Effect of External Debt on Real Gross Domestic Product Growth Rate of Nigeria, Ghana and Benin Republic

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Abstract

The study investigated the impact of external debt on gross domestic product growth rate of Nigeria, Benin Republic and Ghana from 1986 to 2021. Real gross domestic product growth rate was the proxy for macroeconomic indicators, while external debt was the independent variables. Ex post facto research design was adopted in this study. Data were sourced from the various issues of the Central Bank of Nigeria (CBN) statistical bulletin, Bank of Ghana, Bank of Benin Republic and statement of account as well as the National Bureau of statistics Annual Reports. Vector Error Correction and Autoregressive Distributed Lag models were used for data analysis. Various econometric preliminary test techniques such as Augmented Dickey-Fuller unit root test and Johansen cointegration test and model diagnostics test were equally carried out. Results revealed that external debt has a positive and significant impact on the real gross domestic product of Nigeria, Ghana and Benin Republic. It was concluded that external debt plays important roles in shaping the short-run and long-run economic growth of Nigeria, Ghana, and Benin Republic. This study recommends that to reduce reliance on external debt and foreign exchange rate fluctuations, countries should direct borrowed funds to education, health and other productive ventures that will boast economic growth and increase the general wellbeing of the citizenry. Policymakers should ensure that debt servicing does not crowd out essential public expenditures or hinder economic growth. The need for fiscal discipline in managing external borrowing and ensuring that borrowed funds are utilized efficiently to promote economic growth and raise per capita income across the countries is imperative.

Key words: external debt, real gross domestic product, exchange rate, Ghana, Nigeria, Benin Republic.

Introduction

The increasing rate of public debt in many African countries around the world in recent years, especially in the emerging economies, appears to be the aftermath of the global financial crisis and recently the COVID-19 lock down. Countries are faced with only borrowing options to cover budget deficits as a result of economic downturn, therefore making borrowing inevitable. However, borrowed funds are often used to boost economic growth through productive economic

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activities. The recent global economic crisis started in 2007 and affected the European countries in 2008 and gradually came to Africa and Nigeria, especially in 2009.

The level of inconsistencies and inefficiencies detected in the public finance systems with a tremendous budget deficit and public debt increase, forced economies to understand that uncontrolled growth of government debt could lead to bankruptcy of a country when the country is unable to meet liabilities in time (Greece, 2011).

Indeed, the consequences and significance of this phenomenon to the economy are widely considered in the literature. Gelos, Sahay, and Sandleris (2012) in a study found that countries after experiencing bankruptcy may not function normally in international financial markets for four years on average.

The scientific literature highlights several channels through which the crisis of the public finance sector affects the economic development of a country. Borensztein and Panizza (2012) found in a study that the profit rate of government bonds had increased by 400 points (4%) on average one year after bankruptcy. Furthermore, the growth of interest rates of debt financing instruments increases the interest paid every year while the gross domestic product (GDP) starts to decrease when the threshold (specific to each economy) is overstepped. Rose (2012) equally found in a study that the debt crisis negatively affects international trade, which is one of the primary factors conditioning countries' economic growth. For instance, one year after the declaration of insolvency, the volume of international trade decreased by approximately 8% and can last for 15 years on average. On the other hand, Borensztein and Panizza (2012) opined that bankruptcy of a country results in the decline of economic growth by 1.2% per year on the average, while Yeyati and Panizza (2011) presumed that bankruptcy of a country does not result in a decrease of GDP growth; the study found that the quarter of a year in which a country declares insolvency coincides with the end of economic slowdown and marks the beginning of country's economic recovery. Such results reflect the fact that debt crises are usually associated with economic recession, which, in turn, can be conditioned by foreseen plausible bankruptcy of a country.

Countries borrow when they cannot generate enough domestic savings to carry out productive activities. The funds borrowed are meant to boost the economic growth and development of the country, thereby improving the standard of living of the citizenry. Governments usually borrow by issuing securities, government bonds, and bills. Countries could also borrow directly from supranational organizations such as the World Bank and international financial institutions.

In the early 1970s, developing countries borrowed to finance their current account deficit. Such borrowing was geared towards boosting the level of economic growth and development. As the debt piled up, the international financial institutions from the 1980s started providing technical and financial debt-management assistance to debtor countries. This effort, which was still aimed at fostering economic growth, was equally meant to reduce both debt burdens and the poverty level of these countries to make them more viable. While these measures substantially reduced the external debt burdens of many middle-income countries, a different scenario played out for many of their developing economies.

