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Relevance of Wagner's Hypothesis in Achieving Sustainable Development Agenda in Nigeria [1]

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Abstract

Policy ambiguity in the form of non-directional and non-purposeful use of state resources has made sustainable growth outcomes a mirage in Nigeria. Recent economic crisis prompted the debate on how increased government spending induces sustainable economic growth in Nigeria. This paper examines the validity or otherwise of Wagner's theory in Nigeria for the realisation of the Sustainable Development Goals (SDGs) from 1980 through 2017. Using time-series data on real gross domestic product, total government expenditure, money supply and domestic investment and adopting the two-step Engle and Granger estimation procedure, result shows that increased government spending significantly predicts variations in real gross domestic product and thus leaned empirical credence to Wagner's hypothesis as an essential concept for the attainment of Sustainable Development Goals in Nigeria. This paper recommended that the government should exhaust all possible options to increase expenditure in order to realise sustainable growth in Nigeria.

Keywords: Government Expenditure, Economic Growth, Wagner law and Granger Causality

JEL Codes: E62, O11

Introduction

Public expenditure and economic growth have been the focus of public finance since the magnitude of public expenditure has been increasing over time in almost all the countries of the world. However, there exist empirical and theoretical ambiguity on the exact structural relationship between increased government expenditure and sustainable economic growth. An attempt is made in this study to explain the structural relationship that exists between increased government expenditure and inflation-adjusted growth outcomes in Nigeria for the realisation of the Sustainable Development Goals (SGDs).

Wagner (1883) argued that public expenditure grows in consonance with national income since it is endogenously determined. By this, Wagner (1883) posits that government expenditure engineers growth through the functionality and increase in production of an economy. The overriding assumption is that increased state spending has forward linkages that could help in the actualisation of increased and sustainable growth outcomes. However, Keynes (1936) argued that for growth and development to occur, the government must stimulate aggregate demand. By default, public expenditure is central to national income generation. This theoretical proposition contrast with Wagner's law. Keynes argued that in the era of recession like those witnessed in Nigeria from the first quarter in 2016 through the third quarter, increased government expenditure could be used to augment economic activities. This process emanates from the increase in the money supply that quickly increase the probability of the private sector to access credit and subsequently raised productive capacity, which in turn stimulate the aggregate demand.

This theoretical divide has been studied extensively in several decades in the time past (see (Fuller, 1981; Keho, 2015; Udo & Effiong, 2014). Previous studies have focused on several countries (Irandoust, 2019 in Sweden; Sedrakyan & Varela-Candamio, 2019 in Armenia and Spain; Ighodaro & Oriakhi, 2010 in Nigeria; Magazzino, 2012 in Italy) and periods using varying econometric procedure ranging from linear or non-linear cointegration (Dada & Adewale, 2013; Demirbas, 1999) and causality (Ahmad, 2014; Iniguez-Montiel, 2010; Masan, 2015; Menyah & Wolde-Rufael, 2013; Salih, 2012; Srinivasan, 2013; Wu, Tang, & Lin, 2010; Yuk, 2005). However, findings emanating from such studies are mixed and anecdotal. Some reported unidirectional causality from public expenditure to growth (see Akitoby, Clements, Gupta, & Inchauste, 2006; Barra, Bimonte, & Spennati, 2015; Brückner, Chong, & Gradstein, 2011; Szarowská, 2012) while some found unidirectional causality from growth to public expenditure (Bağdigen & Çetintaş, 2004; Henrekson, 2007; Ziramba, 2008). The empirical ambiguity in the quest for sustainable economic growth mainly as it concerns the realisation of the immediate development plan of the SDGs and Africa 2063 Agenda in mind inform the need to re-examine this hypothesis in Nigeria with a view of coming up with findings that can redefine policy and research on the subject matter.

