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Revisiting the link between government spending and economic growth in the present of Wagner's Law in Nigeria.

Usman Gambo Ahmad[1] and Usman Ali Suleiman[2]
Faculty of Economics, Accountancy and Management Sciences, Universiti Sultan Zainal Abidin, 21300 Kuala Terengganu, Terengganu, Malaysia
Department of Economics, Federal University Kashere, Gombe, Nigeria.

Abstract: *This paper aims to revisit the link between government spending and economic growth in the present of Wagner's Law in Nigeria from 1972-2011. The examination is based on the functional form of Wagner Law augmented by incorporating the square of GDP. We employed ARDL bound testing, combine cointegration and Toda-Yamamoto non- Granger causality test in this study. Cointegration was found in both methods, and the causality test supports the presence of Wagner' Law. However, increase in GDP (i.e. Square of GDP) has an adverse impact on economic growth. This shows that GDP as a proxy for economic growth has a certain point from which, any additional increase will reduce government spending. Therefore, the government needs to come up with programs that will motivate small and medium enterprises at all levels of government. Hence, the increase in GDP in the long run, tend to reduce government expenditure, which in turn prevents deficit financing.*

I. Introduction

The Wagner's Law that was named after the German political economist Adolph Wagner (1835-1917) was developed after the empirical analysis in Western Europe at the end of the 19th century (Henrekson, 1993). He argued that government expenditure is a function of increased industrialization and economic development. Wagner stated that during the industrialization process, as the real income per capita of a nation increase, the share of public expenditures in respect to total spending increases. The law cited "The advent of modern industrial society will result in increasing political pressure for social progress and increasing the allowance for social consideration by the industry."

Wagner designed three focal bases for the increase in state expenditure. Firstly, during industrialization process, the public sector activity will replace a private sector activity. State functions like administrative and protective functions will increase. Secondly, governments need to provide cultural and welfare services such as education, public health, pension, subsidy, emergency aid and environmental protection programs. Thirdly, increased industrialization will lead to technological advancement, and large firms will tend to monopolize the industries. Therefore, Governments will have to offset these effects by providing social and merit goods through budgetary means (Khan, 1990). Wagner argued that public expenditure is determined by the growth of national income. Therefore, national income is the cause of government spending. His Law tends to be a long-run phenomenon. That is, the longer the period, the better the economic interpretations. Moreover, for the theory to be realized, it will take an economy with a modern industrialization fifty to hundred years.

Also, Wagner's theory has been proven through empirical analysis for some nation's using both time series and cross-sectional data sets. The exact results, aside from a couple of individual cases give a solid backing to it. These studies include Peacock and Wiseman (1961), Musgrave (1969), Michas (1975), Mann (1980), Ram (1986, 1987), and Khan, (1990), Aregbeyen (2006) and Rehman et al., (2010). However, for the exceptional cases, Henrekson, (1993) found no support in the case of Sweden. Similarly, the work of Hondroyiannis and Papapetrou (1995) discovered that Wagner's law does not hold in the case of Greece based on the Johansen cointegration analysis.

The outcome of other studies in Nigeria regarding Wagner's hypothesis proved to be in support of the theory; others are not in support of it, while other is ambiguous. For example, empirical studies that support the existence of Wagner law in Nigeria are Aregbeyen (2006); Ogbonna (2012); Dada and Adewale (2013); Ibok and Bassey (2014). On the other hand, those that found no existence of the law are Chimobi (2009); Ighodaro and Oriakhi (2010); Akpan (2011); Sevitenyi (2012). Lastly, those that found bi-directional and non-existence of the law are Udo and Effiong (2014) and Owolabi (2015) respectively.

Due to inconsistency in the findings of previous studies, the present study intends to revisit the causal relationship between government expenditure and economic growth using an up to date econometric tools of analysis. In revisiting the relationship, we first of all, use annual data for Nigeria for the period of 1972–2011. The time-series component of the data and order of integration are tested through the Augmented Dickey–Fuller(ADF, 1981)and Philip Perron (PP, 1988). Follow by the cointegration analysis, which the study adopt two methods. First, we employed the most widely used ARDL approach (Pesaran et al., 2001), followed by combined cointegration test proposed by Bayer and Hanck (2013), to test Wagner's hypothesis based on the functional form as used by the previous scholars. For this study to capture the real picture of the scenario, the functional form is augmented as suggested by Murthy (1994). Finally, the causal relationship will be addressed by ARDL Wald test.

