invariant) for all i are eliminated as a result of the time-demeaned transformation. In view

of this, the FE estimator allows for arbitrary correlation between the unobserved individual time-invariant factors (α_i) and other explanatory variables in any time period (Wooldridge,2013).

b) Random Effects Model and Estimation

The random effects model, unlike the fixed effects model, assumes that the variation across countries is assumed to

be random and uncorrelated with the predictor or independent variables included in the model.

The random effects model is:

$$g_{it} = \beta_0 + \beta_i X_{it} + \alpha_i + \mu_{it} \dots \dots \dots (6)$$

The RE estimator assumes the unobserved country-specific factors (α_i) are uncorrelated with the

independent variables in all time periods as shown in equation (7) below:

$$cov(x_{it}, \alpha_i) = 0, \text{ for } t = 1, 2 \dots T, \dots \dots \dots (7)$$

Given (6), if we define the composite error term as $v_{it} = \alpha_i + \mu_{it}$, then equation (6) can be written as

$$g_{it} = \beta_0 + \beta_i X_{it} + v_{it} \dots \dots \dots (8)$$

Because α_i is in the composite error in each time period, the v_{it} are serially

correlated across time. Under the random effects assumptions,

$$Corr(v_{it}, v_{is}) = \sigma_\alpha^2 / (\sigma_\alpha^2 + \sigma_u^2), \text{ t}\neq\text{s}, \dots \dots \dots (9)$$

Where $\sigma_\alpha^2 = Var(\alpha_i)$ and $\sigma_u^2 = Var(u_i)$

Since the serial correlation in the error term can be substantial we use Generalized Least Square (GLS) estimator to solve the serial correlation problem. The usual pooled OLS standard errors ignore this correlation.

The GLS transformation that eliminates the serial correlation can be simplified as follows:

Define

$$\Omega = 1 - [\sigma_u^2 / (\sigma_u^2 + T\sigma_a^2)]^{1/2}, \dots\dots\dots(10)$$

which is between zero and one. Then, the transformed equation turns out to be

$$g_{it} - \Omega \bar{g}_i = \beta_0(1 - \Omega) + \beta_1(X_{it} - \Omega \bar{X}_i) + \dots \beta_k(X_{it} - \Omega \bar{X}_i) + (v_{it} - \Omega \bar{v}_i) \dots\dots (11)$$

Where the overbar denotes the time averages. While the fixed effects estimator subtracts the time averages from the corresponding variable, the random effects transformation subtracts a fraction of that time average where the fraction depends on σ_a^2 , σ_u^2 and the number of time periods, T.

estimator. That is RE allows for explanatory variables that are constant over time to be included in the model. This is because RE assumes that the unobserved effect is uncorrelated with all explanatory variables regardless of whether the explanatory variables are fixed over time or not.

Equation (8) highlights the advantage of random effects over fixed effects

4.2.3 Hausman Tests

Green (2008) argued that the crucial distinction between fixed and random effects models is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model and not whether these effects are stochastic or not. Hence, if you have reason to believe that differences across entities have some influence on your dependent variable

then you should use random effects. To decide between fixed or random effects, we run a Hausman test where the null hypothesis is that the preferred model is random effects versus the alternative the fixed effects. It basically tests whether the unique errors (ui) are correlated with the regressors against the null hypothesis that they are not.

4.2.4 Other Diagnostic Tests

a) Test For Cross-sectional Dependence

Baltagi (2004) observed that cross-sectional dependence, which is not much of a problem in micro panels (with few years and large number of cases), is a problem in macro panels with long time series (over 20-30 years). In view of the fact that the study is about macro panel, we employed Pasaran CD (cross-

sectional dependence) test and Breusch-Pagan LM test of independence were used to test whether the residuals are correlated across entities. Both the Pasaran CD (cross-sectional dependence) test and the Breusch-Pagan LM test are based on the following null hypothesis:

Residuals across entities are not correlated

b) Heteroscedastic

We test for heteroscedasticity using Modified Wald Test for Group wise heteroscedasticity in fixed effect regression model. The null hypothesis is 'homoscedasticity' (or constant variance). We use the option 'robust' to control for heteroscedasticity in the fixed effect regression. The test is based on the following hypothesis:

H₀: Homoscedastic (Constant Variance) for all cross-sectional units.

c) Serial Correlation

For macro panels with long time series (20-30 years), serial correlation is

usually a problem though not a problem in micro panels (with very few years). Serial correlation usually results in standard errors of the coefficients to be smaller than they actually are and higher R-Square. We used the Lagrange-Multiplier test to investigate serial correlation based on the following null hypothesis:

H₀: no first-order autocorrelation.

