

Government Expenditure and Gross Domestic Product: A Test of Wagner's Law on Nigerian Economy

Abudu KASIMU¹ and Meshack AGGREH²

Abstract

The study examined the pattern of government expenditure in Nigeria to know if the growth of public expenditure follows the proposition of Wagner's law of increasing state activities. The study utilized the Johansen cointegration test to examine data from 1960 to 2012. Government expenditure and gross domestic product was found to have long-run equilibrium relation with strong positive correlation as confirmation by correlation matrix. The findings supported the proposition of Wagner's law of increasing state activities. Following the support for increasing state activities with increase in GDP, the government should endeavour that a larger fraction of the Gross National Expenditure be such that affect the real sector of the economy which will transmit to growth of the productive sector of the economy.

Key words: *Wagner's Law, Public Expenditure, Peacock-Wiseman Theory.*

1. Introduction

Despite the push for a private driven economy and agitation for reduction in government participation, Wagner's law is found to hold true by various studies in many nations of the world with little contradiction coming from developing countries. This is particularly so, as the expenditure of various nation is on the increase. The crave for private partnership has reduced government participation in most economy but the size of existing government activities (such as military expenditure) continue to grow leading to increase in total expenditure. This is to assert the fact identified by Smith (1904) that "defence is more important than opulence". Government expenses over the years do not follow a particular trend. In some countries, Government expenditure increases with increasing GDP but this relationship differ among countries. Wagner's law, also known as law of increasing state spending is a principle named after the German economist, Adolph Wagner (1835 – 1917). The law predicts that the development of an industrial economy will be accompanied by an increased share of public expenditure in gross national product. Wagner's law suggests that a welfare state evolves from free market capitalism due to the population voting for ever-increasing social services. According to Wagner, the increase in state expenditure is needed for social activities of the state, administrative and protective actions, and welfare functions.

Some studies like Peacock and Wiseman (1967), Musgrave (1969), and Mann (1980), supported Wagner's proposition. Studies from Nigeria differ in this regard. For example, Aigbokhan (1996) found a bi-directional causality between government total expenditure and income, Essien (1997) found no long run relationship and causality between public spending and real income. On the contrary, Aregbeyen (2006), in a similar study, upheld Wagner's law. Ighodaro and Oriakhi (2010) posit that changes in economic conditions and policies are not the only factors that affect government expenditure but other factors such as fiscal policy

¹ Assistant Lecturer, Department of Accounting, Veritas University Abuja, Nigeria, Email: kasbud2000@yahoo.com; kasimu2020@gmail.com

² Assistant Lecturer, Department of Accounting, Veritas University Abuja; Associate member of the Chartered Institute of Accountant, Nigeria (ICAN), Email: meshiko2000@yahoo.com; aggrehmeshack@gmail.com
Author(s) are thankful to Dr. Tsegba I. N. and Mr. Akwen, G. for valuable suggestions on the paper.

variable and political freedom. In their study, Wagner's hypothesis does not hold in all the estimations rather Keynesian hypothesis was validated in all the estimation. However, it is not clear if Nigerian public expenditure till date follows Wagner's proposition. Following Wagner's proposition, this study examined the pattern of government expenditure in Nigeria.

2. Literature Review

2.1 Public Expenditure

According to Bhatia (2006), public expenditure refers to the expenses incurred by the government for its own maintenance, maintaining its component units, the general society, the political system and the general economy. This defined the scope of government spending and involvement. Various government engagements in the economy involve some form of expenditures. As supported by some studies, Wagner's proposition is of the view that public expenditure resulting from increasing state activities increases at an increasing rate as income increases. Contrary to this view is the view held by Tarschys (1975) that government activities should diminish as the economy becomes private-sector driven. This is apparent as many governments of nations of the world are shrinking their participation in means of production and calling for private sector to undertake production and also assist the government via social responsibility role to provide some social amenities. Wagner (1883) observed that there exists a relationship between economic growth and public spending. He asserted that the growth in public expenditure is a natural consequence of economic growth. That is, the percentage share of public expenditure increases with an increase in gross domestic product.

According to Aladejare (2013), Wagnerian and Rostow- Musgrave hypothesis were found to be applicable to the relationship between the fiscal variables used in his study in Nigeria. Contrary to the findings of prior studies of weak support for Wagner's law for developing countries, Akitoby, Clements, Gupta and Inchauste (2006) found a long-term relationship between government spending and output in developing countries consistent with Wagner's Law. Verma and Arora (2010) also supported Wagner's Law only for the long-run but refute the existence of any relationship between the economic growth and the size of the government expenditure in the short-run.

