






EXTERNAL DEBT DYNAMICS AND SUSTAINABLE GROWTH IN NIGERIA

 Victor Chijioko Ndubuaku^{1*}

 Michael Ugochukwu Uche²

 Cynthia Chika Onwuka³

 Patricia Ozioma Ifeanyi⁴

^{1,2,3,4} Federal College of Agriculture Ishiagu, Ebonyi State, Nigeria.

¹Email: vcndubuaku@gmail.com Tel: +2347054074540

²Email: Michael.uche@rocketmail.com Tel: +2347066664900

³Email: cconwuka95@gmail.com Tel: +2348037449446

⁴Email: omatricia627@gmail.com Tel: +2347055172810



(+ Corresponding author)

ABSTRACT

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The paper provides empirical insights about how the interactions between the external debt and external sector dynamics impacts on economic growth in Nigeria. The paper underscored the critical desire to understand how debt-growth relationship could be optimized for sustainable economic development and growth in developing countries. It proposes modelling the external sector and debt dynamics in order to attain sustainable development in Nigeria. This study became imperative because Nigeria occupies a very significant position in Africa. Nigeria, though a developing country, is currently the largest black nation in the world and most populous country in Africa. The paper opted for an ex post facto research design using CBN statistics extrapolated from its statistical bulletin with 37year coverage from 1980-2016. The data was analyzed using the ARDL and granger causality technique coupled with other pre-estimation and diagnostic tests. The result showed foreign-debt and debt-service was negatively not-significant on sustainable growth. It was concluded that though Nigeria wasn't wrongly positioned on the debt-laffer-curve, the economy had not benefitted positively from the mass of debt funds accessed. The paper's primary contribution is finding that external debt and debts service had a negative (not-significant) impact on economic growth in Nigeria. The policy implication of this research may be applied to other developing countries. The propositions may however lack general applicability in more advanced economies.

Contribution/Originality: The paper contributes in the literature by providing empirical insights about how the interactions between the external debt and external sector dynamics impacts on economic growth in Nigeria.

1. INTRODUCTION

Every strategic economic objective seeks to reduce poverty, ensure economic progress and sustainable development. Therefore, economic policies of less-advanced countries should be tailored to poverty reduction and sustainable economic development. To achieve the basic objectives, a substantial amount of capital investment is required. This would be beneficial the economy if invested in infrastructural and productive capacity development. Nonetheless, majority of the developing economies don't have the finances, resources or reserves to fund their growth requirements (Onafowora & Owoye, 2019). This was partly due to insufficient internally generated savings and investment, reduced productive capacity as well as high consumption levels associated with developing

economies (Aluko & Arowolo, 2010). Following the consequent reduction of internal savings and foreign reserves, these countries reverted to external debts to finance the necessary infrastructural projects in order to achieve rapid sustainable growth and development (Aluko & Arowolo, 2010). Pattilo, Poirson, and Ricci (2004) opined that the expansion of foreign debt stock shouldn't necessarily equate to declining economic growth. However, if the nation is incapacitated by the quantity and composition or it is unable to meet its debt obligations, the economy may be stifled (Pattilo et al., 2004). External debts would only be advantageous if the economic benefits obtained from the use of the funds surpass the associated cost of acquisition. If the funds are consistently and judiciously utilised in economically viable ventures over a sustained period, the result would be increased economic efficiency, growth and development (Pattilo et al., 2004). Otherwise, it would become detrimental and a drain to the economy. This may lead to increased economic deficits through prolonged and unsustainable debt service payments. Also, excessive foreign debt can expose the economy to the vulnerability of shocks and economic crisis. It creates an ineffective environment for the implementation of fiscal and monetary policies (Beetsma & Bovenberg, 2002). Furthermore, accumulated debts oftentimes dissuade investors and investments. It is assumed that large debt profile would usually lead to higher taxes on business firms in order to service debt. This ultimately leads to disinvestment and capital flight in the overall economy; causing a decline in productivity and growth. In extreme circumstances, accumulated external debts may become toxic and plunge an economy into a recession (Onafowora & Owoye, 2019). Nigeria, though a developing economy, boasts as the leading African economy and the largest black African country in the world. The country had been besieged with its own fair share of debt service challenges and ranks as one most debt-ridden economy in Africa (Onafowora & Owoye, 2019). It is believed that Nigeria being the most populous black nation and a leading economy in Africa provides empirical background for analysis and application of the debt-growth subject-matter. The Nigerian economy also has high-level international trade exposure because of its import-dependent nature. It is also highly dependent on foreign exchange revenue due to its oil-dependent economy (Kalu, Ugwu, Ndubuaku, & Ifeoma, 2019). The structure of her economy, exposure to foreign transactions and acquisition cum accumulation of external debt justifies the study of this debt-growth relationship. Prior to the debt relief era, it was posited that Nigeria wrongly skewed on the debt-laffer-curve, thereby crippling investment and progress (Ndubuisi, 2017). After the debt forgiveness, it ponders the mind what may be choking economic prosperity in Nigeria, and driving the economy into a further chronic cycle of debt? Several regimes in Nigeria have held differing stance on the policy direction. This has shown in their varying sumptuous appetite for foreign loans to fund public deficits cum developmental programmes. Around 2005, Obasanjo's government championed Nigeria's debt rescheduling from the Paris Club and other creditors. He however succeeded in reducing the debt of US\$30 to US\$3.65billion (Ayobolu, 2016). Succeeding administrations had however recklessly engaged in "white-elephant" developmental projects using foreign debts. This may have led Nigeria to the debt-trap era as the debt profile had shot up from \$3.65billion to \$9.71billion from 2007 to 2014 respectively (Onafowora & Owoye, 2019). It was valued as \$9.46 billion on 31st March 2015 and increased to \$10.32 billion (N2.03 trillion) by June 2015 (Ayobolu, 2016). It had further exponentially increased to \$40.23 billion as at 2017 (The World Bank, 2019).

