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Research Paper

Testing the Applicability of Wagner's Law in Nigeria

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ABSTRACT:- *This study examined the validity or otherwise of Wagner's theory in Nigeria from 1980- 2015, using time series data on RGDP, TGEX, DINV and HMC. The co integration, VECM and pair wise granger causality econometric tools of analysis were adopted in testing the variables specified in the model. The results obtained from the estimations indicated a long run equilibrium relationship between the dependent and independent variables. TGEX was found to have a negative significant relationship with economic growth both in the short and long run, while DINV maintained positive significant relationship with the dependent variable both in the short and long run. HMC has a positive significant relationship in the short run and insignificant relationship in the long run. The causality test which determines the validity of Wagner's law showed bidirectional causality from national income (RGDP) to government expenditure (TGEX) and vice visa, invalidating the applicability of this hypothesis in Nigeria within the study period. The study therefore recommend the adoption of discretionary fiscal policy in Nigeria that will accommodate a conscious management of public spending and increase in national income simultaneously, through budget discipline and improvement in the ease of doing business in Nigeria to stimulate capital investment.*

I. INTRODUCTION

In years back, a German economist, Adolph Wagner in his typical book, Grundlegung der Politischen Okonomie (1863) developed a law of increasing state activity. He declared that there is a long run tendency for the capacity of government to swell with higher levels of economic progress. Wagner's contribution to public spending hypothesis is predominantly significant when we consider that before Wagner made his observations, the existing view was the concept that as a country grows richer, government activities would have a tendency to decline (Henrekson, 1993). To a large extent this observation is still common in contemporary economic thought. In fact, many conventional economists in the debate on the role of government assert that the growth of government activity in macroeconomic affairs associated with the Keynesian upheaval is a regrettable deviation.

Since the original formulation of Wagner's proposition, a substantial amount of attempt has gone into testing it. This has given rise to many debates among economists on a wide range of issues. First, the specification of an appropriate functional form for empirical testing and a means by which the results are to be interpreted is a serious argument that has not subsided. Second, in econometrics examination, there is a preference between time series models and cross section models to adequately test the 'law'. Besides, the co integration revolution in time series analysis indicates that in order for a long run relationship between government activity and economic development to exist, the two variables should co integrate. In other words, the variables should exhibit a long-run equilibrium. Another issue of note, is whether Wagner's hypothesis is applicable to developing nations like Nigeria and to a lesser extent to advanced economies.

Wagner gave reasons in support of his hypothesis. Firstly, as nations develop, they experience increased difficulty of legal relationships and communications, due to immense division of labour that ensue with industrial growth. As a result of this, Wagner imagined a bloated role for the state in the form of public, regulatory and protective activity. In addition, increased urbanization and population density would lead to greater public expenditure on law and order, and economic regulation due to the associated risk of more conflict in densely populated urban communities. Because of the substitution of private for public activity, the

administrative and protective functions of the state would expand. Thus, as nations become more advanced the number and degree of market failures would make the state to become more regulatory in nature, thereby increasing its role and this would inexorably involve more government *spending*
Wagner predicted the expansion of 'cultural and welfare' expenditures based on the presumption that as income rises, society would demand more education, entertainment, a more equitable distribution of wealth and income, and generally more public services.

Bird (1971) concurs with Wagner's law stating that 'the activities of government are an increasing function of the changing structure of the economy. Whether the state decides to combat or to support private sector activity such as private monopolies, with the growth of this sector, it is plausible to assume that public sector activity will increase.

Richard Musgrave (1969) stated that 'low income countries today do not operate under the same technical, political, and value conditions as prevailed in the past when now developed countries were at similar low levels of income. Attitudes toward growth, changed communication, the demonstration effect of affluence and welfare measures taken abroad, the conflict of political ideologies all make for the basic differences in the historical setting.' This means that developing nations are more likely to provide public services which approximate current levels in the developed countries than the levels provided by the currently developed nations when they were in the earlier stages of development. Some economists argue that it is not the level of income that determines a nation's expenditure, but rather its prevailing conception of the role of the government. They note that developed countries currently spend relatively more on their public services than they had done a hundred years ago, not because they became richer and more prosperous but rather as a result of an evolving conception of the duties of the state. That the state should increase her education budget to accommodate every child of school age and improve the cities with adequate provision of social services was not taken for granted a hundred years ago. They argue that these changes in ideas were not confined to the richer countries; poorer countries went through similar experiences and they too experienced increases in relative public expenditures.

Wagner was inexplicit in his own formulation of the law leaving the precise determination of the theory subject to disagreement among economists. Some economists have argued that Wagner's law cannot be adequately tested empirically because it is not a clear and concise theoretical creation; they believe it amounts to looking at the past and trying to explain the upward trend in public spending. It is therefore inherently biased toward certain factors and their assumed role in past developments. The assumptions are not clearly outlined, rendering it difficult to accept or reject this law based on fact; moreover, the law does not have an explicit empirical counterpart. Whether the relevant variables that determine public spending can be limited is debatable, as public spending is influenced by a number of socio-economic variables not all of which are quantifiable. There seems to be no consensus among economists on what variables should be used to measure both economic development and state activity. It is conventional however, to use per capita income as an index of development but this is not the only index of development nor is it the only compatible interpretation of the law but it continues to be used by most economists (Michas, 1975; Bird, 1971; Goffman, 1968; Gupta, 1967; Musgrave, 1969; Pryor, 1968). Government expenditure is probably the most significant and practical measure of the state's activity and will be adopted in this study.

