Empirical Analysis of Domestic Debt Sustainability and Determinants in Nigeria

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Abstract

The conventional debt to GDP ratio measure of debt sustainability is widely believed to be misleading especially in a developing country context. This has led to the need for improved indicators of domestic debt sustainability such as debt to government revenue ratios. Yet, studies on the comparative usefulness of these measures remain scanty. Consequently, this paper employs the domestic debt to revenue ratio as the preferred indicator because it depicts the debt burden on the country and indicates the fiscal capacity to sustainably accumulate debt. The study relies on a debt sustainability framework while a dynamic modelling approach was used to ascertain the sustainability of debt in Nigeria for the period 1980-2019. The result revealed that debt to government revenue better reflects domestic debt sustainability in Nigeria as against debt to GDP ratio. The counterfactual simulation exercise revealed that an increase in domestic revenue mobilization makes the debt profile more sustainable. The analysis also revealed that the long-run determinants of debt in Nigeria are interest rate, the growth rate of GDP, and financial deepening while the contemporaneous determinants are inflation, exchange rate, trade openness and federal government total expenditure as a percentage of government revenue. Therefore, the paper suggests that efforts towards intensifying non-oil domestic revenue mobilization should be considered particularly through export diversification, broadening the tax base, reducing fiscal leakages and enhancing the efficiency of revenue collection could be considered.

1. Introduction

Nigeria significant revenue shortages due to gradual recovery from the combined oil price and production shock as well as the covid-19 pandemic have constrained fiscal space. This is worsened by the high expenditure outlay especially in critical sectors as outlined in the budget. Given revenue shortage in the face of a large planned spending program, Nigeria's debt stock continues to grow rapidly as the government is forced to look for alternative sources of funds to finance the large fiscal deficit. The country has often resorted to domestic financing through the capital market and financing from the Central Bank of Nigeria (CBN) thereby monetizing the deficit. However, the country has also relied on international capital markets and relatively lower interest loans from international donor agencies to avoid the unhealthy and costly practice of domestic borrowing. Thus, Nigeria's debt dynamics has been subject to heated debates by stakeholders in the press and media about the sustainability or unsustainability of debt. These issues have warranted this empirical investigation which seeks to contribute to the debate on Nigeria's debt dynamics.

According to data from the Debt Management Office (DMO), Nigeria's public debt (Federal and State) stood at N35.5 trillion at the end of June 2021 up from N33 trillion recorded at the end of 2020. These figures do not include the CBN's "ways and means" financing which stood at N15.5 trillion at the end of June 2021. This suggests that the government has borrowed almost double the official amount recorded at the end of 2020. Despite the moderate debt to GDP ratio of 32%, the Chairman of the Presidential Economic Advisory Council, Adedoyin Salami, noted that the Federal Government's debt service to revenue ratio stood at a staggering 98% between January and May 2021. This is a serious concern that requires adequate empirical scrutiny. Following Nigeria's exit from the London and Paris Club debt in 2005, domestic debt has risen rapidly. Therefore, efforts at enhancing non-oil domestic revenue mobilization are imperative to minimize dependence on domestic and foreign borrowing. Notably, the Federal Ministry of Finance, Budget and National Planning had in 2018 underscored the need to reduce excessive dependence on external debt and leverage more on the domestic debt market. A surge in domestic borrowing by the government in 2017 of about N1.36 trillion as against N524 billion in 2009 was attributed to the escalating fiscal deficit which consumed a significant share of the GDP (FMoF, 2018).

Debt means borrowing to pay back sometime soon. Okogbe (2018) note that domestic debt is any federal government debt issued in domestic currency while its conceptualization revolves around the residence of the creditor, the denomination in which the debt is issued, the debt contract law and finally, place of issuance. Bohn (1998) defined debt sustainability as a situation whereby the ratios of debt-to-GDP are stationary and mean-reverting. Therefore, debt sustainability aims at minimizing the risk of defaulting and negative externalities associated with high debt levels. However, the appropriateness of the sustainability of debt indicators has been the subject of raging debate amongst scholars and practitioners. In recent times, debt accumulation has affected the development of many developing countries like Nigeria. In Eastern African countries, for example, domestic debt is seen as a major hurdle truncating sustainable growth and development (Njoroge, 2015). Tanzania's debt for instance accounted for 86% of export earnings while more than a third of Kenya's export earnings were used in debt servicing (ibid.). According to Sow (2018), the trend in Sub-Saharan Africa's public debt profile in the last ten years suggests that the debt sustainability ratio has trended downward until 2012 when it rose from 37% to 56% of GDP in 2016 due to a series of domestic and external shocks.

To identify borrowing situations that may lead to macroeconomic imbalance, a debt sustainability framework was developed jointly by the International Monetary Fund and the World Bank which seeks to analyze various debt sustainability indicators and their implications for fiscal and macroeconomic policy formulation and implementation. The

thresholds used are however determined based on the empirical evidence (for example 25% for Nigeria) linking this ratio to the subsequent episode(s) of debt distress (Debt Management Office [DMO], 2019). One channel of reducing the debt burden is outright debt cancellation by the creditor. However, while some studies suggest that debt relief is not a panacea for restoring debt sustainability in an economy (See Ari and Koc, 2018; Simovic, 2018) some others have shown otherwise. For instance, Gunduz (2017); Cuerpo and Ramos (2015) show the existence of a linear relationship between debt relief and debt sustainability. The inconclusive state of the literature in addition to Nigeria's current debt situation is an important case study.

One of the major methodological setbacks is the measure of debt sustainability (particularly the denominators considered in the measure) which are often said to be spurious indicators. For instance, Canofari, Piergallini and Piersanti (2019) opine that it is not reasonable to compare a flow variable (GDP) with a stock variable (debt) even when a noticeable relationship exists between them. Therefore, the debt to revenue ratio would be more appropriate and this was used by the Federal Government to evaluate domestic debt sustainability in Nigeria due to lapses in the use of the debt-GDP ratio. The advantage of using the debt-revenue ratio is that it does not only show the debt burden but also indicates the effect of fiscal reforms on domestic debt sustainability. Although extensive research has been carried out on debt sustainability using debt to GDP ratio (See Ari and Koc, 2018, for United States, China, Japan and Germany; Amankwah, Ofori-Aberese and Kamasa, 2018 for Ghana; Beqiraj, Fedeli and Forte, 2018 for OECD countries), this study departs from the aforementioned studies by examining domestic debt sustainability in Nigeria through the lens of debt-revenue ratio using the IMF-WB Framework on debt sustainability. In addition, the determinants of debt in Nigeria are analyzed using a dynamic modelling approach.

Against this backdrop and the increasing concern by the Nigerian government over the rising debt profile in the country, this study investigates the sustainability of Nigeria's debt dynamics. In addition, it examines the determinants of debt in Nigeria using a cointegration and error correction model to provide the long and short-run estimates of debt drivers in Nigeria. This is necessitated by the need to formulate strategies and policies that can mitigate risks associated with debt accumulation especially in the context of contingent liabilities and debt stock approaching the debt ceiling which has also become a source of concern for policymakers. Following this Introduction section, Section 2 presents the literature review, Section 3 presents data and methodology, Section 4 highlights the result and the Section 5 concludes and draws some policy implications.

2. Literature Review

The review of contending issues in the literature is provided in this section by focusing on conceptual clarifications as well as major theoretical and empirical issues relating to domestic debt sustainability. Domestic debt is any instrument issued by the federal government and denominated in local currency. Commonwealth Secretariat (1999) defined domestic debt as the debt incurred by the government through borrowing in its currency from residents of its country. Domestic debt consists of Bank and Non-Banking borrowing. Bank borrowing is made up of advances to the government by the banking sector while non-bank borrowing involves borrowing by the government from the public-private sector which is done through the issuance of government securities.

Debt sustainability is seen as a measure of a country's solvency, i.e., a countries ability to ensure that accumulated debts are serviced without defaulting and if countries can sustain their debt servicing over time. Debt sustainability is defined as debt-to-GDP ratios that are stationary and mean-reverting (Bohn, 1998). The danger of using the Debt-GDP ratio among others is the obscuring information; therefore, misleading and unable to identify factors that

are instrumental in determining the sustainable level of Debt-GDP ratio (Mahmood, Rauf and Ahmed, 2009). Debt sustainability visibly affects the government's fiscal space. According to Heller (2005), fiscal space is the availability of budgetary room that allows a government to provide resources for the desired purpose without any prejudice to the sustainability of a government's financial position. In this case, the notion of fiscal space is closely linked to the concept of fiscal sustainability, which in turn is related to the capacity of a government to finance its operations, to service its debt obligations, and to ensure its solvency.