It is surprising to know that, population structure, even though it should affect expenditure, has been neglected in most studies on the validity or otherwise of Wagner's Law. Thus, making studies emanating from such studies largely adhoc. Despite recent advancement in revenue generation, the increasing population has become the major problem of Nigeria (Adeniyi, Oyinlola, Omisakin, & Egwaikhide, 2015). As of 2018, the estimated population of the country is 188.96 million, growing at around 2.6 per cent per annum which is one of the highest growth rates not only in Africa but in the world (UNDP, 2018). At this rate, the population of Nigeria will become over 250 million in 2030, considering the present trend. The economy will struggle to sustain the fast-growing population, and it will not be possible to make a significant improvement in the quality of life even under the most favourable rate of economic development (Iheonu *et al.* 2019). Consequently, an expenditure document (national budget) predicated on a conventional Wagner's or Keynes theoretical fluidity cannot be sustainable (Eboh, Akpata, & Akintoye, 2016). The effect of such expenditure pattern on overall growth and development will be quite minimal (Chakraborty et al., 2014). It is not even entirely clear what the validity or otherwise of the Wagner's hypothesis means for the realisation of the SDGs in Nigeria. It is in such context that information about the implication of the validity or otherwise of the Wagner's hypothesis for the realisation of the SGDs in Nigeria is required.

Another essential concept yet to be examined in the literature on Wagner's hypothesis is the validity of the hypothesis for the realisation of the Sustainable Development Goal (SDGs). There is no gainsaying that the actualisation of the SGDs in Nigeria has been challenging considering the structural characteristics of Africa nations. Development finances are at a modest low in Nigeria because of low-level of income (Moïse & Hongyi, 2017), low saving proportion (Ouma, Odongo & Were 2017), weak credit security (van Rooyen, Stewart, & de Wet, 2012), increasing and agonising problems of insurgency (Onanuga, Odusanya and Adekunle, 2020), problems of corruption (Olivier De Sardan, 1999), and many more. In an argument of whether increased government expenditure induces the growth or the other way round, it is essential to examine the inflationary characteristics of these nominal representations that Wagner's hypothesis and the Keynes theory of income determination rest upon. This is because the primary objective of governance is the welfare and social well being on its citizenry in a manner that is sustainable. Estimating model for the prediction of the impact and the direction of public expenditure without the central sustainability concept enshrined into it makes it lifeless particularly now that the whole world tends towards a sustainable approach and an egalitarian society.

In this study, we seek to examine which public expenditure pattern has a significant effect on the realisation of the SDGs in Nigeria. The novelty of this study is twofold. First, the analysis lies on a new perspective by introducing population structure (a key determinant of public expenditure on the outcome of the validity or otherwise of the Wagner’s hypothesis) for the realisation of SDGs in Nigeria. Second, the analysis of the relationship between economic growth and government spending is made by its components, i.e., following the functional disaggregation of government spending for the realisation of SDGs according to the literature. This country-specific analysis of public finance management in Nigeria gains additional importance in light of the effort made to the realisation of SDGs in Nigeria in the last assessment report on Nigeria released by the WorldBank (2017). It is against this backdrop that this study seeks to empirically validate or refute the Wagner’s hypothesis for the realisation of the sustainable development agenda in Nigeria.

Having introduced the study, we proceed to describe in details the methodology used, then present the empirical results and their corresponding interpretations and discussion while the last part gives the conclusion and policy recommendations.

Methods

Model Specification

In validating the applicability of Wagner's law or otherwise in Nigeria for the realisation of the sustainable development goals (SDGs), this study is a prototype of Ighodaro and Oriakhi (2010) who specify a Solow growth model that emphasised the significance of investment (i.e. capital) and labour effectiveness in augmenting growth process. The Solow growth model is symbolically represented below:

$$Q = f(K, L) \qquad \textbf{(1)}$$

Where Q is the national output, K represents capital resources employed and L for a unit of labour employed in the production process. However, since our focus is on the public sector influence, the model includes government expenditure as one of the factors that explain growth with population bias of expenditure pattern introduced to improve on the outcome of previous studies. The output (growth) model specified for this study is presented thus:

$$RGDP_t = f(GOV_{EXP_t}, GCF_t, POP_t, M_{2_t}) \qquad \textbf{(2)}$$

Where: $RGDP_t$ = Real GDP at time $_t$, GOV_{EXP_t} = Government expenditure at time $_t$, GCF_t= Rate of Investment (proxied by Gross Fixed Capital formation) POP_t = population growth at time $_t$, M_{2_t} = Money supply at time $_t$

Restating the model in an econometric form:

$$RGDP_t = \beta_0 + \beta_1 GOV_{EXP_t} + \beta_2 GCF_t + \beta_3 POP_t + \beta_4 M_{2_t} + \varepsilon_t \qquad \textbf{(3)}$$

Where ε_t represents error term and $\beta_1, \beta_2, \beta_3$and $\beta_4$re elasticities of the growth model. $\beta_0$is the value of the explained variation when the explanatory variables are zero.

