EE
E u r o E c o n o m i c a
Issue 1(42)/2023 *ISSN: 1582-8859*

Can Nigeria Debt Be Sustained in the Face of Increasing Debt Profile?

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Abstract: Nigeria debt profile has been increasing and creating an uncertainty in its sustainability. This study analyzed the sustainability of increasing debt profile in Nigeria from 1980 to 2021 using annual time series data. The study employed unit root, cointegration test and autoregressive distributed lag techniques in is analyses. The result shows that in the long-run, the debt stock-primary balance relationship was positive, indicating that there was sustainability, as the government's response was encouraging. On the other hand, in the short-run, there was an inverse debt stock-primary balance relationship, showing that there was a debt swell, as government did not respond appropriately to the rising debt. This poses a risk to debt sustainability. It was therefore recommended that fiscal discipline should be upheld by the government by curtailing wasteful spending; it is economically profitable to invest in the real sectors of the economy. Sustainability has to be achieved by matching spending with revenues. Government should also look inwards for revenue generation through efficient tax collection. This will greatly reduce the burden of debt servicing by the government. Finally, government should endevour to increase her primary balances in the face of increased debt.

JEL Classification: C22; H63; E62; E62

Keywords: Debt Sustainability; Public Debt; Primary Balance; Developing Countries; lag length.

1. Introduction

Global debt sustainability has attracted enormous concerns in recent times; compelling both theoretical and empirical studies (see Bohn, 1998; Bulime et al., 2021 & Fincke and Greiner, 2012). Recently, debt stocks in developing, emerging and advanced economies are unprecedentedly increasing in history and assuming a critical position. Averagely, advanced economies deal largely with domestic public debt while developing economies deal mainly on external debt. Developing countries, including Nigeria is experiencing debt crises because of increasing public debt which results from macroeconomic instability and unstable business cycles (Kumar & Ter-Minassian, 2007; Tanzi & Blejer, 1988).

In recent times, Nigeria experienced increased external borrowing to finance her deficit budgets. On Tuesday, 1st of February 2022, the federal government admitted that the economy was in crisis due to increasing debt service bill. On Friday, 20th October, the federal government through the Debt Management Office (DMO) decried the fact that debt servicing takes about 98 percent of the Nigeria revenue. It indicated that debt service increased from $2.5 trillion in 2019 to $4.2 trillion in 2021, that is (60% increase within two years), while the major revenue generating agencies generate and only

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contribute a little above the total amount of debt annually (Federal Government of Nigeria [FGN], 2022). Ravaging impacts of covid-19 prompted International Monetary Fund (IMF) and the World Bank (WB) to create a window of opportunity to temporarily suspend debt service for the poor economies of the world. This was geared towards bringing temporary relief and succor to focus resources to struggling small and medium scale enterprises (SMEs) and other sectors which could generate maximize the funds for greater productivity. However, Nigeria turned it down with the mind of having an easy access to future loans (GTCO, 2022). The reactions of government to increased public debt in terms of sustainability have become an issue of great concern to the policy makers. With the effects of recent global recession and the topical Covid-19, there has been increased incidence of borrowing, especially from the developing countries around the world. Some scholars questioned if governments' public borrowing and its projected path of repayment are consistent with their anticipated revenues and expenditures (D'Erasmo et al., 2016; Reinhart & Rogoff, 2011).

The incidence of debt sustainability and its impacts on macroeconomic stability were reawakened with the recent global debt crises. The rising debt was attributed to increased local and foreign borrowing for various government investments, such as increased building of infrastructural facilities, increased debt services, investment in human capital, weak fiscal management, decrease in foreign direct investment and reduced foreign grants. Moreover, public expenditure is increasing because of increased government administrative entities, thus increasing fiscal deficit and public debt (Suruma, 2014). Other causes of rising public debt were also blamed on increasing civil servant salary which results from persistent industrial actions and proliferating corruption common with the public sectors in third world countries. Consequently, the growth in public spending outweighs government revenue, resulting in borrowing (Diogo et al., 2017; Mustapha & Annalisa, 2018).

Declining primary balances, increasing public borrowing, and increasing debt servicing question government solvency liquidity and loan sustainability. Rise in debt profile, increase in government spending and decline in current account balance point to the fact that primary balance is declining. However, positive and increasing primary balances point to the prudence and sustainability of the government; especially in times of rising public borrowing (Bohn, 1998). Nigeria received debt forgiveness from Paris Club in 2013 and the recent increase in debt would unarguably obscure the gains of the debt forgiveness (Teunissen & Akkerman, 2004; Suruma, 2014).