Theoretical literature posits that an increased public debt profile has an inverse effect on GDP. A growing number of empirical studies showed the inverse relationship of external debt and economic growth (Calderon & Fuentes, 2013; Celik & Bařkonuř-Direkci, 2013; Cicek, Gozegir, & Cevik, 2010; Cöğürçü & Coban, 2011; Kharusi & Ada, 2018; Muhia & Yasin, 2018; Safdari & Mehrizi, 2011). However, other empirical literature supports the positive association of external debt and growth (Gövdeli, 2019; Musibau, Mahmood, Ismail, Shamsuddin, & Rashid, 2018). Nonetheless, other studies showed no significant association of external debt and sustainable growth (Hassan, Sule, & Abu, 2015; Ibi & Aganyi, 2015; Matthew & Mordecai, 2016). The study used the concept of gross domestic product, economic growth and sustainable growth interchangeably.

This study modified similar empirical works of Matthew and Mordecai (2016) and Onakoya and Ogunade (2017) which employed multiple regression model to analyse data. However, this study concentrated majorly on

macro-economic variables that related to the foreign sector. This study also employed a fairly new estimation technique (the ARDL regression technique) to analyse the data as a way of modification from previous studies.

The study enlarges existing literature on external public debt and its impact on macroeconomic performance. The findings of the study will be of value to public policy administrators in their quest for directing the economic policy for developmental strides. It would also be very useful to students, scholars and researchers and policy advisers especially in developing economies. Due to the dynamics of developing economies and the research methodology explored, the deductions may however lack universal applicability especially in more advanced economies. However, for further research, the propositions of this work may be tested on advanced economic climes. Nonetheless, the paper shows the practical implications for sustainable development goals in developing economies underscoring the interplay of external debt and external sector variables in relation to economic stability.

1.1. Objective of the Study

The principal objective was to determine the interactions between external debt, debt service payments, foreign reserves, exchange rate and their impact on sustainable growth. Other sub-objectives were;

- a. To determine whether external debt had significant influence on gross domestic product.
- b. To determine whether debt-service payments had significant influence on gross domestic product.
- c. To determine whether foreign reserves had significant influence on gross domestic product.
- d. To determine whether exchange rate fluctuation had significant influence on gross domestic product.

2. LITERATURE REVIEW

2.1. Conceptual Review

Debt capital adds to capital formation and should positively impact and stimulate sustainable progress. Nonetheless, increasing debt-service payments causes capital outflow and consequently weakens the performance of the country thereby reducing real GDP. It also confirms the theoretical expectations that debt service fritters resources away from the debtor country. In theory, it is assumed that an economy can borrow inasmuch as the fund produces a greater rate of return compared to the cost of the debt. In such instance, the economy would experience increased capacity and expanding economic output (Muhia & Yasin, 2018). When a country engages in borrowing, its debt profile accumulates and debt could be classified as internal or foreign debt. This inquiry placed emphasis on foreign debt which debt obligations to lender nations, organisations and bodies. It can be defined as that slice of debt portfolio obtained from and due to foreign sources such as countries, multinationals, organisations etc. External debt could be viewed as a mix of monetary, technical and other debt resources acquired from other countries (Udoffia & Akpanah, 2016). External debt becomes necessary when there is an increased savings and income deficit against the investment stock. When the gap expands widely, the economy requires more financial input in order to bridge the deficit and to stay afloat; and this comes in form of increased borrowing. A mounting stock of debt could result in a debt crisis where the economy becomes shipwrecked because it cannot efficiently manage the debt obligations. A debt crisis therefore occurs when an economy due to the burden of the debt cannot repay the principal of the debt and meet other debt service obligations.