Bird (1971) opines basically that this law is not actually a theory at all but rather a kind of thinking about the past. Efforts to test the law breeds hostility to the facts by adjusting them to predetermined hypothesis. He then proceeded to propose that even if a scarcely distinct formulation of the applicable variables were preferred, the variables are most likely not steady enough over time to allow testing of this progressive proposal.

In the absence of best solutions, economists have required alternatives to the difficulty of testing Wagner's law. We have logical procedures of determining economic development by means of national income and state activity through government expenditure and will, through the adoption of statistical analysis isolates the effect of few variables on public expenditure. Besides, the stationary properties of the data can be evaluated and the strength of the variables measured. The suitable tools are available for the testing of such a hypothesis, a few appropriate variables can be defined to express the law explicitly in numerical terms, what is now left to decide upon is the exact functional form and method of testing.
This study used real gross domestic product as a measure of economic development and total government expenditure as proxy for state activity in addition to other control variables in other to assess the applicability or otherwise of this law in Nigeria within the study period.
There are in broad terms six diverse formulas of Wagner's theory, viz;

i. Peacock and Wiseman traditional version G = f(GDP) ……. 1
ii. Pryor version C = f(GDP) …….. 2
iii. Goff man version G = f(GDPIN) ……... 3

iv. Musgrave version G/GDP = f(GDPRIN) ……4
v. Gupta and Michas version GIN = f(GDPIN) ……5
vi. Peacock-Wiseman "share" version G/GDP = f(GDP) …….. 6
Where G is nominal total government expenditure, GDP is nominal Gross Domestic Product, GDPR is real Gross Domestic Product, N is the total population size, and C is government consumption expenditure. This study adopted the traditional version of Peacock and Wiseman in the model specification and estimation.

The process of Wagner's law is clarified from a demand perception, explicitly; public spending is responsive to the expansionary demand for more public goods, and state regulatory and protective activity. However, there is a budget constraint that the state must observe. The state cannot and does not behave like an unconstrained economic agent but rather it must maximize some form of welfare function subject to a budget constraint. It is plausible at the same time to associate a relationship between government revenue and national income, so that as economic activity heightens or as a country becomes wealthier, tax revenues should rise as well. Rising revenues increase the government's ability to spend.

The term government expenditure is defined as a spending on assets. It is the purchase of items that will last and be used time and time again in the provision of goods or services. IMF (2010) states that government expenditure is always focused on public goods such as building of a new hospital purchase of new computer equipment or networks and constructing new roads, among other objectives. Also, CBN (2011) states that government expenditure is the money spent on goods that are classified as investment goods. This means spending on things that last for a period of time and include investment in hospitals, schools, power sector, telecommunication, agriculture, and road construction. The rising unemployment rate in Nigeria has been a growing concern, despite the fact that the government had embarked on several policies aimed at improving the growth of the economy through the increase in public expenditure.

The pattern of government expenditure in Nigeria has been on consistent increase over the years (Odo,Nwachukwu and Agbi,2016). National Bureau of Statistics (2014) reveals that the rate of poverty in Nigeria has been rising due to factors such as; increased number of school graduates with no matching job opportunities; a freeze on employment in many public and private sector institutions; and mismanagement of capital budget by the government. Thus given the persistent level of economic growth in the country, remedial measures such as improving fiscal measures in government finances and implementing appropriate actions to attract foreign direct investment among others are considered imperative towards stemming the surge (Odo, Nwachukwu and Agbi, 2016).

Sustainable economic development measured in this study by gross domestic product, means a rate of growth which a country can maintain without creating other significant economic problems, especially for future generations (Soludo, 2007). There is clearly a trade-off between rapid economic growth today, and growth in the future through government expenditure. Sustainable economic growth and development are macroeconomic objectives pursued competitively by all nations of the world irrespective of their differences in history, natural resources endowment, economic and political systems, as well as geographical locations (Omoke, 2009). These goals are indeed pursued by all nations even though the extent to which each country attains growth and development may differ from that of another. This perhaps, is linked with different approaches adopted in managing and monitoring government programmes through the budgetary process.

The purpose of this study is to determine the validity or otherwise of Wagner's law in Nigeria by evaluating the causal relationship between the expenditures of government and national income.
In the past, government increasing resources influenced greatly the direction of public spending, especially during the oil boom period. However, with the attendant global recession and subsequent fall in government revenue sources mainly from sales of crude oil, there have been mounting pressures on how to effectively utilize scarce government resource to attain significant economic progress in the economy. This scenario has brought back into the public finance discourse the issue of correlation between national income and public expenditure in an attempt to find appropriate policy prescriptions in the management of fiscal policy. It is the opinion of the authors that the outcome of this study will improve fiscal policy administration in Nigeria.
The table and graph below depict the relationship between government spending and national income (RGDP) in Nigeria, at a five (5) year interval from 1980 – 2015.