Classical theory maintained that increased accrued debt stock increases tax on goods and services, having negative impacts on economic productivity, resulting in crowing out investment and debt overhang (Agu and Nyatanga, 2020; Krugman (1989). Increased borrowing and accumulated debt mortgage the future of the unborn children, as they are the ones to bear the burden of payment in the future (Agu, 2015). To curtail fiscal mismanagement, declining primary balances and improve on current account balances, the government embarked on several economic reforms such as monetary restructuring which geared towards promoting fiscal discipline to guarantee debt sustainability. The government also merged finance and planning sectors to harmonize planning, execution, and budgeting; established the unit that manages cash flow so as to regulate expenditure and debt; creation of the system that addresses the challenges of domestic spending and charts the course of debt forgiveness and relief for the economy (Kuteesa et al., 2010). Despite all these strategies, policies and reforms, external borrowing keeps rising, compounding the precarious nature of the economy, and impairing

macroeconomic stability. In the light of the foregoing, there is the need to examine Nigeria debt sustainability status.

Other sections of this study are structured thus: section two delves into the relevant literature. Section three provides data and methodology. Section four presents result and discusses it. Section five has conclusion and policy recommendations.

2. Literature Review

2.1. Theoretical Literature

On the fiscal reaction function, Sims (1994) conceptually distinguished between passive fiscal policy which does not necessarily stabilize debt and active fiscal policy which does. Bohn (1998) analyzed fiscal and debt sustainability and noted there is no consistency in the results, as the study did not consider non-interest government expenses and the variability in GDP. The study therefore suggested new model that emphasizes on the importance of stable fiscal policy response in handling accruing debt, making sustainability of debt to reflect the actions of the fiscal authorities. This also deals with the methodical modification of primary balance reaction to fluctuations in the levels of debt. Bohn (2011) argued that economies can only sustain her debts when her primary balance-increased debt relationship is positive. It also observed that fiscal response method overlooks the estimates of possible economic fluctuations and the interest rates expectations, hence avoiding certain policy grey areas. Finally, this method verifies whether debt unsustainability emanates from the fiscal policy mismanagement or from economic shocks (Wyplosz, 2007). However, this method was criticized as it is backward-looking, explaining previous reactions of macroeconomic to debt within the sample size (Baldi & Staehr, 2013).

2.2. Empirical Review

Literature is awash with studies on both domestic and external debts. The literature that focuses on both the emerging and advanced climes analyses both the long-run and short-run changes in the reactions of primary balances to changes in debts (see Berti et al., 2016; Barbier-Gauchard & Mazuy, 2018; Mugabi, 2004; Muvawala, 1998; Pamungkas, 2016; Shastri et al.,2017; Wamala, 1994). These studies found evidence for mixed results for debt sustainability for the countries they investigated. While some have negative effects on the economies of study, some have positive impacts on the economies.

For example, Adegbite et al., (2008) employed Ordinary Least Square (OLS) and Generalized Least Square (GLS) to conduct a study on the effects of external debt on South Africa and Nigeria productivity growth between 1980 and 2006. The study used some variables like GDP, external debt, interest rate, broad money supply and openness and noted that external debt and economic growth in both countries have negative relationship. Though, the study observed that in terms of debt service management, South Africa performed better than Nigeria. The study also observed that external debt favoured Nigeria up to a certain stage after which the relationship between external debts has negative relationship with the economic output.

Using OLS multiple regression analysis, Adesola (2009) examined the link that exists between economic growth and debt servicing in Nigeria between 1981 and 2004, with such variables as GDP, interest rate,

exchange rate, money supply and external debts. The result of the study suggests that debt repayments to Promisory notes, London Club creditors, Paris Club and other creditors significantly affect gross domestic product and Fixed Capital Formation), whereas debt repayments to Paris club and to Promissory notes holders are positively related to Fixed Capital Formation and gross domestic product. On the other hand, the result shows a negative relationship between debt repayments to London club creditors, other creditors on GFCF and GDP. In the study of Peru, the Philippines, South Africa, Thailand and Venezuela, Ghatak and Sánchez-Fung (2007) estimated how sustainable fiscal policy was. The study used data spanning from 1971 to 2000 and OLS estimating technique and such variables as fiscal policy instrument such as debt and other macroeconomic variables such as money supply, interest rate, exchange rate and inflation rate. The result shows fiscal policy unsustainability in all the countries, there was a noticeable decline in their primary balances in the face of increased debts.

Though, these studies were done in emerging countries with varieties of variables but the usage of OLS estimating technique may have given unrealistic findings, as OLS can only assess the short-run relationship of variables.