2.1.1. Nigeria's Foreign Debt Burden and Forgiveness

Debt relief refers to a condition where a debtor nation is given concession on a debt; to reduced, suspend or forgiven all or part of its debt obligations (Ekperiware & Oladeji, 2012). A crucial example in empirical discourse is the Paris Club debt forgiveness deal with Nigeria (Winifred, 2014). The organisation was founded in 1956 and consists of fourteen member states which are majorly creditor nations. It aimed to assist debt ridden economies manage their loan requirements and repayment burden. The first Paris Club loan acquired by Nigeria was in 1964 to the tune of \$13million for the construction of Niger Dam (Asogwa, Okechukwu, & Onyekwelu, 2018). The 1970's

oil wave brought an upsurge in the appetite of chronic external debt and unrepayable debt obligations (Asogwa et al., 2018). Various levels of government acquired loans for major developmental programmes following the civil war. The acquiring of unviable loans however continued after the civil war, by business organisations, financial institutions, and all levels of government (Asogwa et al., 2018). Nigeria literally became debt trapped in 1982 following the energy crisis which led to massive fiscal deficits and the inability to repay external debts amidst increased interest payments, and arrears (Asogwa et al., 2018). The threshold occurred in 1986 when Nigeria was rejected to be granted any further external debts for imports. Nigeria debt profile to the Paris Club has been restructured through the years 1986-2007 (Asogwa et al., 2018). This did not however quench the appetite and accumulation of foreign debts which led Nigeria to default with debt service to the Paris Club. Following democratic return in 1999, the Obasanjo regime, campaigned tirelessly for debt relief. It was noted that the economy “bled” more on debt service payments than it did on health, education and other vital sectors. The crusade bred relief in 2005 when Paris Club agreed to forgive 60% (US\$18 billion) of the US\$30.85 billion that the country owed. This forgiveness brought relief as the country saved a yearly US\$2.3 billion expended on the service (Asogwa et al., 2018).

2.2. Theoretical Review

A. Keynesian Theory

It posited that without the active participation of government in the economy, the economy may flounder and become unstable. The Keynesians believed that the activities and decision of individuals and firms may result in inefficient macroeconomic effects. It therefore required the intervention of monetary and fiscal authorities to redirect the economy through its policy decisions. Monetary and Fiscal Policy systematically applied would ultimately create stability of the economic system. The theory explained that during depression, both policies should be applied to target a reduced interest rate, and increased infrastructural investment. Keynes as well as monetarist believed that the application of both policies would stimulate aggregate demand (Blinder, 2019). The monetary policy required the monetary authority decreased interest rate to deposit money banks and the banks reduce the rate charged on financial services. Government investment in infrastructural facilities transmits needed finance into the economy thereby creating business opportunities, employment and stimulating demand. The government usually acquires external debts to finance infrastructure during fiscal deficit. This suggested that the Keynesian theory which views capital accumulation as a catalyst to economic growth is supportive of external loans as it injects fund into the economy to increase economic activity resulting in growth. The theory assumes that debt resources can positively enhance economic growth (Nwannebuike, Ike, & Onwuka, 2016).

B. Debt Overhang Hypotheses

The Theory discussed the impact of increasing debt stock on a country's economic development. The Debt Overhang Theory stipulates that in the event of over accumulation of debt stock beyond the repayment capability of the country, the increasing debt service payments discourage domestic and foreign investment. Subsequently, the expected rate of return from the productive investments will be insignificant to keep the debtor economy afloat as the larger portion of any economic benefit will accrue to the creditor country. The theory hinges on the fact that a counterproductive debt instrument will drastically reduce investment opportunities and low level of output in the economy. The debt overhang is triggered by the illiquidity and disincentive effect which causes economic stagnation. The debt overhang occurs because of the inability of a country to get her debts serviced as at when due. In this respect, government fails to discharge her fiscal obligations. The debt-laffer curve shows the association of debt repayment cost and the size of the debt. When the relationship is so strong, the debtor is said to be on the wrong side of the laffer curve. The theory of the debt-Laffer curve also indicates that there is a threshold point to which further debt incurred cannot stimulate growth. When the debt profile extends beyond the threshold point, it

becomes a burden as debt servicing costs reduces the amount of available resources for productive investments, impeding investment which ultimately stifles growth (Ada, Agu, & Umunna, 2016; Daka, Kapena, Fandamu, & Phiri, 2017). Research studies therefore point that increased debt stimulates economic growth up to a “breaking-point”, after which, any additional increase creates economic stagnation and possibly a recession (Kabadiya, Uzun, & Karakoyi, 2012; Musibau et al., 2018).

