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PROJECT:External Debt and Economic Performance in Nigeria: An ARDL Approach.

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CHAPTER ONE

INTRODUCTION

1.1. Background to the Study

Governments borrow to cover the shortfall when tax revenues fall short of their expenditure promises, causing the economy to undergo structural change (Yusuf & Mohd, 2021). Therefore, governments must use external debt as a mechanism to support public spending, especially when raising taxes and reducing spending are challenging. The majority of governments have significant outstanding bills as a result of this process over time. Faster economic expansion necessitates fair borrowing to finance public and infrastructure investments since emerging nations' tax bases are insufficient. However, excessive borrowing without careful planning for investments may lead to a high or unsettling debt load and interest payments, which may have a number of detrimental effects on the economy (Joy & Panda, 2020).

High levels of foreign debt can result in uncertainty and slow economic growth, which is a major worry for nations with weak macroeconomic systems (Yusuf & Mohd, 2021). Investors are especially concerned about high debt-to-GDP ratios because they have an impact on the stock market and, over time, reduce productive investment and employment (Saungweme, Odhiambo, & Camarero, 2019). Although external debt may boost the economy, if it reaches a critical level, it will need large government spending and earnings from foreign exchange to service and repay, creating huge opportunity costs for future generations.

Nigeria is now one of the most indebted nations in Sub-Saharan Africa. Its GDP growth rate has slowed, its exports have decreased, its income per capita is quickly declining, and its poverty levels are growing (Yusuf & Mohd, 2021). The majority of these nations, including Nigeria, are stuck in a cycle of hurried and anxious borrowing that they are unable to repay. Even worse, the prices of their main exports are declining globally, forcing them to borrow more money (Ogunjimi, 2019). According to Ogunjimi (2019), debt relief provided by the Paris Club of creditors in 2005-which was principally motivated by the desire to free up resources for investment and quicker economic growth—led to a major reduction in Nigeria's debt burden in 2006. Unfortunately, some 15 years later, the government is experiencing a more severe debt issue.

Additionally, the cost of debt payment and unfavourable currency fluctuations may go beyond the capacity of the economy to bear them, endangering efforts to attain specific fiscal and monetary policy goals (Yusuf & Mohd, 2019). In addition, heavier debt loads can make it harder for the government to implement investment plans for infrastructure, public health, and education that are more effective and intended to spur economic growth (Johnny & Johnny walker, 2018). Successive governments have been amassing debt at an alarming rate, while debt servicing costs have skyrocketed, becoming a thorn in Nigeria's budgetary process in the previous decade. As a result, the economy is overburdened by massive government debt and debt service costs, which consume more than half of the government's limited revenue,

limiting the fiscal space available for the government to invest in critical infrastructure that encourages private investment and sustains growth. Hence, it is against this background that the study wishes to investigate external debt's impact on Nigeria's economic growth.

1.2. Statement of the Research Problem

Nigeria's mounting debt load and rising international interest rates indicate that another financial crisis isn't far ahead. Nigeria's faltering growth and lack of investment are reducing its competitiveness abroad and making its financial markets more susceptible to external shocks (Ogbonna, Ibenta, Chris-Ejiogu, & Atsanan, 2019). Either the debt to GDP ratio or the general debt service to revenue ratio may be used to analyse the debt sustainability. Nigeria is said to have one of the lowest debt-to-GDP ratios in the world, at about 22%, well below what other developing nations can provide (Yusuf & Mohd, 2021). Given that its overall debt is less than 30% of GDP, Nigeria looks to have a fairly low level of debt compared to many other nations. However, the debt-to-GDP ratio is not generally seen as the best indicator of debt sustainability, especially in nations like Nigeria, which has one of the lowest tax-to-GDP ratios worldwide (6.1%). (Yusuf & Mohd, 2021).

A more reliable indicator of Nigeria's debt sustainability is the debt service-to-revenue ratio, which demonstrates whether the country's government earns enough income to pay off its debt as it matures. The problem has always been the debt service to income ratio, which in Nigeria has increased to frightening levels in recent years,

leaving analysts to worry whether the government is insolvent or about to become so. Since the 2016 recession, Nigeria has struggled with a higher debt payment to revenue ratio as revenues have decreased in lockstep with drops in oil prices. With a total income of N4.1 trillion in 2019 and debt service costs of N2.45 trillion, the federal government of Nigeria had a 59.6% debt service to revenue ratio (DMO, 2021). As debt payments as a proportion of income hit 83% in 2020, the expense of Nigeria's rising debt profile achieved a new high. This is alarming since it indicates that 83% of the money produced in 2020 would be used to pay off debt.

There is relatively little money left over after debt service for a nation to use to finance capital infrastructure, which has a detrimental effect on economic growth. In addition, the 2019 Poverty and Inequality in Nigeria report from the National Bureau of Statistics (NBS) revealed that almost 83 million people, or 40.1% of the total population, live below the country's poverty line of N137,430 ($381.75) annually, underscoring the low levels of wealth in a nation with Africa's largest economy. Recurrent government spending (debt and non-debt) remained substantial and in line with budgetary estimates notwithstanding the income deficiencies noted. The required capital investment, on the other hand, has drastically decreased during the past 20 years. The sustainability of the Nigerian economy is questioned by the country's ongoing decline in revenue.

Governments that spend a large amount of their revenue paying off enormous debts have less money to invest in necessary infrastructure, which has a detrimental

effect on economic growth. In addition, the 2019 Poverty and Inequality in Nigeria report from the National Bureau of Statistics (NBS) highlights the low levels of wealth in the nation, with roughly 83 million individuals, or 40.1% of the entire population, living below the poverty line of N137,430 ($381.75) annually. Recurrent government spending (both debt and non-debt) has been high and in line with fiscal objectives notwithstanding income shortfalls. Contrarily, during the past 20 years, necessary capital spending has continued to decline.

Nigeria's revenue is still declining, which raises questions about the soundness of the nation's finances. Due to the global effort to battle climate change and choose green growth, government revenue, in particular non-oil revenues, might remain low for a longer period of time. This is especially true given that the economy is likely headed for a Covid-19 and growing insecurity-induced recession. The government will continue to rely on borrowing to fund its operations since our economy is not diverse, which would make Nigeria's debt service-to-revenue ratio more burdensome. Without significant structural policy changes and revenue-driven fiscal reduction, there wouldn't be enough money to finance the budget and provide the facilities that encourage investment and propel long-term growth (Yusuf & Mohd, 2021). In the realisation of this structural problem, this study investigates the impact of external debt on economic performance in Nigeria.

1.3 Research Questions

This research would attempt to answer the following questions

1. What is the impact of external debt on economic growth in Nigeria?
2. What is the impact of external debt on employment in Nigeria?
3. What is the impact of the external debt on inflation in Nigeria?

1.4 Objectives of the Study

The objective of this study is to:

- Empirically examine the impact of External Debt on Economic performance in Nigeria.
- Examine the impact of external debt on employment in Nigeria.
- Investigate the impact of the external debt on inflation in Nigeria.

1.5 Hypotheses of the Study

The null hypotheses formulated for this study are;

1. There is no significant relationship between external debt and economic growth in Nigeria.
2. There is no significant relationship between external debt and employment in Nigeria.
3. There is no significant relationship between the external debt and inflation in Nigeria.

1.6 Scope of Study

This study ranges from 1985 to 2021 using annual time series data. The period is adopted to capture the Structural Adjustment Programme (SAP, 1986) era and the

2005 external debt pardon effect. The entirety of the data was sourced from the CBN Statistical Bulletin 2021 edition.

1.7 Significance of Study

Unlike most past empirical studies on the Nigerian economy, this one will add to the existing research in two ways. The new research is country-specific, whereas several earlier significant studies used panels; this is relevant because panel studies tend to generalise the results of a single regression estimate to various economies with different country-specific features. Furthermore, previous Nigerian studies (Adofu & Abula, 2010; Akhanolu et al., 2018; Egbetunde, 2012; Elom-Obed et al., 2017) used two-stage least square, Vector Error Correction Model (VECM), and Ordinary Least Square (OLS) estimation techniques, which are insufficient in generating a consistent and robust coefficient estimate about the study variables, resulting in a gap in the methodology used. The current study would adopt a more advanced Autoregressive Distributed Lag (ARDL) approach, which allows for more robust co-integration relationships between a mix of I(0) and I(1) variables and works well with small sample numbers. This method makes it easy to deal with model selection, estimate, inference, and determining the long- and short-term consequences of external government debt on Nigerian economic growth all at the same time.

Based on the findings, this study would also provide significant, pertinent, and practical recommendations for enhanced policy formation. The study's conclusions

would have immediate policy implications, particularly for tax and investment decisions, and are critical for determining if an expansionary fiscal strategy that raises the level of debt will lower future living standards. The findings will likely help policymakers devise the best public debt strategy for Nigeria's economic growth goals while also freeing up resources for pro-growth government investment.

1.8 Organization of the Study

The research work will consist of five chapters. Chapter one provides a well detailed introduction on the study. Chapter 2 presents a literature review containing both empirical, conceptual, and theoretical literature. Chapter 3 presents the research methodology. Chapter 4 presents the analysis of data and its interpretation. Chapter 5 gives a summary of the study, it conclusion as well as its recommendation.

1.9 Definition of Terms

Economic Growth: It is the percentage rise in a country's Gross Domestic Product (or Gross National Product) over a period of time, usually a year (IMF, 2012).