The other part of this paper is organized as follows. Section 2 briefly discusses literature review regarding various Wagner's hypothesis versions, together with empirical findings of the causal relationship between government expenditure andeconomic growth. Section 3 explains the econometric tools used in the study. Section 4 presents the empirical results, while Section 5 presents the concluding remarks.

II. Literature Review of Wagner's Hypothesis Versions

The positive relationship between government expenditure and economic growth is seen as the pivot to Wagner's law. However, the interpretation of the functional form of the law seems to be controversial, as a result of the introduction of different versions, which have been empirically tested since the 1960s. These versions are as follows:

$$GE = f(GDP) \tag{1}$$
$$GCE = f(GDP) \tag{2}$$
$$\frac{GE}{GDP} = f(GDP) \tag{3}$$
$$GE = \left(\frac{GDP}{N}\right) \tag{4}$$
$$\frac{GE}{N} = f\left(\frac{GDP}{N}\right) \tag{5}$$
$$\frac{GE}{GDP} = f\left(\frac{GDP}{N}\right) \tag{6}$$

Where GE refers to total government expenditure, GCE means government consumption expenditure, GDP is a gross domestic product, which is used as a proxy for economic development, and N is the population. The functional form of equation (1) is referred to as Peacock – Wiseman (1961) version of Wagner hypothesis. As cited in Halicioglu (2003), the relationship of the first version between government expenditure and national income was graphically established. Which was later used by Musgrave (1969), and Goffman and Mahar (1971). Pryor (1968) adopted the functional form of equation (2). The third equation was a modification of the first equation and was introduced by Mann (1980).The functional form of equation (4) is linked to Goffman (1968) and the version of equation (5) to Gupta's (1967), which was later used by Michas (1975). In addition, the last version of equation (6) was introduced by Musgrave (1969) and adopted by Ram (1986), Murthy (1993), Henrekson (1993), Hsieh and Lai (1994) and Halicioglu (2003). However, the significant difference of the above versions of Wagner Law is the measurement of government expenditure and national income. Also, the last version is often used and is considered most appropriate one (Halicioglu, 2003).

Halicioglu (2003) used annual time series data spanning from 1960-2000 to investigate the present of Wagner Law in Turkey. Based on the econometric tools employed, the study found no support for the presence of Wagner's Law. However, when the model was augmented, the study found significant and statistical evidence for the new version. Similarly, Dependra (2007) examine the present of Wagner's Law in Thailand using annual time series data from 1950-2003. The study found no statistical evidence supporting the presence of Wagner law. Chimobi (2009) applied the Johansen multivariate approach and Granger causality test on annual time series data from 1970-2005 and found no existence of Wagner Law in Nigeria. Ighodaro and Oriakhi (2010) employed VAR model with Gaussian errors on annual time series data from 1961-2007 in Nigeria and found no evidence of Wagner's Law existence. Furthermore, Akpan (2011) and Sevitenyi (2012) employed annual time series data from 1970-2008 and 1961-2009 respectively. Based on their methods of analysis, they found no support for Wagner's Law in Nigeria.

On the other hand, Ogbonna (2012) examined the presence of Wagner Law in Nigeria using annual time series data covering the period 1950-2008.The study employed the Johansen maximum likelihood cointegration method, error correction modeling, and the Granger causality test and concluded that Wagner Law is present in Nigerian economy. Similarly, Dada and Adewale; Alimi; (2013) and Ibok and Bassey (2014) employed annual time series data and econometric tools to investigate the present of Wagner's Law in the context of Nigerian economy. Based on each of the methods adopted, their study found the existence of Wagner's Law.

III. Framework, Data, Method, And Results

To revisit the link between government expenditure and economic growth, the study adopts the functional form of Wagner's law as shown in equation (1). The functional form tries to examine the relationship between total government expenditure and economic activity as opined by Peacock – Wiseman (1961), which was later adopted by Musgrave (1969), and Goffman and Mahar (1971). Therefore, the functional form can be written in a linear form as:

$$GE_t = \varphi_0 + \beta_1 GDP_t + \varepsilon_t \tag{7}$$

However, this study intends to add a new dimension to the above model (i.e. equation 7) by squaring the GDP and as well including a dummy that captures the period of structural adjustment program (SAP). The reason behind the square of GDP is to validate Wagner's claim that increase in economic activities leads to an increase in government expenditure. As such, the new augmented linear model is captured as:

$$GE_t = \varphi_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 DUM_t + \varepsilon_t \tag{8}$$

Where GE_t refers to total government expenditure, φ_0 is the constant term, β_1 and β_2 are the coefficients with positive expected sign, GDP_t is the gross domestic product used as a proxy for economic growth, GDP_t^2 is the squared of GDP, DUM_t represent structural adjustment program, and ε_t is the error term.