2.2 Theories of Public Expenditure

This section elucidate on the macro-model theories (that is Wagner's Law of increasing state activities and Peacock-Wiseman theory) as well as the development theory.

2.2.1 Macro-model theory

Wagner's Law of Increasing State Activities: - the law states that government expenditure must increase as the GNP increases and the government expenditure must of necessity grow at a faster rate. He argued that there was a functional relationship between the growth of an economy and the growth of government expenditure such that, as both increases, there is a tendency for the former to grow at a faster rate. He also argued that there would be need for industrialization and economic development. However, his law has been criticised on the ground that there are periods when government expenditures in relation to GNP will decline, when the elasticity of income to government expenditure is less than one but greater than zero or inelastic (Wagner, 1911). Wagner's law was influenced by the historical events that surrounded Germany in the late nineteenth century, a time when there was expansion of German empire and the fall of the Ottoman Empire. He 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 (Peter, undated).

The results of a study by Ogbonna (2012) in Nigeria supported Wagner's proposition. Dada and Adewale (2013) affirm that Wagner's Law is only true for the long-run.

Peacock-Wiseman Theory (also known as Displacement Theory) argued that the growth of public expenditure follows political economic path. They (Allan T. Peacock and Jack Wiseman) argued that public expenditure does not increase in a smooth and continuous manner, but in jerks and steps like fashion. The occurrence of unexpected social disturbances would necessitate an increase in government expenditures but the inadequacies of revenue position compared with the desired expenditure would cause the government to find a solution to the revenue shortage and also motivate the tax payer to attain a new level of tax tolerance (Ajibola, 2008). This displacement from previous tax level is known as the *displacement effect*. Also the government has a tendency to take larger proportion of national economic activities resulting from unexpected occurrences, a phenomenon known as the *concentration effect*.

2.2.2 Development theory

This theory also known as Musgrave theory argued that at low level of per capita income, the demand for public services tends to be generally high. This is because at the early stages of economic development, the income level is very low and the government is forced to provide the basic infrastructure facilities for economic take-off. But as per capital income rises (peculiar of developed economies), the growth of the public sector tends to fall as more basic wants (essential services) are satisfied. This happens when the economy approaches Rostow's stage of "high mass consumption". This phenomenon is due to less reliance on government provision of social services. Musgrave (1969) asserted that there is a difference in the expenditures of developing countries now than those of developed countries as at the early times of their development. Musgrave theory asserts that as per capital income increases, government will be required to increase the provision of public goods and services thereby resulting in increased expenditures.

Factors such as expansion of state activities, internal securities, defence, welfare activities, population increase, urbanization, price rise (inflation), economic development, globalization, public debt, administrative costs, diplomatic relations and increasing per capita income have been adduced for the growth or expansion of public expenditure in extant literature.

2.3 Overview of Government expenditure and GDP in Nigeria

In Nigeria, the gross national expenditure (GNE) in 1960 was US\$4,518,585,367 with a GDP per capita of US\$514.83. This figure of GNE and GDP increased to US\$5,411,375,546 and US\$547.71 in 1963 with a growth rate of 6.2% annual (World Bank, 2013). These increases in GDP value suddenly plunged downward during the civil war in 1967 with a GDP value of US\$446.16. The value of gross national expenditure did not fall correspondingly rather, the need for the prosecution of the war kept the GNE increasing to a value of US\$5,532,689,346 with a GDP growth rate of -17.56%. After the civil war, the gross national expenditure continued to increase with increasing GDP. Recently in 2006, the value of GNE and GDP increased from US\$123,413,111,169.02 and US\$831.79 to US\$234,244,009,953.71 and US\$1015.56 in 2011 with GDP growing annually from 3.44% to 4.42% (World Bank, 2013).

3. Methodology

Some studies like Oxley (1994); Bohl (1996); and Legrenzi (2004), used the stationarity properties of time series data, as well as cointegration analysis, to test whether

there is a long-run relationship between income and government spending. Goffman and Mahar (1971) and Musgrave (1969) used the relation below:

$$G = f(GDP/N) \text{ and } G/GDP = f(GDPR/N) \quad \dots \quad \dots \quad \dots \quad 3.1$$

Where G = Nominal Total Government Expenditure,
 GDP = Nominal Gross Domestic Product,
 $GDPR$ = Real Gross Domestic Product,
 N = Total Population Size, and
 C = Government Consumption Expenditure.