Table 1: Trends in Government expenditure and National income in Nigeria

YEAR	RGDP	TGEX
1980	31,546.76	14,968.50
1985	201,036.27	13,041.10
1990	267,549.99	60,268.20
1995	281,407.40	248,768.10
2000	329,178.74	701,059.40
2005	561,931.39	1,822,100.00
2010	776,332.21	4,194,217.88
2015	961,874.75	6,919,842.43

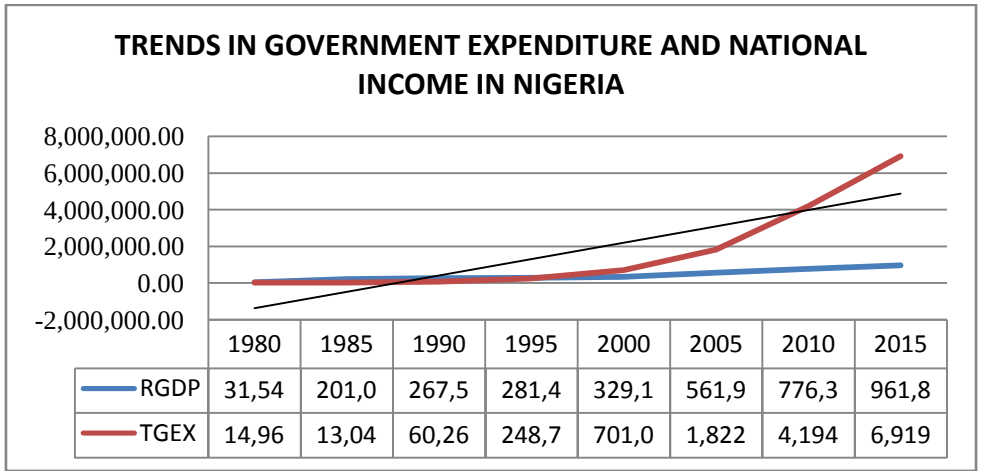

Figure 1

From the above table and graph, it can be seen that government expenditure has not moved in proportion to economic growth. This trend runs contrary to Wagner's hypothesis.

II. THEORETICAL REVIEW

THE PEACOCK-WISEMAN HYPOTHESIS

Peacock and Wiseman conducted a study based on Wagner's Law on public expenditure from 1891 to 1955 in U.K and concluded that Wagner's Law is still valid in that economy.

They further stated that;

i. The rise in public expenditure greatly depends on revenue collection. Over the years, economic development results in substantial revenue to the governments, this enabled to increase public expenditure.

ii. There exists a big gap between the expectations of the people about public expenditure and the tolerance level of taxation. Therefore, governments cannot ignore the demands made by people regarding various services, especially, when the revenue collection is increasing at constant rate of taxation.

iii. They further stated that during the times of war, the government further increases the tax rates, and enlarges the tax structure to generate more funds to meet the increase in defence expenditure. After the war, the new tax rates and tax structures may remain the same, as people get used to them. Therefore, the increase in revenue results in rise in government expenditure. Wagner's law and Peacock -Wiseman hypothesis emphasize on the fact that public expenditure has tendency to increase overtime.

KEYNESIAN THEORY OF PUBLIC EXPENDITURE

The era that had nurtured classical economics had been destroyed by the First World War, and for Keynes the catastrophe since had demonstrated the societal failure. A new mixture was necessary, and that is what Keynes sought to create. In particular, he concluded that classical economics rested on a basic mistake. It assumed, erroneously, that the balance between supply and demand would ensure full employment. On the contrary, in Keynes's view, the economy was chronically unstable and subject to fluctuations, and supply and demand could well balance out at an equilibrium that did not deliver full employment. The reasons were inadequate investment and over saving, both rooted in the psychology of uncertainty.

Keynes advocated that the solution to the classical ideology led global recession was seemingly simple he suggested the replacement of missing private investment with public investment, financed by deliberate government deficits. The government would borrow money to spend on such things as public works; and that deficit spending, in turn, would create jobs and increase purchasing power. By this view, Keynes consciously canvassed for increase in government spending without recourse to the available resources because striving to balance the government's budget during a slump would make things worse, not better . Keynes's analysis laid the basis for the field of macroeconomics, which treats the economy as a whole and focuses on government's use of fiscal policy spending, deficits and tax. These tools could be used to manage aggregate demand and thus ensure full employment; consequently, the government would cut back its spending during times of recovery and expansion. Keynes concluded that the direction of causality runs from public expenditure to national income in contrast to Wagner's law which assumes that causality moves from national income to government expenditure.