The sample data for this study span from 1972-2011. The total government expenditure is the total of government spending at the federal level; the gross domestic product is the total value of all goods and services produced. Also, all the variables are measured in current USD and sourced from World Bank Development Indicators.

Prior to revisiting the link between government expenditure and economic growth, it is assumed that the said time series are stationary. Stationary here implies that the distribution of a process remains unchanged when shifted in time by an arbitrary value. Precisely, a stochastic process is said to be weakly stationary if its mean and variance are not moving over time. Moreover, the value of the covariance between the two periods depends only on the distance or gap between the two periods and not the actual time at which the covariance is computed. A time series is strictly stationary if all the moments of its probability distribution are invariant over time. The usual stochastic process is fully specified by its two moments, the mean and the variance (Gujarati, 2003).

The stationery of a variable depends on whether it has a unit root. If the variable has a unit root, then it is non-stationary. Thus, regression involving unit root series can falsely imply the existence of a meaningful economic relationship. The first task in analyzing econometric time series data should then be testing for the presence of unit roots. In this case, it is necessary to test the order of integration of each variable to know how many times the variable needs to be differentiated to result in a stationary series. However, estimating non-stationary models by eliminating trends in variables or by transforming the data to make them stable through the process of differentiation cannot be a solution. This procedure throws away potentially valuable information about the long-run relationship, about which economic theories have a lot to say (Harris, 1995; Enders, 1995).

Therefore, the study used two methods to test for stationary in the data. This test includes Augmented Dickey-Fuller (1981) and Philip and Perron (1988). First, we begin with the Augmented Dickey-Fuller (ADF) test that was an extension of Dickey-Fuller test for stationary. The augmentation is adding lagged values (p) of first differences of the dependent variable as additional regressors, which are required to account for the possible occurrence of autocorrelation. The ADF test estimates the following regressions.

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=2}^{k} i\beta_i \Delta Y_{t-i+1} + \varepsilon_t \tag{9}$$

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \sum_{i=2}^{k} i\beta_i \Delta Y_{t-i+1} + \varepsilon_t \tag{10}$$

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \sum_{i=2}^{k} i\beta_i \Delta Y_{t-i+1} + \alpha_1 T + \varepsilon_t \tag{11}$$

Testing for unit roots using equation (9) assumes that the underlying data generating process has no intercept term and time trend. To account for the existence of an intercept term, equation (10) is used. Equation (11) suggests using intercept and deterministic term to test for the unit root. The unit root test is carried out based on the null hypothesisthat the series contain unit root (δ=0) against the alternative hypothesis that, the series has no unit root (δ< 0).

Secondly, the Philip and Perron (1988) test that is among the conventional unit root test. Its application in time series analysis is to test the null hypothesis that a time series is integrated of order one I(1). The Phillips-Perron test was form based on Dickey–Fuller test. However, the Phillips-perron test invalidates the dicky-fuller test because he believes that the process of collecting data for Y_t could have a higher order of autocorrelation than it is expected in the test equation. Therefore, they made Y_{t-1}endogenous in the equation. Furthermore, they make a non-parametric correction to the t-test statistic. The test is fit with respect to unspecified autocorrelation and heteroscedasticity in the disturbance process of the test equation.

One possible means of avoiding spurious regression is the application of cointegration techniques, which allow the estimation of non-spurious regressions with non-stationary data. There are several methods of determining the cointegration relationship between the series. However, these approaches depend on the order of integration of the series. For example, once the variables are integrated at first order I(1), then we can use Engle-Granger two-step procedure, the Johanson Maximum Likelihood, Johansen-Mosconi-Nielsen cointegration test, Bayer and Hanck combine cointegration test, Gregory-Hansen cointegration test, and the likes. However, if the variables have mixed stationary of I(0) and I(1), we cannot use any of the cointegration tests above except Autoregressive distributive lag (ARDL) bound test. However, this study used ARDL and combine cointegration test. The former has the ability to test for cointegration among the variables irrespective of their order of integration, and the later contains a group of approaches.