External Debt: According to Ogbeifin (2007), external debt occurs due to the disparity between domestic savings and investment; as the deficit grows, debt builds, forcing the country to borrow ever-increasing amounts. He described Nigeria's external debt as the amount owed by the government to the rest of the world.

External Debt Servicing: Adesola (2009) defines debt servicing as the cash required for a specific period to meet interest and principal payments on a debt.

Exchange Rate: It is the price of a domestic currency in terms of a foreign currency. It can be expressed as the domestic currency per unit of foreign currency (₦/$) or foreign currency per unit of domestic currency ($/₦).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

For the purpose of achieving the objectives of the study, it is essential to review relevant works related to the subject matter of this research that would provide us with adequate conceptual, theoretical and empirical background for assessing the pertinence and contributions of this research study. This section encompasses the clarification of relevant concepts, theoretical literature, review of the relevant empirical literature, summary of literature review, and gaps to fill.

2.2. Conceptual Review

This sub-section encompasses the conceptual review of the meaning of external debt and economic performance/growth

2.2.1. Concept of Economic Performance/Growth

Economic growth is defined by Nnanna, Englama, and Odoko (2004) as an economy's ability to increase its output of goods and services while retaining its capital stock and other factors of production. As a result, per capita income increases, resulting in a high quality of living comparable to that of industrialised countries

(Ughulu & Ajayi, 2020). The terms economic growth and economic development are frequently used interchangeably when discussing a country's economic performance and swings in economic conditions. Although both terms are used to describe the process of developing countries (LDCs) achieving long-term economic growth, they are not interchangeable.

Professor Charles Kindleberger of the Massachusetts Institute of Technology (1965) provided a useful distinction between the two designations. "Economic development" entails both more production and changes in the technical and institutional arrangements by which it is formed. In contrast, "economic growth" entails "both more output and changes in the technological and institutional arrangements by which it is created." In addition to economic growth, economic development involves changes in the structure of outputs and the distribution of inputs by subsectors and sectors of the economy. The amount of products produced is compared to consumer, government, and investment spending to determine the change in GDP (Kesha, 2013). Simon Kuznets (1966) in his work "Modern Economic Growth," stated six main characteristics of econoGDP changes include:

I. High rates of growth of per capita income
II. High rates of growth of total factor productivity
III. High rates of structural transformation of the economy

IV. Growth of trade, specifically imports of raw materials and export of manufacturers.

V. Limited spread of development to only one-third of the world population.

VI. High rates of social and ideological transformation

According to Pettinger (2011), economic growth, which is defined as a rise in real GDP, is influenced by two factors:

I. Demand-side factors

II. Supply-side factors

Demand-side factors influence the growth of aggregate demand (AD).

$$AD=C+I+G+X-M$$

As a result, higher aggregate demand and economic growth can be achieved through increasing consumption, investment, government spending, or exports (Pettinger, 2011). Interest rates, consumer confidence, asset prices, real wages, the value of the currency rate, and the banking sector can all influence aggregate demand.

Long-term aggregate supply growth is also influenced by supply-side issues (the production possibility frontier of the economy). A rise in aggregate demand will only be inflationary if there is no increase in long-run aggregate supply. The long-run aggregate supply, according to Pettinger (2011) can be affected by the following factors;

I. **Levels of infrastructure**: investment in roads, transport, power and communication can help firms reduce costs and expand production. Without necessary infrastructure it can be difficult for firms to be competitive in the international markets.

II. **Availability of resources**: resources such as natural resources, physical resources and even managerial know-how is indeed necessary for firms as these resources serve as the necessary inputs needed for the production process.

III. **Human capital**: human capital is the productivity of workers. This will be determined by the levels of education, training, motivation and health status. Increased labour productivity can assist firms take on more sophisticated production process and become more efficient.

IV. **Development of technology**: in the long-run, development of new technology is a key factor in enabling improved productivity and higher economic growth.

2.2.2. Concept of External Debt

The external debt burden is a well-known phenomenon in developing countries, and it can be considered a prevalent feature of the fiscal sector of economies. According to the World Bank (2015), external debt is "debt owed to non-residents repayable in foreign currency, products, and services." External debt can be long-term (public and publicly guaranteed debts and private non-guaranteed obligations) or short-term (commercial debts and IMF loans).

External debt refers to a country borrowing money from other countries, such as Nigeria, or issuing a Euro bond to fund capital projects. Governments rely on each other to encourage economic growth and achieve sustainable economic development due to resource constraints and the rule of comparative advantage (Adepoju et al., 2007). The monies can be borrowed from the foreign government, foreign business people, and private citizens. External debt is largely regarded to be beneficial to economic development and prosperity (Osinubi et al., 2006). That is the primary reason why debt is usually borrowed in the first place. Governments' need to borrow to support a deficit budget has resulted in the growth of external debt (Osinubi et al., 2006).

Given the future necessity of repaying the debt and satisfying interest commitments, external debt increases a country's total available resources in the future. This form of debt is critical for a developing economy that requires further capital imports to develop. Nigeria has been relying on its external debt to the point where it has become so large that it has drained a significant portion of the country's revenue. Despite the rising nature of Nigeria's debt stock, until the recent fall due to debt cancellation and relief, the country's economic performance has been dismal, particularly when looking at essential components such as job creation and poverty reduction (Ayadi & Ayadi, 2008).

Nigeria's external debt is composed of the Federal government debt, the state government debt, government parastatals debt, etc.. In contrast, the primary source of her external debt includes the Paris Club of creditors, the London Club of creditors, the African Development Bank, the World Bank, the European Investment Bank International Development Association, etc. In most cases, the debt must be paid in the currency of the loan, including interest. As a result, not only did this study employ current external debt, but it also used lagged external debt to highlight the impact of historical foreign debt on the economy

2.2.3. Relationship between External Debt and Economic Growth

External debt has become a key stumbling block to emerging countries' progress and stability. As a result, economists have decided to investigate the pathways via which the impacts of external debt load are realised and have developed two opposing theories: the debt overhang theory and the crowding-out effect theory. Debt overhang happens when a country's debt exceeds its ability to repay it. According to Krugman (1982), loan overhang occurs when the expected repayment amount of debt exceeds the actual amount contracted. Borensztein (1990) described debt overhang as a situation in which the debtor country receives minimal benefit from higher investment returns due to significant debt servicing obligations. The debt overhang effect occurs when a large amount of debt is amassed, discouraging investors from investing in the private sector for fear of being taxed heavily by the government. Given the high debt and consequently large debt service payments, it is

assumed that the government will heavily tax any future income accrued to potential investors to reduce the amount of debt service, scaring off investors and resulting in disinvestment in the overall economy and thus a drop in the rate of growth (Ayadi & Ayadi, 2008). Furthermore, according to Clement et al. (2003), external debt build-up can promote investment up to a point where debt overhang sets in and investors' willingness to lend capital begins to deteriorate.

Audu (2004) claims that the debt servicing burden has stifled quick growth and development while exacerbating societal issues, the notion of debt overhang to Nigeria's debt problem. Nigeria's predicted debt service is increasing as a function of her output. As a result, resources that should be employed for economic development are being taxed away by foreign creditors in the form of debt service payments (Ekperiware et al, 2005). This has exacerbated the level of uncertainty in the Nigerian economy, discouraging foreign investors and lowering private investment. Certain researchers have also proposed other methods that external debt may affect economic growth. According to Borenstein (1990), external debt has an impact on growth because of the credit rationing effect, which occurs when governments are unable to contract new loans due to previous inability to pay.

2.3. Theoretical Review

2.3.1. Crowding In Hypothesis

The “Crowding in” effect can be considered as the government's attempt to encourage private sector investment by conducting capital projects such as road infrastructure, hydropower, education, or health care facilities, all of which reduce the private sector's marginal cost of generating one unit of output. This means that large government spending on capital goods production could potentially expand the stock of public capital investment, so crowding out private sector participation. The government would have to issue debt instruments (domestic or foreign) or raise taxes to fund such initiatives.

2.3.2. Crowding Out Hypothesis

According to Elmendorf and Mankiw (1999), public debt used to cover the budget deficit is a significant cause of private investment crowding out. Interest rates will rise due to the government's massive borrowing, and interest rate hikes may stifle or eliminate private-sector investments in facilities and equipment. As a result of the drop in investment, the broader economy has a reduced capital stock with which to work, lowering future growth rates.

The effect of a budget deficit on savings accumulation is another argument given by Elmendorf and Mankiw (1999). Increased government borrowing can lead to distortive tax measures, which can encourage consumers to save less and, as a result, raise interest rates. As a result, investible funds are reduced, and the cost of capital rises due to rising interest rates. As a result, private-sector investment is declining. As

emphasised by the two authors above, Aschauer (1989) provides empirical data pointing to the government deficit as the principal source of crowding-out private investments.

2.3.3. The Two gap or Dual gap model

In an attempt to clarify the problem of external debt, scholars have taken a variety of perspectives. Chenery's (1996) dual gap model is commonly used to analyse the need for foreign aid to bridge the two gaps in developed and developing nations, namely the savings and trade gaps. Most of these economies begin their development with a modest level of savings. However, it does have change gaps that must be bridged to achieve the required pace of growth and engage in high-level investment. It becomes simpler for economies to reach the take-off stage, as Rostow predicted if the gap is narrowed. What remains to be seen is how the void will be filled. Chenery (1966) sees foreign aid as a method to bridge these two gaps and help the economy reach its objective growth rate.