There are two major approaches employed in the literature to analyze debt sustainability: (i) the present value budget constraint (PVBC); and (ii) the accounting approach

The PVBC approach or Intertemporal budget constraint (IBC) approach or Econometric approach to debt sustainability is based on the following assumptions:(i) that all debt is in the form of domestic bonds B with a nominal interest rate equal to i_t; (ii) that debt is also real and is paid over some time; (iii). That the PVBC does not assume that debt can continue to grow at the growth rate of GDP in the economy so that the debt to GDP ratio remains constant, leaving no role that lenders ultimately play in the economy (Okogbue, 2012). Although debt sustainability is analyzed using both approaches, the solvency condition under the PVBC approach is stronger than the stability condition under the accounting approach. This is because the PVBC takes into cognizance the level of debt as well as growth rates of domestic debt in assessing sustainability.

2.1 Borrowing from Banks and other Financial Institutions by the States, FCT and their Agencies

To ensure that borrowings by the States, FCT and their Agencies from Banks and other financial institutions are controlled, the requirements in Table 6 are expected to be adhered to:

Table 6 Borrowing from Banks and other Financial Institutions by the States, FCT and their Agencies

No	Activity Requirement	Responsibility	Legal Basis/ Reference
1	All Banks and Financial Institutions intending to lend to the States, FCT and any of their agencies, shall obtain the prior approval of the Minister, and shall state the Amount, Purpose of the proposed loan, and the Terms and Conditions of the loan.	Lending	DMO Act, 2003, Section 24;
2	The State Government, FCT or their agency seeking such a loan from Banks and other Financial Institutions shall submit a request to the Minister. The request should be supported by the following: i. The purpose for which the borrowing is intended and its link to the developmental Agenda of the Government; ii. Cost-Benefit Analysis showing full details of how the borrowing is to be utilized and the economic and social benefits of the intended Borrowing;	States/FCT/ Minister	FRA, 2007, Section 44

No	Activity Requirement	Responsibility	Legal Basis/ Reference
	iii. Extract of the Approval of the State Executive Council, duly signed by the Secretary to the State Government. In the case of the FCT, Approval of the FCT Executive Committee, duly signed by the Secretary and the FCT Minister. The approval would include the proposed Loan amount, Purpose (utilization of proceeds), Terms and means of Repayment;		
	iv. Certified True Copy of the Resolution of the State House of Assembly duly signed by the Clerk. In the case of the FCT, Resolution of the NASS, duly signed by the Clerk of NASS;		
	v. Copy of the relevant State or FCT's Appropriation or other Act or Law, authorizing the purpose for which the borrowing is to be utilized.		FRA 44 (2a)
	vi. Copy of accepted Offer Letter for the facility showing the Terms and Conditions of the proposed Borrowing.		
	vii. Submission of the State or FCT's Audited Financial Statements for the past three consecutive years;		FSP, 2016
	viii. Evidence of an up-to-date submission to the DMO of quarterly Domestic Debt Data of the State or FCT; and,		
	ix. Evidence of attainment and maintenance of a current Credit Rating.		
3	The Minister shall direct the DMO to appraise the request and conduct a Debt Sustainability Analysis. The DMO shall conduct a Debt Sustainability Analysis to ascertain that the Monthly Debt Service deduction of the State or FCT, including the servicing of the proposed bank loan being contemplated, does not exceed 40% of the Total Monthly Revenue (FAAC and IGR) of the State or FCT for the preceding 12 months, and make recommendation to the Minister as appropriate	DMO/Minister/ States/FCT	FRA, 2007, Section 44; DMO Act, 2003, Section 6(1c) FSP, 2016

No	Activity Requirement	Responsibility	Legal Basis/ Reference
4	Upon contracting the Loan, States or FCT are to furnish the DMO with the Approved Amount, Total Amount Disbursed, Purpose, Interest Rate, Fees, Tenor, Repayment Schedule and Security for such Loan. The Lending Institution is also required to furnish the State's or FCT's Debt Management Department (DMD) with periodic reports (Monthly) on the drawdown, utilization and servicing of same by the Borrower	States/FCT/ Lending Bank	DMO Act, 2003, Section 24
5	Each Lending Bank and Financial Institution is required to submit quarterly Reports to the DMO on Loans granted to Sub-national governments in the prescribed format, as may be provided by the DMO.	Lending Bank/ Financial Institution	DMO Act, 2003, Section 24 FSP, 2016

Source: DMO

2.2 Theoretical Perspectives of Debt and Fiscal Policy
The Keynesian Approach

Following Innocent (2018), unlike the Ricardian view, the Keynesian school of thought believes that it is only when the economy is not in full employment equilibrium, that the government can increase savings, consumption, output, and growth via deficit financing. The theory assumes that: (i) existence of small open economy; (ii) government collects taxes as revenue from the private sectors; (iii) government finances its current expenditure deficits by borrowing from the private sector. Let the gross domestic debt (B_t), and the domestic debt to government revenue (Y) be denoted by lower case (b_t).

Thus, the monetary value of output, together with interest earned on domestic debt in the preceding period is the GDP at time t. The model can be specified as follows:

$$Y_t = PQ_t + ib_{t-1}Y_{t-1} \tag{2.1}$$

where:

      Y is the government revenue
      PQ is the money value of output.
      ib is the interest payments accruing on domestic debt.
      $b_{t-1} = \frac{PB_{t-1}}{Y_{t-1}}$ and PB_{t-1} is the domestic debt value at time t-1. Government revenue growth equal τ, $Y_{t-1} = \frac{Y_t}{1+\tau}$ then, $Y_t = PQ_t + \frac{ib_{t-1}Y_t}{1+\tau}$ which simplifies to $Y_t = \left\{\frac{(i+\tau)}{(i+\tau)ib_{t-1}}\right\}PQ$.

Thus, the sustainability of domestic debt necessitates that the domestic debt–to–government revenue ratio (b_t) is stabilized at some fixed value. It requires that a constant deficit-to-Government revenue ratio is maintained by the government. Therefore, debt sustainability constraint is given by:

$$\frac{PG}{Y} - \frac{PT}{Y} = \left\{\frac{\tau-1}{1+\tau}\right\}b \tag{2.2}$$

$\frac{PG}{Y} - \frac{PT}{Y}$ = Primary budget deficit to government revenue ratio.

Equation (2.2) is derived thus: The government budget constraint is given by:

$$B_{t-1} = G_{t+1} - T_{t+1} + (i + i_t)B_t$$

where:

G_{t+1} = Government expenditure in period t

B_{t-1} = Stock of Government debt in period t

T_{t+1} = Government revenue in period t

$(i + i_t)B_t$ = Interest on government debt

Sustainable total budget deficits-government revenue ratio is calculated as interest payments accruing on domestic debt in the previous period is added back add back $iPB_t = ibY_t$, expressed as a share of Y_{t+1}- $d_{t+1} + \frac{iPB_t}{Y_{t+1}} = \left\{\frac{(\tau-i)}{1+\tau}\right\} b_t + \frac{iPB_t}{Y_{t+1}}$

Since $Y_{t+1} = (1 + \tau)Y_t$, this gives the long-period deficit to Government revenue; $d_t + \frac{ib_t}{1+\tau} = \frac{b\tau}{1+\tau}$.

From the first condition, setting τ=n gives:

$$d_t + \frac{ib_t}{1+\tau} = \frac{nb}{1+n} \qquad (2.3)$$

where d = primary deficits to Government revenue ratio.

Intuitively, equation 2.2 and 2.3 are related to equation 3.3 in the sense that the total stock of government debt is determined by the combination of government expenditure, government revenue and the interest on government debt at the period. Consequently, the equation in 3.3 was explicitly modified to capture other explanatory variables that actually explains the behavior of the government debt in Nigeria with a view to establish its (un) sustainability.

The major logic of domestic debt sustainability and Keynes's debt conservatism are captured by equations 2.2 and 2.3. Consequently, the above model serves as the theoretical foundation of this study.

2.3 Empirical Review

This section aims at reviewing literature from both developed and developing countries.

Evidence from Developed countries

The first discussion and analyses of debt sustainability emerged during the 1980s with Flavin and Hamilton's (1986) research study on fiscal policy sustainability in the United State encouraged numerous research studies afterwards. Their study employed the ADF test and concluded the existence of stationarity for the United State economy. Hence, the study is fully in conformity with the investors' expectations (Kremers, 1989). Similarly, in contrast to Flavin and Hamilton, Seshan (1987) noted that in India, it can be argued further that considering the rising trend of debt–to-GDP as a sign of unsustainability indicates debt overhang on the government side.

In an investigation into the sustainability of government debt in Finland, Norway, Sweden, Switzerland, UK, Greece and Japan from 2010 to 2013 using a Markov switching technique, it was found that the debt path is found to be sustainable in Finland, Norway, Sweden, Switzerland, and the UK, while Greece and Japan are found to have unsustainable debt trajectories (Velinov, 2014). Public debt sustainability analysis was carried out in Spain with the aid of the Vector Autoregressive (VAR) econometric technique and the study

revealed that Spanish public debt appears largely sustainable along the baseline; however, its realization seems optimistic in the light of historical experience (Cuerpo and Ramos, 2015).

