UNIVERSITY OF LAGOS

Nigerian Journal of Management Studies

Published by the Faculty of Business Administration
UNIVERSITY OF LAGOS

Nigerian Journal of Management Studies

Volume 13, No. 1, 2015

Published by
The Faculty of Business Administration, University of Lagos

Publisher's Website: www.njms.unilag.edu.ng

E-mail: oluakintunde@unilag.edu.ng

ISBN 978-32843-1-2

Published by Faculty of Business Administration, University of Lagos

Typeset and printed in Nigeria by Prints-Biz Communications Network, 08023070715

CONTENTS

Nigerian Journal of Management Studies
Volume 13, No. 1, 2015, 119-129

ON THE DIRECTIONAL CAUSALITY BETWEEN GOVERNMENT SPENDING AND ECONOMIC GROWTH IN NIGERIA USING WAGNERIAN OR KEYNESIAN MODELS

Nwaogwugwu, I. C
University of Lagos
Department of Economics
doknwaogwugwu@yahoo.com
&
Ojapinwa, T. V

Abstract
This paper examines the causality between government spending and economic growth along with external reserve in a VAR technique by applying Granger causality/Block Exogeneity approach to Nigerian data for the period 1961-2011. Various diagnostic tests for adequacy of the model were performed. This study finds that there is unidirectional causality from government spending to economic growth in Nigeria. This supports the conventional Keynesian framework that causality runs from government spending to economic growth and not from economic growth to government expenditure as posited by the Wagnerian.
Key words: Government Spending, Growth, Causality, Nigeria

1 INTRODUCTION

It is a long held proposition in the public finance literature that there exists a fundamental relationship between public expenditure and economic growth. While Wagner (1883) claims that the causal link is from public expenditure to economic growth, the reverse causation, which also exists according to (Keynes 1936), is usually jettisoned. Wagner formulated his famous law in which he observed, on the basis of historical evidence for several industrialized countries, that there is a long run tendency for government expenditure to rise as per capita income increases. This observation led to the so called Wagner's law of increasing state activities. Thus, according to this law, increased government activity and corresponding increase in government expenditure is an inevitable result of economic growth. Keynes however, stated that public expenditure is a fundamental determinant of economic growth. Keynes posited that the government expenditure, as a fiscal policy instrument, is useful for achieving short-term stability and higher long run growth rate. According to Keynes, government could alter economic downturns by borrowing money from the private sector and then returning the money to the private sector through various spending programs. Keynesian approach pointed out that public expenditure is an exogenous factor and a policy instrument for mounting national income. Therefore, it posits that the causal relationship between public expenditure and national income runs from expenditure to growth.

The fundamental question of this study is: what is the direction of causality between government expenditure-growth relationships? Kumar, Webber and Fargher (2009) argue that understanding the directional causality between government expenditure and national income would permit the identification of a benchmark against which one can identify the fiscal policy stance adopted by particular governments, especially in fighting cyclical fluctuation (Kumar, Webber and Fargher, 2009). Based on Kumar, Webber and Fargher's argument this paper attempts to investigate the issue of causality between government expenditure and growth in Nigeria by applying the techniques of Verma and Arora (2010) multivariate framework. The main objective of this study is to investigate the directional causality between government spending and economics growth in Nigeria. The specific objectives are to: (i) test the Wagner's law of public spending and (ii) the Keynesian model of public spending. The rest of the paper is organized as follows: section 2 presents theoretical framework and literature review. Section 3 presents the method of analysis. Section 4 discusses the empirical findings and Section 5 concludes.