On the other hand, not much attention was paid to the domestic debt. Thus some countries, Nigeria inclusive, have been witnessing excessive domestic debt. Generally, the debt burden of developing countries has continued to pile up, coupled with chronic poverty and civil conflicts, culminating in sluggish economic growth.

There seems to be a consensus among public opinion leaders that huge external debt adversely affects economic growth and development in developing countries (Mojekwu and Ogege (2012). Reinhart and Rogoff (2010) affirmed this and observed that 'the relationship between government debt and real GDP growth is weak for debt/GDP ratios below 90 percent of GDP'.

However, the domestic debt is contracted within Nigerian borders, usually through bond and Treasury bills purchased by Nigerian banks, local pension funds, and other domestic and foreign investors. The government also has some contractor arrears and other local liabilities, which form part of the total public debt. The concern is that excessive domestic borrowing could crowd out private sector investment as the government competes with the private sector for available funds. The problem of public debt in developing economies given the uncertainty that surrounds the issue of whether public debt incurred by Government which consists of domestic and external debts has contributed positively or otherwise to the growth of developing economies is worrisome. While the debate on the relevant explanatory variables for predicting public debts continues, it is important to mention that country specific debt problem could differ in terms of the causative factors and the influence of the domestic and external debts on the affected economies (Odili, 2022). The increasing growth of public debt level since 2019 has crossed the 50 percent threshold, which is an alarming signal that the fast growth in the public debt levels in Africa can again surpass the highest public debt levels to GDP in the world, which can cause another debt crisis (Appiah-Kubi, Malec, Phiri, Mikhail, Kamil, Mansoor and Luboš 2022). Considering that debt financing is inevitable and debt overhang is problematic in Africa, it is necessary to know the key drivers of the debt buildup. As government expenditure increases relative to government revenue, the budget deficit equally increases, requiring the government to borrow more (Imimole, Imoughele, Okhuese, 2014). The impact of public debt on key macroeconomic indicators though has been researched in empirical literature, its precise impact has not been satisfactorily determined as a result of contradictory findings. For instance Odili (2022) examined Nigeria's debt status and its effect on Nigeria's macro-economic performance from 1981 to 2018 and discovered the existence of inverse relationship between public debt servicing and RGDP, while long run result showed insignificant effect on RGDP. Domestic debt, however, had positive and significant effect on RGDP in short run and long run. Conflicting and ambiguous results on related literature reviewed and non-availability of empirical studies on the impact of public debt on macroeconomic indicators in developing economies (Nigeria, Ghana, and Benin republic) within the reference period 1986 -2021 necessitated this study.

Objective of the study

The objective of this study is to determine the extent to which external debt affects real gross domestic product growth rate of Nigeria, Ghana and Benin Republic within the study period.

Hypothesis of the study

HO₁: External debt had no significant effect on real gross domestic product growth rate of Nigeria, Ghana and Benin Republic within the study period.

Conceptual review

Public debt and gross domestic product (GDP)

Public debt sustainability analyses are considered a key element by international financial institutions in assessing member countries performance and eligibility for borrowing. They play an essential role in the IMF lending decisions – and help assess critical questions, such as whether

the primary balance needed to stabilize debt under both the baseline and realistic shock scenarios is economically and politically feasible. They also provide input into the design of Fund programs, in particular by helping to determine the timing and size of financing, policy choices, as well as the member's capacity to repay the Fund.

For those forward-looking assessments, it is crucial to understand how changes in public debt are likely to impact real GDP over the short- to medium-term.

This paper revisits the relationship between public debt and GDP. Understanding the impact of increases in public debt on output has gained renewed interest in the context of the COVID-19 pandemic. The pandemic led to a significant contraction in the world economy (Aizenman and Ito, 2020).

An unexpected increase in the public debt to GDP ratio will affect the real GDP level of countries in the following ways; (i) a high initial debt level or (ii) a rising debt trajectory over the five preceding years. On the contrary, unexpected increase in public debt strengthens real GDP for countries that have (iii) a low-income level or (iv) completed the HIPC debt relief initiative.