In a cross-country analysis, the study employed a quantitative lifecycle model and show that among the advanced economies, real interest rates on government debt frequently fall below the growth rate of real GDP, implying that the public debt provides real resources that governments can use to finance government expenditures. Similarly, that slower population growth worsens the cost of servicing the debt, while slower productivity growth improves this cost. Also, although r < g, the level of public debt that minimizes the cost of servicing the debt is lower than current levels. Therefore, Governments must then tradeoff any financial benefits that come from having a high level of public debt on average given r < g + n against the benefits of entering a recession with fiscal space for cyclical increases in the debt to GDP ratio to support greater fiscal stimulus (Mehrotra, 2017).

Examining the role of public debt sustainability on fiscal policy in Croatia, switching regression and Structural Vector Autoregressive (SVAR) approach was used and found that recession harms debt sustainability and that public debt level significantly affects and reduces the effectiveness of fiscal policy in Croatia. It was however concluded that further fiscal efforts are required to reach sustainable levels and to stabilize the public debt in the country (Simovic, 2018). A recent study aimed at assessing the interrelations between public investment and sovereign debt in the United States, China, Japan, and Germany covering the period 2000 to 2015. The model was estimated using Toda Yamamoto (TY) causality technique and found that sovereign debt is harmful to the financing of public infrastructure if it breaches certain thresholds. Therefore, there is a need for the government to mobilize domestic resources and develop new financial models that can help promote sustainable development within the limits of sustainable public debt (Ari and Koc, 2018).

A broader perspective has been adopted on debt sustainability with the aid of simulation test argues that in the absence of fiscal costs, public debt reduces capital accumulation, and may, therefore, have welfare costs. Also, the current US situation in which safe interest rates are expected to remain below growth rates for a long time is more of a historical norm than the exception (Blanchard, 2019).

Evidence from Developing countries

Preliminary work on public debt in a developing country focused on the issue of stabilization and solvency of public debt in India with the aid of intertemporal budget constraint framework and established that solvency was not assured in the country despite the indefinite continuation of public debt and fiscal adjustment undertaken in the past (Buiter and Patel, 1992). Similarly, the domestic debt sustainability strategy in Nigeria between 1960 and 2002 is a typical case of an unsustainable federal government domestic debt approach (Rapu, 2003). In the case of Egypt, evidence shows that domestic debt is not only unsustainable, but it also harms economic growth (El-Mahdy and Torayeh, 2009). Also, similar findings were established in the case of Pakistan where both the domestic and external debt was said to be unsustainable during the study period (Mahmood, Rauf and Ahmad,2009). Contrary to the above findings, domestic debt is sustainable in Zambia using the PVBC (Masengo, 2011).

Terry and Isaya (2014) use the vector error correction model to examine the sustainability of public debt in Kenya. The result shows that the depreciation of the exchange rate did not have a significant impact on the average interest rate of external debt in the country. This view was supported by Oyeleke and Ajilore (2014) in Nigeria; Pradhan (2014) in India who note that public debt policy is sustainable during the review period. Conversely, Mahmood, Arby and Sherazi (2014) in Pakistan, India, Sri Lanka, and Bangladesh reported that public debt is not sustainable in their respective country of study.

Examining public debt management in Nigeria, Fagge (2016) simulated a macro-econometric model and found that the shift from the flexible to a rule-based fiscal system has not taken place after the country's exit from the Paris Club as contained in the Fiscal Responsibility Act of 2007 were not strictly adhered to. Furthermore, a study that set out to determine debt sustainability in Sudan, show that public debt is unsustainable during the review (Haile, 2016). One study also examined the optimal public debt threshold for Nigeria using time series data for the period 2005 to 2015 and found a threshold level of 73.7%, while the estimated external and domestic debt values were 49.4 and 30.9% respectively (Omotosho, Bawa and Doguwa, 2016).

Nnamdi (2017) assessed the possible crowding-out effect of public borrowing on private investment in Nigeria found that domestic borrowing crowds out private investment in Nigeria. In Belize, evidence shows that on average, real GDP growth is highest when public debt is below 60 per cent of GDP, so a debt ratio of 60 per cent of GDP was chosen as the desired target (Ford and Roberts, 2017). In a similar study, in Sudan, external debt is unsustainable during the review period (Mohamed, 2017). Also, an analysis of the impact of the government's foreign debt on Indonesia's fiscal sustainability by employing the Two-Stage Least Square (2SLS) method, established that both the government foreign debt and fiscal sustainability positively impacted economic growth in Indonesia (Maria and Mudayen, 2017).

Amankwah, Ofori-Abebrese and Kamasa (2018) examined the sustainability of public debt in Ghana using Autoregressive Distributive Lag (ARDL) and found that the reaction of the policymakers to high debt levels through the adjustment of primary balance. Innocent (2018) examined the efficacy of the government's domestic management strategies to ascertain its sustainability in Nigeria for the period 1970-2017 using ARDL. The study established that the domestic debt management strategies have not effectively ensured domestic debt sustainability in Nigeria. Moses and Ebere (2019) examined the determinants of domestic debt in Nigeria with the aid the of VAR model and found that the major determinants of domestic debt in Nigeria are GDP growth rate, interest rate, external debt and financial deepening.

Most of the studies in developed and developing countries have captured debt sustainability using the Debt-GDP ratio as the major indicator. This may, however, give the government the leeway to continue borrowing irrespective of whether it is sustainable or not as the behaviour may portend danger to the economy. The danger includes macroeconomic instability, policy distortion, a decline in output level and deterioration in the standard of living of the Nigerian citizens which may hamper economic growth and development. Also, GDP reflects productivity, but this is below optimal capacity in Nigeria due to amongst others, infrastructure deficiency and may not reflect debt financing appropriately compared with the use of income.

For instance, studies such as Ari and Koc (2018); Beqiraj, Fedeli and Forte (2018) assessed debt sustainability using the debt-GDP ratio as the major yardstick. Therefore, this study intends to contribute to the existing literature by employing the domestic debt-revenue ratio using a Debt Sustainability Analysis (DSA) framework in assessing its sustainability in Nigeria. Finally, all the studies reviewed employed annual data in analyzing the determinants of domestic debt in Nigeria (See Moses and Ebere, 2019; Werigbelegha and Peter, 2019). Consequently, this study will deviate from those studies by employing monthly data in assessing the determinants of domestic debt in Nigeria by using the ARDL model which is applicable irrespective of the order of integration of the variables. The advantage of using higher frequency data such as monthly data compared with low-frequency data (yearly) is that it helps in studying a variety of issues related to the trading process and capital market structure.

3. Methodology and Data Issue

3.1 Model Specification

To achieve the broad objective of determining domestic debt sustainability in Nigeria, this study adopts the excel-based debt sustainability framework tool developed by the IMF and World Bank. To investigate the determinants of domestic debt stock, we extend the model of Moses and Ebere (2019) as follows;

$$\ln B_t = \beta_0 + \beta_1 IR_t + \beta_2 FD_t + \beta_3 FGTEXP/GREV_t + \beta_4 GR_t$$
$$+\beta_5 IF_t + \beta_6 EX_t + \beta_7 O_t + \varepsilon_t \qquad (3.2)$$

where B = Domestic Debt stock, FD= Ratio of credit to the private sector to GDP proxy for financial deepening, FGTEXP/GREV= Federal government total expenditure as a percentage of Government revenue, IF= Inflation rate, IR= Interest rate, GR= GDP growth rate, EX= Exchange rate, O= Trade openness, β = parameters, ε_t = Error term

The higher the rate of interest on borrowings, the harder to meet debt service obligations. Thus, the interest rate is expected to exert a positive impact on domestic debt (Omotosho, Bawa, and Doguwa, 2016). A developed financial system increases a country's propensity to borrow and therefore financial deepening would increase domestic debt (Moses and Ebere, 2019). An increase in the coefficient of government spending results in the accumulation of more debt as deficit financing needs arise. Thus, a positive sign is expected as suggested by (Miftahu and Rosni, 2017). An improvement in economic growth suggests lower borrowing for capital-intensive investments. Therefore, the expectation is that the growth rate in GDP will reduce domestic debt (Ford and Roberts, 2017). High inflation in the economy could erode the real value of domestic debt as inflation will lead to excess money in circulation chasing few goods thereby making domestic borrowing. Therefore, the inflation rate is expected to have a negative coefficient. The justification for including openness and exchange rate is informed by the fact that they tend to capture the external sector's impact on domestic debt. An exchange rate appreciation tends to reduce the tendency of borrowing and hence, domestic debt falls while a higher degree of openness indicates the possibility of earning more foreign exchange thereby reducing the propensity to accumulate debt.