MUSGRAVE DEVELOPMENT MODEL

Musgrave suggested that the growth of public expenditure might be related to the pattern of economic growth and development in societies. Three stages in the development process were distinguished:

(a) The early development stage where considerable expenditure is required on education and infrastructure of the economy and private saving is inadequate to finance this necessary expenditure. In this stage, government expenditure must thus be a high proportion of gross national product

(b) The phase of rapid growth in which there are large increases in private saving and public investment falls proportionately, thus total expenditure takes smaller proportion of national income.

(c) High income societies with increased demand for private goods which need complementary public investment.

The increasing need in high-income societies for skilled labour leads education to become increasingly an investment good for society as a whole. Increased population movements lead to the development of urban slums. Such factors and others lead once again to an increase in public expenditure in relation to total output despite the level of national income.

III. EMPIRICAL REVIEW

Alimi (2014) studied the causal relationship between government spending and national income in panel of three African countries: Nigeria, Ghana and South Africa during the period 1970 to 2012 using Johansen Fisher panel co integration test and then on an individual country basis using time series Johansen co integration techniques. The panel co integration results indicate a long run relationship between government spending and national income in the whole panel. The Johansen-Juselius co integration test suggests an existence of long run relationship between government spending and national income only for Ghana as predicted by Wagner, thus suggesting government spending is not an important factor in economic growth in the long run in Nigeria and South Africa. The study found an evidence of bi-directional causality for the whole panel. Furthermore, the result from the causality test shows that there is a bi-directional causality that runs from national income to government expenditure and vice versa for Nigeria and South Africa. However, for Ghana, there was a unidirectional causality that runs from government expenditure to national income and there is no feed-back mechanism. The study concluded that Government spending enhances National Income enormously and vice-versa in the short run for Nigeria and South Africa.

Taiwo and Abayomi(2011) empirically examined the trends as well as effects of government spending on the growth rates of real GDP in Nigeria over the last decades (1970-2008) using econometrics model with Ordinary Least Square (OLS) technique. The result using Durbin Watson unit root test reveals absence of serial correlation and that all variables incorporated in the model were non-stationary at their levels. In an attempt to establish long-run relationship between public expenditure and economic growth, the result reveals that the variables are co integrated at 5% and 10% critical level. The findings show that there is a positive relationship between real GDP as against the recurrent and capital expenditure. The study recommended that government should promote efficiency in the allocation of development resources through emphasis on private sector participation, privatization and commercialization.

Letile and David (2013) empirically examined the relationship between government expenditure and economic growth in South Africa, for the period 1980 to 2011. Econometrics techniques were applied to test the hypothesis that an increase in government expenditure has increased economic growth. The study also examined the causal relationship that exists between government spending and economic growth in South Africa using OLS regression techniques. Secondary data obtained from the South Africa Reserve Bank was used for data analysis. The results indicated a long-run positive relationship which exists between the two variables in the study, and further showed that gross capital formation granger causes economic growth.

Ogbonna (2012) examined the validity of Wagner's law in Nigeria for the time period 1950-2008. He investigated the existence of a long run and causal relationship between government expenditure and national income applying three of the most advanced econometric methods, the Johansen maximum likelihood co integration method, error correction modeling and the Granger causality test to Musgrave (1969) version of the functional interpretations of the law. According to the study all the results of the empirical estimations point to the fact that Wagner's Law is supported for Nigerian economy during the period under review. Policy wise, this contribution suggests that Government of Nigeria cut back on public capital spending because of lack of transparency in the procurement of capital projects which has left such expenditures unproductive. Government should see the urgent need to provide environment conducive for private sector active participation in economic activities and implement with all sincerity the Public Private Partnership Programmes (PPPP). These will ensure increased efficiency in the allocation of resources and tend to reduction in government size. The results further imply that development plans of Nigeria must incorporate such fiscal policy measures that would guarantee commensurate growth in government revenue to accommodate the expected growth in government size.

Dhiresh (2013) studied the relationship between economic growth and public expenditure through wagner's law in indian . The study observed that every government tries to avoid the condition of fiscal deficit and to control their Public Expenditure and Revenue. It noted that fiscal policy is the center point of development, which is the fundamental instrument to control the trade cycle in the economy. Fiscal policy is also considered a center stage in policy making. A striking feature of public expenditure in India is its continuous increase since independence. The Indian Government fiscal policy is in the center of the debates that is related to expenditure and revenue pattern of the government. The study recommended that Fiscal Policy should control public expenditure and invest it in a proper direction so that faster, more inclusive and sustainable growth might be achieved. However, in India, continuous increase in fiscal deficit with reduction in growth (GDP) was observed.

Oyinlola and Akinnibosun (2013) examined the relationship between public expenditure and economic growth in Nigeria during the period 1970-2009. A disaggregated public expenditure level was employed using the Gregory-Hansen structural breaks co integration technique. The result confirms Wagner's law in two models in the long run; there was a break in 1993 in which the political crisis that engulfed the nation was accountable. The result also shows that economic growth and development are the main objectives of government expenditure, especially investment in infrastructure and human resources all of which falls under social and community services. Based on the result, there should be efforts to maintain adequate levels of investment in social and economic infrastructure.