2.3. Empirical Review

Several research works on the related subject area around the world have posited divergent views. Calderon and Fuentes (2013) studied several Latin America nations with the conclusion of an inverse association between external debt and economic growth. The study was carried with the period from 1970 to 2010. Kharusi and Ada (2018) also examined whether the effect of external debt of economic growth with regards to Oman’s economy with data from 1990 to 2015. Their conclusion agreed with the results of Calderon and Fuentes (2013) which suggested an inverse relation among the variables. Also, Celik and Bařkonuř-Direkci (2013) carried out a similar study in Turkey using data from 1991 to 2010 and established that external debt has an inverse relationship on economic growth. It also agreed with Cöğürcü and Coban (2011) which studied the impact external debt on Turkish economy. They focused on the period from 1980 to 2009. They established that external debt has a negative impact on economic growth. It disagreed with Gövdeli (2019) who worked on external debt stock, openness and the consumer price index and the impact on economic growth in Turkey. The study period was from 1970 to 2016. The bounds testing approach of the ARDL was used to determine whether there was cointegration among the variable which was confirmed. The research found that external debt had a significant positive influence on economic growth in Turkey. However, Cicek et al. (2010) worked on external debt, internal debt and economic growth. They employed data from the period 1990-2009. Their study posted an inverse impact of external debt on economic growth which agreed with the work of Safdari and Mehrizi (2011) which studied external debt on economic growth in from 1974 to 2007. The vector autoregressive model was used for the study analysis and showed an inverse effect of external debt on gross domestic product. Other related studies from Africa on external debt and sustainable growth also posited divergent views. Musibau et al. (2018) used panel data from 1980 -2015 and examined causal relationship of external debt and economic growth with focus on ECOWAS nations. It suggested a positive, long plus short-run causal relationship existed. It disagreed with Muhia and Yasin (2018) which studied the link between external debt burden and economic growth in 38 Sub-Saharan Africa from 1990-2016. Panel data and GMM model was employed to evaluate the relationship. It deduced that external debt negatively affected the economies of Sub-Saharan Africa. Also, Hassan et al. (2015) found a non-significant impact of public debt on growth in Nigeria between 1986 and 2013. This agreed with Ibi and Aganyi (2015) which analysed the impact of external debt on sustainable economic growth in Nigeria and found a non- significant relationship between external debt and sustainable economic growth. This also agreed with Matthew and Mordecai (2016) who investigated the relationship between public debt and economic development in Nigeria employing data from 1986-2014 and found a non-significant negative association among the variables.

2.4. Review Summary

Theoretical framework posits that increased public debt profile has a negative effect on GDP. This conforms with a growing number of empirical literature which observed an inverse relationship of external debt and sustainable development (Calderon & Fuentes, 2013; Celik & Bařkonuř-Direkci, 2013; Cicek et al., 2010; Cöğürcü & Coban, 2011; Kharusi & Ada, 2018; Muhia & Yasin, 2018; Onakoya & Ogunade, 2017; Safdari & Mehrizi, 2011). However, other empirical literature supports a positive association between external debt and growth (Gövdeli, 2019; Musibau et al., 2018). Nonetheless, other previous studies showed no significant relationship between external debt and economic growth (Hassan et al., 2015; Ibi & Aganyi, 2015). Evidently, literature on external debt-

growth dynamics abounds with conflicting conclusions. The interaction of debt-growth dynamics is rather inconclusive and therefore is subject to further empirical investigation and therefore justification for this study.

3. RESEARCH METHODOLOGY

The Keynesian Theory and the Debt Overhang theory are the principal theories guiding the research method. The research design was the *ex-post facto*. Data for the study was obtained from CBN statistical bulletin for the years 1980-2016.

3.1. The Model Specification

The model for this is adapted from the macroeconomic debt model employed by (Onakoya & Ogunade, 2017) and the functional form is specified;

$$GDP = f(EXDT, DSPT, EXRT, FXGR)$$

Where: GDP = Real GDP; EXDT = Foreign Debt Stock; DSPT = Foreign Debt Service Payments; EXRT = Exchange Rate; FXGR= foreign exchange and gold reserve.

a. Testing for Unit Root

The check for stationarity is a *sine-qua-non* in time series analytics. For this purpose, we use the conventional ADF test which accommodates ARMA (p, q) models with unknown orders using the regression (Lawal & Aweda, 2015);

Without trend nor intercept

$$\Delta \dot{Y}'_t = \varphi * \dot{Y}'_{t-1} + \sum_{i=1}^{p-1} \varphi * \dot{Y}'_{t-i} + e_t$$

Intercept without trend

$$\Delta \dot{Y}'_t = \varphi * \dot{Y}'_{t-1} + \sum_{i=1}^{p-1} \varphi * \dot{Y}'_{t-i} + \lambda + e_t$$

Intercept with trend

$$\Delta \dot{Y}'_t = \varphi * \dot{Y}'_{t-1} + \sum_{i=1}^{p-1} \varphi * \dot{Y}'_{t-i} + \lambda + \mu_t + e_t$$

Note: $\varphi * = (\varphi_1 + \varphi_2 + \varphi_3 + \dots + \varphi_p) - 1$;

Ho: $\varphi * = 0$ (i.e. $\varphi *$ has unit root); H₁: $\varphi * < 0$ (i.e. $\varphi *$ has no unit root)

3.2. Granger Causality Test

The test posits that “while the past can cause or predict the future, the future cannot predict or cause the past. Thus, according to Granger, X Granger causes Y if past values of X can be used to predict Y more accurately than simply using the past values of Y (Lawal & Aweda, 2015).