The ARDL bound test was introduced originally by Pesaran and Shin (1999) and then extended by Pesaran et al.(2001). This method has advantages over the other method in the sense that, the order of integration of the series does not matter if no series is found to have I(2). Also, the approach is more suitable for small sample size (Haug, 2002). Furthermore, the method can capture the long run and short run simultaneously. Therefore, the ARDL model based on this study is captured as follows:

$$\Delta lnGE_t = \theta_0 + \theta_1 DUM_{1986} + \theta_2 lnGE_{t-1} + \theta_3 lnGDP_{t-1} + \theta_4 lnGDP^2_{t-1} + \sum_{t=i}^{n} \beta_1 \Delta lnGE_{t-i} + \sum_{j=0}^{p} \beta_2 \Delta lnGDP_{t-j} + \sum_{k}^{q} \beta_3\, \Delta lnGDP^2_{t-k} + \varepsilon_t \qquad (12)$$

Where Δ is the differenced operator and ε_t is the residual term at period *t.* the Schwarz information criterion is used in choosing an appropriate lag length of the first differenced regression. As agued by Pesaran and Shin (1999) and Narayan (2005) Schwarz information criterion performs better than Akaike information criterion in ARDL model. The proper calculated F-statistic depends on the appropriate lag order selection of the series to be used in the model. By applying F-test advanced by Pesarsn et al. (2001), the overall significance of the coefficients of the lagged variables is investigated. The null hypothesis of no long run relationship between the variables in equation (12) is $H_0: \theta_2 = \theta_3 = \theta_4 = 0$ against the alternate hypothesis of long run relationship i.e.$H_0: \theta_2 \neq \theta_3 \neq \theta_4 \neq 0$. Two asymptotic critical values have been advanced by pesaran et al. (2001). The decision whether the variables are cointegration or not depends on the two asymptotic critical values i.e. the upper critical bound (UCB) and lower critical bound (LCB). When the variables are integrated at level i.e. I(0), then , it will be appropriate to use the LCB. But, when the variables are stationary at I(1) or mixed of I(0) and I(1) then we apply UCB. Furthermore, the cointegration is said to be present when the computed F-statistic of equation (12) is greater than UCB. If the computed F-statistic is less than the UCB, then the series are not cointegrated. However, if the computed F-statistic falls within the UCB and LCB, then the result becomes inconclusive.

Due to imperfect correlation among the various cointegration approaches, the study further validate the ARDL bound test by applying Bayer and Hanck (2013) combine cointegration approach. This method of cointegration is the combination of the computed P-values of different cointegration test, which is specified in the Fisher's formulae as follows:

$$EG - JOH = -2\left[\ln(P_{EG}) + \ln\left(P_{JOH}\right)\right] \qquad (13)$$

$$EG - JOH - BO - BDM = -2\left[\ln(P_{EG}) + \ln\left(P_{JOH}\right) + \ln(P_{BO}) + \ln(P_{BDM})\right] \qquad (14)$$

WhereP_{EG}, P_{JOH}, P_{BO}, and P_{BDM} are probability values of individual cointegration tests. The decision rule is that if the estimated Fisher statistics is greater than Bayer and Hanck critical values, then we reject the null hypothesis of no cointegration.

Furthermore, the cointegration test and the long-run and short-run results are supported with the causality test using the Toda-Yamamoto (1995). This approach of causality test provides us with the ability to test the causal relationship of the variables irrespective of their order of integration i.e. I(0), I(1) or I(2). The Toda-Yamamoto approach, unlike the vector error correction method (VECM) causality test, does not require the variables to be stationary at first level. Therefore, the Toda-Yamamoto causality model is presented in a VAR system as:

$$lnGOVT_t = \sigma_0 + \sum_{i=1}^{k} \sigma_{1i} lnGOVT_{t-i} + \sum_{j=k+1}^{d\,max} \sigma_{2j}\, lnGOVT_{t-j} + \sum_{i=1}^{k} \beta_{1i}\, lnGDP_{t-i} + \sum_{j=k+1}^{d\,max} \beta_{2j}\, lnGDP_{t-j} + \sum_{i=1}^{k} \delta_{1i}\, lnGDP_{t-i}^2 + \sum_{j=k+1}^{d\,max} \delta_{2i}\, lnGDP_{t-j}^2 + \varphi_{1t} \quad (15)$$

As shown from the equation (15) above, the null hypothesis of no causalityis rejected when the P-value falls within 1-10% level of significance. Therefore, the Granger causality running from GDP and GDP^2 to $GOVT$is given by$\beta_{1i} \neq 0\forall i$ and $\delta_{1i} \neq 0\forall i$ respectively.

IV. Results And Discussion

Table 1 below reports the descriptive statistic. The result by Jarque-Bera test proved that all the variables are normally distributed with zero mean and constant variance.