IV. DATA AND METHOD OF ANALYSIS

DATA

The data for this study covered the period of 1980-2015 and were sourced from Central Bank of Nigeria Statistical Bulletin and online source from data.worldbank.org/indicators, all within the period under consideration.

METHOD OF ANALYSIS

In order to produce a meaningful estimate to determine the sustainability of the employed time series data, we conducted a unit root test. When all variables were found to be stationery at first difference 1(1), we proceeded to investigate for possible long run relationship among the variables using Johansson co integration approach. Co integration equations were identified which led to the specification and estimation of VECM to enable us investigates both the long run and short run effect of the dependent and explanatory variables. The long run causal effect was equally estimated and the diagnostic test for stability of the estimated model was concluded using cusum test, the Mckinnon (1991) critical value or residual procedure is adopted in this study.

MODEL SPECIFICATION

There are in broad terms six diverse formulas of Wagner's theory as identified above, but this study adopted the Peacock and Wiseman traditional version, stated as;

G = f (GDP)…….. 7

Where G = Nominal total government expenditure and GDP is the Nominal gross domestic product. This is transposed to accommodate our variables in form of;

RGDP = f (TGEX, DINV, HMC)…… 8

This function is transformed in a linear equation as;

$RGDPt = \alpha 0 + \alpha 1TGEXt - 1 + \alpha 2DINVt - 1 + \alpha 3HMCt - 1 + \varepsilon t$ …… 9

Where RGDP = Real gross domestic product (measure of national income)
TGEX = Total government expenditure (measure of state activity)
DINV = Domestic investment and
HMC = Human capital development as control variables.
ε_t = Error term and $\alpha 0$ - $\alpha 3$, are estimation parameters.

EMPIRICAL RESULTS AND DISCUSSION

This part is devoted to the result of data examination. Data examinations entail working to make known trends in data sets while interpretation involves explaining those model and trends. Data analysis is considered an important step and it is the heart of the research in any research work. When data has been collected with the assistance of relevant tools and methods, the next logical step, is to analyze and interpret the data with a view to arriving at empirical solution to the problem. Hence, the results for the analysis are presented below.

UNIT ROOT TEST

The Augmented Dickey-Fuller (ADF) and Philip Peron (PP) formulae were employed to test for the existence of unit roots in the data using trend and intercept. The results are presented in table 1-4 below.

Table 1: Augmented Dickey Fuller Unit Root Test
Trend and Intercept @ Levels

Series	ADF Test Statistic	5% critical values	10% critical values	Remarks
RGDP	-0.721299	-3.544284	-3.204699	Not Stationary
TGEX	-1.085088	-3.544284	-3.204699	Not Stationary
DINV	-0.131047	-3.544284	-3.204699	Not Stationary
HMC	-1.994251	-3.544284	-3.204699	Not Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 2: Phillips-Peron Unit Root Test
Trend and Intercept @ Levels

Series	PP Test Statistic	5% critical values	10% critical values	Remarks
RGDP	-0.755903	-3.544284	-3.204699	Not Stationary
TGEX	-0.441388	-3.544284	-3.204699	Not Stationary
DINV	-0.032307	-3.544284	-3.204699	Not Stationary
HMC	-1.938097	-3.544284	-3.204699	Not Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 3: Augmented Dickey Fuller Unit Root Test
Trend and Intercept @ 1st Difference

Series	ADF Test Statistic	5% critical values	10% critical values	Remarks
RGDP	-8.748622	-3.548490	-3.207094	Stationary
TGEX	-10.23912	-3.548490	-3.207094	Stationary
DINV	-7.092486	-3.548490	-3.207094	Stationary
HMC	-8.026288	-3.548490	-3.207094	Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 4: Phillips-Perron Unit Root Test
Trend and Intercept @ 1st Difference

Series	PP Test Statistic	5% critical values	10% critical values	Remarks
RGDP	-8.662177	-3.548490	-3.207094	Stationary
TGEX	-12.57007	-3.548490	-3.207094	Stationary
DINV	-7.049450	-3.548490	-3.207094	Stationary
HMC	-7.7948490	-3.548490	-3.207094	Stationary

Sources: Researcher's compilation from E-view (version 7.0)

JOHANSEN CO-INTEGRATION TEST FOR THE SERIES; RGDP, TGEX, DINV & HMC

This technique is employed to testing for the presence of co integration between the series of the same order of integration through forming a co integration equation. The basic idea behind co integration is that if, in the long-run, two or more series move closely together, it is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary. Lack of co integration implies that such variables have no long-run relationship.