Overview of Nigeria's public debt

Nigeria's indebtedness dates back to pre-independence era. The debts incurred before 1978 were relatively small and mainly long-term loans from multi-lateral and official sources such as the World Bank and Nigeria's major trading partners. The loans were majorly obtained on soft terms and therefore did not constitute a burden to the economy. However, due to the fall in oil prices and oil receipts, the country in 1977/78 raised the first jumbo loan to the tune of US\$1.0 billion from the international capital market. The loan was used to finance various medium to long-term infrastructural projects.

Domestic debt management in Nigeria had hitherto been carried out by the CBN through the issuance of government instruments, such as the Nigerian Treasury Bills (NTBs); Nigerian Treasury Certificates; Federal Government Development Stocks; and Treasury Bonds. The debt management strategy adopted at that time led to inefficiencies resulting in fundamental challenges. In consideration of these numerous difficulties, the government established an autonomous debt management office in order to achieve efficient debt management practices. The Debt Management Office (DMO) was thus established on October 4, 2000 to centrally co-ordinate the management of Nigeria's debt for all the tiers of government. While the state governments' external borrowing is guaranteed by the Federal Government (FG), their domestic borrowings required analysis and confirmation by the FG based on clear criteria and guidelines that the states can repay based on their monthly allocations from the Federation Account Allocation Committee (FAAC) and internally generated revenue (IGR).

The past couple of decades have witnessed rising concern on the increase in Nigeria's public debt. The first most significant rise in Nigeria's public debt occurred in 1987 when the total debt rose by 96.9 per cent to N137.58 billion. From then, the rise in Nigeria's public debt continued unabated such that as at 2004, total public debt stood at N6,188.03 million.

In 1986, total debt which was hitherto driven largely by the domestic debt witnessed a reversal and was being driven by the external debt. Thus, the dominance of the external debt as well as the steady rise in total debt remained till 2005 when the country was granted debt pardon by the Paris Club. The debt forgiveness saw Nigeria's total debt and external debt plummeting by 59.0 per cent and 90.8 per cent, respectively between 2004 and 2006 to $\frac{1}{2}$,533.47 billion and N451.5 billion. Incidentally, as external debt shrunk, domestic debt continued to grow unabated such that by 2011, total debt which was being driven by the domestic debt had exceeded the 2004 level and stood at

N6,519.65 billion. By 2012, Nigeria's total debt had hit an all-time high of N7,564.4 billion. Between 2006 and 2012, the domestic debt had accounted for 82.2 to 87.2 per cent of the total debt. While in the year 2019, the Percentage of federal government debt to total debt stood at 84%, 86% in the year 2020 and 88% in 2021.

According to Debt Management Office in Nigeria, the total Public Debt to GDP as at June 30, 2022, was 23.06% compared to the ratio of 23.27% as at March 30, 2022 and remains within the FGN continues to implement revenue generating initiatives in the non-oil sector and block leakages in the oil sector, Debt Service-to-Revenue Ratio remains high.

Recently, the World Bank, in its International Debt Report, IDR, said that Nigeria spent S9.6 billion to service foreign debts in 12 years, from 2010 to 2021, adding that the nation's debt stock is not reflected in the economy.

Overview of Ghana's debt profile

Ghana's government external debt fell from \$6.6 billion in 2003 to \$2.3 billion in 2006. Significant improvements in education and healthcare followed, due to money being saved and invested, alongside good government policies, enhancing basic service provision. The proportion of children completing primary school was static at around 60–70% from 1980 to 2006, since when it has increased to almost 100% (Kraay and Vikram 2004). The proportion of births attended by a skilled health professional only increased from 44% to 47% between 1998 and 2006, but in the following eight years it increased to 74%.5 Commodity and lending boom, and manufacturing decline However, Ghana's dependence on commodities continued, and as prices rose, this created more willingness for lenders to give loans off the back of a growing economy. Gold and cocoa prices began to increase from the mid2000s, as part of a global boom in primary commodity prices heavily influenced by Chinese growth and demand, on top of continued high consumption in rich North American, European and Asian economies. Furthermore, Ghana discovered oil, and began to produce and export it from 2011 (Pritchett, 1996).