Table 1 Descriptive statistics

	ln govt	*ln gdp*	*ln gdp²*
Mean	4.995	11.776	139.985
Median	4.895	11.631	135.292
Maximum	6.633	13.804	190.557
Minimum	3.165	10.043	100.857
Std. Dev.	1.075	1.158	27.523
Skewness	0.028	0.180	0.267
Kurtosis	1.630	1.632	1.686
Jarque-Bera	3.135	3.335	3.354
Probability	0.209	0.189	0.187
Sum	199.815	471.046	5599.385
Sum Sq. Dev.	45.029	52.268	29543.18
Observations	40	40	40

Notes: *ln govt*=log of total government expenditure, *ln gdp*=log of gross domestic product at current USD and $ln\ gdp^2$ is the square of ln gdp.

Table 2 ADF and PP unit root analysis

Variables	ADF test		PP test	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
*ln*govt	-0.790	-2.116	-0.790	-2.143
Δ*ln*govt	-7.163***	-7.142***	-7.145***	-7.087***
*ln*gdp	0.794	-1.680	0.814	-1.699
Δln gdp	-6.043***	-6.086***	-6.044***	-6.088***
$ln\ gdp^2$	1.375	-1.520	1.440	-1.520
$\Delta ln\ gdp^2$	-6.016***	-6.313***	-6.017***	-6.313***

Note: *** indicates significant at 1% level.

The series have unit root problem at level in both models i.e. intercept, and intercept and trend as shown in Table 2. However, the variables are found to be integrated at first difference. This means all the variables are stationary at I(1) and have the same level of integration. The outcome in Table 2 satisfied the precondition of using ARDL bound test to cointegration as none of the variables is integrated at I(2).

The suitable lag order selection of the variables is important for ARDL bounds model specification. As shown in Table 3, LR, FPE, and AIC tests statistic chose2lag respectively. However, SC and HQ criterion chose1 lag. Therefore, the study used the SC criterion as suggested by Narayan, (2005), Pesaran and Shin, (1999).

Table 3 Lag length selection.

Lag	LL	LR	FPE	AIC	SC	HQ
0	-77.294	NA	0.012	4.118	4.246	4.164
1	101.748	321.357	2.02e-1	-4.602	-4.091*	-4.419*
2	112.547	17.721*	1.86e-1*	-4.695*	-3.799	-4.373
3	120.389	11.663	2.02e-1	-4.635	-3.356	-4.176

Notes: LR: Sequential modified LR test statistic, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, and HQ: Hannan-Quinn information criterion. * indicates lag order selected by criterion

Table 4 The ARDL bound test to cointegration.

Dependent variable	Independent variables	Dummy	F-statistic	Decision
*ln*govt	*ln*gdp, lngdp^2,	1986	4.950***	Cointegration exists
Asymptotic critical value	99% critical bounds		95% critical bounds	
	I(0)	I(1)	I(0)	I(1)
	5.593	6.333	3.937	4.523

Note: *** and ** indicates significant at 1% and 5% level respectively

The estimated results presented in Table 4 provide the ARDL bound test to cointegration. The empirical evidence shows that the computed F-statistic is greater than Narayan (2005) critical value at 5% level of significance. Meaning, cointegration exists among the variables. To check the robustness and reliability of the cointegration relation among the variables, Bayer and Hanck (2013) is applied. As shown in Table 5, all the individual cointegration methods justify the existence of a long run relationship among the variable at adifferent level of significance. Furthermore, the combined test of all the methods (i.e. EG-J-Banerjee-Boswijk) proved the existence of cointegration among the variables at 5% level of significance.

Table 5 Bayer-Hanck combines cointegration.

Lag length	EG	Johansen	Banerjee	Boswijk	EG-Johansen	EG-J-Banerjee-Boswijk
K=1	-3.933** (0.028)	36.572*** (0.000)	-3.590** (0.040)	29.907*** (0.000)	24.214**	49.078**

Notes: EG-Johansen critical value at 5% is 10.895; EG-J-Banerjee-Boswijk critical value is 21.106. While *** and ** represents 1% and 5% respectively.

Table 6 presents the long run coefficients of the ARDL model. The estimated coefficient of GDP is positive and significant at 1 % level. This implies that 1 % increase in GDP will amount to 2.6 % increase in government expenditure, all things being equal. This result is in line with the findings of Rehman et al. (2010), Ogbonna (2012), Ibok and Bassey (2014) in Pakistan and Nigeria respectively. However, the square of GDP has a negative sign and is statistically significant at 5 % level.This shows that increase in GDP has a diminishing return as 1% increase in economic activities leads to 7 % decrease in government expenditure.