Table 5: Co integration Test

Date: 07/07/16 Time: 15:22
Sample (adjusted): 4 36
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDP TGEX DINV HMC
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.972300	178.6006	47.85613	0.0000
At most 1 *	0.769790	60.25214	29.79707	0.0000
At most 2	0.284330	11.78300	15.49471	0.1676
At most 3	0.022273	0.743317	3.841466	0.3886

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.972300	118.3484	27.58434	0.0000
At most 1 *	0.769790	48.46915	21.13162	0.0000
At most 2	0.284330	11.03968	14.26460	0.1522
At most 3	0.022273	0.743317	3.841466	0.3886

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

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

RGDP	TGEX	DINV	HMC
2.50E-06	-3.89E-06	5.88E-07	8.46E-06
-9.93E-06	5.84E-06	7.42E-07	-4.47E-05
-2.01E-05	-9.42E-06	1.70E-06	0.000152
2.81E-05	-1.50E-05	3.56E-06	0.000126

Unrestricted Adjustment Coefficients (alpha):

D(RGDP)	-12326.66	2034.994	1588.062	1251.879
D(TGEX)	-102483.9	-134551.7	-55609.58	-998.0156
D(DINV)	-1136618.	-4363.781	204550.4	-71806.80
D(HMC)	-8848.738	-1020.524	-8870.140	1006.619

1 Cointegrating Equation(s): Log likelihood -1617.973

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	TGEX	DINV	HMC
1.000000	-1.553648	0.234685	3.379341
	(0.24080)	(0.05207)	(2.82317)

Adjustment coefficients (standard error in parentheses)

The trace statistics indicates two (2) co integration equations at both the five percent (5%) and 10% level of significance, suggesting that there is a long run relationship among the variables tested.

The VECM Result

The existence of co integration among the variables as indicated above presents an evidence of long-run economic relationship among the variables. This implies that, vector error correction model is the best option for further analysis. It captures both the long run equilibrium and short run dynamic relationships associated with the above results.

Table 6: VECM 1

Vector Error Correction Estimates
Date: 07/07/16 Time: 13:10
Sample (adjusted): 4 36
Included observations: 33 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
RGDP(-1)	1.000000
TGEX(-1)	-1.553648 (0.24080) [-6.45192]
DINV(-1)	0.234685 (0.05207) [4.50737]
HMC(-1)	3.379341 (2.82317) [1.19700]
C	839452.7

Error Correction:	D(RGDP)	D(TGEX)	D(DINV)	D(HMC)
CointEq1	-0.030873 (0.00493) [-6.26840]	-0.256675 (0.09734) [-2.63703]	-2.846706 (0.33662) [-8.45667]	-0.022162 (0.00943) [-2.35111]
D(RGDP(-1))	0.304379 (0.13139) [2.31658]	3.145596 (2.59670) [1.21138]	-11.82241 (8.98038) [-1.31647]	-0.150216 (0.25147) [-0.59735]
D(RGDP(-2))	-0.093257 (0.06255) [-1.49097]	-0.521171 (1.23614) [-0.42161]	-1.269969 (4.27505) [-0.29707]	-0.044029 (0.11971) [-0.36779]
D(TGEX(-1))	-0.078974 (0.00824)	-1.321006 (0.16284)	-5.971180 (0.56316)	-0.023578 (0.01577)

	[-9.58470]	[-8.11233]	[-10.6030]	[-1.49514]
D(TGEX(-2))	-0.072145	-1.339541	-6.169937	-0.033210
	(0.00939)	(0.18566)	(0.64207)	(0.01798)
	[-7.67980]	[-7.21516]	[-9.60941]	[-1.84708]
D(DINV(-1))	0.003181	0.082602	0.467113	-0.000725
	(0.00169)	(0.03345)	(0.11569)	(0.00324)
	[1.87926]	[2.46922]	[4.03754]	[-0.22388]
D(DINV(-2))	0.006637	0.338143	0.551111	-0.003061
	(0.00159)	(0.03145)	(0.10878)	(0.00305)
	[4.17018]	[10.7503]	[5.06622]	[-1.00472]
D(HMC(-1))	0.231838	5.526463	16.36732	-0.434574
	(0.10870)	(2.14818)	(7.42924)	(0.20804)
	[2.13288]	[2.57263]	[2.20310]	[-2.08894]
D(HMC(-2))	0.325264	6.770636	-22.68810	0.017222
	(0.11154)	(2.20434)	(7.62346)	(0.21347)
	[2.91615]	[3.07150]	[-2.97609]	[0.08067]
C	39476.59	320174.3	2874038.	30131.21
	(5802.86)	(114682.)	(396614.)	(11106.1)
	[6.80296]	[2.79185]	[7.24643]	[2.71303]
R-squared	0.885399	0.913846	0.903808	0.315824
Adj. R-squared	0.840555	0.880133	0.866168	0.048104
Sum sq. resids	2.94E+09	1.15E+12	1.37E+13	1.08E+10
S.E. equation	11296.55	223253.5	772097.2	21620.52
F-statistic	19.74402	27.10706	24.01182	1.179678
Log likelihood	-348.8326	-447.2983	-488.2448	-370.2544
Akaike AIC	21.74743	27.71505	30.19666	23.04572
Schwarz SC	22.20092	28.16854	30.65014	23.49921
Mean dependent	23096.65	209330.9	674378.9	7555.234
S.D. dependent	28290.47	644835.9	2110535.	22160.08