Collectively these changes led to a booming economy. Between 2006 and 2013 Ghana's GDP per person grew by 44%.6 However, over the same time period the number of people living below the national poverty line only fell by 10%, a slower rate than in the previous seven years when growth had been far lower.7 The reason was that much of the proceeds of growth went to those with the highest incomes. For every GH¢1 increase in income for the poorest 10%, the incomes of the richest 10% increased by more than GH¢9. This rapid economic growth led to an increased willingness and desire of various institutions to lend to Ghana, with a corresponding willingness to borrow. Loans increased steadily from 2008 to 2011. In total, between 2007 and 2015 there were \$18.2 billion of external loans and \$8.7 billion of debt payments, leaving \$9.5 billion of the additional borrowing to be spent within Ghana (World Bank, 2006).

Overview of Benin Republic's debt profile

The Benin Eurobond, combined with the 2018 debt reprofiling, has titled the composition of the public debt towards external debt (Arestoff, and Hurlin, 2005). In 2016 and 17, Benin's domestic debt accounted for more than half of total debt (about 60 percent of total debt at end-2017). The October 2018 debt re-profiling operation, which issued cheap and long-term external debt to buy back more expensive and short term maturity domestic debt, started to rebalance the composition of the debt stock. In addition, Benin issued its first Eurobond in March 2019 (Arestoff, and Hurlin, 2005). The Eurobond amounted to EUR 500 million (equivalent to 3.9 percent of 2019 GDP). The issuance was done at favorable terms. As of end-December 2019, external debt represented almost

60 percent of the total debt. Benin's external public debt is essentially owed to multilateral and bilateral creditors. As of end 2019, Benin's external debt owed to multilateral creditors represented around 57 percent of total external debt against 43 percent held by bilateral creditors. However, the share of the multilateral debt decreased after the issuance of the Eurobond (which is commercial debt) in March 2019. The share of concessional loans represented 54 percent of total external debt amounted to CFAF 2,020.7 billion (about US\$ 3.4 billion) as of end-2019 (Arestoff, and Hurlin, 2005). Such debt is non-concessional and is associated with roll-over and interest rate risks. Total domestic debt amounted to CFAF 1,455.9 billion as of end-2019.

Debt management, institutions and instruments

Government debt management has evolved quite substantially since the 1970s when the need to develop the debt capital market was identified. Before 1990, the state issued debt only three or four times per annum. Bonds were issued at par, as and when needed, and issuance typically coincided with bonds maturity dates. During this period there were no formal auctions, liquid benchmarks, active secondary market or prevailing market rate. Unlike most developing countries, because of sanctions, South Africa's debt was mainly domestic (and this trend continues today). By the end of apartheid, risk premiums were huge and Treasury Bonds traded at a massive discount. In 1993 the country was on the edge of a debt crisis and had very bad credit rating.

From 1994, government started to use macroeconomic frameworks to guide debt management strategies. In 1996 a formal bond exchange2was formed to promote the debt capital market and allow for self-regulation. The SARB was then appointed as an issuer of and settlement agent for government bonds. Commencing in 1998, auctions were conducted regularly at predetermined dates. Twelve primary dealers were appointed to ensure market efficiency, liquidity and transparency. Prior to 1999, the main objective of debt management was to develop the domestic market and promote a balanced maturity profile. After 1999, the focus shifted to reducing the cost of debt to within acceptable risk limits, ensuring government's access to domestic and international financial markets, and diversifying funding instruments. These objectives continue to anchor government's debt management strategy today.

Up until the 1990s, rising debt-to-GDP ratios made government more aware of the costs in managing public debt. At the same time, the shift away from financing budget deficits through banks towards nonbank sources increased the risk of rolling over debt at higher interest rates, not least in the context of financial markets that have become increasingly open internationally, especially after South Africa emerged from the apartheid pariah status.

Theoretical framework

This study is anchored on Neo-Classical Growth Theory.

Neo-Classical Growth Theory

This theory dates back to 1956 when Robert Solow put forward a formal model which postulated that the key variable in growth is labour productivity (i.e. output per worker). For this model, the role of technological change became imperative and even more important than capital accumulation. The model assumed that output (Y) is produced by employing technology, labour and physical capital. The model is expressed as Y = f(A,K,L); where Y is the aggregate output, A is the number based on the current state of technology, K is the quantitative measure of the size of the stock of manufactured capital and L the quantity of labour employed during that period of time

K, A and L are the only factors of production explicitly included in the model. All factors are relative for the production of output, with the exponents in the equation indicating their relative contribution and productivity that increases as a result of technological change, in addition to changes in organization and practices.