If the savings gap dominates, the economy is functioning at full employment and not using all of its foreign exchange earnings, based on the assumption of full employment. It may have enough foreign exchange to buy more capital goods from other countries, but it lacks the extra domestic resources to carry out further investment projects. As a result, an extra foreign exchange may be used to import high-end items. Such a country has a scarcity of productive resources, which can be

viewed as a scarcity of savings. On the other hand, countries with a savings gap or a foreign exchange gap cannot close the gap by employing extra domestic savings. To obtain a certain rate of economic growth, the foreign exchange imbalance must be closed.

Dormar (1939), Harrod (1946), and Chenery and Strout (1966) developed a dual gap analysis that hinges development on investment. Savings are required for such an investment, and savings should theoretically equal investment, but this is insufficient to encourage progress in practice. The model also assumed that most emerging countries had a shortage of domestic savings to supplement low investment and foreign exchange to finance intermediate and capital goods. The two-gap model is explained using the national income identity:

$$Y = C + I + G + X - M = C + S + T \quad - - - - - - \quad (1)$$

Where Y is the total output produced in a given year (GDP); C is private consumption, I represents Investment and G is government consumption. X explains export while M denotes imports. S and T are savings and total government tax revenue, respectively. The premise of the analysis is that domestic savings and inflows of capital can finance domestic investment. Therefore, by rearranging equation (1), the resource gap is highlighted with the savings gap (constraint) on the left-hand side

constraints to financing growth and foreign exchange (external finance gap) constraint on the right-hand side of equation (2):

$$I - S = (X-M) + (G-T) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (2)$$

By representing (M – X) with F, and with the assumption that government plans its expenditure to be equal to its tax revenue, equation (2) is modified to be:

$$I - S = T \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad (3)$$

Several possible scenarios may play out: where savings (S) is too small to permit the amount required for investment (I) for the country to undertake, a savings gap would exist. On the other hand, if export (X) is too small to permit the importation (M) and ensure full utilisation of the resources of the economy, a foreign exchange (or trade) gap would exist. The deduction from equation (3) is that domestic investment can be financed by domestic savings and/or external debt. External debt can augment investment, which stimulates economic growth by filling either the savings or foreign exchange gap. This model is relevant for this study considering the development level of Nigeria's economy and its domestic realities. In the next sections, evidence is gathered from Nigeria and some other developing countries.

2.4. Empirical Review

In this section, relevant empirical works on or related to external debt and economic growth, employment, and inflation in Nigeria and other countries of the world are reviewed.

2.4.1. External Debt and Economic Growth Nexus

Abdulkarim & Saidatulakmal (2021) used annual data from 1980 to 2018 to investigate the impact of government debt on Nigeria's economic growth. The Autoregressive Distributed Lag technique was used to estimate the data. The empirical findings revealed that external debt hampered long-term growth despite having a growth-enhancing effect in the short run. Domestic debt had a large favourable long-term influence on growth while having a negative short-term impact. Debt service payments slowed growth both long and short term, proving the debt overhang effect. According to the findings, the government should invest the borrowed monies in diversifying the economy's productive base. This will boost long-term economic growth, broaden the tax base, and increase the country's ability to pay off current obligations on time. The study's key contribution is fiscal changes that stimulate domestic resource mobilisation, efficient debt management measures, and dependence on domestic debt rather than external debt for increasing deficit financing to foster stronger growth.

Ekor et al. (2021) carried out a study to examine the impact of foreign debt on the Nigerian economy using annual time series data from 1976 to 2008. The dynamic variant of the ARDL methodology was adopted and the main finding of this study is

that external debt accumulation and the associated service payments have negative effects on the economy in the long run. The policy implication is that the government should always make sure that external debt growth is sustainable and used to fund infrastructure development. Muhammad and Kabir (2020) in their study investigated the impact of external debt servicing on Nigeria's economic growth. The study utilised time-series data from 1985 to 2018 and an ARDL model. According to the study's findings, external debt servicing will have a detrimental impact on economic growth in the long run. As a result of the increased external debt servicing, economic growth has slowed. The study concluded and recommended that debt payment obligations should not exceed the debt stock, and the contracted loan should be used efficiently and judiciously for infrastructure development.

Veronica (2021) used annual time series data from the Central of Nigeria statistical bulletin to examine the impact of public debt on economic development in Nigeria from 1990 to 2019. Real GDP, public debt, inflation, debt to GDP ratio, debt servicing to GDP ratio, and exchange rate are the factors. The short and long-run influence of public debt on economic growth was examined using the Vector Error Correction Model. The impact of public debt on economic growth was negative and significant in the long run, according to empirical findings. In the short run, the impact of public debt on economic growth was negative but minor. Furthermore, the short- and long-term effects of the debt-service-to-GDP ratio were considerable and negative. The relationship between governmental debt and economic growth was not causal.

According to the study, Nigerian governments should move away from relying on public debt and instead focus on diversifying the economy's export base and expanding the tax net to increase revenues. The study also suggests that public institutions be strengthened so that revenues collected through debt or other means can be put to good use on efficient investments.

Eke and Akujuobi (2021) carried out a study on the influence of public debt on economic growth in Nigeria which covered the years 1981 to 2018. Using a co-integration approach, the study discovered, among other things, that Nigeria's public debt and economic growth had a considerable short-run link. Furthermore, while both the domestic and external debt variables were statistically significant, only the latter failed the a priori expectation test, implying that it has a negative impact on Nigeria's economic growth. The analysis indicated that the majority of Nigeria's external borrowings are misappropriated based on the data. As a result, the advice is that adequate methods of monitoring public borrowings be established, with a particular focus on all external debts incurred, in order to ensure that misappropriation is severely minimised, if not eliminated.

Ndubuisi (2017) used the ordinary least squares approach and other statistical tools to extend the study on the influence of external debt on Nigerian economic growth from 1985 to 2015. The exchange rate and external reserve were used as control variables, whereas external debt stock and external debt servicing were used as important independent factors. The GDP was also included as a dependent variable in

the study. As a result, the data demonstrated that debt service payments had a negligible negative influence on economic development, whereas Nigeria's external debt stock had a considerable positive impact. External reserve and exchange rate, which are control variables, had a major impact on GDP. As a result, the report suggested that external debt be used to fund infrastructure expansion.

Elwasila (2018) used the vector error correction method to evaluate the impact of external debt on Sudan's economic growth from 1969 to 2015. The exchange rate and foreign direct investment were also used as controlled factors in the study. The GDP was the dependent variable, while the external debt to exports ratio served as a proxy for the major explanatory variable, external debt. As a result of the findings, the Effect of Foreign Debt on the Economic Growth of Nigeria demonstrated that the external debt to export ratio had a beneficial impact on Sudan's economy, while the control variables (exchange rate and FDI) used had a negative impact on Sudan's GDP growth. Matuka and Asafo (2018) used co-integration analysis and an error correction methodology to investigate the influence of external debt on economic growth in Ghana. The research used annual time series data spanning the years 1970 to 2017. External debt had a favorable long-term and short-term influence on Ghana's economic growth, according to the research.

Matandare and Tito (2018) investigated Zimbabwe's public debt and economic growth. The study used a quantitative research approach. The WDI database was used

to obtain secondary time series data from 1986 to 2016. Inferential analysis was used to examine the data collected in the study. The study's findings found that in Zimbabwe, there is a negative significant link between external debt and economic growth. The study also discovered that the exchange rate and inflation have negative significant associations with economic growth in Zimbabwe, while external factors had a significant positive relationship. The authors concluded that the government should increase efforts to boost domestic revenue sources to finance its growth plans, as external debt accumulation slows economic growth, and that they need to diversify the economy is critical, as the government should develop new revenue-generating sectors to contribute to economic growth.

Using several econometric methodologies, Shkolnyk and Koilo (2019) experimentally studied the link between external debt and economic development in Ukraine from 2006 to 2016. Economic growth is hampered by a high degree of external debt and macroeconomic uncertainty, according to the report. The study also demonstrated that Ukraine's debt burden, similar to that of other emerging economies, had prevented them from achieving predicted economic growth.

Al-Tamimi and Jaradat (2019) used annual time series data from 2010 to 2017 to evaluate the influence of external debt on economic development in Jordan. External debt had a strong detrimental influence on economic growth, according to the empirical findings. As a result, the study recommended foreign direct investment as a

potential source of funding. Favour et al. (2019) investigated the relationship between public debt and economic development in Nigeria using the Vector Error Correction Model (VECM) and the Granger causality test. Between 1985 and 2015, the results showed that both domestic and external debt had a considerable negative impact on Nigeria's economic growth. The granger causality test revealed that the variables have a bi-directional relationship. The poor outcomes were related to misallocation of borrowed cash, according to the report, which advised stronger distribution systems that are free of corruption.

Didia and Ayokunle's (2020) findings were not the same as those of Favour et al (2019). Didia and Ayokunle's (2020) study found a long-run statistically significant positive relationship between domestic debt and economic growth, but a statistically insignificant negative relationship between external debt and economic growth. The VECM was used to conduct an empirical examination of data from 1980 to 2016, and the researchers determined that domestic debt was more favorable to Nigerian economic growth than external debt. They advised the government to consider the domestic and international debt mix in Nigeria's debt portfolio.

Michael et al. (2019) used multiple regression analysis, autoregressive distributed lag, and the Chow breakpoint test to investigate the impact of public debt on economic development in Nigeria. External and domestic debt both had negative effects on GDP, but only the effect of external debt on GDP was substantial, according to the findings. External debt should not be utilised to cover budget shortfalls,

according to the report. Osuma et al. (2017) employed a 2SLS to explain the relationship between internal debt, GDP, national savings, and recurrent expenditure. Only the direct association between internal debt and GDP is statistically significant, according to the first step of the regression. Internal debt was observed to have a positive influence on national savings and recurrent expenditure while having a negative impact on GDP in the second stage, but the results were slightly different. The study recommended debt minimisation based on the findings.