To investigate whether domestic debt crowds out fiscal deficit, we analyze monthly data using a model that draws from the work of Tuffor (2012) and is stated as follows;

$$FISD_t = \alpha_0 + \sum_{i=1}^{a} \alpha_{1i} FISD_{t-i} + \sum_{j=a+1}^{a+c_{max}} \alpha_{2j} FISD_{t-j}$$
$$+ \sum_{i=1}^{a} \emptyset_{1i} B_{t-i} + \sum_{j=a+1}^{a+c_{max}} \emptyset_{2j} B_{t-j} + \varepsilon_{1t} \qquad (3.3)$$

$$B_t = \beta_0 + \sum_{i=1}^{a} \beta_{1i} FISD_{t-i} + \sum_{j=a+1}^{a+c_{max}} \beta_{2j} FISD_{t-j}$$
$$+ \sum_{i=1}^{a} \emptyset_{1i} B_{t-i} + \sum_{j=a+1}^{a+c_{max}} \emptyset_{2j} B_{t-j} + \varepsilon_{2t} \qquad (3.4)$$

where FISD = Fiscal deficit, B is as earlier defined while a denotes the optimal lag length and c_{max} is the maximum order of integration. This model is applicable if the two series are of different orders of integration (say (I (0) and I(1) series). B granger- cause FISD if $\emptyset_{1i} \neq 0$; otherwise, it does not. Also, FISD is said to granger-cause B if $\beta_{1i} \neq 0$; otherwise, it does not. Note that B granger causes FISD. This implies that domestic debt could crowd out fiscal space because as government incurs more debt domestically, the government's capacity to ensure solvency, service its debt obligation and finance its operations will be hindered

(Heller, 2005). Hence, the expectation is that domestic debt crowds out fiscal space in the country.

3.2 Estimation Techniques
Debt sustainability framework (IMF/World Bank)

To better understand the dynamics of debt sustainability and its impact on economies, the International Monetary Fund & World Bank (IMF-WB, 2001) developed a debt sustainability framework to identify over-borrowing situations that affect macroeconomic stability. They show that a country is at a "high risk" of debt stress if any of the debt ratios exceeds a specified threshold in the baseline scenario over the forecast horizon. The threshold is determined based on empirical evidence linking these ratios to episodes of debt distress (the threshold varies across countries depending on the quality of policies and institutions as measured by the country's Policy and Institutional Assessment (CPIA) index of the World Bank. Even though the IMF-WB DSF has helped many countries to evaluate its debt sustainability, it has, however, being subjected to many criticisms (see Hjertholm, 2003). The debt sustainability tool contains 5 excel sheets and they are discussed briefly as follows:

Input worksheets:

Worksheet 1 is where the domestic debt data will be entered. It is further divided into two: part one which contains data for domestic debt already contracted and more specifically: domestic debt outstanding and domestic debt service. Part two includes the inputs regarding new loans such as the amount contracted and its service cost, principal plus interest.

Worksheet 2 contains macroeconomic indicator data entering. It reflects the macroeconomic scenario before any borrowing impacts.

Support data worksheet:

Worksheet 3 contains the discounts. This worksheet contains the discount rates that are used to compute the net present value of debt and debt service. Any Changes in these values will have an impact on the net present value (NPV) calculations and sustainability ratios.

Reports and outputs:

Worksheet 4contains the NPV for nominal debt and debt service, which are calculated based on the three previous datasheets. It uses data from 'Debt data' and 'Discount rates' worksheets.

Worksheet 5 is used to compute the debt sustainability ratios, based on the NPV of debt and macroeconomic indicators. The decision from worksheet 5 will then determine whether the domestic debt is sustainable or not using the country-specific threshold of 25% for Nigeria.

ARDL Approach

To examine the determinants of domestic debt in Nigeria, the ARDL model proposed by Pesaran, Shin and Smith (2001) is used. An advantage of this model is that it makes it possible to test for the long-run association of variables irrespective of the order of integration. The model is specified as follows:

$$\Delta[\ln(B_t)] = \propto +\gamma_1 B_{t-i} + \gamma_2 IR_{t-i} + \gamma_3 FD_{t-i} + \gamma_4 \frac{FGTEXP}{GREV}_{t-i} +\gamma_5 GR_{t-i}$$

$$+\gamma_6 IF_{t-i} + \gamma_7 EX_{t-i} + \gamma_8 O_{t-i} + \sum_{i=1}^{K} \emptyset_1 \Delta B_{t-i} + \sum_{i=1}^{L} \emptyset_2 \Delta IR_{t-i}$$

$$+ \sum_{i=1}^{M} \emptyset_3 \Delta FD_{t-i} + \sum_{i=1}^{N} \emptyset_4 \frac{\Delta FGTEXP}{GREV}_{t-i} + \sum_{i=1}^{O} \emptyset_5 \Delta GR_{t-i}$$

$$+ \sum_{i=1}^{P} \emptyset_6 \Delta IF_{t-i} + \sum_{i=1}^{Q} \emptyset_7 \Delta EX_{t-i} + \sum_{i=1}^{R} \emptyset_8 \Delta O_{t-i} + \varepsilon_t \qquad (3.5)$$

The error correction form of Equation 3.5 is specified as follows:

$$\Delta[\ln(B_t)] = \sum_{i=1}^{K} \emptyset_1 \Delta B_{t-i} + \sum_{i=1}^{L} \emptyset_2 \Delta IR_{t-i} + \sum_{i=1}^{M} \emptyset_3 \Delta FD_{t-i}$$
$$+ \sum_{i=1}^{N} \emptyset_4 \frac{\Delta FGTEXP}{GREV}_{t-i} + \sum_{i=1}^{O} \emptyset_5 \Delta GR_{t-i} + \sum_{i=1}^{P} \emptyset_6 \Delta IF_{t-i}$$
$$+ \sum_{i=1}^{Q} \emptyset_7 \Delta EX_{t-i} + \sum_{i=1}^{R} \emptyset_8 \Delta O_{t-i} + \delta_1 ECT_{t-1} + \mu_t \qquad (3.5)$$
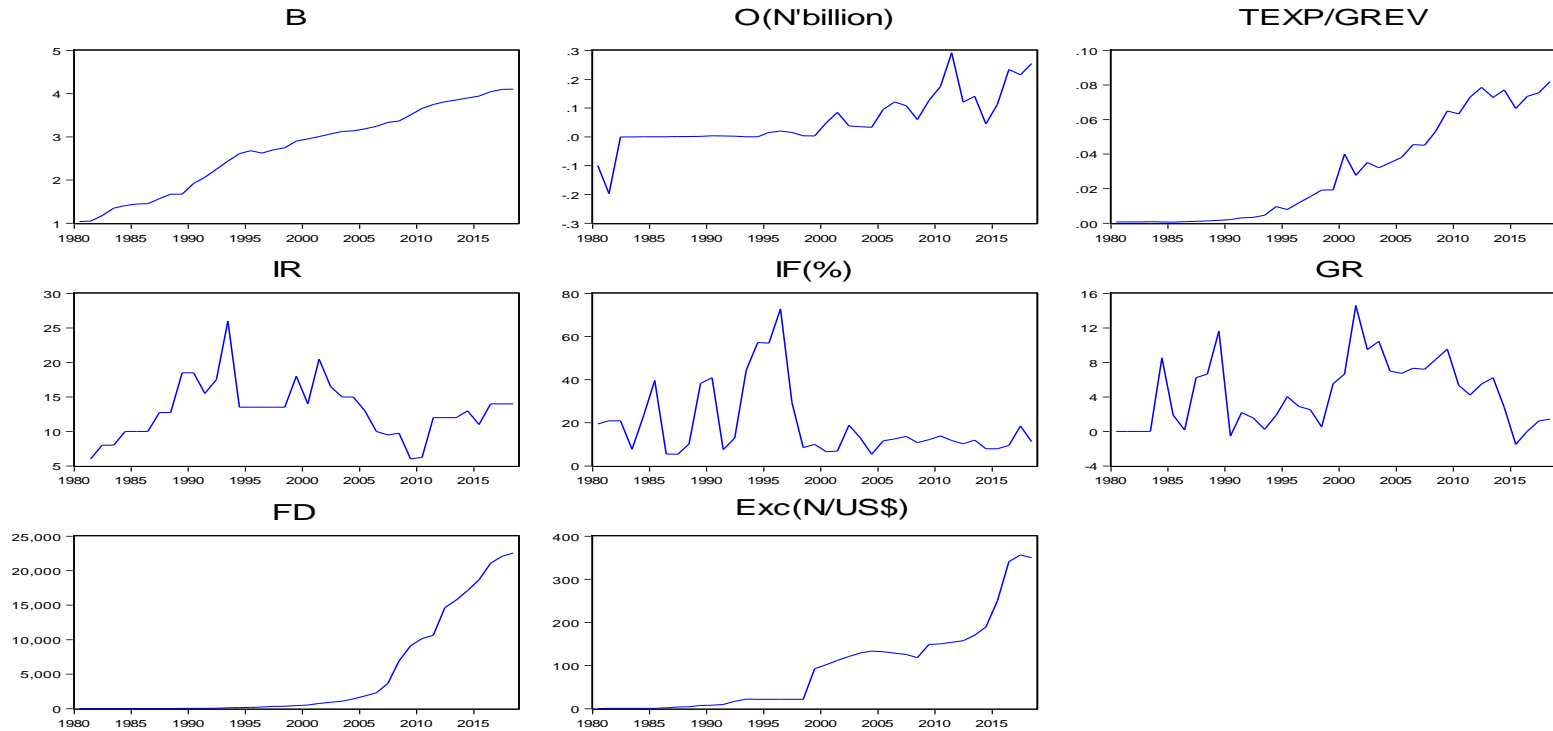
where γ_i's are the long-run regression coefficients, $\emptyset_i$'s are the short-run coefficients and ECT is the error correction term which measures the speed of adjustment back to steady-state equilibrium in the presence of a shock to the economy. The term *K, L, M…. R* represent the optimal lag lengths of the respective variables.