Thus, an increase in government expenditure could be justified if it results from a rise in education and health services because they are assumed to be the most important investments in human capital. It is against the backdrop that the neo-classical growth theory was adopted considering the fact that public debt if borrowed to finance health, education and development investments, it is referred to as being productive, which can contribute positively to economic growth via increased labour, capital and technology (Precious, 2015; Eze, Nweke and Atuma, 2019). This study will therefore be anchored on the Keynesian and neo-classical theory.

Empirical review

Abdulkarim and Saidatulakmal (2023) assessed Non-linear effects of public debt on economic growth in Nigeria from 1980 to 2020 using the Nonlinear Autoregressive Distributed Lag method. Empirical evidence indicated that external debt have a significant positive and symmetric impact on economic growth in the long and short run, while debt service payment supporting the debt overhang hypothesis activated a symmetric effect that stifle growth. Domestic debt retarded growth asymmetrically in the short term and linearly over the long term. Foreign reserve holding, on the other hand, had an asymmetric long-run influence and a symmetric short-run impact on growth motivation. To mitigate the negative effects of unsustainable public debt, the study advocated for fiscal reforms that effectively reduce deficit financing to keep the level of government debt low and be able to respond robustly to an economic shock, improve domestic revenue generation and infrastructure spending, and strengthen governance practices and institutions.

Odili (2022) examined Nigeria's debt status and its effect on Nigeria's macro-economic performance for a period of 37 years ranging from 1981 to 2018. Autoregressive-Distributed Lag (ARDL) bounds testing model was adopted in investigating the existence or otherwise of long-run relationship between debt status and macro-economic performance in Nigeria. The dependent variable, real gross domestic product (RGDP) represents macro-economic performance, while public debt servicing, external debt, domestic debt and exchange rate were used as proxies for explanatory variables. The estimated short-run results revealed the existence of inverse relationship between public debt servicing and RGDP, while long run result showed insignificant effect on RGDP. Domestic debt had positive and significant effect on RGDP in short run and long run. The external debt revealed negative and significant impact on RGDP in the short-run and long-run, but exchange rate result revealed negative and significant effect on RGDP in the short-run and long-run and insignificant impact in the long-run. The study recommends that expansionary fiscal policies of government should focus on capital expenditure funding for sustainable growth.

Eke and Akujuobi (2021) carried out a study on public debt and economic growth in Nigeria. The study employed a co-integration approach and reveals a significant short run relationship between Nigeria's public debt and economic growth. Both domestic and external debt variables were statistically significant. The study further concludes that most of the external borrowing in Nigeria ends up being misappropriated.

Abolulkarim, Saidatulakmal and David (2021). The impact of government debt on economic growth in Nigeria. The study employed autoregressive distributed lag technique; the empirical results showed that external debt constituted an impediment to long-term growth while its short-

term effect was growth enhancing. Domestic debt had a significant positive impact on long-term growth while its short-term effect was negative. Findings suggested that government should direct the borrowed funds to the diversification of the productive base of the economy.

Alshammary *et al.*, (2020) examined whether a debt-to-GDP threshold exists in the public debt and economic growth relationship for 20 Middle East and North Africa countries from 1990 to 2016. The study applies a fixed effect threshold regression approach with standard control variables. The study found that the effect of public debt on economic growth is significant and positive only below the threshold value of debt to GDP. More precisely, debt had a promoting influence on economic growth when the debt was less than 58 percent of the GDP, but turns negative above the threshold level. This was broadly consistent with other studies that found lower debt thresholds for developing countries.

Pham, Mai, and Nguyen (2020) used World Bank data to test the existence of a debt-growth threshold level using a bootstrap method. The survey sample included 13 Asian countries (high and middle income) from 2004 to 2015. The results suggested that for the whole sample the impact of public debt on GDP was not statistically significant until a threshold level of 72.5 percent was reached. Beyond this threshold level, public debt had a negative and statistically significant impact on growth. The study concluded with recommendations for reducing excessive public expenditure, reforming the tax system, and enhancing investment performance.