Determinant resid covariance (dof adj.)	1.92E+38
Determinant resid covariance	4.53E+37
Log likelihood	-1617.973
Akaike information criterion	100.7256
Schwarz criterion	102.7210

Table 7: VECM 2

Dependent Variable: D(RGDP)
Method: Least Squares
Date: 07/07/16 Time: 13:11
Sample (adjusted): 4 36
Included observations: 33 after adjustments
D(RGDP) = C(1)*(RGDP(-1) - 1.55364836822*TGEX(-1) +
0.234685462624*DINV(-1) + 3.37934147447*HMC(-1) +
839452.695699) + C(2)*D(RGDP(-1)) + C(3)*D(RGDP(-2)) + C(4)
*D(TGEX(-1)) + C(5)*D(TGEX(-2)) + C(6)*D(DINV(-1)) +
C(7)*D(DINV(
-2)) + C(8)*D(HMC(-1)) + C(9)*D(HMC(-2)) + C(10)

	Coefficient	Std. Error	t-Statistic	Prob.

C(1)	-0.030873	0.004925	-6.268402	0.0000
C(2)	0.304379	0.131392	2.316576	0.0298
C(3)	-0.093257	0.062548	-1.490968	0.1496
C(4)	-0.078974	0.008240	-9.584701	0.0000
C(5)	-0.072145	0.009394	-7.679801	0.0000
C(6)	0.003181	0.001693	1.879263	0.0729
C(7)	0.006637	0.001592	4.170183	0.0004
C(8)	0.231838	0.108697	2.132883	0.0438
C(9)	0.325264	0.111539	2.916152	0.0078
C(10)	39476.59	5802.856	6.802960	0.0000

R-squared	0.885399	Mean dependent var	23096.65
Adjusted R-squared	0.840555	S.D. dependent var	28290.47
S.E. of regression	11296.55	Akaike info criterion	21.74743
Sum squared resid	2.94E+09	Schwarz criterion	22.20092
Log likelihood	-348.8326	Hannan-Quinn criter.	21.90001
F-statistic	19.74402	Durbin-Watson stat	2.355167
Prob(F-statistic)	0.000000		

CUSUM TEST

The Structural stability test of the model was conducted using the Cumulative Sum of recursive residuals (CUSUM) test. This is necessary in view of the fact that stability of model will determine the extent to which we can make forecast concerning behavior of the variables in the model.

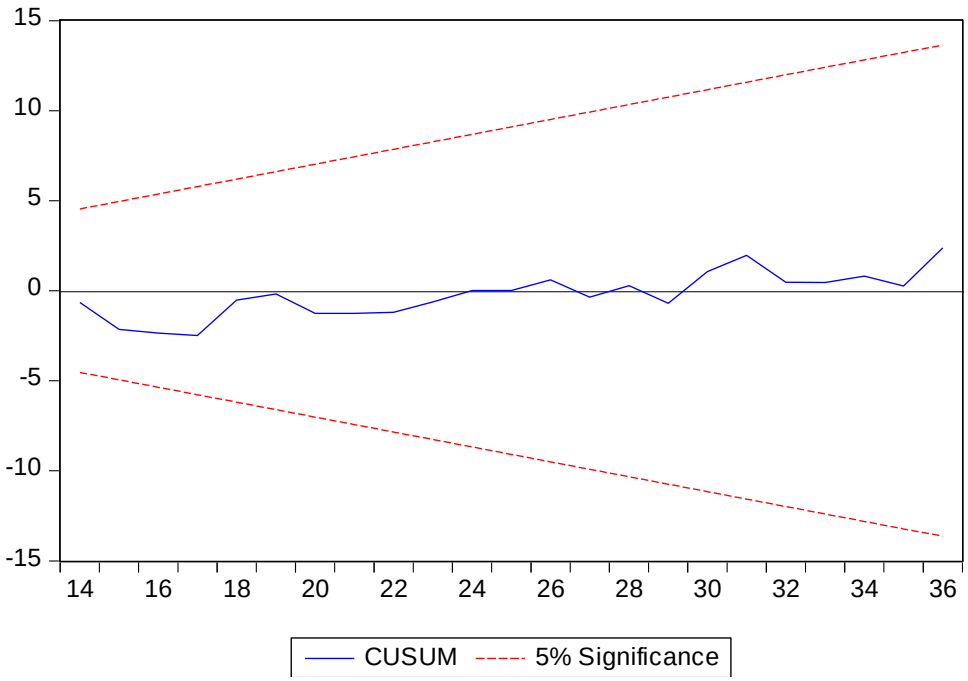

Figure 2

The blue line in figure 2 above is within the critical lines. This implies that the model is stable.

Table 8: Granger Causality Test

Pairwise Granger Causality Tests
Date: 07/07/16 Time: 15:30
Sample: 1 36
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.