These variables are log-linearised to adjust for heteroskedasticity and variance in dimension in units and measurements

$$lnRGDP_t = \beta_0 + \beta_1 lnGOV_{EXP_t} + \beta_2 lnGCF_t + \beta_3 lnPOP_t + \beta_4 lnM_{2_t} + \varepsilon_t \qquad \textbf{(4)}$$

Data Sources and Measurements

Our study used time series data for sustainable economic growth and development (measured with real GDP) and indicators for Wagner's proposition in Nigeria (government expenditure, gross capital formation, money supply, and population growth) from 1980 through 2017. The data are mainly obtained from the CBN statistical bulletin various issues up until 2017 and World Bank Database (World Development Indicator, 2017). Sustainable economic growth was measured using real GDP (an inflation-adjusted growth index) as used in the work of Alier (2009); Anand and Sen (2000); Böhringer and Jochem (2007); Henderson, Storeygard, and Weil (2012); Raudino and Raudino (2016). However, government expenditure as in Afonso and

Fernandes (2006); Hajamini and Falahi (2018); Schwartz and Clements (1999), gross fixed capital formation as in Krkoska (2002); van der Eng (2009), population growth Ehrlich and Holdren (1971); Ness (2008); Pearce (2013) and money supply are the explanatory variables of the model stated in equations (9) above. The data are mainly obtained from the World Bank Database (World Bank, 2017). The variables of the study and their respective descriptions and sources are contained in Table 1

Table 1: Variable Description

Abbreviation	Description	Variable	Source
$RGDP$	Real GDP	Sustainable Economic Growth	World Development Indicator (WDI), 2017
GOV_{EXP}	Government Expenditure	Total Government Expenditure	World Development Indicator (WDI), 2017
GCF_t	Gross Fixed Capital Formation	Domestic Investment	World Development Indicator (WDI), 2017
POP	Population Growth	Population	World Development Indicator (WDI), 2017
M_2	Money Supply	Money Supply at Current Time *t*	Central Bank of Nigeria Statistical Bulletin (CBN) Statistical Bulletin, 2017

Estimation Technique

The study employs three-prong procedural steps. The first phase consists of pre-estimation evaluation, These are the preliminary evaluation of the data using the descriptive statistics method in order to help show, describe and summarize the data in a meaningful way and also to know if the data are normally distributed through their averages and Jarque-Bera values (Gujarati &Poter, 2009). The next step is the determination of the stability of the variables. For the purpose of this research, the Augmented Dickey-fuller (ADF) unit root tests were deployed. This test of the time series data is required because a non-stationary regressor invalidates many standard empirical results (Phillips & Perron, 1988). The presence of a stochastic trend is determined by testing the presence of unit roots in time series data. Thereafter, the Johansen co-integration test is applied to establish whether there is a long-run relationship between the variables. The primary step in the Johansen cointegration test is to obtain the optimal lag length because the Johansen cointegration test is sensitive to lag length (Johansen, 2015). If the lag length is too much, the test will give a misleading result. The optimal lag length was determined by the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SC). However, in a situation where any of the criteria (AIC or SC) picks an optimal lag length different from the other, the Schwarz Information Criterion is a better criterion to be used to determine the optimal lag length (Koehler & Murphree, 1988).