In examining how sustainable the debt of some countries in European Monetary Union (EMU) were, Barbier-Gauchard and Mazuy (2018) used quarterly data between 1990 and 2017with variables such as total debt, interest rate, money supply, primary balances in vector autoregression (VAR) environment. The study observed that while Austria, Belgium, Germany and Finland had debt sustainability both in short and long-run, Lithuania, Malta, Slovakia and Slovenia had debt sustainability only in the long-run. In addition, Greece and Italy had debt sustainability only in the short-run while Portugal and Spain was not sustainable both in the long and short-run.

Burger et al. (2012) analyzed the fiscal reaction function for South Africa employing some estimating techniques such as OLS, Threshold autoregressive (TAR), (VAR) and general method of moments (GMM), from 1974 to 2008. The result shows that South Africa was debt sustainable, as they operate a robust fiscal policy. The study therefore concluded that there was a noticeable decline in debt-GDP ratio which was a reflection of debt sustainability. Using Autoregressive distributed lag (ARDL) estimating technique, Amankwah et al. (2018) estimated how sustainable debts was in Ghana. Employing annual data between 1990 and 2016 and employing such variables as GDP, interest rate, debt, money supply and exchange rate. The result shows that primary balance-public debt is positively related in the long-run. On the other hand, in the short-run, primary balance-public debt was negatively related.

Muranganwa (2012) examined debt-growth-investment relationship in Zimbabwe. Using such variables as domestic debt, external debt, GDP, investment and exchange rate, the study employed hybrid models, incorporating public debt into a growth model and adopting the ARDL method of estimation. The result shows that all debts (local and foreign) have negative association with per capita GDP and investment, implying that Pakistan suffers "Debt overhang effect" which crowds out private investment. Meanwhile, on the economy of Iran, Safdari and Mehirizi (2011) analyzed the external debt impacts on economic growth employing such variables as local and foreign borrowing, GDP, imports and private investment. The study used VAR model to achieve its objectives and the result shows that external debt-economic growth relationship was negative while evidence for investment-economic growth was positive.

Bulime et al (2021) used annual time series data to estimate how sustainable public borrowing in Uganda between 1981and 2017 was. The study employed fiscal reaction function and autoregressive distributed

lag methods with variables such as debts, primary balances, interest rate, exchange rate and money supply to investigate the responsiveness of growing debt to economic growth. The result shows that in the long-run, there is growing debt sustainability via increase in primary balance while in the short-run, government did not respond to the growing debt sustainably.

3. Data and Methodology

3.1. Theoretical Framework

This section presents the theoretical framework of debt sustainability analysis. Debt sustainability can be examined through two major approaches, viz: the solvency and the sustainability approaches (Bohn, 1998). The solvency approach is forward-looking; its primary focus is purely on predicting the future fiscal policy. The solvency approach is determined if the intertemporal budget constraints are not violated. The fact that solvency is purely forward-looking attracted some criticisms. (a) Using time series data with econometric tests are of limited importance. That is, econometric tests can only mirror the historical past behaviours of the dataset, implying that any assessment made on the dataset will only hinge on the proposition that the future will mirror the past. (b) if the past is forgotten, any government policy will be deemed to be solvent irrespective of the current level of debt. Therefore any conclusion based on solvency analysis is likely to adjudge government policy credible. However, definitional meaning of debt sustainability lies in its forecasting ability and using hard data and objective criteria to inform decisions. It focuses on the fiscal policy behaviour over time and using it to forecast and judge what will likely come up in the future. The IMF (2017) observed that sustainability of public debt is achieved when current budget constraint is satisfied. In other words, sustainability is achieved if government services its debt without unnecessarily adjusting its fiscal policy.

Following Bohn's (1998) approach, and considering a real economy, the analysis of debt sustainability starts with the standard government budget constraint that describes the accumulation of public debt thus:

$$G_t + (1 + r_t)D_{t-1} = T_t + D_t \quad (1)$$

where G_t denotes the primary spending and T_t represents the volume of tax revenues. At the end of time t, public debt D_t is the stock of the previous debts D_{t-1} to which we add the interest due $r_t D_{t-1}$ and the difference between the primary spending and the volume of revenue which can conveniently be called the primary deficit is $P_t \equiv G_t - T_t$.