2 THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

In 1893, the German political economist Adolph Wagner put forward his well-known proposition that regards public expenditure growth as a natural consequence of economic growth. His views were later formulated as a law and came to be known as "Wagner's law" or "Wagner's hypothesis" (Henrekson, 1993; Halicioglu, 2003). The Law suggests that an expansion of a country's level of economic development leads to an increase in its relative size of public sector. This statement includes a comparison of development between private and public sectors. According to Wagner's law as the national economy grows, the public sector will grow at a faster rate than the private sector. There are several underlying reasons causing this result. First, with economic growth, industrialization and urbanization would generate an increase in government expenditures. Development of the economies makes legal relationships between the economic agents more complex, which triggers the administrative, regulatory and protective functions of the government. Second, real income growth would lead to a higher level of demand for basic infrastructure. In such a case, there would be a need for increased provision of social and cultural goods and services. As a result, as economy develops, expenditures on social welfare of society such as education and health expand. Third, government has to interfere to the market to ensure the functioning of natural monopolies and to enhance economic efficiency (Gupta 1967; Pryor 1968; Peacock-Wiseman 1979; Oktayer & Oktayer 2013).

One of the most influential empirical studies on the subject is Singh and Sahni (1984). Singh and Sahni examined the causal link between government expenditure and national income for India and found out that the causation is neither Wagnerian nor Keynesian. Similarly, Ahsan et al. (1992) for the United States failed to detect any causality between public expenditure and national income. Similarly, Abizadeh and Yousefi (1998) found no evidence for the proposition. Besides, Bohl (1996) found that Wagner's law was valid only for the United Kingdom and Canada, out of the G7 countries, during the post-World War II period. Moreover, Frimpong and Oteng-Abayie (2009) supported neither Wagner's hypothesis nor its reverse for the West African Monetary Zone (WAMZ) countries. Verma and Arora (2010) confirmed the absence of any instantaneous impact of increasing GDP and the size of government expenditure in India. Afzal and Abbas (2010) and Rauf, Qayum and Zaman (2012) asserted that there is no causality from national income to public expenditure and public expenditure to national income in Pakistan. Moreover, Ray and Ray (2012) confirmed the absence of short run causality between economic growth and developmental expenditure of government which neither supports Keynesian approach nor Wagner's law in India.

On the other hand, the studies by Chletsos and Kollias (1997) for Greece, Ghali (1998) for the 10 OECD countries, Demirbas (1999) for Turkey, Thornton (1999) and Chang (2002) for the 6 emerging countries, Kolluri et al. (2000) for the G7ountries, Al-Faris (2002) for the Gulf Cooperation Council (GCC) countries, Aregbeyen (2006) for Nigeria, Kalam and Aziz (2009) for Bangladesh and Rehman et al. (2010) for Pakistan found causality from growth to public expenditure (as proposed by Wagner's law). Grullón (2012) and Salih (2012) supported the Wagner's law for Dominican Republic and Sudan, respectively.

In contrast, the studies of Jiranyakul and Brahmasrene (2007) for Thailand, Pradhan (2007) for India, Babatunde (2008) for Nigeria, Magazzino (2010) for Italy and Ighodaro and Oriakhi (2010) for Nigeria confirmed the validity of Keynesian law of public expenditure. Besides, Ayo et al. (2011) reported bi-directional causality between government expenditures and economic growth both in the short run and in the long run for Nigeria.

The existing literature reveals that the debate pertaining to the public expenditure and economic growth relationship are well established and has been one that is unending.. As it can be observed, findings vary considerably from country to country with some supportive and some opposing evidence. The reasons of conflicting results have been quested by scholars and many explanations have been given. Although these contradictory results are generally attributed to different econometric methodologies used, Ram (1987) suggests that differences in the nature of underlying data, the test procedure and the period studied may explain the diversity in results.

3 METHODOLOGY

Sims (1972) argued that the single equation models are simple and easy to estimate, the equations are not derived explicitly from a larger model and therefore important feedback mechanism may be omitted. He further argued that the extension of single equation approaches to models of interdependent variables, where feedback mechanism exists, went some way with Vector Auto- Regressive (VAR) models (Granger 1969; Sims 1982b). Vector Auto- Regressive (VAR) models have emerged as powerful multivariate models since the early 1980s (see Sims, 1982b). In a vector autoregressive model, each of a set of variables is regressed on past values of itself and past values of every other relevant variable in the system. Cross variable linkages are incorporated because lags of all variables in each equation are included and also because of the existence of correlation among the disturbances of various equations. One of the common uses of VAR models has been in testing the causality between the variables. A variable y_1 is said to be Granger (1969) caused by a variable y_2 if information in the past and present y_2 help improve the forecasts of variable y_1. It is commonly used to help identify and understand the pattern of cross linkages and feedback in vector auto regressions. An F-test is constructed under the null hypothesis that the coefficients on the lags of an independent variable in the equation for given dependent variable are jointly equal to zero.