Sansa's (2020) studies on the impact of public debt on economic growth and poverty in Tanzania from 2000 to 2018 revealed a negative and negligible relationship between public debt and all of the study's dependent variables (GDP and poverty). Multiple linear regression models were used in the analysis. Sansa (2020) determined that public debt has no impact on economic growth and poverty reduction in Tanzania based on the findings. Similarly, Saungweme and Odhiambo (2020) study on the influence of domestic and public foreign debt on Zimbabwe's economic growth between 1970 and 2017 found a negative impact. The Autoregressive Distributed Lag method (ARDL) was used to conduct the research, which revealed that local debt had a greater negative impact on the Zimbabwean economy than foreign debt. The study concluded that the government's endeavor to maintain a low budget deficit, low debt-to-GDP ratio, and the use of debt for capital projects all contribute to the probability of favourable outcomes between public debt and economic growth.

Owusu-Nantwi and Erickson (2016) observed a positive and statistically significant association between public debt and economic growth in Ghana from 1970 to 2012, when investigating the impact of public debt and economic growth in Ghana. This was owing to the country's ability to keep its debt-to-GDP ratio low throughout time. Another study by Kharusi and Ada (2018) found that external debt has a negative and significant impact on Oman's economic growth. Using the Autoregressive Distributed Lag Cointegration technique, they looked at the link between external debt and economic development in Oman from 1990 to 2015. Based on their findings, they advocated for more productive use of external debt to boost economic growth in Oman.

Ibhagui (2018) carried out a study on external debt, trade openness, and current account in Sub-Saharan Africa using panel data from 1985 to 2013. According to empirical analysis, increases in external debt, on the other hand, exacerbate current account deficits in nations with strong openness. The findings are robust to a variety of time periods and econometric estimate methodologies, as well as the inclusion of other current account factors as control variables and endogeneity considerations. The study concluded that SSA's high debt burden resulted in a reduction in the persistence of current account deficits and the initiation of current account adjustments, particularly because these countries were heavily debt-burdened and their growth rates during these periods were suboptimal and unattractive to encourage sustained capital inflows to finance the deficits.

2.4.2. External Debt and Employment

Aladejana et al. (2021) in their study investigated Nigeria's debt burden and its implications for infrastructure development for the period 1986 to 2019. The researchers used annual time-series data using Fully Modified Ordinary Least Squares (FMOLS) estimation techniques to evaluate the association between the variables. The findings revealed that domestic debt and infrastructure development have a positive and statistically significant association, while external debt has a negative link with infrastructural development and is not statistically significant over the study period. The findings imply that increases in federal government domestic debt result in an increase in infrastructure development (in the near run), however, rises in federal government external debt have not resulted in any improvement in infrastructure development in the past. Finally, in the long term, the Granger Causality test validated both the unidirectional and bidirectional links. As a result, the study concluded that Nigeria's foreign debt has not contributed considerably to the development of the country's infrastructure and that the country's massive external debt profile, even prior to debt forgiveness in 2005/2006, is unjustifiable and uncalled for. External financing, it was suggested, should be limited to specific recognised infrastructural or productive projects

2.4.3. External Debt and Inflation

To assess the relationship between domestic debt, public debt, GDP, loan rates, and inflation in Nigeria, Essien et al. (2016) used vector autoregression, granger

causality, impulse response, and variance decomposition approaches. Changes in external debt have an impact on lending rates, according to the findings. The findings also revealed that neither external nor domestic debt had a substantial impact on inflation or output. The report suggests debt with a longer repayment period and borrowing plans that are consistent across all levels of government. In a study of the impact of public debt on external reserves in Nigeria. From 1981 to 2013, Oduntan et al. (2016) advise that the government reform its negotiation procedures to enable us to obtain more favorable rates and payment schedules. The results of the Johansen Cointegration test and the completely modified least-squares technique were used to get the conclusions. The findings revealed a long-term positive association between government debt and broad money supply, as well as external reserves and economic growth. There was also a study of empirical evidence from other nations that were not linked to Nigeria.

Shuaibu (2021) carried out a study on the effect of Nigeria's public debt from 1985 to 2020 on inflation and unemployment. A variety of econometric tests are run using annual data spanning 36 years. For the analysis of the data, it employs the Autoregressive Distributive Lag (ARDL) Error Correction Model (ECM). To evaluate the model's effectiveness and propensity for prediction, unit root tests and Granger causality tests were also carried out. According to the study's findings, there is a long-term connection between Nigeria's public debt and unemployment. It demonstrates that higher public debt levels increase unemployment, but higher external debt levels

increase unemployment relative to domestic debt. The results of cointegration analysis, however, indicate that there is no connection between public debt and inflation. The paper urges the government to borrow less in the future and, when it does, to prioritise domestic debt over foreign debt.

Ezeanyeji et al. (2019) using a scope from 1981 to 2017 examined Nigeria's public debt and inflation in connection to each other. The investigation used the Augmented Dickey-Fuller (ADF) test, co-integration test, and Error Correction Model (ECM). The findings showed that Nigerian inflation is significantly and positively impacted by the national debt, the currency rate, and the money supply. Additionally, the real GDP growth rate has a detrimental and statistically negligible effect on Nigeria's inflation. According to the report, the government should execute strict fiscal and monetary policies, finance the budget deficit with non-inflationary sources, develop a programme to stabilise prices by providing subsidies for staple foods, and manage public debt well to maintain lower inflation rates. Additionally, the government should suggest policies to cut public debt by broadening the tax base and structurally reforming spending.

2.5. Gaps to Fill

The empirical literature on the impact of external debt on economic growth, employment, and inflation in Nigeria, particularly in emerging economies like Nigeria, did not give compelling evidence. As reviewed above, significant attention has been paid to the debt-growth nexus with little attention to the debt-employment nexus in

Nigeria. As a result, this study aims to cover this lacuna by investigation the impact of external debt on employment, inflation, and economic growth. In general, it becomes critical to conduct an empirical analysis using up-to-date data with control variables drawn from the real sector and the financial sector to uncover further the missing link(s) between these phenomena.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

The study's theoretical framework is based on the Dual Gap Model. Chenery's (1996) dual gap model is commonly used to analyse the need for foreign aid to bridge the gaps in developed and developing countries: the savings and the trade. Essentially, the theory states that investment is a function of savings and that domestic savings-based investment is insufficient to assure economic progress, necessitating the use of complementing foreign products and services. According to a two-sector model, the gross domestic product identity is of the form:

$GDP = C + S$

…….. (2.1)

Alternatively;

$GDP = C + I + (X - M)$ ……..

(2.2)

Where,

C = Consumption

I = Investment

X = Exports

M = Imports

S = Saving

In this model, the investment includes both private-sector investment and government investment expenditure. That is,

$I_p = I_g$

…… … (2.3)

Where;

I_p = government expenditures

I_g = private sector investment

Since GDP equals domestic consumption plus domestic saving, it follows from equations (2.1) and (2.2) that the demand for domestic investment equals the sum of domestic savings and the import balance on current accounts, which is financed by net borrowing from abroad.

$I = S + (M - X)$ …… (2.4)

Where, (M - X) = net foreign borrowing

To answer why external debt tends to increase rapidly, we recall the two-gap model described by Chenery and Strout (1966). In their model, net external borrowing is known as basic transfer (BT). Mathematically, it is measured as the difference between the net capital inflow (gross capital minus the amortisation on past debt) and interest payments on the remaining accumulated foreign debt.

$BT = Dd - rD$ …… (2.5A)

Where,

D= total accumulated foreign debt

d = percentage rate of increase in total debt

r = average annual interest rate

Dd = net capital inflow or the rate of increase in total external debt

rD = total annual interest rate payments

Equation (2.5A) shows losses or gains in foreign exchange from international capital flows by a country in a given year. BT indicates gain if d > r and loss otherwise. Generally, if borrowing is linked with productive use when rates of return exceeds r and BT is positive, increasing the external debt will not hamper the economy of the recipient country in the long run.

Given that the aforementioned theory relates to inter-temporal budget constraint in a period-to-period flow, the following equation becomes applicable:

$(D_t - D_{t-1}) = Y_t - \mathrm{r}D_t - C_t - I_t - G_t$ ..... (2.5B)

Where;

$(D_t - D_{t-1})$ = net change in debt from a period t to a period t+1

Y_t = GNP in period t (net remittance is included)

C_t = consumption in period t

I_t = domestic investment in time

G_t = government expenditure in time t

In equation (2.5B), the debt size in a given period can be reduced by increasing a country's output and reducing consumption, domestic investment, and government expenditure. The failure of a country to do a period-to-period flow analysis and to

reach the level where the sum of output, consumption, domestic investment, and government expenditure is less than the basic transfer will lead to a debt crisis as shown below:

$C_t + I_t + G_t - Y_t < dD_t - rD_t$ …….. (2.6)

Based on the above-stated models, it can be deduced that output growth (which stand for economic growth) is determined by domestic savings, debt burden, capital, and other macroeconomic variables such as exchange rate**.**

3.2 Model Specification

The specification of an acceptable econometric model, according to Koutusoyiannis (1997), is dependent on the current economic situation(s) and the availability of economic data relating to the variable(s) under consideration. Therefore, the relationship between external debt and economic growth in Nigeria is explicitly expressed in this study based on the model of Ogbonna et al. (2021). The three models to be estimated based on the objectives of this study are provided as:

GRRG = f (EXDT, GFCF, INFL, TOPP) ……..……... (3.1)

UNEM = f (EXDT, GRRG, INFL, GFCF) ……..…… (3.2)

INFL = f (EXDT, GRRG, POP, GEXP) …….…….. (3.3)

Where,

GRRG = Growth Rate of Real Gross Domestic Product (measure of economic growth)

UNEM = Unemployment Rate

INFL = Inflation Rate

EXDT = External Debt stock (measure of external debt burden)

TOPP = Trade Openness (control variable)

POP = Population (control)

GEXP = Total Government Expenditures (control variable-real sector)

In order to minimize spurious results, the study, therefore, converted the data of the parameters above into their natural log form (LN).