$$D_t = (1 + r_t)D_{t-1} + P_t \quad (2)$$

It is assumed that tax revenues grow with the growth in GDP. Therefore, it better to scale the values in equation (2) in percentage of the nominal GDP (represented as Y_t). This simply means that if government revenue can increase indeterminately, spending and debt can also grow indeterminately. Therefore assuming that Y_t increases annually in θ per cent, equation (2) becomes:

$$\frac{D_t}{Y_t} = (1 + r_t)\frac{D_{t-1}Y_{t-1}}{Y_{t-1}Y_t} + \frac{P_t}{Y_t}$$

$$d_t = \left(\frac{1+r_t}{1+\emptyset_t}\right) d_{t-1} + P_t \quad (3)$$

At any given time t, the interest of past debt accumulation accounts for the percentage of public debt to GDP and this indirectly rests on the government policies and the current primary deficit and this represents the fiscal policy decision. Therefore, to completely grasp the dynamics of government budget constraints, the indeterminate rolling over of public debt has to be done thus:

$$d_t = \left(\frac{1}{R_{t-1}}\right) d_{t-1} - \frac{1}{R_{t-1}} P_{t-1} \quad (4)$$

In macroeconomic theory, equation (4) is regarded as dynamic efficiency which stifles any Ponzi schemes in the economy, implying that government does not involve itself in Ponzi schemes.

Considering the a priori infinite time horizon **T** of a government, its budget constraint as **T** approaches a limit now becomes:

$$d_t = \lim_{T\to\infty} \prod_{j=1}^{I} \frac{1}{R_{t-1}} \, d_{t+j} \, d_t + T - \sum_{j-1}^{\infty} \prod_{k=1}^{j} \frac{1}{R_{t+k}} \, P_{t+j} \quad (5)$$

Therefore, government solvency requires that $d_t = \lim_{T\to\infty} \prod_{j=1}^{I} \frac{1}{R_{t-1}} \, d_{t+j} \, d_t + T = 0$. Equation (6) below denotes that surpluses must balance the primary deficits:

$$-\sum_{j-1}^{\infty} \prod_{k=1}^{j} \frac{1}{R_{t+k}} \, P_{t+j} \quad (6)$$

Model Specification

Following Bohn (2008) and Chalk & Hemming (2000) who noted that for public debt to be sustainable, the two variables in Equation (6) above, namely; public debt (P) and primary balance (R) must be stationary. Bohn further observed that "sustainability model" involves the estimation of econometrical relationship amongst government spending, public debt, and primary balance thus:

$$Pb_t = \beta_0 + \beta_1 D_t + \beta_2 Y_t + \beta_3 G_t + \mu_t \quad (7)$$

Where $pb_t = -\sum_{j-1}^{\infty} \prod_{k=1}^{j} \frac{1}{R_{t+k}} \, P_{t+j}$ (left hand side) of equation (6) is primary balance and D_t is public debt (DEBT) while Y_t stands for output growth (gross domestic product growth rate [GDPGR]), G_t represents government spending (GOVEX) and μ_t represents stochastic error term. Equation (7) shows that the primary balance rises with rise in debt. Debt sustainability can be achieved only when government thoroughly adjusts the primary balance (government revenue less non-interest government spending) with the increase in debt. There is the need also to include other non-debt variables, as to see how they influence primary balance of the government. Therefore, following the twin deficits hypothesis, current account balance (CAB) was included (see Sakyi & Opoku, 2016), following debt relief literature, debt relief dummy was included (see Suruma, 2014), following fiscal rules literature, fiscal rule dummy was added (IMF, 2016b) and in line with political business cycle theory, election dummy was also added to the model (Alesina et al,, 1997). Then, equation (7) becomes equation (8) which is to be estimated.

$$PBAL_t = \beta_0 + \beta_1 DEBT_t + \beta_2 GOVEX_2 + \beta_3 GDPGR_t + \beta_4 CAB_t + \beta_5 DER_t + \beta_6 ELD_t + \beta_7 FSD_t + \mu_t \quad (8)$$

The additional variables have been defined in table 1 and the justifications for their inclusion done earlier (under model specification).

Table 1. Variables, label, Description and Sources of Data

Variables	LABEL	DISCRIPTION	SOURCES
Primary balance as a ratio of GDP	PBAL	The ratio of Primary balance to GDP was calculated using government revenue, expenditure and interest payments on debt.	Ministry of Finance and CBN
Public Debt	DEBT	The ratio of total (external plus local) debt to GDP	Ministry of Finance, CBN
Government Expenditure as a ratio of GDP	GOVEX	Temporary variations in noninterest spending.	CBN
Output gap as a ratio of GDP	GPDGR	This is growth rate of GDP	World Bank (WDI)
Current account Balance	CAB	Ratio of current account to GDP.	CBN
Debt relief	DER	Dummy for debt relief (dummy equals one from 1980 to 2005 and zero from 2006.	Dummy
Election dummy	ELD	Dummy (this has one during the year preceding and one year after Presidential and National assembly election elections and zero in non-election years.	Dummy
The fiscal rule	FRD	Dummy (one for the years of fiscal constraints and zero for other years).	Dummy

Note that Central Bank of Nigeria is CBN
Source: Authors'

Pre-Tests

Unit root

This study employed three-unit root techniques, namely; Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). This method was chosen as to pick the most consistent results (see Agu & Nyatanga, 2020). Table 2 shows the Unit root results.