3.3 Preliminary Diagnostic Test and the Data

To test for the stationarity property of the series, both the Phillips-Peron (PP) and Augmented Dickey-Fuller Test (ADF) tests were employed while Ng-Peron (Ng-P) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) were used to complement the weaknesses of these tests. To better understand the underlying data generating process, we examine the correlation matrix, descriptive statistics and line plots of the data. The data used were sourced from both the Central Bank of Nigeria (CBN) Statistical Bulletin and Debt Management Office (DMO) from 1980 to 2019. However, to examine the determinants of domestic debt in Nigeria, the annual data was converted into monthly data using the E-views econometric techniques. The importance of using higher frequency data such as monthly data compared with low-frequency data (yearly) is that it helps in studying a variety of issues related to the trading process and market microstructure

The graphical analysis in Figure 4.1 presents the trend of the series, indicating key periods. The direction of the variables suggests a mixture of both upward trends and fluctuation over the years as indicated by the trend analysis. The statistical properties of the data such as the mean, Skewness, Kurtosis, the minimum and maximum values, and the Jarque Bera test were summarized in Table 4.1. The results emanated therein suggested an obvious variation as indicated by a wide discrepancy in the size of the standard deviation of the variables under consideration. Evidence from the skewness series shows both positive and negative skewness as the series appears to be a mixture of symmetric (normal data) and asymmetric (non-normal data). Also, the Kurtosis statistic equally indicates that government expenditure/ government revenue ratio, domestic debt and interest rate are platykurtic while fiscal deficit, inflation rate, GDP growth rate, trade openness and exchange rate are leptokurtic.

The coefficient of the correlation test for the variables under consideration is shown in Table 4.2. Accordingly, inflation is negatively correlated with domestic debt while the trade openness, interest rate, growth rate, government expenditure/government revenue ratio, fiscal deficit and exchange rate are positively linked to domestic debt. Besides, the possibility of collinearity among the variables is eliminated as shown by the relatively low correlation coefficient. As a precondition for most time-series analyses, it is expected that the variables should be subjected to stationarity tests. The study employed efficient stationarity tests: Phillips-Peron (PP) and Augmented Dickey-Fuller Test (ADF) while both Ng-Peron (NP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests were used to validate the robustness of the PP and ADF tests. Expectedly, the result shows that the stationarity property of the series is a mixture of I (0) and I(1). Hence, paving way for estimating ARDL Bounds co-integrating test.

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Note: B = Domestic debt stock; IF=Inflation; FD= Financial Deepening; IR= Interest rate; Exc= Interest rate; O= Trade Openness; GR= GDP Growth rate and TEXP/GREV= Ratio of Total Government Expenditure to Government Revenue.
Source: Authors' calculations
Figure 4.1 Line Plots showing trend analysis of selected variables

Table 4.1 Descriptive Statistics

	B	IR	INF	GR	FISD	EX	TEXP/GREV	O
Mean	13.160	21.61	19.17	4.17	322132.5	102.9	190.371	0.06
Median	13.586	21.34	11.74	4.10	-70.3	102.1	93.197	0.03
Maximum	16.356	36.09	72.78	21.30	12589474	360	620.115	0.29
Minimum	9.016	9.50	5.38	-6.60	-7342.2	0.6	199.917	-0.20
Std. Dev.	2.214	6.30	16.86	4.78	301992156	107.7	199.917	0.09
Skewness	-0.276	-0.08	1.78	0.96	6.0	1.1	0.717	0.49
Kurtosis	1.868	2.66	4.98	5.60	37.03	3.3	2.055	3.84
Jarque-Bera	30.9(0.000)	2.8(0.25)	322.4(0.000)	202.9(0.000)	25386.9(0.000)	91.6(0.000)	54.6(0.000)	32.9(0.00)

Source: Authors' calculations.

Table 4.2 Correlation Test

Correlation	lnB	0	IR	INF	GR	FISD	EX	TEXP/GREV	FD
lnB	1.000								
O	0.808	1.000							
IR	0.641	0.465	1.000						
INF	-2.202	-0.215	0.183	1.000					
GR	0.234	0.064	0.232	-0.131	1.000				
FISD	0.233	0.326	0.241	-0.256	-0.113	1.000			
EX	0.870	0.838	0.533	-0.315	0.071	0.372	1.000		
TEXP/GREV	0.552	0.377	0.094	-0.313	0.401	-0.136	0.246	1.000	
FD	0.791	0.817	0.452	-0.253	-0.001	0.294	0.853	0.369	1.000

Source: Authors' calculations.

Bounds test result reported in Table 4.3 indicates that the estimated F-statistics is 3.23. This suggests the existence of cointegration among the variables. Thus, we proceed with estimating the ARDL model. As a necessary condition, it is pertinent to substantiate that the chosen model is reliable before proceeding to test for causality among the variables. Consequently, Table 4.4 shows the serial correlation test (using the LM test) implying the non-existence of serial correlation.

Table 4.3 Bounds Test for Cointegration

		Significance	**I(0)**	**I(1)**
F-Statistic	3.23	1%	2.73	3.9
K	7	5%	2.17	3.21

Source: Authors' calculations.

Table 4.4 Serial Correlation Test

Lags	Stat	Prob.
1	1.599	0.809
2	1.858	0.772
3	1.684	0.794
4	1.421	0.841
5	1.186	0.880
6	1.212	0.876
7	4.000	0.406

Source: Authors' calculation.

4. Empirical Analysis and Discussion of Results

The discussion of results is divided into three sub-sections: (i) Sustainability of Domestic Debt in Nigeria; (ii) Determinants of Domestic Debt in Nigeria and (iii) Domestic Debt and Fiscal Space.

4.1 Sustainability of Domestic Debt in Nigeria

The evidence from Fig 4.2 suggests that domestic debt appeared to be unsustainable at some point in time**.** Specifically, during the periods 1987, 2006, 2015, 2016 and 2018, one would observe that domestic debt was unsustainable as it inched out of the 25% threshold. Convincingly, this may be realistic given the impact of both the external and internal shocks that hampered the fiscal discipline of the country during the stated periods. For instance, there was a shock to government revenue during the periods 2015-2016, which adversely affected the fiscal space and therefore, expenditure shoot up and led to debt overhang. Thus, the government inability to adequately and timely finance the debt culminated in the unsustainability of the domestic debt as a result of the shock to domestic revenue mobilization. Surprisingly, a look at Fig. 4.3 shows that domestic debt was sustainable in virtually all the years except for three years: 1983, 1984 and 1988 respectively.

Interestingly, for instance, the debt to GDP indicator shows that domestic debt is unstainable in the years 1983 and 1984 whereby the government experienced an upsurge in domestic revenue mobilization during the year. Expectedly, domestic debt was supposed to be sustainable but the result showed otherwise. Contrariwise, debt to government revenue shows the sustainability of domestic debt during a similar period, justifying its strength of being able to reflect actual reality in the economy. Thus, this raised concerns on the authenticity and efficacy of applying debt to GDP ratio in evaluating the (un)sustainability of domestic debt. Thus, the weakness associated with the usage of debt to GDP is enumerated by Canofarati, Piergallini and Piersanti (2019) who argued that it is not reasonable to make
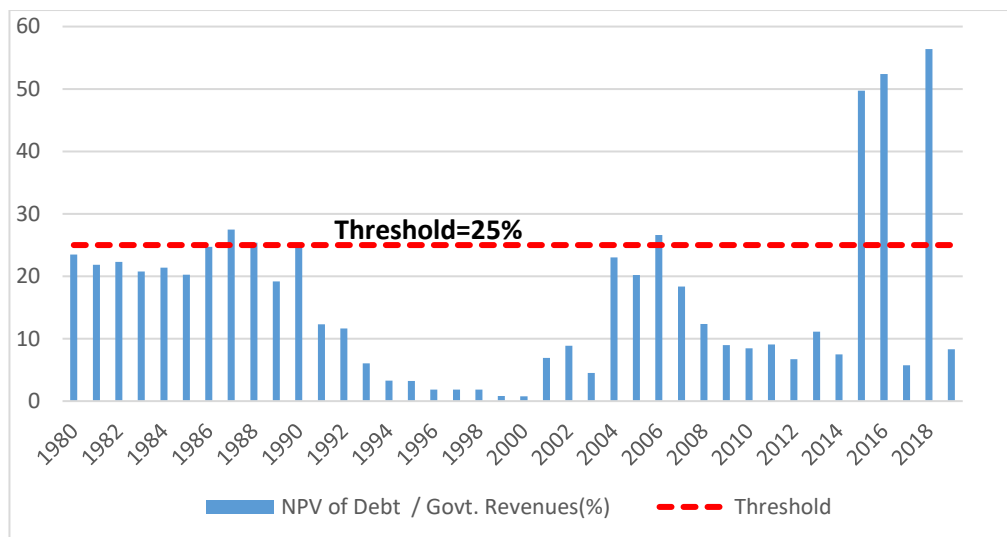
a comparison between a flow (GDP and stock (Debt) variable even when a noticeable relationship exists between them. This is however capable of leading to inconsistent policy recommendations and also introducing more uncertainty which hurts the economy. For instance, if the unsustainable policy is not detected by the indicator, the possibility of government default is high, thereby magnifying fiscal risks. Conversely, the wrong information provided by the indicator that a policy is unsustainable can affect government fiscal projection during the stated period. Nevertheless, it can be posited that domestic debt is sustainable in Nigeria as most of the years exhibited domestic debt sustainability in the country.