4.3 Data

Data for the variables used in the empirical investigation were drawn from the World Development Indicators

(WDI) of the World Bank database. The panel data analysis utilized annual data from 2000 to 2014.

5.0 ANALYSIS OF ECONOMETRIC RESULTS

5.1 Results of Panel Unit Root Test

The results of the panel unit root tests are presented in table 1 in the Appendix. All the variables appear to be stationary

in levels based on the Im Pesaran Shin or the Fisher-Type panel unit root test.

5.2 Estimation Results of the FE and RE Models

The results of FE and RE estimations as well as the Hausman Test are presented in table 7. The results of the Hausman Test shows that the null hypothesis that is the errors (ui) are not correlated with the regressors and can be rejected even at the 1.0 percent level of significance. This implies that the FE model is favoured over the RE model. Hence, the FE model is the appropriate model for estimating the relationship between external debt in the WAMZ. This indicates that further analysis should be focused on 'Panel A' of Table 5.1 which contains the results of the FE model.

The results of the FE models show that both external debt and square of external debt were statistically significant at 1% and carried the expected positive and negative signs respectively. Thus, the FE results confirm the non-linear "laffer curve" relationship between external debt and economic growth and provide support for the debt overhang hypothesis, suggesting that, beyond a certain threshold, higher debt is associated with lower real growth. These are shown in Panel A of table 5.1 below as, the co-efficient of external debt stock is positive whilst that of the square of external debt is negative and both statistically significant at 1%.

The results of the FE model also show that the co-efficient of external debt service is statically significant at 1% and carried negative sign consistent with the "crowding out" effect. This indicates that a high debt burden leads to significant portion of government revenue or budgatory resources being devoted to debt servicing instead of being channeled to productive investment.

The coefficient of gross domestic investment is not statistically significant at 5% according to the fixed effect model. The result shows that gross domestic investment in the zone over the period had no significant effect on economic growth. This may reflect the low marginal efficiency of public expenditure or investments in the WAMZ, giving further support to the findings observed from the trend analysis that recurrent and military expenditures dominated or underlined the high external debt that occasioned the debt reliefs in the early 2000s.

The co-efficient of population growth is significant at 5% and has positive impact on growth. The co-efficients of changes in terms of trade and degree of openness were not significant, according to the FE model.

Table 7: Panel Data Estimation Results-With Real GDP growth as Dependent Variable

Dependent Variable	Panel A: Fixed Effect Model		Panel B: Random Effect Model	
	Individual Effects		Individual Effects	
Real GDP Growth (Annual)	Coefficient	T-stat	Coefficient	Z-stat
<i>External Debt (as % of GDP)</i>	0.622134**	-3.36	0.033919*	2.03
<i>Square of External Debt (as % of GDP)</i>	-0.0000944**	-4.02	-0.0000592*	-2.75
<i>External Debt service (as % Export)</i>	-0.140462**	-3.87	-0.1003*	-2.98
<i>Gross Domestic Investment</i>	-0.0583868	-0.51	-0.13299	-1.4
<i>Degree of Openness</i>	0.0429898*	2.4	0.01568	1.2
<i>Terms of Trade</i>	-0.8449918	-1.06	-0.2605	-0.48
<i>Population Growth</i>	3.411883**	2.77	3.4822**	3.2
<i>No. of Group</i>	6		6	
<i>F-test</i>	7.23 **(0.000)			
Wald Chi Square Statistics	Not Applicable		34.01**(0.000)	
F-Test (u, i=0)	3.81***(0.0092)			
No. of Observation	90		90	
Hausman Test	34.91** (0.000)			

Note: ** indicates significance at the 1% level, * indicates significance at 5% level, while probability values are in parenthesis

5.3 Results of Other Diagnostic Tests

Key diagnostic tests confirms the robustness of our results (see Appendix I).

5.3.1 Heteroscedastic

The Modified Wald Test for Group wise heteroscedasticity in fixed effect regression model indicates presence of heteroscedasticity as the null hypothesis of ‘homoscedasticity’ was rejected at the 1.0 percent level of significance.

Table 2 in appendix 1 shows the results. We corrected for the presence of heteroscedasticity by re-estimating our FE with robust standard errors. The results shown in table 3 in the appendix confirm the earlier results.