Some other functional formulations for examining Wagner's Law are as follows:

Peacock-Wiseman "traditional" version

$$G = f(GDP) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad 3.2$$

Pryor version

$$C = f(GDP) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad 3.3$$

Gupta/Michas version

$$G/N = f(GDP/N) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad 3.4$$

All variables are as previously defined.

Based on the above, the study examined Wagner's Law of increasing state activities using data from Nigeria with the model below:

$$\Delta GE = f(GDP, POP) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad 3.5$$

Where ΔGE = change in Government Expenditure
 GDP = Gross Domestic Product Per Capita
 POP = Population

The equation is specified econometrically as follow:

$$\Delta GE_t = GE_{t-1} + GDP_t + POP_t + U_t \quad \dots \quad \dots \quad \dots \quad \dots \quad 3.6$$

We made use of secondary source of data obtained from the World Bank Development Indicators in the World Bank National Account Data, OECD National Account and the Central Bank of Nigeria Statistical Bulletin for the period of fifty-two (52) years (1960 – 2012) with particular emphasis on the Nigerian Economy. Furthermore, the unit root test was conducted to check for stationarity of the data and cointegration test to check for long-run relationship between government expenditure and gross national product.

4. Analysis of Data

Table 4.1: The results of the unit root test

Variables	PP Unit Root Test Statistic	Critical Value @ 5%	Order of Integration	Remark
	<i>At level with intercept</i>			
GE	4.245805	-2.9190		NS
$GE(-1)$	4.245805	-2.9190		NS
GDP	-0.347601	-2.9178		NS
POP	26.48411	-2.9178		NS
	<i>At 1st Difference with trend & intercept</i>			
$D(GE)$	-7.807121	-3.5005	I(1)	S
$D(GE(-1))$	-7.807121	-3.5005	I(1)	S
$D(GDP)$	-5.173069	-3.4987	I(1)	S
$D(POP)$	5.241725	-3.5625	I(1)	S

Source: Author's computation using E-View 3.1, (2014)

The results of the unit root test revealed that at level the data were non-stationary, implying the presence of a unit root which suggests that there is need for the application of a more sophisticated statistical model for estimation. The series were however found to be stationary at first difference with intercept and trend for GE, GE (-1), GDP, and only intercept for POP. Truncation lag was used for correction of autocorrelation. The truncation lag for GE, GE (-1), GDP was 3 while there was no truncation lag for POP.

The results of the Johansen cointegration test

Table 4.2: Johansen Cointegration Test

Sample: 1960 – 2012				
Included observations: 50				
Test assumption: Linear deterministic trend in the data				
Series: GE GDP POP				
Exogenous series: GE				
Warning: Critical values were derived assuming no exogenous series				
Lags interval: 1 to 1				
	Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
1.000000	1765.844	29.68	35.65	None **
0.265752	18.59168	15.41	20.04	At most 1 *
0.060986	3.146243	3.76	6.65	At most 2
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. test indicates 2 cointegrating equation(s) at 5% significance level				

Source: Author's computation using EView 4.1

Comparing the Likelihood ratio with the 5 per cent critical value (*see table 4.2*), the results refute the hypothesis of no cointegrating equation and accept that there are at most two cointegrating equations specifying the existence of a long-run relationship between the cointegrating variables GE and GDP.

Table 4.3: Correlation Matrix

	<i>GE</i>	<i>GDP</i>	<i>POP</i>
<i>GE</i>	1.000000	0.817293	0.792885
<i>GDP</i>	0.817293	1.000000	0.683642
<i>POP</i>	0.792885	0.683642	1.000000

Source: Author's computation using EView 4.1

The result of the correlation matrix revealed a strong positive co movement of GE and GDP with a correlation value of 0.82 (*see table 4.3*). The result also revealed strong relationship with a value of 0.79 that government expenditure increases with increasing population.

5. Conclusion and Recommendations

The study tested Wagner's law using data from Nigeria. This was to ascertain if government expenditure in Nigeria follows Wagner's proposition. The findings supported Wagner's proposition of increasing state activities as GDP increases. The "displacement effect" as argued by Peacock & Wiseman (1967) was found to be true in the case of Nigeria (*see table 4.2*).

Following the support for increasing state activities with increase in GDP, the government should endeavour that a larger fraction of the Gross National Expenditure should be expended on activities that will affect the real sector of the economy which will transmit to growth of the productive sector of the economy. However, it is not still clear if the

government should shrink or continue to expand her activities. Further studies can explore on this to advance the frontiers of knowledge.