Swamy (2020) employed Solow growth model and estimated panel data growth regressions with country-specific fixed effects and time-specific fixed effects. Using a two-step GMM estimator for a very large worldwide dataset of 252 countries from 1960 to 2009, the study observed a negative relationship between government debt and growth. The point estimate of the range of econometric specifications suggest a 10 percentage point increase in the debt-to-GDP ratio is associated with 23 basis point reduction in average growth. These specifications were consistent with the findings of other studies that found similar debt effects on growth.

Miroslava, Martin and Samuel (2019) studied the impact of macroeconomic indicators on public debt of Slovak Republic. The study adopted several scientific methods including simple linear regression. The study find out that some macroeconomic indicators proved to be statistically significant are GDP growth rate, openness of economy, size of public sector, government bond yields and unemployment rate.

Berggren and Bjornskov (2019) in a study pointed out that regulation of economy (such as regulation of labor, business and credit) have significant influence on public debt. Based on the empirical analysis covering up to 67 countries during the period 1975–2010, the study confirmed that regulatory freedom, especially with respect to credit availability, reduces debt accumulation (it is even more significant during the policy stability and credibility, and when governments have right-wing ideologies).

Al-Qudah (2019) examined the effect of some macroeconomic variables on public debt in Jordan. These variables included real gross domestic product growth, budget deficit, government current expenditure and unemployment rate. The study was conducted from 1992–2017. The hypothesis of the study was analyzed using autoregressive distributive lag (ARDL). Similar to prior studies, real gross domestic product growth has a negative and noteworthy influence on public debt, but unemployment and budget deficit rate have a positive and noteworthy influence on public debt. In the case of Jordan, the government's current expenditure is insignificant in determining public debt level.

Methodology

Research design

This study made use of the ex-post facto research design, data for this study were sourced from the various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin, Bank of Ghana and Bank of Benin Republic and Statement of Account as well as the National Bureau of statistics Annual Reports. Panel Autoregressive Distributed Lag (ARDL) model method was adopted to estimate the impacts of the independent variables on the dependent variable.

Model specification

The model adopted in this study was similar to that employed by the cited authors in their empirical analysis of debt and economic growth and impact of public debt on economic growth respectively. The functional form of the models used by Misiri, Morina and Shabani, (2021) and Owusu-Nantwi and Erickson, (2016) is stated as follows:

RGDPGR = f(EXD, DOD, DSE, EXR)

The econometric approach of the adopted model is stated as follows:

The econometric forms of the models are stated in equations 3.5 and 3.6.

 $logRGDPGR_{t} = \beta_{0} + \beta_{1}logEXD_{t-1} + \beta_{2}logDOD_{t-2} + \beta_{3}logDSE_{t-3} + \beta_{4}logEXR_{t-4} + \varepsilon_{it}$ Where

RGDPGR = Real gross domestic product growth rate (macroeconomic indicator proxy)

EXD = External debt

DOD = Domestic debt

DSE = Debt servicing

EXR = Exchange rate

Where, β_0 is the constant parameter. Theoretically, β_1 , β_2 are expected to have positive effect on macroeconomic indicators of the selected countries, while β_3 and β_4 are expected to have negative effect. Alternatively, the *a priori* expectations can be stated as $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$ and $\beta_4 < 0$. log = Natural Logarithm while ε_i is the error term.

Data analysis

Descriptive statistics

Table 1. Pooled summary of descriptive statistics for Nigeria, Gnana and Benin						
	GrRGDP	EXR	EXD	DOD	DSE	
Mean	7.820762	207.3299	15.24444	25.75145	2.894171	
Median	2.440000	123.1931	6.915000	21.75057	1.973265	
Maximum	239.9400	732.3977	76.21000	49.94000	10.76960	
Minimum	-1.570000	0.008916	0.760000	6.388499	0.100218	
Std. Dev.	23.98348	232.6737	16.25104	13.38061	2.438632	
Skewness	8.778299	0.696826	1.349189	0.342706	1.055815	
Kurtosis	85.20849	1.965302	4.712598	1.599454	3.409339	
Jarque-Bera	30915.80	13.55790	45.96404	10.94093	20.81942	
Probability	0.000000	0.001137	0.000000	0.004209	0.000030	
Sum	821.1800	22391.62	1646.400	2781.157	312.5705	
Sum Sq. Dev.	59821.54	5792665.	28258.32	19157.36	636.3210	
Observations	108	108	108	108	108	
	4.4.	(2022)				

Table 1. Pooled summary of descriptive statistics for Nigeria, Ghana and Benin

Source: EViews computations (2023)

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The results of the pooled descriptive statistics for Nigeria, Ghana and Benin Republic, as presented in Table 1 above, reveals that real gross domestic product (RGDP) growth rate, , external debt (EXD), domestic debt (DOD), debt servicing (DSE) and foreign exchange rate (EXR) emerged with average (mean) values of \$64.57, \$207.33, \$15.24, \$25.75 and \$2.89 respectively.