TGEX does not Granger Cause RGDP	34	12.9270	0.0001
RGDP does not Granger Cause TGEX		6.64955	0.0042
DINV does not Granger Cause RGDP	34	6.87068	0.0036
RGDP does not Granger Cause DINV		4.14794	0.0260
HMC does not Granger Cause RGDP	34	6.94632	0.0034
RGDP does not Granger Cause HMC		0.02452	0.9758
DINV does not Granger Cause TGEX	34	0.17651	0.8391
TGEX does not Granger Cause DINV		3.71107	0.0367
HMC does not Granger Cause TGEX	34	4.09790	0.0271
TGEX does not Granger Cause HMC		1.08834	0.3501
HMC does not Granger Cause DINV	34	5.49974	0.0094
DINV does not Granger Cause HMC		2.16356	0.1331

V. DISCUSSION

From the above empirical results, the findings indicate that all the variables were stationary at first difference in both ADF and PP unit root test, this gave impetus for the adoption of co integration analysis so as to determine whether a long run equilibrium relationship exist among the variables in the model. The result of the co integration test indicates the existence of long run equilibrium relationship among the variables, supported by the presence of 2 co integration vectors. The nature of the long run equilibrium relationship is found from the normalized co-integrating coefficients and also from the upper chamber of the VECM. Thus, the equation is stated as follows;

RGDP = 8395 – 1.55TGEX + 0.24 DINV + 3.38 HMC

Where RGDP is the dependent variable, 8395 is the constant term, -1.55 is the coefficient of TGEX, 0.24 is the coefficient of DINV and 3.38 is the coefficient of HMC. The signs borne by the coefficient estimate of the variables: HMC and DINV have positive relationship with RGDP while TGEX have negative relationship with RGDP.

This means that total government expenditure has negative significant relationship with economic growth in the long run, implying that government total spending has not translated to increase in national income as suggested by Keynesian theory of public expenditure. However ,domestic investment showed a significant positive impact on economic growth in the long run while human capital development were found to have positive insignificant relationship with the dependent variable.

From the above result also, the coefficient of ECM (-1) is -0.030873 satisfying the negative condition and its P value is 0.0000 that is less than 0.05 level of significance satisfy the second condition of statistical significance. The coefficient indicates that the speed of adjustment between the short run dynamics and the long run equilibrium is 03.08% in absolute value. The computed coefficient of determination ($R^2 = 0.885399$) shows that 88% of the total variation in the dependent variable are accounted for by the variation in the explanatory variable while 12% of the total variation in economic growth is attributable to the influence of other factors not included in the regression equation. R^2=88% is relatively high to be dependable for policy decision; it tells more on the (true) relationship between real gross domestic product and TGEX, DINV and HMC in Nigeria. R^2 in the neighborhood of 80-90% is seen to be ideal for the power of explanatory variables explaining dependent variable.

The F – statistics of 19.74, with p value of 0.000000 which is less than 0.05 shows that the influence of explanatory variables on the dependent variables is statistically significant. The Durbin Watson test determines the presence or level of autocorrelation among the residuals, since the DW has the value of 2.355167; it indicates the absence of auto correlation among the residuals**.**

In the short run, total government expenditure maintained a negative significant relationship with the dependent variable while domestic investment and human capital development was found to have significant positive relationship with the dependent variable.

The validity or otherwise of Wagner's law is determined by the direction of causality from the pair wise causality test. The result above indicates a bidirectional causality running from national income (RGDP) to total government expenditure and from total government expenditure back to national income. This implies that neither Wagner's law nor Keynes hypothesis is valid in Nigeria within the period of this study. This finding agrees with the finding in Alimi (2014) and in contrast with Ogbonna (2012) and Oyinlola and Akinnibosun (2013). The implication of this finding is that fiscal policy managers in Nigeria should adopted a discretionary fiscal approach in promoting public expenditure programmes and increase in national income as either of the two can benefit the economy. The above result also indicates a bidirectional causality from domestic investment to real gross domestic product and vice versa, and unidirectional causality from total government expenditure to domestic investment. Human capital development was also found to granger cause both total government expenditure and national income in conformity with the bidirectional causality result between the two variables.

VI. CONCLUSION

This study examined the validity or otherwise of Wagner's theory in Nigeria from 1980- 2015, using time series data on RGDP, TGEX, DINV and HMC. The co integration, VECM and pair wise granger causality econometric tools of analysis were adopted in testing the variables specified in the model. The results obtained from the estimations indicated a long run equilibrium relationship between the dependent and independent variables. TGEX was found to have a negative significant relationship with economic growth both in the short and long run, while DINV maintained positive significant relationship with the dependent variable both in the short and long run. HMC has a positive significant relationship in the short run and insignificant relationship in the long run. The causality test which determines the validity of Wagner's law showed bidirectional causality from RGDP to TGEX and vice visa, invalidating the applicability of this hypothesis in Nigeria within the study period.

The study therefore recommend the adoption of discretionary fiscal policy in Nigeria that will accommodate a conscious management of public spending and increase in national income simultaneously, through budget discipline and improvement in the business environment to stimulate capital investment.

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