Comparatively, Figures 4.2 and 4.3 show the country's debt (un)sustainability profile over the years through the lens of Net Present Value of debt/ GDP and Net Present Value of debt/revenue ratios respectively. It is however conspicuous that both indicators suggest different evidence with regards to the country's debt (un)sustainability status. The NPV of debt to government revenue indicator shows that the country debt profile became unsustainable at five different periods: 1987, 2006, 2015, 2016, and 2018. However, the debt to GDP ratio indicator reports not only a different frequency in the number of times the country's debt became unsustainable but also regarded the country's debt to be unsustainable at different periods of times: 1983, 1984, and 1988. The NPV of debt to government revenue indicator appears to be the most appropriate indicator of the country's actual debt profile for one important reason. All the periods where the country's debts were deemed to be unsustainable coincides with periods when the country faced either external or internal shocks to its revenue or is forced to borrow to meet up with its intended expenditures. These periods, of course, should have far-reaching implications for the country's debts profile. However, it turns out that the indicator (debt/GDP ratio) reflected none of these eventualities.

The debt unsustainability spike witnessed in 1987 can be explained by the increase in the country's debt profile in the year. Essien et al. (2016) noted that the 1987 debt in Nigeria represents the first significant upsurge in public debt, ushering the country's total debt profile into a high of N137.58billion, representing a 96.9% increase from previous years. Furthermore, the 2006 debt unsustainability case could be attributed to the drastic fall in non-oil revenue. Revenue from the non-oil sector fell by 13.7% to N677.5billion. this revenue shortfall is substantially attributed to the dramatic fall in tax revenue caused by the implementation of the common external Tariff (CET) ECOWAS protocol, and the several duty waivers and tax holidays given to foreign investors (CBN, 2007).
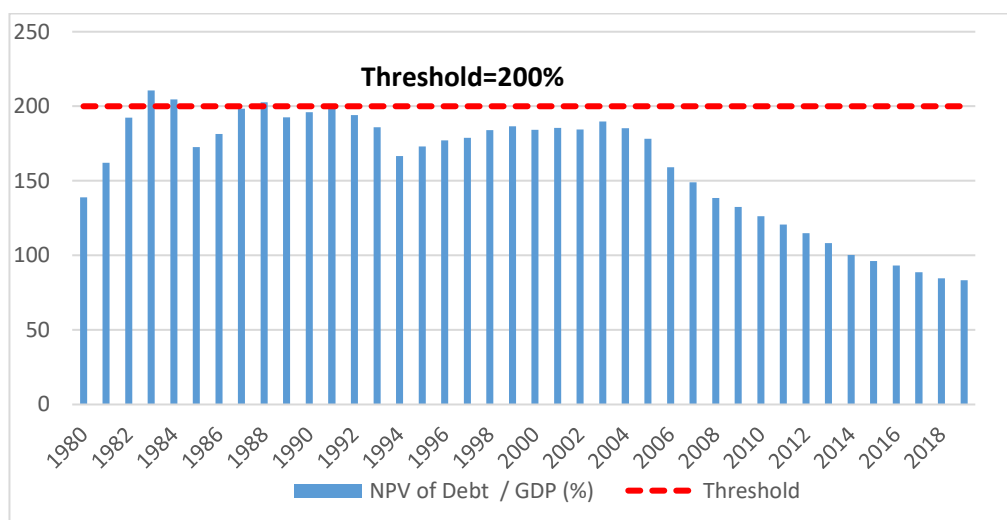
The debt unsustainability shown in 2015 and 2016 can be traced to the external shock that hit the economy around mid-2014. This shock saw oil revenue falling precipitously as the country was meant to cut back production levels to sustain the international oil prices from further falling. Particularly, as of 2014, the country's oil revenue was N6,793.82 billion, but as of 2015, this figure falls drastically to N3,830.10billion and further to N2,693.90 billion in 2016 representing a difference of N2,963.72billion and N1,136.2billion respectively. Also, macroeconomic indicators during this period suggest that this oil price shock led to a drop in oil and non-oil revenue. For instance, in 2014, revenue from the non-oil sector stood at N3,275.03billion, but plummet to N3,082.41billion in 2015 and further nosedive to N2,922.50billion in 2016. This represents a fall of N192.62billion and N159.91billion in 2015 and 2016 respectively (CBN, 2019; NBS, 2016).

Finally, the debt unsustainability witnessed in 2018 can be explained by the sudden increase in the country's debt profile. Evidence suggests that the country debt profile in 2017 stood at N21.725trillion, but inched to N24.387trillion in 2018; representing a 12.25% increase within the two years (DMO, 2019). These debts were incurred to finance projects and refinance maturing debt obligations.
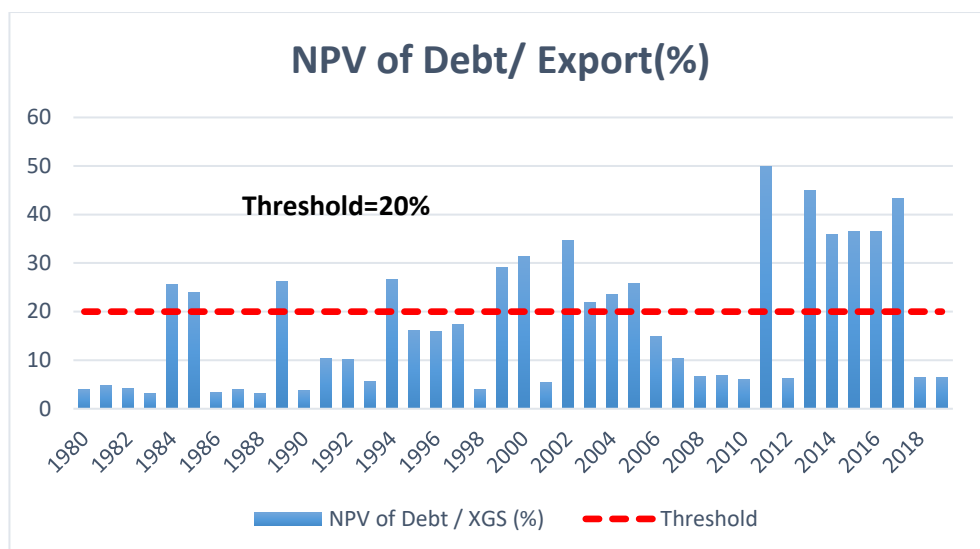
Source: Authors' calculations.
Figure 4.2 NPV of Debt/ Govt. Revenue (%)

Source: Authors' calculations.
Figure 4.3 NPV of Debt/ GDP (%)

Source: Authors' calculations.
Figure 4.4 NPV of Debt/ Export (%)

Table 4.5 shows the average values of the various indicators over four decades. Going by the NPV of Debt/Govt. revenue indicator, it would be observed that, on average, the country has been able to stay below the 25% threshold. The highest debt profile was recorded between 1980-1989 followed by 2010-2019. These two periods had a debt profile of 22.68 and 21.55 respectively. Interestingly, the 1980-1989 period of highly sustainable debt profiles coincided with the highest accumulation of public debt in 1987. Secondly, the decade between 2010-2019 also witnessed several external and internal shocks to the country's revenue. These include the fall in government oil revenue and the resultant fall in other non-oil revenue sources. Surprisingly, the debt to GDP ratio also indicated that debt was sustainable for about four decades. It can then be inferred from the results that domestic debts were sustainable during the four decades under consideration.