The Error Correction Model (ECM), a test for a short run and long-run dynamics between variables is then conducted. The error correction model is specified as in equation (11):

$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, \Delta\, RGDP_{t-1} + \sum_{i=1}^{n} \alpha_{2i} GOV_{EXP_{t-1}} + \sum_{i-1}^{n} \alpha_{3i} \Delta GCF_{t-1} + \sum_{i=1}^{n} \alpha_{4i} \Delta POP_{t-1} + \sum_{i=1}^{n} \alpha_{5i}\, \Delta\, M_{2_{t-1}} + \delta ECT_{t-1} + \varepsilon_t \quad \textbf{(5)}$$

The third phase is the post estimation. In order to confirm the robustness and validity of the regression model, some post-estimation tests were conducted. These are the Breusch-Godfrey Serial Correlation to test for autocorrelation (Aue & Horváth, 2013), Breusch-Pagan Heteroscedasticity test to test for the violation of homoscedasticity and Granger Causality test to determine the nature of the causal relationship that exists between the variables. Also, the Cusum structural stability test was conducted to examine the structural stability of the model.

Result and Discussion

Descriptive Statistic, Normality Test and Correlation Matrix

Table 2: Descriptive Statistics of the Data Set

Description	$lnRGDP$	$lnGOV_{EXP}$	$lnGCF$	$ln\,POP$	lnM_2
Mean	8.149449	5.565807	22.81514	18.58724	6.349659
Median	8.395581	6.370539	22.17989	18.58490	6.317335
Maximum	11.45259	8.032117	25.22128	19.04120	9.846986
Minimum	4.546746	2.265558	21.42738	18.13941	2.672158
Std. Dev.	2.317413	1.894469	1.283214	0.269842	2.471091
Skewness	-0.165288	-0.580534	0.771602	0.017800	-0.048259
Kurtosis	1.723156	1.816919	2.120550	1.820879	1.598291
Jarque-Bera	2.609417	4.121639	4.732367	2.087389	2.961154
Probability	0.271252	0.127350	0.093838	0.352151	0.227506

Source: Author, 2019

Table 2 shows the mean and median of all the observations in the data set lie within the maximum and minimum values indicating the high tendency of the normal distribution. Gross capital formation and the populationare positively skewed while money supply, government expenditure and real GDP are negatively skewed. The kurtosis statistics showed that real GDP, government expenditure, gross fixed capital formation, population growth and money supply were platykurtic, suggesting that their distributions were flat relative to normal distribution. The Jarque-Bera statistics shows that the series is normally distributed since the p-values of all the series are not statistically significant at 5% level. Thus, informing the acceptance of the null hypothesis that says each variable is normally distributed.

Table 3: Correlation Matrix of the Data Set

	REAL_GDP	*GOV_EXP*	*GCF*	*POP*	*M_2*
REAL_GDP	1				
GOV_EXP	-0.523671	1			
GCF	-0.274067	0.3076	1		
POP	-0.075093	-0.031851	0.280163	1	
M_2	0.486981	0.489765	0.654883	0.493106	1

Source: Author, 2019

Furthermore, studies have argued that testing of the correlation among the variables of estimates would make the researchers detect whether the variables have high multicollinearity among themselves. As a result, the parameter estimates may contradict what the theory says due to the unexpected effect of multicollinearity among the independent variables (Dormann *et al.*, 2013). However, Iyoha (2004) argued that multicollinearity among variables occur when the result of the correlation coefficient is above 0.95. In line with this explanation, the study presents the results of the correlation analysis of the set of variables employed in Table 3 above. The table shows the correlation coefficients among the variables $RGDP_t GOV_{EXP_t}, GCF_t, POP_t, M_{2_t}$ are below 0.95, indicating that there is no tendency for multicollinearity to occur among the independent variables.

Time Series Properties of the Variables

To establish the stationarity, we proceed to check the Augmented Dickey-Fuller (ADF) unit root test for the acceptance or rejecting of the null of non-stationarity of variables in the data set following (Dickey & Fuller, 1979). Constant mean and variance depict stationarity in consonance with the assumption of the classical linear regression model. To reject the position of Null which states *contain a unit root,* the absolute value of the t-Stat must be higher than the critical value at 5% level of significance for every single variable in the model. The ADF test consists of estimating the following regression.

$$\Delta Y_t = \alpha + \beta_t + \delta Y_{t-1} + \sum_{i=1}^{m} \varphi i \Delta Y_{t-i} + \varepsilon_t \quad \textbf{(6)}$$

Where α represents the drift, *t* represents deterministic trend and m is an optimal lag length ample enough to ensure that ε_t is a white noise error term.