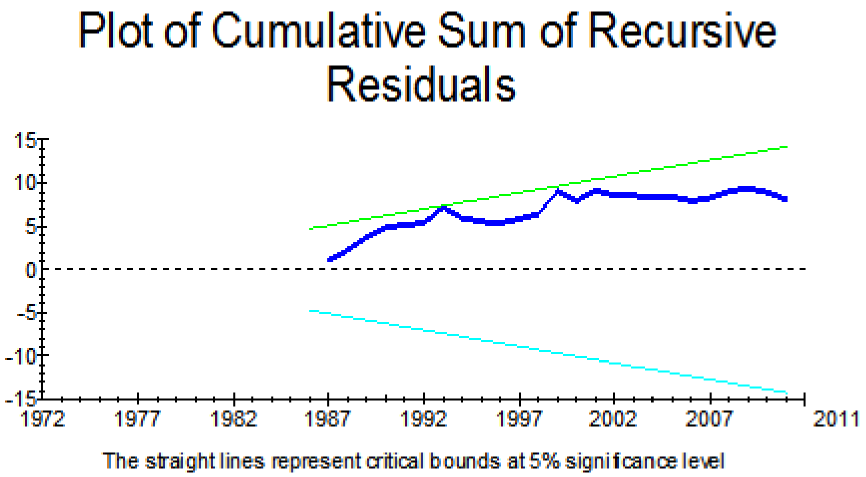
The short run results showed that both GDP and the square of GDP are statistically significant with a positive coefficient at 5 % and negative coefficient 10 % respectively. The negative sign on the error correction term indicates the expected speed of adjustment from the short run to the long run dynamics. The expected sign implies that 60 % of the disequilibrium from the previous year's shocks adjusts back to the long run equilibrium in the present year.

In addition, the diagnostic test, which includes Lagrange multiplier test of residual serial correlation; heteroscedasticity; Ramsey's RESET test proved that the diagnostic test reject the null hypothesis. This implies that the coefficients of the long run and ECM are free from serial correlation, heteroscedasticity. Moreover, the equations are free from any functional form misspecification. The plots of the CUSUM and CUSUMSQ statistics are within the critical bounds. This implies that all coefficients in the ECM model are stable over the period of analysis (i.e. 1972-2011).

Table 6 Long-and-short run analysis.

Dependent variable: ln govt			
Variables	Coefficient	Std. error	Prob. value
Long run results			
Constant	-15.5254***	0.11229	0.001
ln gdp	2.5809***	0.74551	0.001
ln gdp^2	-0.070145**	0.030300	0.027
dummy	0.0086168	0.11229	0.939
Short run results			
Constant	-9.4442**	3.6540	0.014
Δln gdp	1.5700 **	.60162	0.013
Δln gdp^2	-0.042670*	.021652	0.057
dummy	0.0052416	.067921	0.939
ECM_{t-1}	-0.60831***	.12515	0.000
Diagnostic tests			
Test	F-statistic	Prob. value	
$\chi^2 SERIAL$	0.59270	0.447	
$\chi^2 ARCH$	0.85386	0.361	
$\chi^2 WHITE$	7.1850	0.028	
$\chi^2 REMSAY$	0.17460	0.679	

Notes: *** indicate significant at 1% level, ** 5% and * 10% level of significant.



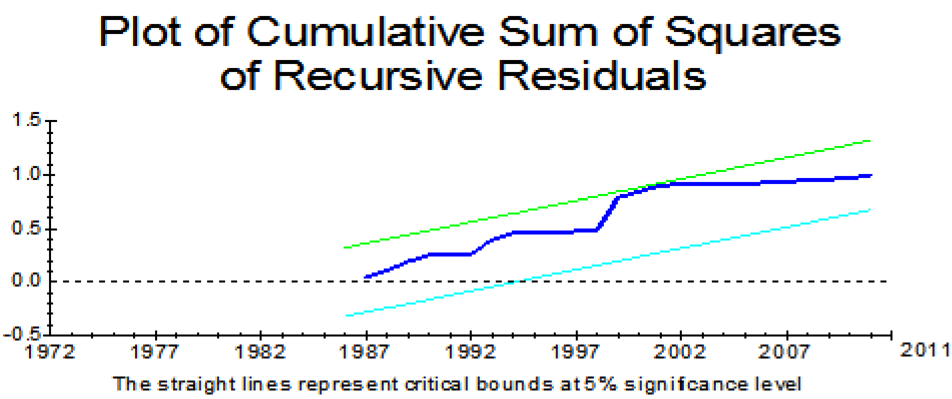


Table 7 Non- Granger causality test

Variables	*ln govt*	*ln gdp*	combine
ln govt	………..	26.48376 (0.0000)***	40.12040 (0.0000)***
ln gdp	0.636338	…………	2.074147
	(0.7275)		(0.7221)