3.3. Methodology

The study employed the Ordinary Least Squares method to examine the subject matter of this study. Before estimation of the model, the properties of the variables under study were tested to know their levels of stationarity. The econometric techniques used are ADF (Augmented Dickey-Fuller) tests for stationarity. The t-statistic and F-statistic tests are used to evaluate the whole set of estimated parameters.

Brown et al (1975) cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) methods are also used to verify the overall stability of the empirical model. Serial correlation, normality, and heteroscedasticity are also checked to further empirically validate that the findings of this study are provided.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULTS

4.1. Preliminary tests

4.1.1. Descriptive Statistics

Table 4.1. Descriptive Statistics

	GRRG	INFL	UNFM	EXDT	GFCF	TOPP	POP	GEXP
Mean	4.456191	19.377	4.708333	2602.234	27.23161	36.78747	1.46E+08	2995.974
Median	4.128962	12.945	3.995	1207.115	26.11488	37.6245	1.42E+08	1978.85
Maximum	14.60438	72.84	9.71	12705.62	48.40018	53.27796	2.08E+08	10231.73
Minimum	-1.92	5.38	3.7	328.45	14.16873	16.35219	97685360	66.5844
Std. Dev.	3.863441	16.61646	1.736959	2958.292	10.73638	9.306858	33928410	2905.713
Skewness	0.478216	2.012491	1.904922	1.850062	0.373801	-0.26375	0.269571	0.969716
Kurtosis	2.919982	5.993003	4.944234	6.155475	1.851747	2.619882	1.837487	3.074935
Jarque-Bera	1.151456	31.44819	22.8687	29.55992	2.346742	0.528437	2.052638	4.708767
Probability	0.562295	0	0.000011	0	0.309322	0.767806	0.358323	0.094952

Sum	133.6857	581.31	141.25	78067.02	816.9482	1103.624	4.39E+09	89879.21
Sum Sq. Dev.	432.8592	8007.098	87.49382	2.54E+08	3342.824	2511.911	3.34E+16	2.45E+08
Observations	30	30	30	30	30	30	30	30

Source: Author (2022)

Table 4.1 depicts the summary of descriptive statistics of the variables included in the model. The descriptive statistics above shows that the average or mean of GRRG is about 4.5% and that of UNEM and INFL are 4.7% and 19.4% respectively. The mean of EXDT is about ₦2,602 billion naira, the average value of EXDS is about ₦1.64 billion, while that of EXCR and TGEXP are about ₦137/$ and ₦2,996 billion respectively. The table shows that the series is at a high level of consistency as all the mean and median values of the respective variables are within the max and min values of the series. The skewness and Kurtosis statistics provide pivotal information regarding the symmetry of the probability of the data and the thickness of the distribution respectively. All the distributions in the analysis are positively skewed as the skewness of all the variables are positive. The probability of the Jarque-Bera statistic shows that the residuals of half of the variables are not normally distributed. This shows that some operations are required to normalize the time series data. To obtain the Best Linear Unbiased Estimates (BLUE), the Ordinary Least Squares (OLS) assumption of normality should be considered imperatively. By implication, a unit root test is conducted to ensure the stationarity of our variables and avoid spurious regression.

4.1.2. Unit Root Test

This test is the first step and involves testing the stationarity of the variables, and then the order of integration of the individual series under consideration. Researchers have developed several procedures for the test of order of integration. The most popular among them is the Augmented Dickey-Fuller (ADF) test due to Dickey (1979) and Fuller (1981). The Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favour of the alternative hypotheses of no unit root (the series are stationary). The justification for the use of the unit root test is that the data for this study is a time series data. In order to avoid the possibility of spurious regression or running regression with non-stationary data, there is need to conduct unit root test to ensure stationarity of our data series.

Table 4.2a Unit Root Test (At Levels)

VARIABLES	ADF TEST STATISTICS	ADF CRITICAL VALUE			ORDER OF INTEGRATION	**Remarks**
		1% Level	5% level	10% level		
GRRG	-1.986305	-3.679322	-2.967767	-2.622989	I(0)	NOT STATIONARY
UNEM	-1.630819	-3.737853	-2.991878	-2.635542	I(0)	NOT STATIONARY
INFL	-2.831735	-4.440739	-3.632896	-3.254671	I(0)	NOT STATIONARY
EXDT	0.751508	-3.689194	-2.971853	-2.625121	I(0)	NOT STATIONARY
GFCF	-2.249014	-3.679322	-2.967767	-2.622989	I(0)	NOT

						STATIONARY
TOPP	-2.551925	-3.679322	-2.967767	-2.622989	I(0)	NOT STATIONARY
GEXP	0.153244	-4.394309	-3.612199	-3.243079	I(0)	NOT STATIONARY
POP	-1.308886	-3.737853	-2.991878	-2.635542	I(0)	NOT STATIONARY

Source: Author's Computation using E-views 10, 2023

Table 4.2b Unit Root Test (At First Difference)

VARIABLES	ADF TEST STATISTICS	ADF CRITICAL VALUE			ORDER OF INTEGRATION	**Remarks**
		1% Level	5% level	10% level		
D(GRRG)	-6.007580	-3.689194	-2.971853	-2.625121	I(1)	STATIONARY
D(UNEM)	-5.415437	-3.737853	-2.991878	-2.635542	I(1)	STATIONARY
D(INFL)	-4.278985	-3.752946	-2.998064	-2.638752	I(1)	STATIONARY
D(EXDT)	-7.566566	-3.689194	-2.971853	-2.625121	I(1)	STATIONARY
D(GFCF)	-3.985205	-3.689194	-2.971853	-2.625121	I(1)	STATIONARY
D(TOPP)	-4.909854	-3.699871	-2.976263	-2.627420	I(1)	STATIONARY
D(GEXP)	-5.789541	-4.394309	-3.612199	-3.243079	I(1)	STATIONARY
D(POP)	-7.861986	-3.752946	-2.998064	-2.638752	I(1)	STATIONARY

Source: Author's computation using E-views 10, 2022

Table 4.2a and 4.2b which show the results of the ADF unit root test at levels and first difference respectively. However, the test suggests that all the variables were stationary at their first difference using 5% critical values.

4.2. OLS Results

4.2.1. Model I: External Debt and Growth

GRRG = f (EXDT, GFCF, INFL, TOPP)

Table 4.4: Ordinary Least Square Results
Dependent variable: GRRG

Variables	Coefficients	St. Error	t-Statistics	Prob.
C	-0.393312	0.613707	-0.640878	0.5277
DEXDT	0.000185	0.000516	0.358409	0.7232
DGFCF	-0.379566	0.209152	-1.814787	0.0821***
DINFL	-0.019454	0.045619	-0.426448	0.6736
DTOPP	0.020198	0.061085	0.330652	0.7438
R^2 = 0.126741		DW stat = 2.400383		

Source: Author's Computation Using E-Views 10, 2022

From the regression result in Table 4.4, the coefficient of determination (R^2) which depicts the goodness of fit i.e. the predictive power of the model, indicates that about 13% of the systematic variations in the GRRG were explained or captured by the explanatory variables while the remaining 87% is due to chance. Depicting that the predictive power of the model is low. The D-W test for serial correlation depicts an estimate of 2.4 which is approximately 2 hence, the absence of serial correlation in the model. The coefficient estimation depicts that there is a positive (B=0.000185) and insignificant (p-value of 0.7232>5%) relationship between external debt stock and growth rate of RGDP in Nigeria. Also, there is a negative (B= -0.379566) and significant (p-value of 0.0821<10%) relationship between GFCF and growth rate of RGDP in Nigeria. There is a negative (B= -0.019454) and insignificant (p-value=0.6736) relationship between INFL and growth rate of RGDP in Nigeria. Finally, there is a positive (B= 0.020198) and insignificant (p-value of 0.7438>5%) relationship between TOPP and growth rate of RGDP in Nigeria. From the Model I estimation, only gross fixed capital formation was significant determinant of the growth rate of RGDP in Nigeria using 10% significance level.