Table 4.5 Computation of Average value of the various indicators

Indicators	1980-1989	1990-1999	2000-2009	2010-2019
NPV of Debt/ Export	10.21	13.89	18.14	27.23
NPV of Debt/GDP (%)	185.69	184.37	168.65	101.63
NPV of Debt/Govt. Revenue (%)	22.68	6.79	13.06	21.55
Debt/Import (%)	715.45	120.99	56.40	32.46
Debt/Oil Export	777.84	86.93	33.71	28.68
Debt /Non-Oil export	24854.43	3368.67	1495.52	372.56
Debt / Total trade	373.47	49.03	20.34	14.50

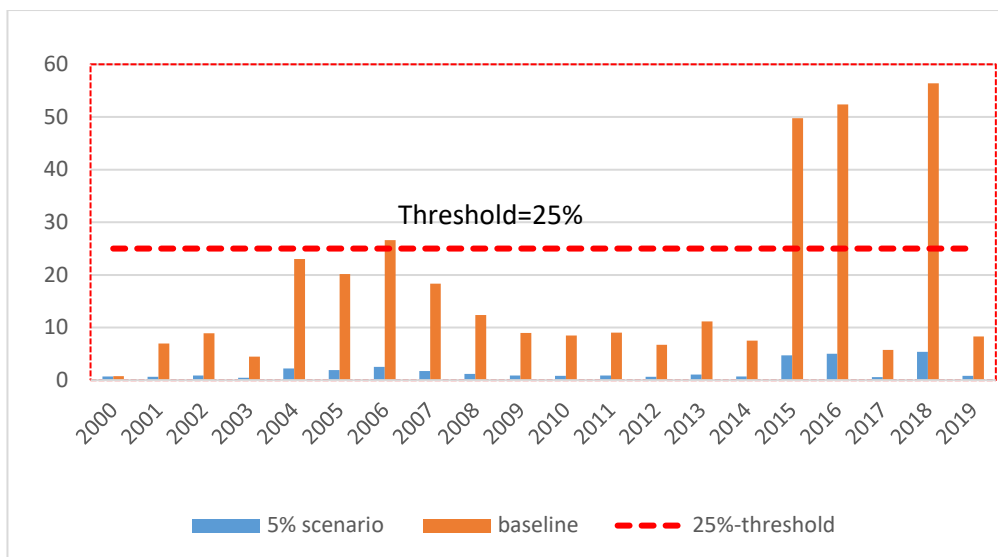**Source**: Authors' calculations.

4.2 Scenario Analysis of Domestic Debt Dynamics

This study assumes four additional scenario cases, concerning the baseline result. A 5% and 10% increase in domestic revenue mobilization and domestic debt portfolio were assumed. The assumed 5% and 10% increase in domestic revenue mobilization are realistically plausible assumptions given the current increase in the country's Value Added

Tax, expansion in its tax net, and the potential increase in oil companies' tax following the recent amendment of the Petroleum Industry Bill. In addition, the assumed values are equally plausible for an increase in domestic debt given the recent COVID-19 pandemic outbreak that is requiring the government to spend handsomely on containment and mitigation measures. Given the current tight fiscal profile of the country, and shuttered economic activities, opting for debt financing may seem inescapable for the government.
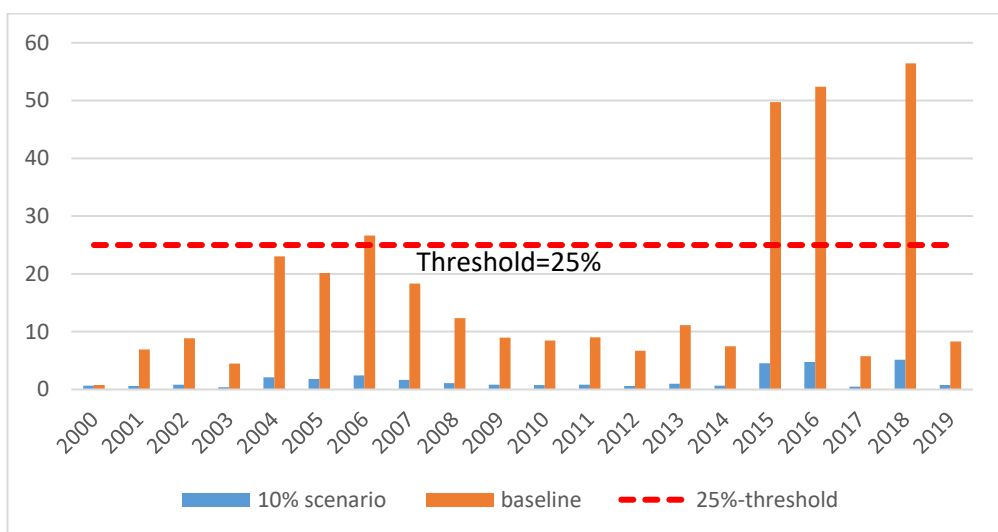
Therefore, the results of the various scenarios are presented in Figures 4.9 to 4.12. Figure 4.9 suggest that a 5% increase in the government revenue profile tends to free up fiscal space and therefore making domestic debts sustainable. This result is pretty similar to when a 10% increase is further assumed. The extent to which both scenarios fell below the sustainability threshold implies that debt (un)sustainability is very much responsive to the country's revenue mobilization potentials; such that with increased revenue mobilization, the country would very much be able to sustain its domestic debts profile and vice versa.

Conversely, Figure 4.11 suggests that a 5% increase in domestic debts has the potential to only worsen the debt unsustainability, but not to usher the country into a new unsustainable debt profile. This conclusion equally turns out to be the same when a 10% increase in the country's debt was assumed. Only that, this time, the country further plunged into its existing unsustainability profile. What this result implies is that Nigeria's debts (un)sustainability profile responds dissimilarly to its revenue and debt portfolios. Such that increased domestic revenue mobilization has the potential of inching the country out of its unsustainable debt profile, while a similar increase in the country's debt stock worsens the already unsustainable debt profile.
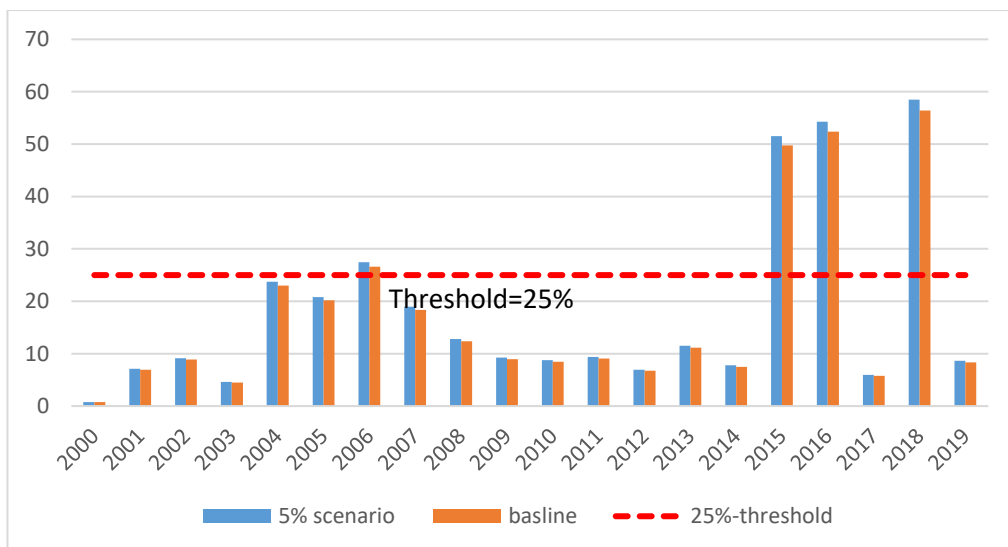
Source: Authors' calculations.
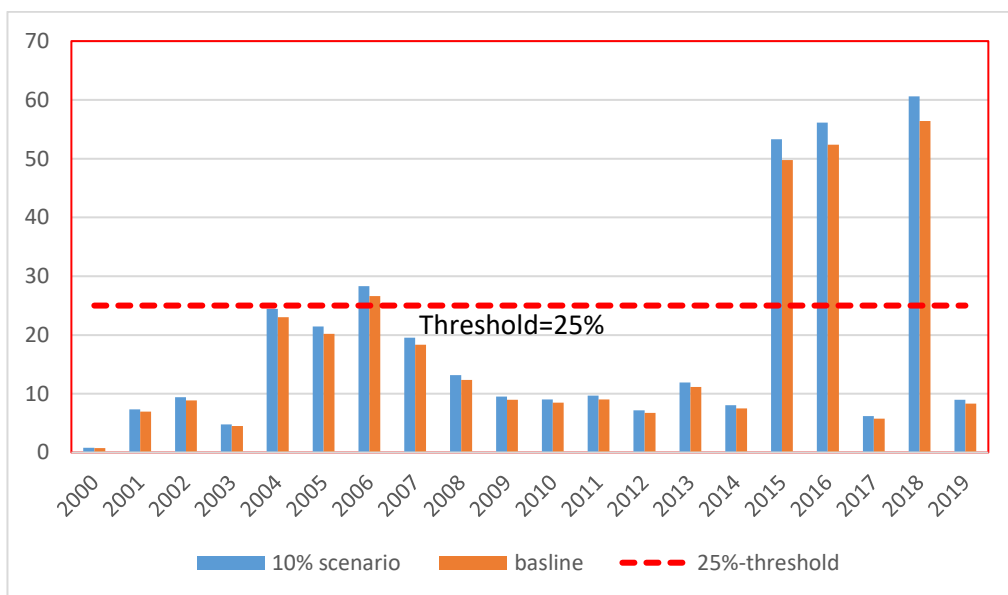**Figure 4.9** NPV of Debt-Revenue due to 5% increase in revenue

Source: Authors' calculations.
Figure 4.10 NPV of Debt-Revenue due to 10% revenue increase

Source: Authors' calculations.