$$Y_t = \gamma_0 + \gamma_1 Y_{t-1} + \dots + \gamma_p Y_{t-p} + \varphi_1 X_{t-1} + \dots + \varphi_p X_{t-p} + \omega t$$

$$X_t = \nu_0 + \nu_1 X_{t-1} + \dots + \nu_p X_{t-p} + \varphi_1 Y_{t-1} + \dots + \varphi_p Y_{t-p} + \nu t$$

3.2.1. Auto Regressive Distributed Lag (ARDL p,q) Model

This model contains the dependent variable in its lagged form, the current variables and explanatory variables in its lagged form. It thus incorporates endogenous and exogenous variables. The ARDL model can be specified if all the proxies are $\dot{I}(1)$ or $\dot{I}(0)$ or cointegrated. The ARDL is more efficient when you have a small and finite sample data size. It also provides unbiased long run estimates (Adeleye, 2018).

The generalised ARDL (p,q) model employed in the study:

$$Y_t = \alpha_{0i} + \sum_{i=1}^p \beta_{0i} Y_{t-1} + \sum_{i=0}^q \beta'_{1i} X_{t-1} + \varepsilon_{it}$$

The specified ARDL model employed to test the hypothesis was;

$$GDP_t = \alpha_0 + \sum_{i=1}^p \beta_0 GDP_{t-1} + \sum_{i=1}^q \beta_1 DSPT_{t-1} + \sum_{i=1}^q \beta_2 EXDT_{t-1} + \sum_{i=1}^q \beta_3 EXRT_{t-1} + \sum_{i=1}^q \beta_4 FXGR_{t-1} + \psi_0 GDP_{t-1} + \psi_1 DSPT_{t-1} + \psi_2 EXDT_{t-1} + \psi_3 EXRT_{t-1} + \psi_4 FXGR_{t-1} + \varepsilon_t$$

Where: GDP = Economic Progress; DSPT = Debt Service Payment; EXDT = External debt; EXRT = Exchange Rate; FXGR = Foreign Exchange and Gold Reserves; ε_t = Stochastic error term

4. ANALYTIC

Table-1. Showing the Gross Domestic Product and External Sector Variables.

Year	Total External Debt [EXDT]	Foreign exchange and gold reserves [FXGR]	Nigeria: Debt service (DSPT)	Gross Domestic Product [GDP]	Exchange Rate [EXRT]
	USD (\$) Billion	(US \$) Billion	(US \$) Billion	(US \$) Billion	N/\$
1980	8.94	10.64	1.15	64.20	0.55
1981	11.45	4.17	1.79	61.08	0.62
1982	11.99	1.93	2.09	51.40	0.67
1983	17.58	1.25	2.57	35.45	0.72
1984	17.78	1.67	4.07	28.50	0.77
1985	18.66	1.89	4.43	28.87	0.89
1986	22.22	1.35	2.05	20.72	1.75
1987	29.02	1.50	1.11	24.09	4.02
1988	29.62	0.93	2.21	23.27	4.54
1989	30.12	2.04	2.12	24.23	7.36
1990	33.46	4.13	3.34	30.76	8.04
1991	33.53	4.68	2.94	27.39	9.91
1992	29.02	1.20	2.41	29.30	17.3
1993	30.70	1.64	1.49	15.79	22.07
1994	33.09	1.65	1.87	18.09	22
1995	34.09	1.71	1.83	28.55	21.9
1996	31.41	4.33	2.23	34.99	21.88
1997	28.47	7.78	1.42	35.82	21.89
1998	30.31	7.30	1.33	32.00	21.89
1999	29.10	5.65	1.07	35.87	92.34
2000	32.37	10.10	1.85	46.39	101.7
2001	31.42	10.65	2.52	44.14	111.23
2002	31.78	7.57	1.48	59.12	120.58
2003	36.71	7.42	1.63	67.66	129.22
2004	39.90	17.26	1.71	87.85	132.89
2005	25.75	28.63	8.81	112.25	131.27
2006	9.62	42.74	6.71	145.43	128.65
2007	12.14	51.91	1.01	166.45	125.81
2008	13.13	53.60	0.69	208.06	118.55
2009	15.94	45.51	0.76	169.48	148.9
2010	15.48	35.88	1.26	369.06	150.3
2011	17.66	36.26	0.53	411.74	153.86
2012	18.13	47.55	1.34	460.95	157.5
2013	21.14	46.25	0.50	514.97	157.31
2014	24.76	37.50	4.55	568.50	158.55
2015	28.94	31.33	1.46	481.07	192.44
2016	31.15	30.03	2.50	404.65	253.49

Source: Cbn Statistical Bulletin, World Development Indicators.

The raw data showed the Gross Domestic Product and external sector variables for the period (1980-2016) in view (see Table 1).

3.3. A priori Expectation

It is expected that debt service payment and external debt show a negative association with GDP. This expectation is consistent with the debt overhang models which impressed that larger debt stocks impedes growth by partly reducing investment leading to increased poverty. Also, external reserves and foreign exchange rate were to show a positive relationship with GDP respectively, *ceteris paribus*.

Table-2. Descriptive Statistics.