Table 4 Unit Root Test: Augmented Dickey-Fuller Test (ADF)

Variables	***Level T-Stat***	***Critical Value @ 5%***	***First Difference T-Stat***	***Critical Value @ 5%***	***Order of Integration***
$lnRGDP$	-0.811619	-2.948404	-5.049675	-2.951125	I (1)
$lnGOV_{EXP}$	-0.089026	-3.544284	-3.548490	-6.226249	I (1)
$lnGCF$	0.032608	-2.948404	-4.192599	-2.951125	I (1)
$lnPOP$	1.345058	-2.971853	-6.523446	-2.971853	I (1)
lnM_2	-1.377232	-2.951125	-4.215257	-3.595026	I (1)

Source: Authors, 2019

It is observed that all the variableswere stationary at first difference I (1) at 5% significance level thus necessitating the conduct of Error Correlation Model to gradually adjust from the long run converging characteristics of the variables to the short run. The error correction modelling procedure has a specification built into it that prevent the long convergence behaviour of the variable by gradually adjusting back to equilibrium (Engle & Granger, 2015).

Optimal Lag Length Selection

In selecting the optimal lag length for the cointegration equation based on the hypothesis that the residuals are serially uncorrelated, the lag length which minimises the Akaike Information Criterion (AIC), Schwarz Criterion (SC) and the Hannan-Quinn Criterion and at which the model does not have autocorrelation is the optimal lag length. In this study, we rely on the Akaike Information Criterion (AIC) in choosing our optimal lag length.

Table 5: Optimal Lag Length Selection Criteria

Lag length	LogL	LR	FPE	AIC	SC	HQ
0	-130.3963	NA	0.000123	8.023310	8.292668	8.115169
1	64.80295	310.0223*	1.09e-08*	-1.341350*	0.544154*	-0.698339*

Source: Author, 2019.

Notes * indicates lag order selected by the criterion

LR: Sequential modified LR test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: -Hannan- Quinn Information Criterion

The result in Table 5 portrays different lag length criterion (LR, FPE, AIC, SC and HQ). The Schwarz information criteria depicting lag order length of (1) for the model is selected. After establishing the lag order length, the co-integration, and long-run equation results were estimated and explained in the next section.

Co-Integration Test

Johansen Co-Integration Test

The result of the Johansen Co-integration for both the Trace Statistic and Maximum Eigen Value is reported in Table 4 and Appendix ii. With the hypothesised level of acceptance is 5 per cent.

Table 6: Result of Johansen Co-integration test based on Trace Statistic and Max Eigenvalue

		Trace Statistic			**Max. Eigen Value**		
No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.	Max-Eigen Value	Critical Value	Prob.**
None *	0.74	138.42	95.75	0.00	44.52	40.10	0.01
At most 1 *	0.69	93.91	69.82	0.00	38.61	33.88	0.01
At most 2*	0.53	55.29	47.86	0.01	25.50	27.58	0.09
At most 3*	0.42	29.80	29.80	0.05	18.17	21.13	0.12
At most 4	0.21	11.63	15.50	0.18	7.86	14.26	0.39
At most 5	0.11	3.76	3.84	0.05	3.76	3.84	0.05

Source: Author, 2019.

Notes: Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

Max-eigenvalue test indicates 2 cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The result means that there is a long-run relationship between real GDP, government expenditure, gross capital formation, population growth and money supply based on the rejection of the null hypothesis at 5% level of significance. The determination of the short-run association is computed in the next section.

Error Correction Model
Table 7: Short-run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.144023	0.043916	3.279479**	0.0029*
D(ln GOV_{EXP})	0.119305	0.077033	1.548755**	0.0331**
D(ln GCF)	0.176324	0.072101	2.445524**	0.0213**
D(ln POP)	-0.227719	0.145573	-1.564291**	0.0294**
D(lnM_2)	0.191688	0.141091	1.358615*	0.0255**
ECM(-1)	-0.459100	0.129109	-3.555899	0.0014*
R-squared	0.716278			
Adjusted R^2	0.753229			
F-statistic	11.36061			
Prob(F-statistic)	0.000003*			
Durbin-Watson stat	1.977587			

Source: Author, 2019.
*(1%) **(5%) indicates significance levels

Table 7 represents the result of short-run estimates by using the Error Correction Model (ECM). The estimated coefficient of the error correction vector is 0.4591. This means ECM (-1) is the speed of adjustment correcting back at the rate of 45.91 per cent annually. The negative sign and the significant probability signify the existence of co-integration among the variables. This shows that approximately 46% of the previous year's disequilibrium in the economy is corrected in the long run which implies that adjustment of the deviation of the explanatory variable back to normality is very high.