5.3.2 Cross-sectional Dependence

Both the Breusch-Pagan LM and Pesaran Tests of Cross-sectional dependence and contemporaneous correlation did not reject the null

hypothesis of ‘no cross-sectional dependence and contemporaneous correlation as indicated in tables 4 and 5 in the appendix .

5.3.3 Autocorrelation in Panel data

Furthermore, the Wooldridge Test for autocorrelation in panel data did not reject null of ‘no first-order serial

correlation’ at the 5.0 percent level of significance as indicated in table 6 in the appendix.

6.0 Conclusion and Recommendations

6.1 Conclusion

This study sought to establish the relationship between external debt and

growth in the WAMZ, using trend and panel data analysis.

6.1.1 Outcome Of Trend Analysis

The trend analysis revealed the following facts about external debt and economic growth in the WAMZ:

- Economic growth was volatile for most WAMZ economies during the period 1980 and 2014, with the volatility driven by factors such as political instability, external shocks, effects of fiscal and debt management policies as well as structural reforms and adjustments. The adverse effects of protracted period of civil war and other political upheavals that characterized Liberia, Sierra Leone and Guinea reflected in their growth trajectory. The economic contraction during the war periods and the rebound of economic growth during the recovery and reconstruction periods explained clearly the devastating effects of the political crises suffered by these countries.

- Economic growth trends in the zone were also driven by fluctuations in the prices of primary commodities exported by WAMZ economies and the management of revenues accruing from same, as growth in WAMZ economies improved during periods of favorable export price movements but deteriorated when the reverse occurred. Inefficient management of export revenues during periods of boom and the absence of fiscal buffers rendered the economies

susceptible to adverse terms of trade and domestic shocks, with the effects vividly reflected in growth trends and patterns. The positive effects of the structural adjustments and continuous economic reforms implemented by some WAMZ countries particularly, The Gambia, Ghana and Nigeria, reflected in their growth trends. Ghana and Nigeria maintained upward trends in real GDP per capita between 1984 and 2014. Real GDP growth of Ghana also showed minimal volatility during the period.

- The high and worsening external debt situations that characterized almost all WAMZ economies prior to the receipt of debt reliefs in early 2000s, was largely driven by persistent fiscal deficits financed by external borrowing and accumulation of arrears. Government expenditures was higher and rose more than proportionately than revenue for a greater part of the period.

- In spite of the rising expenditures that occasioned the persistent deficits and rising debt levels, economic growth was low for most of the countries reflecting the low efficiency and productivity of public expenditure and investments during the period. The trend analysis shows that underlying the persistent fiscal deficits

were high external debt levels which were not productive investments but rather military expenditures and recurrent expenditures such as wages and salaries. Hence, the countries' inability to derive and utilize the returns from the public investments to pay for the external debt.

- The qualitative analysis shows that debt relief had positive impact on economic growth of WAMZ countries. Consistent with the views of Dijkstra (2011), debt relief had three effects on WAMZ economies. First, it led to decrease in the size of the external debt stock and a reduction in debt service

which later created opportunity for some of the countries (e.g. Ghana and Nigeria) to access international private capital for increased investment and growth. In addition, the lower debt service created fiscal space for poverty-reducing expenditures and investment in critical physical and social infrastructure for sustainable economic growth. Finally, conditions attached to debt relief led to policy improvement and created favourable environment for increase in economic growth and poverty reduction. These are confirmed by the growth trends exhibited by most of the countries subsequent to the debt relief.

6.1.2 Outcome Of Panel Data Analysis

The above observations were supported by the results of the panel data analysis.

- The positive co-efficient of the external debt stock variable and the negative co-efficient of the square of external debt stock (the quadratic term) which were both statistically significant in both the fixed effect model and the dynamic version shows that the relationship between external debt and growth in the WAMZ is non-linear "Laffer curve" shaped. This non-linear relationship confirms the debt overhang theory and suggests that, the accumulation of external debt beyond a certain threshold may affect economic growth.

- The negative co-efficient of the external debt service variable captures the crowding-out effect of rising external debt stock in the WAMZ. That

is, the rising debt service associated with high levels of external debt stock limits fiscal space available to government, preventing the use of limited resources or revenue for productive public investments that would accelerate economic growth. Conversely, this confirms the effects of the reduction in debt service from the debt relief received by the WAMZ on growth.

- The gross domestic investment variable was to capture the effects of rising debt stock on economic growth through investments. The results show low marginal efficiency of public investments in the WAMZ, giving further support to the findings observed from the trend analysis that recurrent and military expenditures dominated or underlined the high external debt that occasioned the debt relief in the early 2000s.