Table 2. Unit Root Results

Dickey-Fuller (DF)			**Augmented Dickey-Fuller (ADF)**		**Philips-Perron (PP)**		
Variables	Order of Integration	P-Value	Order of Integration	Prob. Value	Order of Integration	Integration P-Value	Most Consistent results
PBAL	I(1)	0.0002***	I(1)	0.0003***	I(1)	0.0020***	I(1)
DEBT	I(0)	0.0039***	I(0)	0.0610*	I(0)	0.0003***	I(0)
GOVEX	I(0)	0.0173**	I(0)	0.0133**	I(0)	0.0004***	I(0)
GPDGR	I(1)	0.0002***	I(1)	0.0020***	I(1)	0.0030***	I(1)
CAB	I(1)	0.0010***	I(1)	0.0003***	I(1)	0.0020***	I(1)
DER	I(0)	0.0780	I(0)	0.0670	I(1)	0.0003***	I(0)
ELD	I(1)	0.0002***	I(1)	0.0000***	I(1)	0.0004***	I(1)
FRD							

*Source: Author's Compilation (2022) ***(1 percent), ** (5 percent) and * (10 percent)*

Table 2 shows that the variables have a mixed series. That is, while some variables co-integrated at order 0, I(0), others that have unit roots co-integrate at order 1, I(1).

Cointegration Test

The study went on to test for the cointegrating variables of the data. The method of co-integration test depends on the stationarity properties and the number of cointegrating equations in the model. The study considered the Pesaran et al., (2001) (ARDL Bound Test) method as the most appropriate because (i) it is endogeneity problem free (ii) it is appropriate in small samples (ii) it is appropriate in single models provided the model has only one cointegrating equation. Table 3 shows the cointegration results.

Table 3. ARDL Cointegration (Bound Test) Result

F-Bounds Test Null Hypothesis: No levels relationship				
Test Statistic	Value	Significant	I(0)	I(1)
F-statistic	8.15	10%	2.04	3.0
K	6	5%	2.58	3.7

Source: Author's Compilation (2022)

The result shows that the F-statistic at 5% level of significance is (8.15) which is above the upper bound (3.7) at 5% significant level, concluding the acceptance of a long-run co-integration amongst the variables. Having ascertained the mixed series of the data and the presence of long run cointegration in the variables, the study chose autoregressive distributive lag (ARDL) estimating technique as the most appropriate in this study. Therefore, equation (8) is specified as an ARDL dynamic model.

$$\Delta Pbal_t = \beta_0 + \sum_{t-i}^{p} \beta_1 \Delta Pbal_{t-i} + \sum_{t-i}^{p} \beta_2 \Delta Govex_{t-i} + \sum_{t-i}^{p} \beta_3 \Delta Gdpgr_{t-i} \sum_{t-i}^{p} \beta_4 \Delta Cab_{t-i} + \sum_{t-i}^{p} \beta_5 \Delta DER_{t-i} + \sum_{t-i}^{p} \beta_6 \Delta ELD_{t-i} + \sum_{t-i}^{p} \beta_7 \Delta FRD_{t-i} + \sum_{t-i}^{5} \rho_j D_{jt} + \lambda_1 Pbal_{t-i} + \lambda_2 Debt_{t-i} + \lambda_3 Govex_{t-i} + \lambda_4 Cab_{t-i} + \mu_t \quad (8)$$

Where β_0 ; ... β_7 *and* ρ_j represent the unknown coefficients to be estimated which also shows the short-run dynamics of the model. The second part with λ_1 *to* λ_j denotes the long run association of the

variables, showing long-run coefficients, while *i* represents the lag length. (Table 4 indicates the ARDL lag selection to be 1 lag). The first difference operator is denoted by Δ; while μ_t is the stochastic error term. The null hypothesis in the model is that $\lambda_1 + \cdots + \lambda_j = 0$, signifying there is no long-run relationship. There was the need to ascertain the lag length which the data would enter the model. Table 4 below shows that lag 1 was chosen by Akaike information criterion (AIC), Final prediction error (FPE), Schwarz information criterion (SC) and sequential modified LR test statistic, each test at 5 per cent level.