*** indicate 1% significant level and values in parenthesis are the P-value.

Based on the unit root test and optimal lag selection results, the maximum lags (l) chosen for non-causality test is 2-i.e. ($l = d_{max} + k \leq 2$). As shown in Table 7 above, the result indicates a unidirectional causality running from GDP to government expenditure. This implies that government expenditure is an outcome of economic activities, which supports Wagner's hypothesis. These findings is consistence with the works of Pahlavani et al. (2011), Akpan (2011), Alimi (2013), Srinivasan (2013) in Iran, Nigeria and India respectively.

V. Concluding remarks

This study attempted to revisit the Wagner's law by using modern time-series econometric techniques in Nigerian context from 1972-2011. Furthermore, the study includes the square of GDP to validate Wagner's claim that increase in economic activities is the cause of government spending. Based on the empirical findings of this study, the presence of Wagner's Law was found to be valid. However, increase in GDP (i.e. the square of GDP) has negative impact on government expenditure. This implies that, increase in economic activities has a positive impact on government expenditure to a certain limit from which any additional increase will not increase government spending as proved by the negative coefficient of the square of GDP. Based on the empirical findings of this study, we found new evidence that has not been explored in the context of Nigeria. As such, the government needs to provide enabling environment for small and medium enterprises at all levels of government in order to boost the economic activities in the country, which in turn reduces government expenditure in the long run.

References:

[1]. Akpan, U.F. (2011).Cointegration, causality and Wagner's hypothesis: Time series evidence for Nigeria, 1970-2008.*Journal of Economic Research*, 16 (2011), 59–84.

[2]. Alimi, R. S. (2013). Testing augmented Wagner's Law for Nigeria Based on Cointegration and Error-Correction Modelling Techniques (No. 52319).*University Library of Munich, Germany*.

[3]. Aregbeyen, O. (2006). Cointegration, causality and Wagner's Law: A test for Nigeria, 1970-2003.*Central Bank of Nigeria Economic and Financial Review*, 44(2).

[4]. Bayer, C., &Hanck, C. (2013).Combining non-cointegration tests. *Journal of Time Series Analysis*, 34(1), 83-95.

[5]. Chimobi, O. P. (2009). Government expenditure and national income: A causality test for Nigeria.*European Journal of Economic and Political Studies*, 2(2), 1–12.

[6]. Dada, A. M. &Adewale, O. A. (2013). Is Wagner's law a myth or a reality? Empirical evidence from Nigeria.*International Journal of Development and Economic Sustainability*, 1(1), 123-137.

[7]. Dependra, S. (2007). Does the Wagner's Law hold for Thailand? A time series study.*Munich Personal RePEc Archive MPRA*, http://mpra.ub.uni-muenchen.de/2560/ (Accessed on the 5th of February, 2009).

[8]. Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, 49, 1057-1072.

[9]. Enders Walter (1995), *Applied Econometric Time Series*, John Wiley & Sons, Inc., USA.

[10]. Goffman, J.J. (1968). On the empirical testing of Wagner's Law: A technical note.*Public Finance/Finances Publique*, 3(3): 359-364

[11]. Goffman, J.J.; Mahar, D.J. (1971.)The growth of public expenditure in selected developing nations: Six Caribbean countries.*Public Finance/Finances Publique*, 3(3), 57 – 74.

[12]. Gujarati, D. (2003). *Basic Econometrics: 4th edition*. New York. McGraw Hill Publishing Company.

[13]. Gupta, S.P. (1967) Public expenditure and economic growth: A time series analysis.*Public Finance/Finances Publique*, 22 (4), 423 – 461.

[14]. Halicioglu, F. (2003) Testing Wagner's Law for Turkey, 1960 – 2000.*Review of Middle East Economics and Finance*, 1(2), 129 - 140.

[15]. Harris, R.I.D. (1995), *Using Cointegration Analysis in Econometric Modeling*, Simon and Schuster International Group, England.

[16]. Haug, A. A. (2002). Temporal aggregation and the power of cointegration tests: a Monte Carlo study.*Oxford Bulletin of Economics and Statistics*, 64(4), 399-412.