4.2.2. Model II: External Debt and Employment

UNEM = f (EXDT, GRRG, INFL, GFCF)

Table 4.5: Ordinary Least Square Results
Dependent variable: UNEM

Variables	Coefficients	St. Error	t-Statistics	Prob.
C	0.090013	0.120201	0.748859	0.4612
DEXDT	0.000239	9.75E-05	2.451521	0.0219**
DGRRG	-0.051613	0.039560	-1.304659	0.2044
DINFL	0.002029	0.008874	0.228609	0.8211
DGFCF	0.002496	0.043321	0.057606	0.9545
R^2 = 0.275089		DW stat = 2.011785		

Source: Author's Computation Using E-Views 10, 2022

From the regression result in Table 4.5, the coefficient of determination (R^2) which depicts the goodness of fit i.e. the predictive power of the model, indicates that about 28% of the systematic variations in the unemployment rate were explained or captured by the explanatory variables while the remaining 72% is due to chance. Depicting that the predictive power of the model is low. The D-W test for serial correlation depicts an estimate of 2.011785 which is approximately 2 hence, the absence of serial correlation in the model. The coefficient estimation depicts that there is a positive (B= 0.000239) and significant (p-value of 0.0219<5%) relationship between external debt stock and unemployment rate in Nigeria. Also, there is a negative (B= -0.051613) and insignificant (p-value of 0.2044>5%) relationship between GRRG and unemployment rate in Nigeria. There is a positive (B=0.002029) and insignificant (p-value=0.8211) relationship between INFL and unemployment rate in Nigeria. Finally, there is a positive (B= 0.002496) and insignificant (p-value of

0.9545>5%) relationship between GFCF and unemployment rate in Nigeria. From the Model II estimation, only external debt stock is a significant determinant of unemployment rate in Nigeria.

4.2.3. Model III: External Debt and Inflation

INFL = f (EXDT, GRRG, POP, GEXP)

Table 4.6: Ordinary Least Square Results
Dependent variable: INFL

Variables	Coefficients	St. Error	t-Statistics	Prob.
C	-0.676663	0.536600	-1.261019	0.2194
DEXDT	0.000217	9.84E-05	2.208395	0.0370**
DGRRG	-0.044246	0.036728	-1.204706	0.2401
DPOP	2.24E-07	1.49E-07	1.500421	0.1465
DGEXP	-0.000230	0.000254	-0.903860	0.3751
R^2 = 0.338029		DW stat = 2.047806		

Source: Author's Computation Using E-Views 10, 2022

From the regression result in Table 4.6, the coefficient of determination (R^2) which depicts the goodness of fit i.e. the predictive power of the model, indicates that about 34% of the systematic variations in the inflation rate were explained or captured by the explanatory variables while the remaining 66% is due to chance. Depicting that the predictive power of the model is low. The D-W test for serial correlation depicts an estimate of 2.047806 which is approximately 2 hence, the absence of serial correlation in the model. The coefficient estimation depicts that there is a positive (B= 0.000217) and significant (p-value of 0.0370<5%) relationship between external debt stock and inflation rate in Nigeria. Also, there is a negative (B= -0.044246) and insignificant (p-value of 0.2401>5%) relationship between GRRG and inflation rate in Nigeria. There is a positive (B=2.24) and insignificant (p-value=0.1465) relationship between EXCR and inflation rate in Nigeria. Finally, there is a negative (B= -0.000230) and insignificant (p-value of 0.3751>5%) relationship between total government expenditures and inflation rate in Nigeria. From the Model III estimation, only external debt stock is a significant determinant of inflation rate in Nigeria.

4.3. Policy Implication of Findings

The estimation of the first model depicts that external debt stock, inflation rate, and trade openness were not significant determinants of the growth of the economy of Nigeria. While gross fixed capital formation is a significant determinant of growth rate of the economy. Hence, only capital formation has policy implication on the growth rate of the economy. From the second model, the findings depicts only that external

debt stock significantly impact on unemployment rate in Nigeria while growth rate of the economy, inflation rate and gross fixed capital formation were not significant determinants of the unemployment rate in Nigeria. Hence, only external debt stock significantly impact on unemployment rate in Nigeria. Finally, the third model depicts that external debt stock has a significant impact on inflation rate in Nigeria while growth rate of the economy, total population, and government expenditures were not significant determinants of the inflation rate in Nigeria. Hence, the only external debt stock has significant impact on inflation rate in Nigeria.

4.4. Hypothesis Testing

The null hypotheses formulated for this study are:

1. There is no significant relationship between external debt and economic growth in Nigeria.
2. There is no significant relationship between external debt and employment in Nigeria.
3. There is no significant relationship between the external debt and inflation in Nigeria.

From the findings of the three models, we therefore fail to reject the first null hypotheses of this study. Based on the findings of the second and third models, the

second and third null hypotheses are rejected concluding that external debts impact significantly on unemployment rate and also inflation rate in Nigeria.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1. Summary of Findings

This study investigate the external debts on economic growth, employment and inflation in Nigeria. The objective of this study is to: empirically examine the impact of External Debt on Economic performance in Nigeria; examine the impact of external debt on employment in Nigeria; and finally investigate the impact of the external debt on inflation in Nigeria. On the bases of the objectives of the study, the research findings show that external debt do not significantly influence economic growth, however, it does impact significantly on employment and inflation rate. In specific

terms, the external debt stock has a positive and insignificant relationship with growth rate of real gross domestic product in the first model, positive and significant impact on unemployment rate in the second model, and finally a positive and significant impact on inflation rate in Nigeria.

On the basis of the a priori expectation and based on the objectives of this study, the coefficients of external debt conformed to a priori expectation in the first model while it didn't conformed to a priori expectation in the second and third models.

5.2. Recommendations

Based on the findings of this study, the following policy recommendations are provided:

1. Projects financed through government external borrowing should be thoroughly evaluated in the face of rising exchange rate. This would aid in the restoration of financial discipline and the reduction of external debt misapplication and inefficiency thereby increasing employment, reduce inflation rate, and increase the growth of the economy of Nigeria.
2. The credibility of the financial system should be enhanced by policies aimed at stabilizing the exchange rate. The export base should further be diversified in order

to improve our international competitiveness. This would reduce the continuous depreciation of the naira against the dollar. And this would also reduce the cost of external debt servicing.

3. Furthermore, the government should ensure that borrowings are made on conditions that are consistent with debt sustainability, and that borrowed money are invested productively in high-value-added areas of the economy to generate long-term growth. This is required if the country is to overcome its debt crisis, regain creditworthiness, and achieve employment generation, reduced inflation rate, and long-term growth.

5.3. Conclusion

This study utilized annual time series data from 1991 to 2020, this study examines the impacts of external debt on economic growth, employment, and inflation rate in Nigeria. Three models were designed and estimated using external debt as the variable of interest in the first model, unemployment rate in the second model, and inflation rate in the third model. After obtaining data stationarity using ADF test for unit root, OLS was employed for data analysis. The empirical findings showed that external debt insignificantly improved economic growth while it significantly improve inflation rate and unemployment rate in Nigeria. To this end, the study conclude that government should ensure that borrowings are made on conditions that are consistent

with debt sustainability, and that borrowed money are invested productively in high-value-added areas of the economy to generate long-term growth and employment. This is required if the country is to overcome its debt crisis, regain creditworthiness, and achieve employment generation, reduced inflation rate, and long-term growth

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APPENDIX I

YEAR	GRRG	UNEM	INFL	EXDT	GFCF	TOPP	GEXP	POP
1991	-0.552	4.12	13.01	328.45	48.4002	37.0216	66.5844	97685360
1992	2.19349	4.09	44.59	544.26	43.7744	38.2274	92.7974	100182045
1993	1.56881	4.1	57.17	633.14	44.4764	33.7198	191.229	102775465
1994	0.25657	4.09	57.1	648.81	42.0678	23.0592	160.893	105456121
1995	1.87235	4.06	72.84	716.87	37.2059	39.5284	248.768	108187610
1996	4.05203	4.03	29.27	617.32	36.5817	40.2577	337.218	110956183
1997	2.88592	4.02	8.53	595.93	38.4223	51.461	428.215	113791181
1998	2.4956	4	10	633.02	40.5534	39.2786	487.113	116690527
1999	0.52184	3.99	6.62	2577.37	38.278	34.4578	947.69	119695565
2000	5.5185	3.95	27.2	3097.38	34.0493	48.9956	701.051	122851984
2001	6.66685	3.94	18.87	3176.29	30.0379	49.6805	1018	126152678
2002	14.6044	3.88	12.88	3932.88	26.7687	40.0352	1018.18	129583026
2003	9.50261	3.9	14.03	4478.33	28.3709	49.335	1225.99	133119801
2004	10.442	3.88	15	4890.27	26.0633	31.8959	1504.2	136756848
2005	7.00846	3.87	17.86	2695.07	24.9661	33.0595	1919.7	140490722
2006	6.72597	3.86	8.24	451.46	26.1665	42.5666	2038	144329764
2007	7.31808	3.84	5.38	438.89	20.18	39.3369	2450.9	148294028
2008	7.19929	3.82	11.58	523.25	18.8598	40.7968	3240.82	152382506
2009	8.35334	3.8	11.54	590.44	21.1155	36.0587	3452.99	156595758
2010	9.53979	3.78	13.72	689.84	16.815	43.3208	4194.58	160952853
2011	5.30792	3.77	11.8	896.85	15.6763	53.278	4712.06	165463745
2012	4.20589	3.74	12.22	1026.9	14.2111	44.5324	4605.3	170075932
2013	5.48779	3.7	12.23	1387.33	14.1687	31.0489	5185.32	174726123
2014	6.22294	4.56	8.06	1631.5	15.0835	30.8852	4587.39	179379016

2015	2.7864	4.31	9.55	2111.51	14.8272	21.3327	4988.86	183995785
2016	-1.5831	7.06	15.68	3478.91	14.725	20.7225	5858.56	188666931
2017	0.82399	8.39	16.52	5787.51	14.7156	26.3476	6456.7	193495907
2018	1.91	8.46	12.09	7759.2	19.0184	33.0078	7813.74	198387623
2019	2.27	8.53	11.98	9022.42	24.6252	34.0239	9714.65	203304492
2020	-1.92	9.71	15.75	12705.6	26.7442	16.3522	10231.7	208327405