The result of the short run in Table 5 indicates that government expenditure, gross capital formation and money supply have a positive and significant relationship with inflation-adjusted growth (RGDP) in the short run, while the population has a negative and significant relationship with inflation-adjusted growth (RGDP) in the short run. The findings of this study are consonance with the findings of Borcherding, Ferris, and Garzoni (2005); Chinweuba (2016); Tsaliki and Katrakilidis (2009). However, the findings of this study is in contrast to Nurudeen (2010); Chude and Chude (2013); Landau (1997); Oluwatobi and Ogunrinola (2011). The value of the adjusted R^2 of 0.75 indicates that government expenditure, gross fixed capital formation, money supply and population explain 75.32% of variations in inflation-adjusted growth (RGDP) while the remaining 24.68% are captured outside the model. The value of Durbin Watson is 1.98 for the model. This implies that our model is free from problems of serial correlation. The F-statistics of 11.36061 is statistically significant at the 1 per cent level, indicating that the explanatory variables are jointly significant, suggesting that the model has a very good fit.

Granger Causality Test

A standard method for testing Granger causality is, firstly, to regressing the dependent variable " y " on its own lagged values and on lagged values of explanatory variables, indicated by " x " and, secondly, to testing the null hypothesis that the estimated coefficients of the lagged values of " x " are jointly zero. Failure to reject the null hypothesis is equivalent to failure to reject the hypothesis that "x" does not Granger cause "y".

The equation to be tested is given by the following regression:

$$RGDP_t = \propto_o + \sum_{j=1}^{p_2} \beta_j GOV_{EXP_{t-j}} + \sum_{k=1}^{p_3} \beta_k GCF_{t-k} + \sum_{v=1}^{p_4} \beta_l POP_{t-v} + \sum_{m=1}^{p_5} \beta_m M_{2-m} + \mu_t \quad \textbf{(7)}$$

To test the non-Granger causality from $GOV_{EXP_t}, GFCF_t$, POP_t, and $M_{2_t}$to $\boldsymbol{RGDP_t}$, we test the nullity of all coefficients, $\beta_j, \beta_{k,}\beta_v, and\ \beta_m$

The pairwise Granger Causality test results are given in Table 8.

Null hypothesis: X does not Granger Cause Y	F-Statistics	Probability
$RGDP_t \rightarrow GOV_{EXP_t}$	1.8339	0.1760
$GOV_{EXP_t} \rightarrow RGDP_t$	0.2475	0.0091*
$RGDP_t \rightarrow GCF_t$	5.7459	0.4170
$GCF_t \rightarrow RGDP_t$	0.7742	0.4333
$RGDP_t \rightarrow POP_t$	3.8083	0.0510
$POP_t \rightarrow RGDP_t$	13.6670	0.0041*
$RGDP_t \rightarrow M_2$	0.1476	0.7010
$M_2 \rightarrow RGDP_t$	4.3221	0.0328*

The result above indicated that there is unidirectional causality from government expenditure to sustainable economic growth in Nigeria. Hence, government expenditure granger causes sustainable economic growth in Nigeria. Also, unidirectional causality from the population and money supply to sustainable economic growth. Hence the population and money supply granger cause sustainable economic growth in Nigeria. This assertion is in tandem with the proposition of Wagner (1883). The findings of the this study are in consonance with Babatunde and Ibukun (2016); Chude and Chude (2013); Nasiru (2012).

Table 9: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	0.845890	Prob. F (3,25)		0.4433
Obs*R-squared	2.236642	Prob. Chi-Square (3)		0.3268

Source: Author, 2019

Given the probability value of 32.68 per cent, we fail to reject the null hypothesis and conclude that our short-run model is free from problems of serial correlation.