	LGDP	LDPTS	EXRT	LFXGR	LEXDT
Mean	24.96252	21.32707	74.41514	22.74573	23.86020
Median	24.56026	21.32917	22.07000	22.72678	24.08859
Maximum	27.06627	22.89883	253.4900	24.70480	24.40959
Minimum	23.48258	20.02139	0.550000	20.65390	22.91360
Std. Dev.	1.116133	0.627725	72.02899	1.365908	0.410654
Skewness	0.678335	0.222860	0.466344	0.061307	-0.807532
Kurtosis	2.063414	3.330930	2.010183	1.543616	2.450762
Jarque-Bera	4.189859	0.475113	2.851532	3.293139	4.486400
Probability	0.123079	0.788552	0.240324	0.192710	0.106118
Sum	923.6134	789.1014	2753.360	841.5918	882.8275
Sum Sq. Dev.	44.84709	14.18540	186774.3	67.16538	6.070907
Observations	37	37	37	37	37

The mean, median, mode and standard deviation of the variables are clearly spelt out (see Table 2). The dataset of GDP, EXDT, DPTS, EXRT and FXGR were log-transformed to LGDP, LEXDT, LDPTS, EXRT and LFXGR respectively. The dataset for LGDP, LDPTS, EXRT, LFXGR had positive skewness to the right [S>0] while the data set for LEXDT had negative skewness to the left [S<0]. The dataset for LDPTS was mesokurtic [K=3] while the dataset for LGDP, EXRT, LFXGR, LEXDT were platykurtic [K<3] respectively. The Jarque-Bera (J-β) results [P>0.05] signals all the variables were normally distributed respectively.

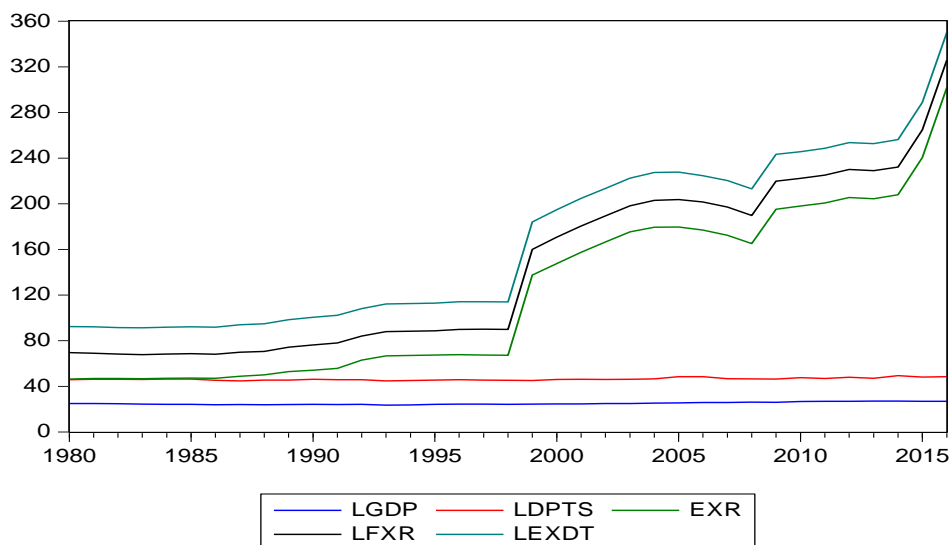


Figure-1. Line Graph showing the interactions between LGDP, LDPTS, EXRT, LFXGR and LEXDT.

The line graph in Figure 1 showed the interaction between the study variables. It suggested a positive and strong correlation between the exchange rate (EXRT), foreign exchange and gold reserves (FXGR) and external debt (EXDT) respectively. It showed that the 3 variables moved in the same directions simultaneously. Also there

seemed to be a strong correlation between the variables of gross domestic product (LGDP) and debt service (LDPTS) as both lines moved in the same direction simultaneously.

Table-3. ADF Unit Root Test of debt dynamics and economic progress.

Parameter	AD-F	1percent	5percent	10percent	P-value	Decision
EXRT	-3.67	-3.63***	-2.95**	-2.61*	0.00<0.01	I(1)
LDSPT	-4.25	-3.62***	-2.94**	-2.61*	0.00<0.01	I(0)
LFXGR	-5.00	-3.63***	-2.95**	-2.61*	0.00<0.01	I(1)
LGDP	-5.25	-3.63***	-2.95**	-2.61*	0.00<0.01	I(1)
LEXDT	-4.83	-3.63***	-2.95**	-2.61*	0.00<0.01	I(1)

The unit root test presented the integration at the first order of all the variables except LDSPT which was integrated at levels (see Table 3). Consequently, the suitable estimation technique used was the Auto Regressive Distributed Lagged (ARDL) technique.

Table-4. Showing Pairwise Granger Causality Tests between external debt dynamics and economic growth in Nigeria.