Figure 4.11 NPV of Debt-Revenue due to 5% increase in domestic debt

Source: Authors' calculations.

Figure 4.12 NPV of Debt-Revenue due to 10% increase in domestic debt

4.3 The Determinants of Domestic Debt in Nigeria

Table 4.6 presents the empirical estimate of the model. Panel A indicates the long-run estimates while Panel B reports the short-run estimates. The signs and magnitudes of the determinants of domestic debt followed the apriori expectation and were significant. The coefficient of interest rate (IR) turns out to be positively signed and statistically significant at 5 per cent. This suggests that the higher the amount charged on loan (IR), the more likely is it to have a culminated and overhung debt over the years. This further implies that a higher rate of interest on the loan make it difficult for the country to fully repay given the quantum of debt incurred. Specifically, for a unit increase in interest rate, domestic debt increases by about 4 per cent. This conforms with the findings of Omotosho, Bawa and Doquwa (2016).

Also, the coefficient of the growth rate of gross domestic product (GR) turns out to be negatively signed and statistically significant at 10%. This is in line with the apriori expectation of a negative relationship between the growth rate of gross domestic product and domestic debt. This suggests that the higher the growth rate of the gross domestic product in the country, the lesser the amount of domestic debt incurred during the period. This further implies that, the more the country experiences improvement in the growth rate in the economy, the lesser the amount of domestic debt the country will incur to embark on a meaningful developmental project. In particular, for a unit increase in the growth of gross domestic product (GR), domestic debt will fall by as much as 5 per cent. This is because a substantial part of our GDP growth rate is driven by the oil sector, and increases in oil production mean more revenue for the government; which also means a lesser need to borrow. It corroborates the findings of Belize, Ford and Roberts (2017).

In the same vein, the coefficient of financial deepening (FD) turns out to be positively signed and statistically significant at 5 per cent. This suggests that the higher the financial deepening of the economy, the more the amount of domestic debt to be incurred. This further implies that with a deeper financial system, the government's borrowing needs can be met domestically. Specifically, a unit increase in financial deepening, means domestic debt will increase by as much as 1 per cent. Therefore, this lends support to the fact that financial sector development plays a key role in the development of the domestic debt market. This corroborates the finding of Kutivadze (2011) in low-income countries and Moses and Ebere (2019) in Nigeria who found that financial deepening exerts a positive impact on domestic debt.

However, the exchange rate was not statistically significant in the Nigerian context given the volatility of the stock exchange market and the role of the international market. The exchange rate depreciation leads to more inflationary pressure and thereby more debt is incurred. Surprisingly, it does not affect domestic debt in the Nigerian context which may be to lack of transparency and accountability in the administration of the stock market and policy summersault on the part of the government.

In panel B, the short-run estimates suggest that all the variables are statistically significant in determining domestic debt in the country. The error correction term is negatively signed and statistically significant as expected with an estimate of -0.0024. It implies that 0.24% of the deviations from the steady-state are corrected each month. Based on the result in Panel C, each of the test statistics did not suggest a rejection of the null hypothesis. This means that the estimated model does not suffer from serial correlation, heteroscedasticity and misspecification.

Table 4.6 Long-run and Short-run ARDL Estimate

Panel A: Long-run Estimate		
	Coefficient Estimate	**P-value**
IR	0.2206	0.0383**
GR	-0.0275	0.0541**
IF	-0.0269	0.1624
FCTEXP/GREV	-0.4256	0.4149
FD	0.4333	0.0124**
EXC	-0.0173	0.2661
O	-0.0197	0.2495
C	0.1245	0.9511
Panel B: Short-run Estimates		
D(INT)	-0.0030	0.0000**
D(GR)	-0.0065	0.0000**
D(IF)	0.0005	0.0916***
D(FD)	-0.0029	0.0967***
D(EXC)	-0.0009	0.6701
D(O)	-0.0004	0.0380**
ECT(-1)	-0.0240	0.0000**
Panel C: Diagnostic test		
	Test Statistic	**P-value**
Breusch-Godfrey LM test	1.35	0.26
ARCH	0.38	0.77
Ramsey Reset test	1.97	0.12

Notes: ** and * denote 5% and 10% significant levels.
Source: Authors' calculations.

4.4 Domestic Debt and Government Revenue

The causal relationship between domestic debt and fiscal deficit is present in table 4.7 The result shows that the probability values are statistically significant, suggesting the existence of a causal effect between the variables. The causality result shows that domestic debt crowds out government revenue, and vice versa. What this means is that the more the government is indebted to domestic financial investors, the less it's able to mobilize and

deploy funds to meet its fiscal obligations due to shortages in its revenue mobilization. And the more it is unable to do this, the more it will be indebted to domestic financial investors.

This is because if the government cannot mobilize resources to meets its spending obligations, particularly income-generating investments, servicing its domestic debt becomes a challenge; thereby increasing its indebtedness to domestic financial investors. Collectively, this means the government would have less to spend on consumption and investment which could constrain domestic growth. This finding aligns with the work of Folorunsho and Falade (2013) for Pakistan.

Table 4.7 Causality between Domestic Debt Stock and Fiscal Deficit

Dep. Variable	Chi-Square	Degree of Freedom	P-Value	Inference
LnB	11.80731	2	0.0027	Causality present
Fisd	13.62836	2	0.0011	Causality present

Source: Authors' calculations.

5. Conclusion and Policy Implications

The rapid accumulation of domestic debt in Nigeria poses a serious challenge particularly the crowding out of private sector investment and constraining of fiscal space. This issue has become a serious concern to policymakers and other stakeholders where the debate rages on as to the sustainability or unsustainability of the country's debt dynamics. This study investigates the sustainability of Nigeria's debt using the NPV of debt to government revenue ratio as against the debt to GDP indicator which has dominated extant literature and is often termed a spurious indicator. The study also examines the long and short-run macroeconomic determinants of debt in Nigeria. The IMF-World Bank debt sustainability framework was employed while time series econometrics was used to assess the determinants of domestic debt. Preliminary tests such as unit root, correlation, descriptive analysis, causality and cointegration were conducted before the estimation of a short-run error correction model.

The findings showed that Nigeria's domestic debt was sustainable during some years and this coincided with the positive international crude oil price and production shocks as the need for borrowing to finance the deficit subsided. This is in line with the findings of Okogbe (2012); Omotosho, Bawa and Doguwa (2016). Conversely, for the years 1987, 2006, 2015, 2016 and 2018; debt was unsustainable resulting from both the external and internal shocks to the government's fiscal profile. Furthermore, the simulation analysis suggests that an increase in domestic revenue mobilization further ensures the sustainability of domestic debt as against when there is an upsurge in domestic debt which pushes the economy into an unsustainable debt threshold. Lastly, the second model examines whether domestic debt crowds out fiscal space in Nigeria. A bi-causal relationship between fiscal deficit and domestic debt was established in the country. This further implies that domestic debt crowds out fiscal space in the country which justifies the liquidity constraint hypothesis which states that domestic debt could crowd out fiscal space.

The paper concludes that Nigeria's debt profile is closely tied to oil price developments and the need to diversify the revenue base cannot be downplayed. Consequently, an improvement in non-oil domestic revenue mobilization could create fiscal space and would thus minimize the dependence on borrowing to finance the deficit as well as excessive deficit monetization through the central bank. We also conclude that domestic debt crowds out fiscal space in the country. The implication of this on the economy is that it affects the economy negatively as more sectors that are in dire need of funds to propel growth and development

would be starved of funds as the government channels available resources towards debt servicing. Based on the foregoing the study underscores the need to urgently pursue and sustain reforms that seek to boost non-oil domestic revenue mobilization by broadening the tax base, improving revenue collection through the use of modern technologies, and blocking fiscal leakages.

6. Contribution

This study contributes to knowledge in the following ways: The study computes debt sustainability analysis. It establishes that debt to government revenue ratio better reflects domestic debt sustainability in Nigeria as against debt to GDP ratio. Besides, the counterfactual simulation exercise revealed that an increase in domestic revenue mobilization makes the debt profile more sustainable. Also, the finding from the study suggest that domestic debt crowds out fiscal space in the country as shown by the value of the Chi Square (11.8073) at 5% significance level. Lastly, the analysis also revealed that the long run determinants of debt in Nigeria are interest rate, Growth rate of GDP, and financial deepening with coefficient of 0.22; -0.27 and 0.043 respectively.

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