[17]. Henrekson, M. (1993). Wagner's Law--A spurious relationship?.*Public Finance= Finances publiques*, *48*(3), 406-15.

[18]. Hondroyiannis, G. and Papapetrou, E. (1995).An examination of Wagner's law for Greece: a co-integration analysis.*Public Finance/Finances Publiques*, 50 (1), 67–79.

[19]. Hsieh, E. and Lai, K. S. (1994).Government spending and economic growth: the G-7 experience.*Applied Economics*, 26 (6), 535–542.

[20]. Ibok, O. W., &Bassey, N. E. (2014). Wagner's Law revisited: The case of Nigerian agricultural sector (1961-2012). *International Journal of Food and Agricultural Economics*, 2(3), 19-32.

[21]. Ighodaro, C. A., &Oriakhi, D. E. (2010). Does the relationship between government expenditure and economic growth follow Wagner" s Law in Nigeria? *Annals of University of Petrosani Economics*, 10(2), 185-198.

[22]. Khan, A. H. (1990).Wagner's Law and the developing economy: A time series evidence from Pakistan. *The Indian Economic Journal*, *38*(1), 115-123.

[23]. Mann, A.J. (1980). Wagner's law: an econometric test for Mexico, 1925–1976.*National Tax Journal*, 33 (2), 189–201.

[24]. Mihas, N. A. (1975). Wagner's law of public expenditures: what is appropriate measurementfor a valid test. Public Finance/Finances Publiques, 30 (1), 77–84.

[25]. Murthy, V. N. R. (1994). Wagner's law, spurious in Mexico or mis-specification: a reply.*Public Finace/Finances Publiques*, 49 (2), 295–303.

[26]. Musgrave, R. A. (1969). *Fiscal Systems* (New Haven and London: Yale University Press).

[27]. Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests.*Applied economics*, 37(17), 1979-1990.

[28]. Ogbonna, B. C. (2013). Does the Wagner's Law hold for Nigeria?: 1950-2008. *Journal of Research in National Development*, 10(2), 290-299.

[29]. Owolabi, M.O. (2015).Re-examining the Wagner's Law versus Keynesian hypothesis: Evidence from Nigeria.*International Letters of Social and Humanistic Sciences*, 57(2015), 142-146.

[30]. Pahlavani, M., Abed, D., &Pourshabi, F. (2011).Investigating the Keynesian view and Wagner's Law on the size of government and economic growth in Iran.*International Journal of Business and Social Science*, 2(13), 170-175.

[31]. Peacock, A.T.; Wiseman, J**.** (1961).*The Growth of Public Expenditure in the United States*, Princeton University Press, Princeton

[32]. Pesaran MH, Shin Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. Chapter 11 in *Econometrics and Economic Theory in the 20th Century*: The Ragnar Frisch Centennial Symposium, Strom S (ed.). Cambridge University Press: Cambridge.

[33]. Pesaran, H., Shin, Y., and R.J. Smith (2001), "Bounds testing approaches to the analysis of level relationships," *Journal of Applied Econometrics*, 16, 289-326.

[34]. Phillips, P. C. B., &Perron, P. (1988).Testing for a unit root in time series regression.*Biometrica*, 75, 335-346.

[35]. Pryor, F.L. (1968) *Public Economics in Capitalist and Communist Nations*, London: George Allen and Unwin.

[36]. Rahman J., Iqbal A. and Siddiqi, M. (2010) Cointegration –causality analysis between public expenditure and economic growth in Pakistan, *European Journal of Social Sciences*, 13(4), 556-565.

[37]. Ram, R. (1986). Causality between income and government expenditure: a broad international perspective.*Public Finance/Finances Publiques*, 31 (3), 393–413.

[38]. Ram, R. (1987). Wagner's hypothesis in time series and cross section perspectives: evidence from Real data for 115 countries.*Review of Economics and Statistics*, 69 (2), 359–393.

[39]. Sevitenyi, L. N. (2012). Government expenditure and economic growth in Nigeria: An empirical investigation (1961-2009).*Journal of Economic Analysis*, 3(1), 38-51.

[40]. Srinivasan, P.(2013),"Causality between public expenditure and economic growth: The Indian case", *International Journal of Economics and Management*, 7(2), 335-347.

[41]. Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of econometrics*, 66(1), 225-250.

[42]. Udo, A., &Effiong, C. (2014).Economic growth and Wagner's hypothesis: The Nigerian experience.*Journal of Economics and Sustainable Development*, 5(16), 41-58.

[43]. World Bank, World Development Indicators, 2015, Washington.