LGDP			LEXDT			LDSPT			LFXGR			EXRT		
Parameter	χ^2 - value	P-value	Variable	χ^2 - value	P-value	Variable	χ^2 - value	P-value	Variable	χ^2 - value	P-value	Variable	χ^2 - value	P-value
LEXDT	0.34	0.71	LGDP	0.66	0.52	LEXDT	1.39	0.26	LEXDT	1.40	0.26	LEXDT	0.91	0.41
LDSPT	0.86	0.43	LDSPT	3.58	0.04*	LGDP	0.88	0.42	LDSPT	2.09	0.14	LDSPT	0.55	0.58
LFXGR	2.42	0.11	LFXGR	1.23	0.31	LFXGR	0.16	0.85	LGDP	5.52	0.01*	LFXGR	5.78	0.01*
EXRT	0.99	0.38	EXRT	0.75	0.48	EXRT	0.05	0.95	EXRT	0.83	0.45	LGDP	7.34	0.00*

Note: * indicate statistical significance at 5 per cent significance which connotes the rejection of null hypothesis.

The decision criteria stipulates that when Prob. value >0.05, accept null hypothesis, otherwise refuse to accept null hypothesis. We therefore make the following assertions (as indicated in Table 4);

- LGDP does not granger cause LEXDT, LDSPT, LFXGR, EXRT respectively.
- LEXDT does not granger cause LGDP, LFXGR, EXRT respectively. However, LEXDT granger causes LDSPT.
- LDSPT does not granger cause LEXDT, LGDP, LFXGR, EXRT respectively.
- LFXGR does not granger cause LDSPT, LEXDT, EXRT respectively. However, LFXGR granger causes LGDP.
- EXRT does not granger cause LDSPT and LEXDT. However, EXRT granger causes LGDP and LFXGR respectively.

4.1. Restatement of Model 1

$$GDP_t = \alpha_0 + \sum_{n=1}^p \beta_0 GDP_{t-1} + \sum_{n=1}^q \beta_1 LDSPT_{t-1} + \sum_{n=1}^q \beta_2 EXDT_{t-1} + \sum_{n=1}^q \beta_3 EXRT_{t-1} + \sum_{n=1}^q \beta_4 FFXGR_{t-1} + \psi_0 GDP_{t-1} + \psi_1 DSPT_{t-1} + \psi_2 EXDT_{t-1} + \psi_3 EXRT_{t-1} + \psi_4 FFXGR_{t-1} + \epsilon_t$$

Table-5. Table Showing ARDL model .

LGDP_t	+0.81	+0.77LGDP_{t-1}	+0.001EXRT_t	+0.15LFXGR_t	-0.06LEXDT_t	-0.002LDSPT_t
SE	(0.56)	(0.06)	(0.001)	(0.05)	(0.12)	(0.05)
T-Stat	{1.44}	{11.85}	(1.08)	(2.79)	(-0.50)	{-0.03}
P-Value	[P >0.05]	[P <0.05]	[P >0.05]	[P <0.05]	[P >0.05]	[P >0.05]
Diagnostic Test						
R²	Adjusted R²	F-statis.	DWts.	BrG-F	X²(HET)	RESET-F
97%	96%	177.90	2.3	0.27	0.23	0.14

The analysis above indicated a significantly positive impact between lagged-variables of GDP and current-variables of GDP (see Table 5). It showed a positively not-significant impact of exchange rate (EXRT) on gross

domestic product (LGDP). It depicted that foreign exchange and gold reserve (LFXGR) had a positive and significant impact on LGDP. It suggested that 1 percentage (%) growth in foreign reserves generated a 0.15 percentage (%) growth in GDP. It showed a negatively not-significant impact of external debt (LEXTD) on LGDP. It showed a negatively not-significant impact of debt service (DSPT) on LGDP *ceteris paribus*.

The goodness of fit ($R^2=97\text{percent}$) and the (Adjusted $R^2=96\%$) showed a strongly related link between the explained and independent variables. The F-stat (177.90; $P<0.05$) suggested that the equation was significant at five percent error limit. Therefore, the deduction of the model can be confidently relied upon. The Durbin Watson (DWts.) inferred there wasn't any suspicion of first-order autocorrelation which was confirmed by Breusch-Godfrey Serial Correlation LM Test. The X^2 (HET) confirmed the model to be homoscedastic.

The RESET-F suggested that the model was specified in the correct form. The CUSUM plus the CUSUM of Squares figures suggested that the model was stable inside the lower and the upper bounds which indicated that the model was stable and correctly specified (see Figures 2 and 3). The Jarque-Bera normality test ($P\{JB\text{ Norm}\}>0.05$) suggested that the residuals of the equation were normally distributed. The log-transformed data were done to improve linearity. The lagged variables were lagged-transformed to make the model robust. Therefore, the model was the Best Linear Unbiased Estimator (BLUE).