This choice of Vector Autoregression model is as a result of the fact that it best captures the multi-way relationship among contemporaneous relationships, and other variables used and their related lags. A unique feature of the VAR model is that an endogenous variable in one equation of the system appears in another equation as an explanatory variable thereby becoming stochastic and correlated with the disturbance term (Shock or impulse term) of the equation(Gujarati & Porter, 2009). Also, in a VAR model, variables are treated equally and no distinctions are made between endogenous and exogenous variables. Hence, the Ordinary Least Square (OLS) technique will appear to produce results that are inconsistent. The general form of a VAR model is given by the equation (1) in the following unrestricted (reduced form) system.

$$Z_t = \alpha + \psi(L)Z_t + ut \qquad 1$$

Where Z_t is a vector of the η (stationary endogenous)

Variable, α is an $n \times 1$ vector of constants,

$\psi(L)$ is an $n \times n$ matrix of (lagged) polynomial

Coefficients, and ut is an $n \times 1$ vector of white noise innovation terms with $E(u_{tk})$ =0 and $E(u_{tk}, u_{sk}) = 0$ $for\ t \neq s$). The disturbance term, ut, also has a covariance matrix, $E(u_t u_{t'}) = \Sigma$. Finally, the lag operator is defined as $\psi(L) = \psi_1 + \psi_2 L + ... + \psi_k L^{k-1}$ of degree $K-1$ and ψ_j $for\ j = 1,......., K$.

More specifically, our model which also incorporates the above direct and indirect linkages is presented as follows:

$$RGDP = f(CE, RE, EXR) \qquad 2$$

$$RGDP_t = \beta_{0t} + \sum_{j=1}^{n-i} \beta_{1ij} RGDP_{t-j} + \sum_{j=1}^{n-i} \beta_{2ij} CE_{t-j} + \sum_{j=1}^{n-i} \beta_{3ij} RE_{t-j} + \sum_{j=1}^{n-i} \beta_{4ij} EXR_{t-j} + U_{1t} \qquad 3$$

$$CE_t = \beta_{0it} + \sum_{j=1}^{n-i} \beta_{1ij} CE_{t-j} + \sum_{j=1}^{n-i} \beta_{2ij} RGDP_{t-j} + \sum_{j=1}^{n-i} \beta_{3ij} RE_{t-j} + \sum_{j=1}^{n-i} \beta_{4ij} EXR_{t-j} + U_{2t} \qquad 4$$

$$RE_t = \beta_{0it} + \sum_{j=1}^{n-i} \beta_{1ij} RE_{t-j} + \sum_{j=1}^{n-i} \beta_{2ij} RGDP_{t-j} + \sum_{j=1}^{n-i} \beta_{3ij} CE_{t-j} + \sum_{j=1}^{n-i} \beta_{4ij} EXR_{t-j} + U_{3t} \qquad 5$$

$$EXR_t = \beta_{0it} + \sum_{j=1}^{n-i} \beta_{1ij} EXR_{t-j} + \sum_{j=1}^{n-i} \beta_{2ij} RGDP_{t-j} + \sum_{j=1}^{n-i} \beta_{3ij} CE_{t-j} + \sum_{j=1}^{n-i} \beta_{4ij} RE_{t-j} + U_{4t} \qquad 6$$

β_0, β_1, β_2, β_3, $and \beta_4$ are the unknown parameters where β_0 is the intercept and

RGDP = Real gross domestic product

RE = Recurrent expenditure

CE = Capital expenditure

EXR = External Reserve

$\sum \beta_{ij} RGDP_{t-j}$ = sum of the lags of real gross domestic product added from period t to j

$\sum \beta_{ij} CE_{t-j}$ = sum of the lags of capital expenditure from added period t to j

$\sum \beta_{ij} RE_{t-j}$ = sum of the lags of recurrent expenditure from added period t to j.