On the other hand, the minimum and maximum values depict the highest and lowest values associated with each of the variables. In other words, it connotes the range of the series. The deviation of the series from their respective mean values is represented by the standard deviation. The positive values of the skeweness denote a slightly right-skewed distribution with potential outliers or extreme values on the positive side of the distribution. The positive values of the series maintained an increasing trend, i.e. there is low level of decrease among the series of data collected. Similarly, the Jarque-Bera shows that the pooled dataset deviated from a normal distribution.

Variable	ADF	ADF @			Order of integration
	@ Level: I(0)	First difference: I(1)			
	t-Statistic	P-value	t-Statistic	P-value	
GrRGDP	-2.985127	0.1413	-10.58300	0.0000***	I(1)
PCI	-2.157312	0.5080	-9.951496	0.0000***	I(1)
EXD	-3.812966	0.0195	-	-	I(0)
DOD	-2.329756	0.4142	-10.88657	0.0000***	I(1)
DSE	-2.885897	0.1713	-10.81562	0.0000***	I(1)
EXR	-1.994848	0.5972	-10.80434	0.0000***	I(1)
ADF critical values:					
	1% = -4.046925				
	5% = -3.452764				

Pooled unit root test for Nigeria, Ghana and Benin Republic Table 2: Summary of ADF test results (Pooled Data)

Source: EViews computations, 2023

The results of the pooled ADF test revealed that the majority of the series were integrated of order one, I(1), indicating stationarity when considering the first difference. However, external debt (EXTD) was found to be integrated at level, I(0), suggesting stationarity at its original level. This situation is known as mixed order of cointegration. Consequently, the autoregressive distributed lag model can be applied to analyze the relationships among these variables.

Empirical results	5					
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Table 3: Vector error correction mechanism (VECM) results for Nigeri						
	Coefficient	Std. Erro	r t-Statistic Prob.			
ECM(-1)	-0.125078	0.044348	-2.820415 0.009	1		
D(GrRGDP(-1))	-0.497689	0.165826	-3.001272 0.005	9		
D(EXD(-1))	0.021675	0.114560	0.189204 0.8514	4		
D(DOD(-1))	0.021675	0.114560	0.189204 0.8514	4		
D(DSE(-1))	0.021675	0.114560	0.189204 0.8514	4		
D(EXR(-1))	0.021675	0.114560	0.189204 0.8514	4		
С	0.021675	0.114560	0.189204 0.8514	4		
R-squared	0.547201					
Adjusted R-square	ed 0.442709					
F-statistic	5.236765					
Prob(F-statistic)	0.001189					
Durbin-Watson sta	at 1.866093	3				
Source: EViews of	computations,	2023 Depe	ndent variable =	D(GrRGDP)		

Table 3 shows that the error correction mechanism (ECM) is negatively (-0.125078) signed with a probability value (p-value) of 0.0091 which suggests significance at 5% level. The significance of error correction mechanism (ECM) indicates the velocity of adjustment to the long-run equilibrium after a short-run shock. The coefficient -0.125078 of the ECM shows that about 12.50% of the discrepancies in real gross domestic product are corrected in each period. It is worthy of note that this speed of adjustment is relatively low, meaning that the adjustment process to restore equilibrium after disturbance is effectively slow, thus takes a long period. To find how long it takes for equilibrium to be restored, one (1) is divided by the ECM, i.e. 1/0.125078 =7.9950. Hence, it will take 7.99 years to correct the discrepancies in real gross domestic product. The goodness of fit of the model as indicated by the R -squared (0.547201) showed that the model fits the data well, the total variation in the observed behavior of real gross domestic product (RGDP) growth rate is jointly explained by the variation in the components of public debt (EXD, DOD, DSE and EXR) up to 54.72%. The remaining 45.28% is accounted for by the stochastic term. The overall significance of the model was also tested using the F-statistic. Here, the significance of the F-statistic value of 0.001189 did not occur by chance, it actually confirmed that the model fitted the data well. The Durbin-Watson value 1.866093 is approximately 2 which is indicative of the absence of serious autocorrelation in the VECM mechanism.