Source: WDI (2020), CBN (2020)

APPENDIX II

UNIT ROOT TEST

At levels

Null Hypothesis: GRRG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.986305	0.2908
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRRG)
Method: Least Squares
Date: 01/19/23 Time: 12:02
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRRG(-1)	-0.274162	0.138026	-1.986305	0.0572
C	1.234828	0.820548	1.504882	0.1440

R-squared	0.127496	Mean dependent var	-0.047171
Adjusted R-squared	0.095181	S.D. dependent var	2.868528
S.E. of regression	2.728601	Akaike info criterion	4.911927
Sum squared resid	201.0220	Schwarz criterion	5.006223
Log likelihood	-69.22294	Hannan-Quinn criter.	4.941459
F-statistic	3.945407	Durbin-Watson stat	1.953822
Prob(F-statistic)	0.057237		

Null Hypothesis: INFL has a unit root

Exogenous: Constant, Linear Trend
Lag Length: 7 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.831735	0.2016
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL)
Method: Least Squares
Date: 01/19/23 Time: 15:54
Sample (adjusted): 1999 2020
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL(-1)	-0.921681	0.325483	-2.831735	0.0151
D(INFL(-1))	0.287565	0.273826	1.050177	0.3143
D(INFL(-2))	-0.071408	0.172463	-0.414049	0.6861
D(INFL(-3))	-0.252972	0.148097	-1.708155	0.1133
D(INFL(-4))	-0.317775	0.081479	-3.900070	0.0021
D(INFL(-5))	0.024589	0.104842	0.234539	0.8185
D(INFL(-6))	-0.223955	0.087245	-2.566962	0.0247
D(INFL(-7))	-0.159817	0.100305	-1.593301	0.1371
C	5.954039	6.696664	0.889105	0.3914
@TREND("1991")	0.242948	0.185180	1.311958	0.2141

R-squared	0.858828	Mean dependent var	0.261364
Adjusted R-squared	0.752949	S.D. dependent var	6.128358
S.E. of regression	3.046053	Akaike info criterion	5.368526
Sum squared resid	111.3413	Schwarz criterion	5.864454
Log likelihood	-49.05378	Hannan-Quinn criter.	5.485352
F-statistic	8.111408	Durbin-Watson stat	1.817873
Prob(F-statistic)	0.000683		

Null Hypothesis: UNEM has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.630819	0.4521

Test critical values:	1% level	-3.737853
	5% level	-2.991878
	10% level	-2.635542

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UNEM)
Method: Least Squares
Date: 01/19/23 Time: 15:57
Sample (adjusted): 1997 2020
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEM(-1)	-1.612500	0.988767	-1.630819	0.1213
D(UNEM(-1))	0.584628	0.949192	0.615922	0.5461
D(UNEM(-2))	3.176294	0.922526	3.443039	0.0031
D(UNEM(-3))	5.903074	1.235123	4.779340	0.0002
D(UNEM(-4))	-1.214633	1.398056	-0.868801	0.3971
D(UNEM(-5))	-15.40005	3.292011	-4.678006	0.0002
C	6.229670	3.919081	1.589574	0.1304

R-squared	0.698777	Mean dependent var	0.236667
Adjusted R-squared	0.592464	S.D. dependent var	0.666024
S.E. of regression	0.425180	Akaike info criterion	1.365887
Sum squared resid	3.073233	Schwarz criterion	1.709486
Log likelihood	-9.390640	Hannan-Quinn criter.	1.457044
F-statistic	6.572780	Durbin-Watson stat	1.580288
Prob(F-statistic)	0.000992		

Null Hypothesis: EXDT has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.751508	0.9912
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXDT)
Method: Least Squares

Date: 01/19/23 Time: 15:58
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXDT(-1)	0.073480	0.097777	0.751508	0.4594
D(EXDT(-1))	0.603424	0.232616	2.594079	0.0156
C	76.30637	267.2227	0.285553	0.7776

R-squared	0.360325	Mean dependent var	434.3343
Adjusted R-squared	0.309151	S.D. dependent var	1161.766
S.E. of regression	965.6292	Akaike info criterion	16.68439
Sum squared resid	23310996	Schwarz criterion	16.82713
Log likelihood	-230.5815	Hannan-Quinn criter.	16.72803
F-statistic	7.041168	Durbin-Watson stat	1.686182
Prob(F-statistic)	0.003754		

Null Hypothesis: GFCF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.249014	0.1944
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GFCF)
Method: Least Squares
Date: 01/19/23 Time: 15:59
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF(-1)	-0.102784	0.045702	-2.249014	0.0329
C	2.053952	1.338480	1.534541	0.1365

R-squared	0.157778	Mean dependent var	-0.746758
Adjusted R-squared	0.126585	S.D. dependent var	2.827256
S.E. of regression	2.642260	Akaike info criterion	4.847618
Sum squared resid	188.5015	Schwarz criterion	4.941914

Log likelihood	-68.29046	Hannan-Quinn criter.	4.877150
F-statistic	5.058065	Durbin-Watson stat	1.498024
Prob(F-statistic)	0.032873		

Null Hypothesis: TOPP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.551925	0.1143
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOPP)
Method: Least Squares
Date: 01/19/23 Time: 16:03
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOPP(-1)	-0.473824	0.185673	-2.551925	0.0167
C	17.05195	7.136671	2.389342	0.0241

R-squared	0.194326	Mean dependent var	-0.712739
Adjusted R-squared	0.164486	S.D. dependent var	9.263925
S.E. of regression	8.467823	Akaike info criterion	7.176896
Sum squared resid	1936.009	Schwarz criterion	7.271192
Log likelihood	-102.0650	Hannan-Quinn criter.	7.206428
F-statistic	6.512323	Durbin-Watson stat	1.798921
Prob(F-statistic)	0.016687		

Null Hypothesis: POP has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.308886	0.6083
Test critical values:	1% level	-3.737853	
	5% level	-2.991878	

	10% level	-2.635542

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POP)
Method: Least Squares
Date: 01/19/23 Time: 16:03
Sample (adjusted): 1997 2020
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POP(-1)	-0.004880	0.003728	-1.308886	0.2080
D(POP(-1))	1.982613	0.210391	9.423468	0.0000
D(POP(-2))	-2.042708	0.462037	-4.421090	0.0004
D(POP(-3))	2.219658	0.652366	3.402473	0.0034
D(POP(-4))	-2.052367	0.755726	-2.715757	0.0147
D(POP(-5))	1.062566	0.483465	2.197815	0.0421
C	210760.8	82860.51	2.543562	0.0210

R-squared	0.998249	Mean dependent var	4057134.
Adjusted R-squared	0.997631	S.D. dependent var	701414.0
S.E. of regression	34142.04	Akaike info criterion	23.95294
Sum squared resid	1.98E+10	Schwarz criterion	24.29654
Log likelihood	-280.4353	Hannan-Quinn criter.	24.04410
F-statistic	1615.048	Durbin-Watson stat	1.749879
Prob(F-statistic)	0.000000		

Null Hypothesis: GEXP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.153244	0.9960
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GEXP)
Method: Least Squares
Date: 01/19/23 Time: 16:05
Sample (adjusted): 1997 2020

Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEXP(-1)	0.021055	0.137394	0.153244	0.8801
D(GEXP(-1))	-0.319459	0.235521	-1.356391	0.1938
D(GEXP(-2))	0.416244	0.205764	2.022923	0.0601
D(GEXP(-3))	0.261329	0.216826	1.205245	0.2456
D(GEXP(-4))	-0.964977	0.214135	-4.506387	0.0004
D(GEXP(-5))	-1.039939	0.251144	-4.140812	0.0008
C	-247.7996	355.5339	-0.696979	0.4958
@TREND("1991")	54.91574	38.70132	1.418963	0.1751

R-squared	0.774743	Mean dependent var	412.2713
Adjusted R-squared	0.676194	S.D. dependent var	509.6219
S.E. of regression	289.9952	Akaike info criterion	14.43881
Sum squared resid	1345555.	Schwarz criterion	14.83149
Log likelihood	-165.2657	Hannan-Quinn criter.	14.54299
F-statistic	7.861445	Durbin-Watson stat	2.288471
Prob(F-statistic)	0.000337		

At first difference

Null Hypothesis: D(GRRG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.007580	0.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRRG,2)
Method: Least Squares
Date: 01/19/23 Time: 16:13
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(GRRG(-1))	-1.184896	0.197233	-6.007580	0.0000
C	-0.128275	0.543869	-0.235857	0.8154

R-squared	0.581260	Mean dependent var	-0.247697
Adjusted R-squared	0.565155	S.D. dependent var	4.361298
S.E. of regression	2.875963	Akaike info criterion	5.019401
Sum squared resid	215.0502	Schwarz criterion	5.114559
Log likelihood	-68.27162	Hannan-Quinn criter.	5.048492
F-statistic	36.09102	Durbin-Watson stat	1.923609
Prob(F-statistic)	0.000002		