6.2 Recommendations

- Given the vulnerability of WAMZ economies to adverse terms of trade shocks, there is the need for government policies to diversify the productive and export base of the economies away from reliance on a few primary commodities to ensure resilience to external and domestic shocks. The recent crude oil and other commodity price declines in the international markets highlight the urgent need for export diversification of WAMZ economies.
- The favourable growth performance recorded during the period of political stability and democratic governance in the WAMZ, support the need to sustain political stability and consolidate democratic and constitutional governance in the zone .
- Effective fiscal policy and prudent fiscal management are essential to prevent persistent fiscal deficits. Specifically, governments need to control recurrent expenditures such as wages and salaries and other charges, especially during periods of transitory upward movements in revenues. Government revenue mobilization efforts should be intensified by expanding the tax coverage to rope in the large informal sector in the zone. This will also limit the macroeconomic imbalances and intermittent depreciation of domestic currencies that normally aggravate external debt problems in the zone
- Efficient and effective debt management mechanisms should be adopted and implemented to keep debt levels within sustainable limits.

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Appendix I: Diagnostic Test Results

Table 1: Panel Unit Root Test Results: Im-Pesaran-Shin and Fisher-Type

Variable	Im-Pesaran-Shin	Fisher-type
Growth	-3.8296	69.5865
	(0.0001)	(0.0000)
External Debt (as % of GDP)	-6.3409	0.3356
	(0.0000)	(0.6314)
Square of External Debt (as % of GDP)	-38.0910	15.1567
	(0.0000)	(0.2320)
External Debt service (as % Export)	-6.3409	29.5130
	(0.0000)	(0.0033)
Gross Domestic Investment	-3.6470	46.1691
	(0.0000)	(0.0000)
Degree of Openness	-0.7164	24.0276
	(0.2369)	(0.0202)
changes in Terms of Trade	1.1176	-1.7009
	(0.8681)	(0.0445)
Population Growth	-6.6234	76.8888
	(0.0000)	(0.0000)

Note: ** indicates significance at the 1% level, * indicates significance at 5% level, while probability values are in parenthesis

Table 2: Modified Wald Test for Group wise heteroscedasticity in fixed effect regression model	
H0: Homoscedastic (Constant Variance) for all cross-sectional units	
Chi2 (6)	193.56
Prob>chi2	0.0000

Table 3: Panel Data Estimation Results –Fixed Effect Model with Robust Standard errors.

Dependent Variable	Panel A: Fixed Effect Model	
	Individual Effects	
Real GDP Growth (Annual)	Coefficient	T-stat
<i>External Debt (as % of GDP)</i>	0.622134**	-2.81
<i>Square of External Debt (as % of GDP)</i>	-0.0000944**	-4.03
<i>External Debt service (as % Export)</i>	-0.140462**	-5.06

<i>Gross Domestic Investment</i>	-0.0583868	-0.57
<i>Degree of Openness</i>	0.0429898**	5.31
<i>Terms of Trade</i>	-0.8449918	-1.06
<i>Population Growth</i>	3.411883**	2.77
No. of Group	6	
No. of Observation	81	

Note: ** indicates significance at the 1% level, * indicates significance at 5% level, while probability values are in parenthesis

Table 4: Pesaran's Test of cross sectional Independence	
T-stats	-0.436
Prob.	0.6629
Average absolute value of the off-diagonal elements	0.26

Table 5: Breusch -Pagan LM test of independence- Correlation Matrix Of Residuals.						
Null Hypothesis: Residuals across entities are not correlated.						
	<i>E1</i>	<i>E2</i>	<i>E3</i>	<i>E4</i>	<i>E5</i>	<i>E6</i>
<i>E1</i>	1					
<i>E2</i>	0.3828	1				
<i>E3</i>	-0.3985	-0.7975	1			
<i>E4</i>	-0.0937	-0.3306	0.5894	1		
<i>E5</i>	0.3235	0.0821	0.0099	0.207	1	
<i>E6</i>	-0.4663	0.0352	0.1465	0.2292	-0.3744	1
Breusch-Pagan LM test of independence: $\chi^2(15)=21.932$ Pr=0.1095						
We reject the null hypothesis that Residuals across entities are not correlated.						
Based on 11 complete observations over the Panel and conclude that there is no Cross-sectional dependence						

Table 6: Wooldridge Test for autocorrelation in Panel data	
H0: No first order autocorrelation	
F(1,6)	1.997
Prob> F	0.0662