$\sum \beta_{ij} EXR_{t-j}$ = sum of the lags of external reserve added from period t to j

The data used in this study are taken from the Central Bank of Nigeria Statistical bulletin (2012). Annual observations from 1961 to 2011 are used to estimate the models. External reserve (EXR) is used as government international savings. This is based on Kumar, Webber and Fargher (2009) government near savings argument. Doan (2000) argued that when time series are nonstationary, it will generate estimates that are spurious. On the other hand a VAR model specified with differences, when series are nonstationary will generate estimates that are efficient but will ignore potential long run relationships. Sims (1982b) and Doan (2000), argue against differencing even if the variable contains a unit root because it throws away information concerning the co-movement of variables. Fuller (1976, Theorem) shows that differencing produces no gain in asymptotic efficiency in an autoregression, even if it is appropriate. Following Sims and Doan, unit root tests are not conducted and the present study uses levels rather than differences of the variables involved.

4 EMPIRICAL RESULT

4.1 Robustness Tests

Table 1 shows the result from the serial correlation Lagrange multiplier (LM) test. The test been an alternative to the Q –statistics for testing serial correlation shows that there is serial correlation for AR(12) as tested in the analysis. This result further implies serial correlation in the residual, and that OLS standard error and impulse response function are invalid and should not be used (E view 4 Guide, p 377)

Table 1 VAR Residual Serial Correlation LM Tests

VAR Residual Serial Correlation LM Tests		
Lags	LM-Stat	Prob
1	23.29761	0.1060
2	38.81147	0.0012
3	27.81624	0.0333
4	24.43848	0.0804
5	30.50632	0.0155
6	30.78906	0.0143
7	70.07655	0.0000
8	33.32006	0.0067
9	55.38562	0.0000
10	27.04087	0.0410
11	15.74627	0.4708
12	12.85440	0.6834
Probs from chi-square with 16 df.		

Table 2 shows the result from the lag structure test. AR Roots Table/Graph investigates the lag structure of our model and reports the inverse roots of the characteristic AR polynomial (Ltkepohl, 1991)

Table 2: The Lag Structure Test: *AR Roots Table*

Root	Modulus
1.132287	1.132287
0.956171	0.956171
0.575584 - 0.276676i	0.638629
0.575584 + 0.276676i	0.638629
-0.489693	0.489693
0.305342	0.305342
-0.230656 - 0.139361i	0.269488
-0.230656 + 0.139361i	0.269488

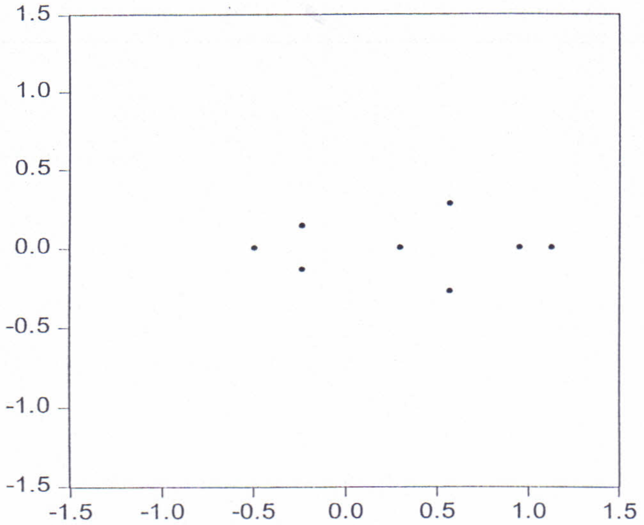
Warning: At least one root outside the unit circle.
VAR does not satisfy the stability condition.
Source: Econometric View 7 based on authors calculation

The estimated inverse root indicate that the (VAR) equation is not stable since some roots have modulus up to 1 in table 2 and lie outside the unit circle in figure 1. Since

VAR is not stable it implies that, certain results (such as impulse response standard errors) are not valid.

Figure 1: The Lag Structure Test: *AR Roots Graph*

Inverse Roots of AR Characteristic Polynomial



Source: Econometric View 7.