References

- Aigbokhan, B. E. (1996). Government size and economic growth: The Nigeria experience, in *Beyond Adjustment: Management of the Nigerian economy. Proceedings of the 1996 Annual Conference of the Nigeria Economic Society.*
- Ajibola, R. (2008). *Public finance: Principles and practice (second edition).* Lagos: AVL Publishing
- Akitoby, B., Clements, B., Gupta, S., & Inchauste, G. (2006). Public spending, voracity, and Wagner's law in developing countries. *European Journal of Political Economy*, 22, 908–924.
- Aladejare, S. A. (2013). Government spending and economic growth: Evidence from Nigeria. *Munich Personal RePEc Archive, MPRA Paper No. 43916, 18 January. Online at <http://mpra.ub.uni-muenchen.de/43916/>*
- 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), June.
- Bhatia, H. L. (2006). *Public finance* (26th Ed.). New Delhi: Vikas Publishing House PVT Ltd.
- Bohl, M.T. (1996). Some international evidence on Wagner's law. *Public Finance* 51, 185–200.
- Dada, M.A., & Adewale, (2013). Is Wagner's law a myth or a reality? Empirical evidence from Nigeria. *International Journal of Development and Economic Sustainability*, 1, 123-137, September.
- Essien, E. A. (1997). Public sector growth, an econometric test of Wagner's law. *Central Bank of Nigeria Economic and Financial Review*, 35(3).
- Goffman, I. J., & Mahar, D. J. (1971). The growth of public expenditure in selected developing nations: Six Caribbean countries. *Public Finance / Finances Publiques*, 26(1), 57-74.
- Ighodaro, C. A. U., & Oriakhi, D. E. (2010). Does the relationship between government expenditure and economic growth follow Wagner's law in Nigeria? *Annals of the University of Petroșani, Economics*, 10(2), 185-198.
- Legrenzi, G. (2004). The displacement effect in the growth of governments. *Public Choice*, 120, 191–204.
- Mann, A. J. (1980). Wagner's law: An econometric Test for Mexico, 1925 – 1970, *National Tax Journal* 33, 189 – 201.
- Michas, N. A., (1975). Wagner's law of public expenditures: What is the appropriate measurement for a valid test. *Public Finance/ Finances Publiques*, 30, 1, 77-84.
- Musgrave, R. A. (1969.) *Fiscal Systems*, New Haven and London: Yale University Press.
- OECD National Accounts data files (2013).
- Ogbonna, B. C. (2012). Does the Wagner's law hold for Nigeria? : 1950-2008. *JORIND* 10 (2), June, ISSN 1596 - 8308. www.transcampus.org./journals, www.ajol.info/journals/jorind.
- Oxley, L. (1994). Cointegration, causality and Wagner's law: a test for Britain 1870–1913. *Scottish Journal of Political Economy*. 41, 286–298.
- Peacock, A. T. & Wiseman, J. (1967). *The growth of public expenditure in the United Kingdom*, London: George Allen and Unwin.

- Peters, A. C. (Undated). An application of Wagner's 'law' of expanding state activity to totally diverse countries. Basseterre St Kitts, West Indies: Monetary Policy Unit, Eastern Caribbean Central Bank
- Pryor, F. L. (1968), *Public Expenditures in Communist and Capitalist Nations*. London: George Allen and Unwin.
- Smith, A. (1904). *An inquiry into the nature and causes of wealth of nations*. London: Methuen.
- Tarschys, D. (1975). The growth of public expenditures – nine modes of explanation. *Scandinavian Political Studies*, 10(1), 9 – 32.
- Verma, S. & Arora, R. (2010). Does the Indian economy support Wagner's law? An econometric analysis. *Eurasian Journal of Business and Economics*, 3(5), 77-91.
- Wagner, A. (1883). Three extracts on public finance, in R.A. Musgrave and A.T. Peacock (eds) (1958), *classics in the theory of public finance*. London: Macmillan.
- Wagner, A. (1911). Staat in nationalo"konomischer Hinsicht. *Handwo"rterbuch der Staatswissenschaften*, Lexis, Jena, 743– 745.
- World Bank national accounts data (2013).