Based on the coefficient estimates, it was found that one year lag in RGDP growth rate had a negative impact on current RGDP growth rate. A period lag in external debt (EXD) had a positive impact on RGDP growth rate. Also, a period lag in domestic debt (DOD) caused a positive impact on RGDP growth rate while a period lag in debt servicing (DSE) caused a positive impact on RGDP growth rate. In furtherance, foreign exchange rate (EXR) had a positive impact on RGDP growth rate.

Model diagnostics tests

Model diagnostics tests are techniques used to assess the performance and validity of VECM model in order to ensure that the chosen model is appropriate for the data and that the model's assumptions are met.

Residual normality test



Figure 1: Residual normality test

The Jarque-Bera statistic value of 2.560348 with a p-value of 0.277989 indicates that the residuals are normally distributed.

Heteroskedasticity test Table 4: Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.510654	Prob. F(5,29)	0.7659
Obs*R-squared	2.832179	Prob. Chi-Square(5)	0.7258
Scaled explained SS	1.621899	Prob. Chi-Square(5)	0.8986

Source: EViews computation, 2023

The Breusch-Pagan-Godfrey was used to test the Heteroskedasticity test. The probability value of the F statistics (0.7659) is greater than 0.05 which implies that the null hypothesis is not rejected. This concludes that there is homoscedasticity (equal variance).

Serial Correlation test Table 5.: Q-statistic probabilities adjusted for 6 dynamic regresso						
Autocorrelatio	n Partial Correlat	ion	AC	PAC	Q-Stat	Prob*
. .	. .	1	0.060	0.060	0.1290	0.719
. * .	. * .	2	-0.175	5-0.180	1.2751	0.529
.** .	. * .	3	-0.208	8-0.191	2.9329	0.402
.** .	.** .	4	-0.284	-0.317	6.1533	0.188
. .	. * .	5	-0.017	-0.099	6.1659	0.290
. **	. *.	6	0.295	0.163	9.8848	0.130
. .	.** .	7	-0.054	-0.220	10.016	0.188
. * .	. * .	8	-0.120	0-0.185	10.685	0.220
		9	0.029	0.040	10.726	0.295
. * .	. * .	10	-0.161	-0.177	12.026	0.283
. *.		11	0.089	-0.015	12.442	0.331
	.** .	12	20.025	-0.216	12.478	0.408
.* .	.* .	13	-0.089	-0.131	12.936	0.453
		14	0.034	-0.041	13.004	0.526
. *.		15	0.141	0.003	14.280	0.504
		16	50.002	-0.038	14.281	0.578

Source: EViews computation, 2023

Since all of the p-values are greater than 0.05, we fail to reject the null hypothesis and conclude that there is no serial correlation of the residuals.

Test of hypothesis

H01: External debt does not significantly affect real gross domestic product of Nigeria, Ghana and Benin Republic.

Based on the decision rule stated in the previous chapter, it could be seen in Table 4.42 that the P-value of External debt is 0.00 which is lesser than 0.05, we therefore reject the null hypothesis and accept the alternate hypothesis. We conclude that external debt significantly affect real gross domestic product of Nigeria, Ghana and Benin Republic.

Conclusion

This study investigated the impact of external debt on real gross domestic product of developing economies: a study of Nigeria, Benin Republic and Ghana. Findings suggested that That External debt has a positive and significant impact on the real gross domestic product of Nigeria, Ghana and Benin Republic. Based on the data analysis of the study, it can be concluded that external debt, play important roles in shaping macroeconomic indicators of Nigeria, Ghana, and Benin Republic. Policymakers should carefully manage debt levels and exchange rate fluctuations to foster sustainable and inclusive economic development across these countries.

Recommendation

Government should direct all external debt to productive sectors of the economy to boast economic growth and increase the general wellbeing of the citizenry; a transparent debt management mechanism should be set-up for citizens to monitor all stages of loan management, from securing to implementation. This will prevent leakage and diversion of borrowed funds.

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