Table 4. Lag Selection Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-231.098	NA	0.004639	14.49178	14.79655	14.923
1	-75.8047	291.506*	2.12e-04*	3.8537*	143.760*	14. 252
2	-5.3453	82.7568	3.43e-06	6.4345	21.574	7.8874
3	58.7869	40.8659	2.25e-04	2.6561	20.008	5.0864

** indicates lag order selected by the criterion*

LR: sequential modified LR test statistic (each test at 5per cent level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

4. Presentation and Discussion of Results

Table 5. Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
PBAL	41	-0.014	0.043	-0.053	0.004
DEBT	41	0.446	0.158	0.021	0.643
GOVEX	41	0.0134	0.021	-0.022	0.034
GDPGR	41	0.054	0.003	-0.004	0.006
CAB	41	-0.051	0.024	-0.123	0.003

The 41 observations depict the number of years of the study. The mean and median values concentrate within the minimum and maximum values and represent the central tendency of the variables. Debt has the highest value of 0.643 whereas the gross domestic product growth rate has the smallest value of (-0.004). The standard deviations are significantly low and lie about the mean, showing absence of outliers in the data.

Table 6. Correlation Matrix

Variables	**PBAL**	**DEBT**	**GOVEX**	**GPDGR**	**CAB**
PBAL	1				
DEBT	-0.212	1			
GOVEX	-0.613*	0.021	1		
GPDGR	0.023	0.235	0.165	1	
CAB	0.435**	-0.322**	0.005	0.352**	1

The results in table 6 above show that there is an inverse link existing between primary balance and the government spending (-0.613), suggesting that primary balance declines with a rise in the government spending gap. The correlation results generally depict weak associations amongst the variables, suggesting the absence of multicollinearity.

4.1. ARDL Regression Estimates

Table 7. Results of the ARDL Estimates

DEPENDENT VARIABLE: PBAL (Primary Balance)					
PANEL A			PANEL B		
	Model 1	Model 2			
ECT	-0.573*** (0.120)	-0.644*** (0.0674)			
LONG-RUN ESTIMATES			SHORT-RUN ESTIMATES		
Variables	Model 1	Model 2	Variables	Model 1	Model 2
DEBT	0.0250** (0.0163)	0.0243*** (0.0215)	DEBT	-0.032* (0.0324)	-0.0148*** (0.0342)
GOVEX	-0.430*** (0.721)	-0.764*** (0.0455)	GOVEX	-0.165* (0.0348)	
GDPGR	-3.261*** (1.346)	-3.543*** (0.498)	GDPGR	-6.359*** (0.312)	-4.423*** (0.0447)
CAB	0.227*** (0.076)	0.243*** (0.0234)	CAB		-0.354** (0.0754)
DER		0.000349 (0.00532)	Constant	-0.00508* (0.00318)	-0.0210*** (0.00420)
FRD		-0.0321*** (0.00320)	Observations	41	42
ELD		-0.000214 (0.00331)	R-squared	0.89	0.90
			Adjusted R-squared	0.83	0.86
			F-stat	43.5*** F[9, 24]	53.40*** F[12, 43]

*Note that (i). The values in parentheses are the standard errors, (ii). The values in square brackets are F-statistic, (iii).***(1 percent), ** (5 per cent), and *(10 per cent). (iv). The results excluded the dummies' results from the short-run table because they had no lags.*

Source: Authors' Computation 2022

In table 7 above, **Panel A** presents the ARDL long-run results while **Panel B** shows the short-run estimate results.

The long-run result shows that debt-primary balance relationship is positive and statistically significant in both model 1 and model 2. This result corroborates earlier studies such as Amankwah et al. (2018) and Berti et al. (2016) who also observed a positive nexus between debt and primary balance for Ghana and Finland respectively. This implies that a rise in debt stock increases primary balance of the economy. It therefore translates to a percentage rise in debt brings about an increase in primary balance between 0.024 and 0.025 per cent ceteris paribus. The implication is that the authorities responded proactively to the debts by either increasing the primary surplus or declining the primary deficit in the economy in the face of rising debt to as to make debt sustainable. On the other hand, short-run result shows that debt-primary balance nexus is significantly negative for both models. The implication is that a percentage

rise in debt stock negatively affected primary balance between -0.032 and -0.015 percent in the short-run. This result may not be unconnected with government's inability to sustain debt in the short-run due to her concern to fix business cycle fluctuations in the short-run such as stabilizing the inflation and exchange rates and other macroeconomic indicators that would enhance economic growth. All these may warrant government going for unsustainable debt to fix such needs.