Null Hypothesis: D(INFL) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.278985	0.0030
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL,2)
Method: Least Squares
Date: 01/19/23 Time: 16:15
Sample (adjusted): 1998 2020
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFL(-1))	-1.349466	0.315371	-4.278985	0.0006
D(INFL(-1),2)	0.477603	0.283263	1.686073	0.1112
D(INFL(-2),2)	0.247775	0.195708	1.266048	0.2236
D(INFL(-3),2)	0.184690	0.164330	1.123900	0.2776
D(INFL(-4),2)	-0.075243	0.124143	-0.606100	0.5530
D(INFL(-5),2)	0.210979	0.097303	2.168270	0.0456
C	-0.386360	0.966047	-0.399939	0.6945

R-squared	0.896290	Mean dependent var	1.065652
Adjusted R-squared	0.857399	S.D. dependent var	10.59798
S.E. of regression	4.002066	Akaike info criterion	5.857288
Sum squared resid	256.2645	Schwarz criterion	6.202874
Log likelihood	-60.35882	Hannan-Quinn criter.	5.944202
F-statistic	23.04614	Durbin-Watson stat	2.192200

Prob(F-statistic)	0.000000

Null Hypothesis: D(UNEM) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.415437	0.0002
Test critical values:	1% level	-3.737853	
	5% level	-2.991878	
	10% level	-2.635542	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UNEM,2)
Method: Least Squares
Date: 01/19/23 Time: 16:16
Sample (adjusted): 1997 2020
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNEM(-1))	-16.17880	2.987533	-5.415437	0.0000
D(UNEM(-1),2)	14.26616	2.784600	5.123234	0.0001
D(UNEM(-2),2)	16.04850	3.111027	5.158585	0.0001
D(UNEM(-3),2)	20.39577	3.913480	5.211670	0.0001
D(UNEM(-4),2)	17.16364	3.249497	5.281938	0.0001
C	-0.159109	0.115268	-1.380339	0.1844

R-squared	0.775501	Mean dependent var	0.050417
Adjusted R-squared	0.713140	S.D. dependent var	0.829638
S.E. of regression	0.444349	Akaike info criterion	1.427904
Sum squared resid	3.554026	Schwarz criterion	1.722418
Log likelihood	-11.13485	Hannan-Quinn criter.	1.506039
F-statistic	12.43568	Durbin-Watson stat	1.551195
Prob(F-statistic)	0.000025		

Null Hypothesis: D(EXDT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.566566	0.4859

Test critical values:	1% level	-3.689194
	5% level	-2.971853
	10% level	-2.625121

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXDT,2)
Method: Least Squares
Date: 01/19/23 Time: 16:17
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXDT(-1))	-0.297016	0.189597	-1.566566	0.1293
C	216.0584	190.2882	1.135427	0.2666

R-squared	0.086249	Mean dependent var	123.8354
Adjusted R-squared	0.051104	S.D. dependent var	982.9590
S.E. of regression	957.5129	Akaike info criterion	16.63530
Sum squared resid	23837604	Schwarz criterion	16.73046
Log likelihood	-230.8943	Hannan-Quinn criter.	16.66440
F-statistic	2.454129	Durbin-Watson stat	1.696191
Prob(F-statistic)	0.129308		

Null Hypothesis: D(GFCF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.985205	0.0049
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GFCF,2)
Method: Least Squares
Date: 01/19/23 Time: 16:18
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(GFCF(-1))	-0.741601	0.186089	-3.985205	0.0005
C	-0.388814	0.539676	-0.720458	0.4777

R-squared	0.379206	Mean dependent var	0.240884
Adjusted R-squared	0.355329	S.D. dependent var	3.400807
S.E. of regression	2.730555	Akaike info criterion	4.915636
Sum squared resid	193.8541	Schwarz criterion	5.010793
Log likelihood	-66.81890	Hannan-Quinn criter.	4.944726
F-statistic	15.88186	Durbin-Watson stat	1.832588
Prob(F-statistic)	0.000486		

Null Hypothesis: D(TOPP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.909854	0.0005
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOPP,2)
Method: Least Squares
Date: 01/19/23 Time: 16:18
Sample (adjusted): 1994 2020
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOPP(-1))	-1.591089	0.324060	-4.909854	0.0001
D(TOPP(-1),2)	0.308959	0.208284	1.483356	0.1510
C	-0.733096	1.798141	-0.407697	0.6871

R-squared	0.612412	Mean dependent var	-0.487558
Adjusted R-squared	0.580113	S.D. dependent var	14.41371
S.E. of regression	9.339899	Akaike info criterion	7.410907
Sum squared resid	2093.609	Schwarz criterion	7.554889
Log likelihood	-97.04725	Hannan-Quinn criter.	7.453720
F-statistic	18.96069	Durbin-Watson stat	1.964271
Prob(F-statistic)	0.000011		

Null Hypothesis: D(POP) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.861986	0.3431
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POP,2)
Method: Least Squares
Date: 01/19/23 Time: 16:20
Sample (adjusted): 1998 2020
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POP(-1))	-0.020259	0.010880	-1.861986	0.0811
D(POP(-1),2)	1.108162	0.218880	5.062880	0.0001
D(POP(-2),2)	-1.217479	0.302741	-4.021522	0.0010
D(POP(-3),2)	1.432412	0.432218	3.314097	0.0044
D(POP(-4),2)	-1.419078	0.516988	-2.744897	0.0144
D(POP(-5),2)	0.698070	0.361061	1.933384	0.0711
C	117365.5	53987.43	2.173942	0.0451

R-squared	0.701637	Mean dependent var	95126.74
Adjusted R-squared	0.589751	S.D. dependent var	51017.86
S.E. of regression	32677.29	Akaike info criterion	23.87254
Sum squared resid	1.71E+10	Schwarz criterion	24.21812
Log likelihood	-267.5342	Hannan-Quinn criter.	23.95945
F-statistic	6.270994	Durbin-Watson stat	1.912370
Prob(F-statistic)	0.001528		

Null Hypothesis: D(GEXP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.789541	0.0005
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GEXP,2)
Method: Least Squares
Date: 01/19/23 Time: 16:21
Sample (adjusted): 1997 2020
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GEXP(-1))	-2.587138	0.446864	-5.789541	0.0000
D(GEXP(-1),2)	1.291148	0.414231	3.116973	0.0063
D(GEXP(-2),2)	1.722879	0.396207	4.348430	0.0004
D(GEXP(-3),2)	1.992686	0.341031	5.843117	0.0000
D(GEXP(-4),2)	1.035008	0.241815	4.280171	0.0005
C	-295.7577	163.8003	-1.805599	0.0887
@TREND("1991")	60.51526	12.38103	4.887738	0.0001

R-squared	0.840505	Mean dependent var	17.85972
Adjusted R-squared	0.784213	S.D. dependent var	606.0824
S.E. of regression	281.5430	Akaike info criterion	14.35694
Sum squared resid	1347530.	Schwarz criterion	14.70054
Log likelihood	-165.2833	Hannan-Quinn criter.	14.44810
F-statistic	14.93106	Durbin-Watson stat	2.293459
Prob(F-statistic)	0.000006		

APPENDIX III

OLS RESULT

Model I

Dependent Variable: DGRRG
Method: Least Squares
Date: 01/19/23 Time: 17:03
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.393312	0.613707	-0.640878	0.5277
DEXDT	0.000185	0.000516	0.358409	0.7232
DGFCF	-0.379566	0.209152	-1.814787	0.0821
DINFL	-0.019454	0.045619	-0.426448	0.6736
DTOPP	0.020198	0.061085	0.330652	0.7438

R-squared	0.126741	Mean dependent var	-0.047171
Adjusted R-squared	-0.018802	S.D. dependent var	2.868528
S.E. of regression	2.895369	Akaike info criterion	5.119688
Sum squared resid	201.1958	Schwarz criterion	5.355428
Log likelihood	-69.23547	Hannan-Quinn criter.	5.193519
F-statistic	0.870817	Durbin-Watson stat	2.400383
Prob(F-statistic)	0.495758		

Model II

Dependent Variable: DUNEM
Method: Least Squares
Date: 01/19/23 Time: 16:57
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.090013	0.120201	0.748859	0.4612
DEXDT	0.000239	9.75E-05	2.451521	0.0219

DGRRG	-0.051613	0.039560	-1.304659	0.2044
DINFL	0.002029	0.008874	0.228609	0.8211
DGFCF	0.002496	0.043321	0.057606	0.9545

R-squared	0.275089	Mean dependent var	0.192759
Adjusted R-squared	0.154270	S.D. dependent var	0.611561
S.E. of regression	0.562413	Akaike info criterion	1.842425
Sum squared resid	7.591403	Schwarz criterion	2.078166
Log likelihood	-21.71517	Hannan-Quinn criter.	1.916256
F-statistic	2.276873	Durbin-Watson stat	2.011785
Prob(F-statistic)	0.090572		

Model III

Dependent Variable: DUNEM
Method: Least Squares
Date: 01/19/23 Time: 16:51
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.676663	0.536600	-1.261019	0.2194
DEXDT	0.000217	9.84E-05	2.208395	0.0370
DGRRG	-0.044246	0.036728	-1.204706	0.2401
DPOP	2.24E-07	1.49E-07	1.500421	0.1465
DGEXP	-0.000230	0.000254	-0.903860	0.3751

R-squared	0.338029	Mean dependent var	0.192759
Adjusted R-squared	0.227700	S.D. dependent var	0.611561
S.E. of regression	0.537443	Akaike info criterion	1.751598
Sum squared resid	6.932280	Schwarz criterion	1.987338
Log likelihood	-20.39817	Hannan-Quinn criter.	1.825429
F-statistic	3.063839	Durbin-Watson stat	2.047806
Prob(F-statistic)	0.035802		