APPENDIX

APPENDIX I: NIGERIAN GOVERNMENT EXPENDITURE, POPULATION AND GNI

YEAR	GROSS NATIONAL EXPENDITURE (CURRENT \$US)	GDP PER CAPITA (CONSTANT 2005 US\$)	POPULATION, TOTAL	GNI PER CAPITA (CURRENT LCU)	GDP PER CAPITA GROWTH (ANNUAL %)
1960	4,518,585,367.00	514.83	45,211,614	65.94	
1961	4,785,124,373.00	505.40	46,144,154	68.82	-1.83
1962	5,169,166,021.00	515.26	47,117,859	73.89	1.95
1963	5,411,375,546.00	547.71	48,128,461	75.76	6.30
1964	5,897,827,261.00	562.66	49,169,820	79.10	2.73
1965	6,175,416,492.00	577.59	50,238,570	80.39	2.65
1966	6,634,747,305.00	541.21	51,336,376	85.11	-6.30
1967	5,532,689,346.00	446.16	52,468,594	69.61	-17.56
1968	5,503,009,940.00	430.97	53,640,549	67.14	-3.41
1969	6,902,141,957.00	523.36	54,859,202	83.62	21.44
1970	12,897,942,041.00	639.40	56,131,845	153.74	22.17
1971	9,438,407,080.00	713.63	57,453,735	167.51	11.61
1972	12,375,973,304.00	720.39	58,829,321	173.06	0.95
1973	15,076,732,673.00	740.91	60,285,455	188.86	2.85
1974	22,210,392,902.00	802.67	61,857,025	305.90	8.34
1975	29,026,997,579.00	740.26	63,565,601	352.65	-7.78
1976	38,380,837,563.00	784.23	65,426,979	427.23	5.94
1977	35,188,733,906.00	806.83	67,425,439	492.99	2.88
1978	38,065,552,178.00	737.50	69,512,236	516.56	-8.59
1979	44,540,638,767.00	764.19	71,619,219	595.35	3.62
1980	57,666,665,849.00	773.86	73,698,099	648.93	1.27
1981	62,345,690,446.00	654.23	75,729,574	652.65	-15.46
1982	52,732,854,008.00	635.90	77,729,805	653.99	-2.80
1983	36,319,082,628.00	587.13	79,729,313	702.85	-7.67
1984	27,647,674,017.00	544.86	81,775,217	756.19	-7.20
1985	27,368,511,799.00	582.59	83,901,572	831.32	6.92
1986	20,898,478,455.00	581.86	86,118,046	788.63	-0.12
1987	22,517,976,319.00	562.79	88,412,920	1,105.73	-3.28
1988	22,597,451,628.00	602.42	90,773,617	1,564.31	7.04
1989	22,046,096,733.00	629.12	93,179,760	2,201.44	4.43
1990	24,309,383,876.00	663.33	95,617,350	2,449.39	5.44
1991	25,707,050,695.00	677.39	98,085,373	3,044.38	2.12
1992	32,141,912,327.00	679.78	100,592,242	5,608.43	0.35
1993	22,010,154,525.00	677.54	103,144,749	8,347.41	-0.33
1994	23,428,194,338.00	661.49	105,752,796	10,534.90	-2.37
1995	27,517,609,437.00	661.32	108,424,827	16,799.62	-0.03
1996	27,992,162,500.00	672.75	111,166,210	23,797.38	1.73
1997	33,620,581,711.00	673.86	113,979,481	24,199.17	0.17
1998	33,603,795,455.00	669.56	116,867,371	22,075.68	-0.64
1999	36,248,792,480.00	660.18	119,831,888	25,660.01	-1.40
2000	35,890,490,302.00	678.59	122,876,727	33,317.19	2.79
2001	42,861,048,123.00	682.25	126,004,992	38,935.50	0.54
2002	59,522,437,930.00	675.56	129,224,641	49,189.02	-0.98
2003	66,124,937,296.00	726.45	132,550,146	58,489.89	7.53
2004	76,518,475,300.00	783.07	135,999,250	76,323.29	7.80
2005	94,860,208,796.00	804.15	139,585,891	92,993.36	2.69
2006	123,413,111,169.02	831.79	143,314,909	125,577.77	3.44
2007	140,898,906,104.32	862.14	147,187,353	131,688.81	3.65
2008	183,192,904,635.25	889.43	151,208,080	150,496.30	3.17
2009	159,626,591,436.84	925.79	155,381,020	147,601.71	4.09
2010	216,497,741,748.59	972.55	159,707,780	196,651.45	5.05
2011	234,244,009,953.71	1015.56	164,192,925	208,289.68	4.42
2012		1052.34	168,833,776	222,077.14	3.62

Source: World Bank national accounts data, and OECD National Accounts data files (2013).