Also the result in figure 1 which is the estimated inverse root indicate that the (VAR) equation is unstable (not stationary) since the modulus lie outside the unit circle.. There will be roots, where the number of endogenous variables is the largest lag. Because the VAR equation is not stable, the impulse response standard errors result would be invalid and the variance decomposition is inefficient.

Table 3: VAR Granger Causality/Block Exogeneity Wald Tests

Cause Variable	Chi-sq	p-value	Null hypothesis	Decision
Real GDP	18.93554	0.0050	Total expenditure, recurrent expenditure, capital expenditure and external reserve not Granger cause real GDP	Reject the null hypothesis
Total Exp	11.7841	0.0651	Recurrent expenditure, capital expenditure and external reserve do not Granger cause total expenditure	Reject the null hypothesis
Recurrent Exp	11.43548	0.0758	Capital expenditure and external reserve do not Granger cause recurrent expenditure	Reject the null hypothesis
Capital Exp	26.46808	0.0002	Total expenditure, recurrent expenditure and external reserve do not Granger cause capital expenditure	Reject the null hypothesis
External Reserve	52.21906	0.0000	Total expenditure, recurrent and capital expenditure do not Granger cause external reserve	Do not reject the null hypothesis

Source: Econometric View 7 based on authors calculation

To determining the direction of causality among real GDP, total expenditure, recurrent expenditure, capital expenditure and external reserve variables, we employed Granger causality technique within block exogeneity wald tests. The result of the Granger causality test are shown in the table 3 above (confidence interval is 95% From these results, we can see that when the cause variables are recurrent and capital expenditure and external reserve, the Chi value was 18.94 with p value of 0.0050. It is less than 0.05, we reject the null hypothesis. That is, recurrent and capital expenditure and external reserve variables do individually and collectively Granger cause real GDP in Nigeria. Also, capital expenditure and recurrent expenditure Granger cause external reserve jointly and individually. However, real GDP do not cause external reserve as shown in the appendix 2.

When the cause variables are real GDP, capital expenditure, and external reserve, all the variables except real GDP do granger cause recurrent expenditure individually while all the variables cause recurrent expenditure collectively. Also, recurrent expenditure, and external reserve Granger cause capital expenditure individually. However, real GDP do not cause capital expenditure individually since the chi square value is 2.87 with 0.2377 p value. This result is similar to that of Jiranyakul and Brahmasrene (2007) for Thailand, Pradhan (2007) for India, Babatunde (2008) for Nigeria, Magazzino (2010) for Italy and Ighodaro and Oriakhi (2010) who found a unidirectional causality from expenditure to growth but not vice versa and different from that of Chletsos and Kollias (1997) for Greece, Ghali (1998) for the 10 OECD countries, Demirbas (1999) for Turkey, Thornton (1999) and Chang (2002) for the 6 emerging countries, Kolluri et al. (2000) for the G7ountries, Al-Faris (2002) for the Gulf Cooperation Council (GCC) countries, Kalam and Aziz (2009) for Bangladesh and Rehman et al. (2010) for Pakistan, Grulló (2012) and Salih (2012) supported the Wagner's law for Dominican Republic and Sudan, respectively. The unidirectional causality from government expenditure to growth implies that government expending (both recurrent and capital) individually and collectively are good predictor of economic growth in Nigeria.

5 CONCLUSION

Using VAR approach within block exogenous's version of the Granger-causality method, the paper examines the relationship between government spending and economic growth along with external reserve in Nigeria from 1961 to 2011. We conduct various diagnostic tests to ensure that the models are adequate. The findings of this research provide evidence to support a unidirectional causality while concluding that causality runs from government expenditure to economic growth. This supports the conventional Keynesian framework that causality runs from government expenditure to economic growth and not from economic growth to government expenditure as posited by the Wagnerian. This result implies that government interventions in Nigeria economy through government spending play a crucial role in the development process. This supports the Keynes argument that, government could alter economic downturns by borrowing money from the private sector and then returning the money to the private sector through various spending programs.