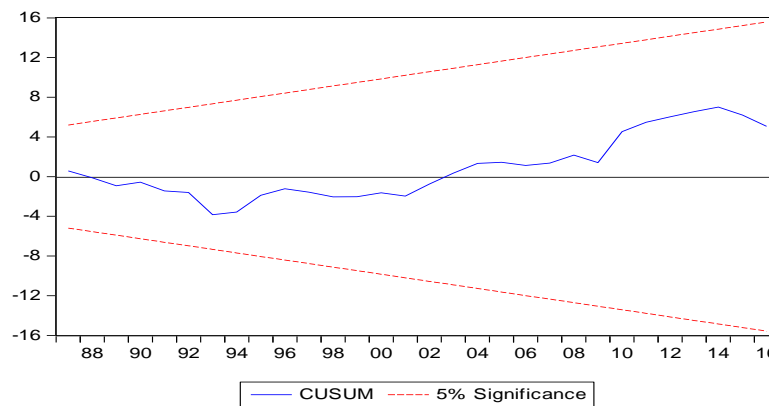


Figure-2. Showing CUSUM analysis for Model 1.

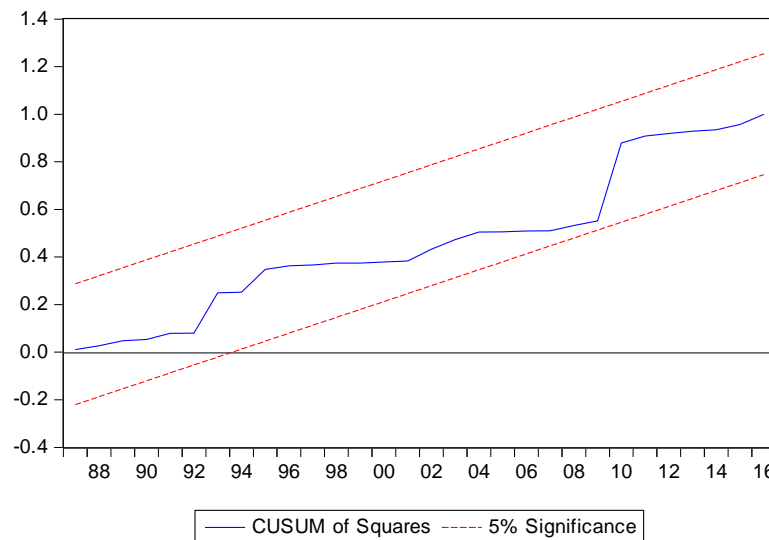


Figure-3. Showing CUSUMQ analysis for Model 1.

5. CONCLUSION

The paper empirically examined the interactions between external debt dynamics and the impact on sustainable growth. Secondary data collected was from the CBN Stat. Bulletin, Debt Management Office's website and other

relevant sources. The dataset covered a 37year period from 1980-2016. The Auto Regressive Distributed Lagged (ARDL) regression method and granger causality test represented the principal estimation methods used with a combination of other diagnostic tests. The analysis followed an analytical sequence by conducting a pre-test, followed by estimation techniques and finally, diagnostic test. The significant contribution of the study was that it exposed the fact that external debt, debt service payments and exchange rate fluctuations had not significantly impacted on economic growth in Nigeria. However, foreign exchange and gold reserves had a significant impact on sustainable growth.

Also, external debt and debt service had a negative insignificant impact on GDP. This conformed to the debt overhang theory that excessive external debt is a dysfunction to economic growth. It also lined up with empirical results of negative linkage between external debt and sustainable growth. It was extrapolated that external debt had no-causal association with economic growth. Therefore, external debt did not granger-cause GDP and GDP does not granger-cause external debt. There is no causality between external debt service payment and sustainable growth. Therefore, debt service payment wasn't granger-caused by GDP and GDP wasn't granger-caused by external debt service payment.

It was concluded that though Nigeria was not badly sloped on the edge of the debt-laffer-curve, external debt still had a negative relationship on sustainable growth. The foreign debt profile and external debt service payments had not reached a worrisome, economic threatening threshold. That implied that the country could still afford to meet its critical obligations to its citizens. However, it also implied that the economy had not benefitted positively from the mass of external debt it had accessed through the period. This may be attributed to the corrupt process and wastage associated with governance in the country. The country's infrastructure throughout the years, which should have been the justification for the large indulgence in foreign loans, was still in disarray. With no causality between external debt and economic growth, further accumulation of external debt may be counterproductive and enrich only a few.

The study therefore recommended that if external debt must be obtained, the funds should be invested in infrastructural facilities and other viable sectors of the Nigerian economy in order to increase its benefits to the economy.

The paper's primary contribution is finding that external debt and debts service had a negative (not-significant) impact on economic growth in Nigeria. The study used fairly new estimation techniques to estimate the debt-growth relationship and re-modelled the debt-growth hypothesis using the ARDL model as a further contribution to literature.

The policy implication of this research suggests that external debt may have a negative impact on the economy if not channeled to the productive ventures. The proposition is likely to hold true for other developing countries but may lack general applicability in more advanced economies. This paper satisfies an intrinsic desire to understudy how the debt-growth relationship can be optimised for sustainable economic development and growth in developing countries.

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