Heteroscedasticity Test Result

Breusch-Pagan-Godfrey Heteroscedasticity Test:			
F-statistic	0.565126	Prob. F (13,7)	0.8225
Obs*R-squared	10.75370	Prob. Chi-Square (13)	0.6314
Scaled explained SS	0.746089	Prob. Chi-Square (13)	1.0000

Source: Author, 2019.

Given the probability value of 63.14 per cent, we fail to reject the null hypothesis and conclude that our short-run model is free from problems of heteroskedasticity.

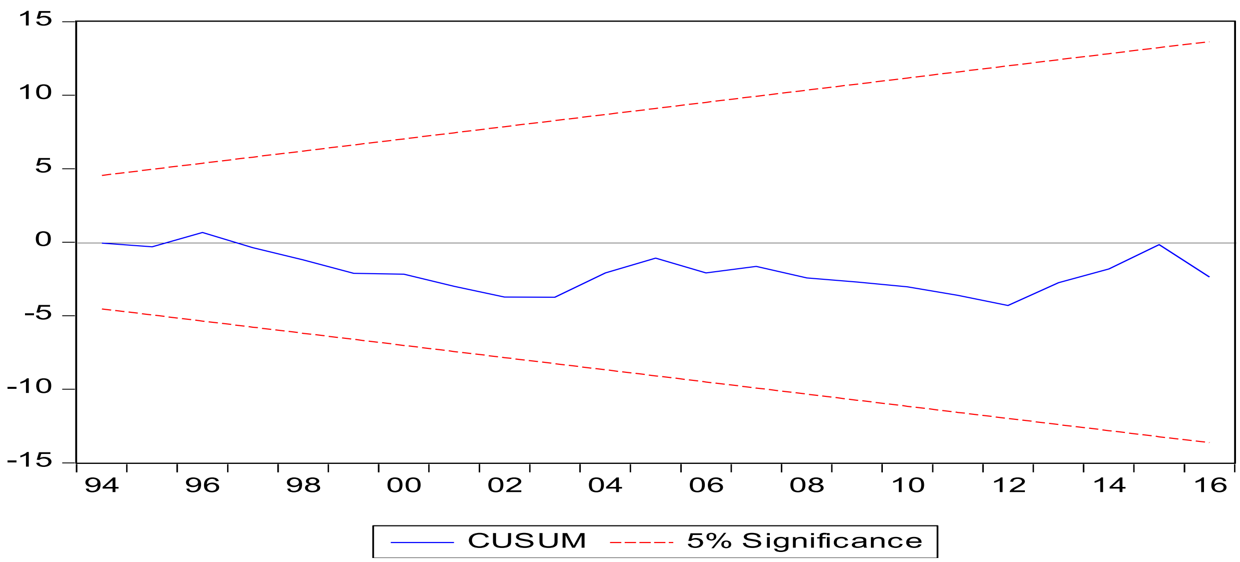

Fig. 1: CUSUM Stability Test

Source: Author, 2019.

The above figure shows that the CUSUM line is within the critical bounds of 5 per cent level of significance which indicates that the model has structural stability.

Conclusion

The paper tests the efficacy of Wagner's law for sustainable development in Nigeria using times series data on key macroeconomic indicators from 1981 to 2016. In evaluating its objectives, the paper adopts error correction modelling to account for the short-run dynamics of the model. The empirical result reveals that government expenditure, domestic investment and money supply induce sustainable economic growth in Nigeria. As such, are sensitive to the performance of significant sectors of the economy. The findings of this study are in tandem with the findings of Sevitenyi (2012); Olugbenga and Owoye (2007); Omotoye (2007) and in stark contrast to Ergun and Turk (2006); Muhlis and Hakan (2003); Singh and Sahni (1984) who found negative association between government expenditure and growth. The findings of the study validate the applicability of Wagner's law in Nigeria for the period observed. As long as government expenditure grows, economic growth and subsequently, sustainable economic growth will be achieved. It is therefore recommended that short-run policies should be tailored towards augmenting total government spending to trigger a reversal growth in GDP which can then be sustained over time.

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