Reference

Abizadeh, S., Yousefi , M. (1998). An Empirical Aanalysis of South Korea's Economic Development and Public Expenditures Growth." *Journal of Socio-economics*, Vol. 27, No. 6, pp. 687-701.

Afzal, M. and Abbas, Q. (2010). Wagners law in Pakistan: Another look, *Journal of Economics and International Finance*, 2(1), 12-19.

Ahsan, S. M., Kwan, A. C., Sahni, B. S. (1992). Public Expenditure and National Income Causality: Further Evidence on the Role of Omitted Variables." *Southern Economic Journal*, Vol. 58, No.3, pp. 623-634.

Al-Faris, A. F. (2002). Public Expenditure and Economic Growth in the Gulf Cooperation Council Countries, *Applied Economics*, 34(9), 1187-1195.

Aregbeyen, O. (2006). Cointegration, Causality and Wagner's Law: A Test for Nigeria, *Economic and Financial Review*, 44(2), 1-18.

Ayo, O. S., Ifeakachukwu, N. P. and Ditimi, A. (2011). A Trivariate Causality Test among Economic Growth, Government Expenditure and Inflation Rate: Evidence from Nigeria, *The Journal of World Economic Review*, 6(2), 189-199.

Babatunde, M. A. (2008). A bound testing analysis of Wagner's law in Nigeria: 1970-2006, Conference Paper presented at African Econometric Society, 13th Annual conference on econometric modeling in Africa 9-11 July 2008, University of Pretoria, South Africa.

Bohl M. T. (1996). Some International Evidence on Wagner's Law. *Public Finance*, 51(2), 185-200.

Chang, T. (2002). An Econometric Test of Wagner's Law for Six Countries Based on Co integration and Error-Correction Modeling Techniques, *Applied Economics*, 34(9), 1157-1169.

Chletos, M., Kollias, C. (1997). Testing Wagner's Law Using Disaggregated Public Expenditure Data in the Case of Greece: 1958-1993. *Applied Economics*, Vol. 29, pp. 371-377.

Central Bank of Nigeria (2011). Annual Report and Statement of Accounts 31st Dec. 2011, Abuja.

Corcket, A. D and Evans, J. E. (1980). Demand for Money in Middle Eastern Countries. *IMF Staff Papers*, 27(3), pp. 543-577.

Demirbas, S. (1999). Co-integration Analysis-causality Testing and Wagner's Law: The Case of Turkey, 1950-1990. University of Leicester Discussion Papers, 99/2, available at: www.le.ac.uk/ economics/research/RePEc/lec/leecon/econ99-3.pdf.

Ghali, H. K. (1998). Government Size and Economic Growth: Evidence from a Multivariate Cointegration Analysis. *Applied Economics*, Vol. 31, pp. 975-987

Fuller, W. A. (1976). *Introduction to Statistical Time series*. New York: Wiley.

Frimpong, J. M. and Oteng-Abayie, E. F. (2009). Does the Wagners hypothesis matter in developing economies? Evidence from three West African monetary zone WAMZ countries, *American Journal of Economics and Business Administration*, **1(2)**, 141-147.

Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica*, 37, pp. 424-438.

Grullón, S. (2012). National Income and Government Spending: Co -integration and Causality Results for the Dominican Republic, *Developing Country Studies*, **2(3)**, 89-98.

Gujarati, D.N. and Porter, D.C. (2009). *Basic Econometrics 5th International Edition.* The Macgraw-Hill Companies.

Gupta, S. P., (1967). Public Expenditure and Economic Growth: a Time Series Analysis." *Public Finance/Finances Publiques*, Vol. 22, No. 4, pp. 423–461.

Halicioglu, F. (2003). Testing Wagner's Law for Turkey, 1960-2000. *Review of Middle East*

Economics and Finance, Vol. 1, No. 2, pp. 129-140.

Henrekson, M. (1993). Wagner's Law: a Spurious Relationship? *Public Finance/Finances*

Publiques, Vol. 48, No. 2, pp. 406-415.

Ighodaro, C. A. U. and Oriakhi, D. E. (2010). Does the Relationship between Government Expenditure and Economic Growth follow Wagners Law in Nigeria?, *Annals of the University of Petroşani, Economics*, **10(2),** 185-198.