The ratio of government spending to GDP entered the model with significant negative signs both in the long- and short-run. The coefficient reported -0.43 and -0.76 in models 1 and 2 of the long-run result but reported -0.17 in the short-run. Averagely, a percentage increase in government spending will decline primary balance between 0.4 and 0.8 in the long-run but will decline primary balance by 0.17 in the short-run ceteris paribus. The implication is that any increase of the non-interest spending above a threshold negatively affects the primary balance. It seems that government prefers large non-interest spending to adjusting current tax level to finance her projects. This result is in line with the study of Jeong (2014) and Shastri et al. (2017) who also found an inverse link between government spending- and primary balance in US and Sri lanka respectively.

In addition, the gross domestic product growth rate has a large negative and statistically significant association with primary balance both in the long- and short-run in both models. In the long-run, a percentage increase in growth rate reduces primary balance by between 3.26 and 3.54 per cent while in the short-run, growth rate declines primary balance by between 4.42 and 6.36 per cent. Therefore, shrinking (expanding) of the economy brings about decline (increase) impact on the primary balance of the economy, suggesting that government reacts to low economic growth with expansionary fiscal policies to awaken the economy from contraction. This finding corroborates the Barro (1979) and Amankwah et al. (2018) who observed that primary balance-output nexus is inverse.

In the long-run, current account balance has a significantly positive association with primary balance in both models, whereas it exhibits a negative association in the short-run. In the long run, a one per cent increase in current account balance enhances primary balance between 0.22 and 0.24 percentage point. This result is in line with the twin deficit hypothesis which states that increase in current account balance increases the possibility of raising primary balance in an economy. The implication is that government manipulated fiscal policy framework to favour primary balance of Nigeria. This finding is in line with the observation of Agu & Nyatanga (2020) for Nigeria and Checherita-Westphal & Žďárek (2017) for Euro economies. Nevertheless, in the short-run, the current account balance-primary balance shows an inverse relationship. It shows that a one percent point rise in current account balance reduces primary balance by 0.35 percent. The implication of current account balance-primary balance inverse relation seems to show that a decline in current account balance negatively affect the economic growth. This may encourage the government to promote growth through deficit spending.

The coefficients of the dummy variables, namely, debt relief dummy (DER) and election dummy show expected signs. While debt relief dummy has a positive relationship with primary balance, election dummy shows a negative association with primary balance. The implication is that whenever an economy gets a debt relief, the primary balance increases with the increase in economic growth while the mindless spending of the government before and during the elections has a negative impact on the primary balance.

Finally, the coefficient of the fiscal rule has a statistically significant but negative relationship with primary balance. This result is against the a priori expectation, as fiscal discipline is supposed to increase

primary balance. The implication is that fiscal policy in Nigeria seems not to be constrained by fiscal rules such as the budget deficit rule which stipulated that fiscal deficit should not exceed 25 percent of annual GDP. For example, between 1980 and 2019, fiscal rule was that debt to GDP ratio was fixed at 25 per cent however it was raised to 40 percent between 2020 and 2023 to accommodate new borrowings (GTCO, 2022). This greatly increased the interest payment on loan, increasing debt to GDP ratio and bringing about unfavourable shocks in the economy. This finding seems not to corroborate the finding of Barbier-Gauchard & Mazuy (2018) who noted that fiscal rules-primary balance nexus in Euro economy was positive.

The error correction term (ECT) measures the speed at which primary balance can adjust from short-run disequilibrium to the long run equilibrium. The coefficients of the ECT for both models are -0.573 and -0.644 respectively. The implication of the result is that between 57.3 and 64.4 per cent of the short-run disequilibrium will be reverted to long-run equilibrium within one year.

4.2. Post Estimation Test

The study conducted some post estimation tests certify that the model is in line with classical assumptions and to ascertain the reliability and validity of the model. Table 8 presents the results of the post-test namely, serial correlation, heteroskedasticity, normality and variance inflation factor test results.

Table 8. Post Test Results

Diagnostic test	**Model 1 (p-value = 5 percent)**	**Model 2 (p-value = 5 percent)**
Serial correlation	0.2846	0.3176
Heteroskedasticity	0.5987	0.6539
Normality	0.3282	0.4687
Multicollinearity (Mean VIF)	3.45	2.97

Source: Author's Computation, 2022

Breusch-Godfrey test for Serial correlation indicated that there is no Serial correlation as depicted by the statistically insignificant probability value of 0.2846 for model 1 and 0.3176 for model 2. The same conclusion can be made on heteroskedasticity test. As the p-values for model 1 shows 0.5987 and 0.6539 for models 1 and 2 respectively, it can be concluded that the model heteroskedasticity free. Normality test was also conducted to ascertain the stability and normality of the model. The result of the variance inflation factor (VIF) shows the absence of multicollinearity, as the VIF in both models are less than 10.