Jiranyakul, K. and Brahmasrene, T. (2007). The Relationship Between Government Expenditures and Economic Growth in Thailand, *Journal of Economics and Economic Education Research*, **8(1),** 93 – 102.

Keynes, J. M. (1936). *General Theory of Employment, Interest and Money*, London: Palgrave Macmillan.

Kolluri, Brahat R., Michael J. Panik, and Mahmoub S. Wahab (2000). Government Expenditure and Economic Growth: Evidence from G7 Countries, *Applied Economics*, **32(8),** 1059-1068.

Kumar, S., Webber, D. J., Fargher, S. (2009). Wagner's Law Revisited: Cointegration and Causality Tests for New Zealand. University of the West of England Discussion Papers, No: 917.

Magazzino, C. (2010). Wagners Law in Italy: Empirical Evidence from 1960 to 2008, *Global and Local Economic Review*, 2(January-June**),** 91-116.

Oktayer, A. and Oktayer, N. (2013). Testing Wagner's law for Turkey: evidence from a trivariate causality analysis Prague Economic papers, 2.

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

Pradhan, P. P. (2007). Wagners Law: Is It Valid in India?, *The IUP Journal of Public Finance*, **5(2),** 7-20.

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.

Rauf, A., Qayum, A. and Zaman, K-U. (2012). Relationship Between Public Expenditure and National Income: An Empirical Investigation of Wagners Law in Case of Pakistan, Academic Research International, **2(2)**, 533-538.

Ray, S. and Ray, I. A. (2012). On the Relationship between Governments Developmental Expenditure and Economic Growth in India: A Cointegration Analysis, *Advances in Applied Economics and Finance*, **1(2)**, 86-94.

Salih, M. A. R. (2012). The Relationship between Economic Growth and Government Expenditure: Evidence from Sudan, *International Business Research*, **5(8),** 40-46.

Ram, R. (1987). Wagner's Hypothesis in Time-series and Cross-section Perspectives: Evidence from Real Data from 115 Countries. *Review of Economics and Statistics*, Vol. 69, No. 2, pp. 194-204.

Singh, B., Sahni, B. **S.** (1984). Causality between Public Expenditure and National Income." *Review of Economics and Statistics*, Vol. 66, No. 4, pp. 630-644.

Sims, C. A. (1972). Money, income, and causality. *American Economic Review* 62 (September): 540-52.

Sims, C.A (1980b). Comparison of interwar and postwar business cycles: Monetarism reconsidered. *American Economic Review* 70 (May): 250-57.

Thornton, J. (1999). Cointegration, Causality and Wagners Law in 19th Century Europe, *Applied Economics Letters*, **6(7),** 413-416.

Verma, S. and Arora, S. (2010). Does the Indian Economy Support Wagners 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.

Appendix 1

Pairwise Granger Causality Tests
Date: 07/22/14 Time: 10:43
Sample: 1961 2011
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TE does not Granger Cause RGDP	49	11.7841	0.0651
RGDP does not Granger Cause TE		1.20108	0.3105

Appendix 2

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 07/20/14 Time: 16:56
Sample: 1961 2011
Included observations: 49

Dependent variable: RGDP

Excluded	Chi-sq	df	Prob.
RE	10.3689	2	0.0056
CE	6.5722	2	0.0045
EXR	8.511605	2	0.0248
All	18.935542	6	0.0050

Dependent variable: RE

Excluded	Chi-sq	df	Prob.
RGDP	2.2907	2	0.3179
CE	5.8365	2	0.0540
EXR	6.6379	2	0.0362
All	11.43548	6	0.0758

Dependent variable: CE

Excluded	Chi-sq	df	Prob.
RGDP	2.8736	2	0.2377
RE	7.5706	2	0.0227
EXR	7.7166	2	0.0211
All	26.46808	6	0.0002

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
RGDP	2.970776	2	0.2264
RE	38.36433	2	0.0000
CE	9.533100	2	0.0085
All	52.21906	6	0.0000