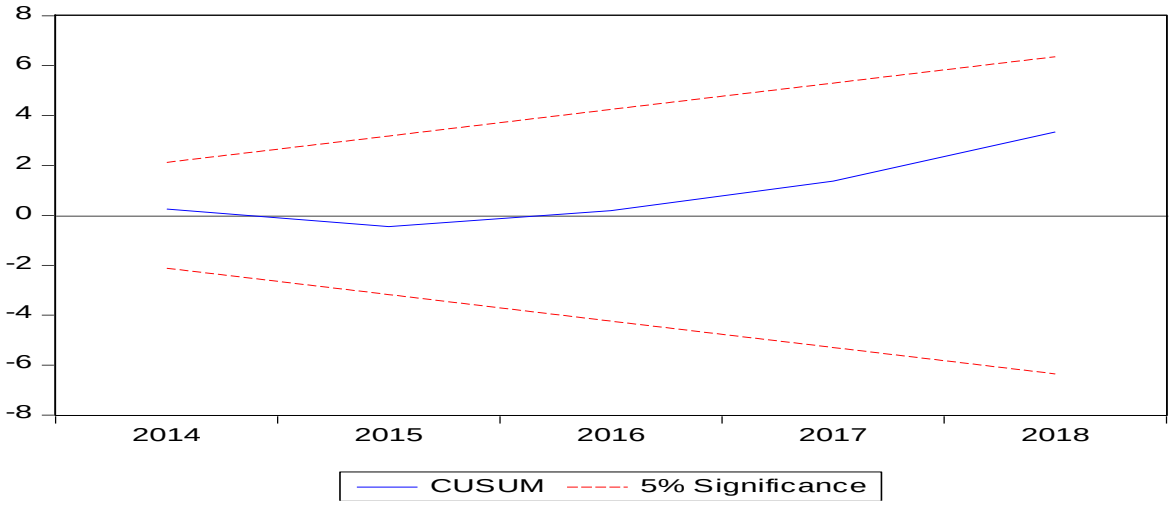

Figure 1. Cusum Test
Source: Author's Computation, 2022

The CUSUM test above also shows that the model is stable, as the model lies within the 5 per cent threshold as depicted by the blue line staying within the two red lines.

5. Conclusion and Recommendations

In conclusion therefore, the long-run result shows that debt-primary balance relationship is positive and statistically significant in both model 1 and model 2, implying that a rise in debt stock increases primary balance of the economy. This indicates that the authorities responded proactively to the debts by either increasing the primary surplus or declining the primary deficit in the economy in the face of rising debt as to make debt sustainable. On the other hand, in the short-run, debt-primary balance nexus is significantly negative for both models. This result may not be unconnected with government's inability to sustain debt in the short-run due to her concern to fix business cycle fluctuations in the short-run such as stabilizing the inflation and exchange rates and other macroeconomic indicators that would enhance economic growth. All these may warrant government going for unsustainable debt to fix such needs.

The ratio of government spending to GDP entered the model with significant negative signs both in the long- and short-run. The implication is that any increase of the non-interest spending above a threshold negatively affects the primary balance. It seems that government prefers large non-interest spending to adjusting current tax level to finance her projects. The gross domestic product growth rate on the other hand has a large negative and statistically significant association with primary balance both in the long- and short-run in both models. Therefore, shrinking (expanding) of the economy brings about decline (increase) impact on the primary balance of the economy, suggesting that government reacts to low economic growth with expansionary fiscal policies to awaken the economy from contraction.

In the long-run, current account balance has a significantly positive association with primary balance in both models, whereas it exhibits a negative association in the short-run. This result is in line with the twin deficit hypothesis which states that increase in current account balance increases the possibility of raising primary balance in an economy. The implication is that government manipulated fiscal policy framework to favour primary balance of Nigeria. Nevertheless, in the short-run, the current account

balance-primary balance shows an inverse relationship. The implication of current account balance-primary balance inverse relation seems to show that this may encourage the government to promote growth through deficit spending.

Finally, the coefficient of the fiscal rule has a statistically significant but negative relationship with primary balance. This result is against the a priori expectation, as fiscal discipline is supposed to increase primary balance. The implication is that fiscal policy in Nigeria seems not to be constrained by fiscal rules such as the budget deficit rule which stipulated that fiscal deficit should not exceed about 25 percent of annual GDP. It was therefore recommended that fiscal discipline should be upheld by the government by curtailing wasteful spending. This must be achieved by matching spending with revenues. Government should also look inwards for revenue generation through efficient tax collection. This will greatly reduce the burden of debt servicing by the government. Government should endevour to increase her primary balances in the face of increased debt.

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