The Jahangirnagar Review: Part II: Social Science, Vol. 49, No.1. June-2025
ISSN 1682-7422 © Jahangirnagar University

An Empirical Examination of Keynesian and Wagner's Hypotheses in Emerging Asian Countries

Md Shahjahan[1]

Abstract: *Economists have paid much attention to the nexus between government expenditure and economic growth for decades. The research's foremost concern is verifying the Keynesian and Wagner's hypotheses in emerging Asian countries from 2005 to 2022. A univariate analysis is conducted to confirm the causal relationship and measure whether panel series are integrated in the same order. A causal relationship exists in emerging Asian countries. The estimation results observe the Keynesian proposition in Bangladesh and the Philippines and Wagner's proposition in China, Singapore, and Thailand. Also, the finding directs the presence of Keynesian and Wagner's Hypotheses in India, Indonesia, the Korean Republic, and Malaysia. Moreover, economic growth/government expenditure positively impacts government expenditure/ economic growth through impulse response functions that explain the short-term and long-term status.*

Keywords: Government expenditure, Economic growth, Panel series analysis, Causality approach, Asian countries.
JEL Codes: E01; E12; H50; C23; N15

Introduction

The scenery of the link concerning government expenditure (GE) and economic growth (EG) has two contrasting beliefs by Economists. Firstly, Wagner's hypothesis (1883) states that a long-run equilibrium connection prevails due to national income growth, which triggers the expansion of GEs. Secondly, from the Keynesian (1936) viewpoint, the expansion of national income is caused by government expenditure, regarded as an exogenic policy variable. Wagner's hypothesis shares a theoretical hypothesis of causation from EG→GE while the Keynesian hypothesis claims causation GE→EG. This theory assumes government expenditure depends upon economic growth. More specifically, higher GE requires higher EG. The findings of the Wagner hypothesis exposed that the rate of intensification in government expenditure was greater than the rate of improvement domestically (Kumar et al., 2012). Thus, the Wagner is

[1] Associate Professor, Department of Economics, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh. Email: shahjahanju@juniv.edu

characterized as the “Hypothesis of GE expansion” in the sources of the national economy. This opinion is asserted as "Wagner's Hypothesis".

It is acknowledged that GEs are applied to inspire government expenditure aside from EG and to stimulate short-term fluctuations. In this regard, Wagner's Hypothesis, which advocates that the rise in GEs arises because of improvement and advancement, and the Keynesian method, which links EG to the increase in GEs, is vital.

The Keynesian principle believes causality runs from GE to EG and treats GE as exogenous. This policy advocates using GE to affect EG and correct short-run fluctuation. A positive association between income and GE was observed in the Greek economy and a statistically significant long-term effect on economic performance (Antonis et al., 2013). Through empirical observation, this proposition is confirmed next to Bird (1970), Beck (1979), and Ansari (1993), together with others. Converse to Keynesian, the Wagnerian contends that growth in GE is a consequence of EG. Hence, the use of GE as a policy variable is impotent. Wagner’s hypothesis supports Gupta's (1967), Beck's (1981), and Ahsan et al. (1996) findings. Moreover, there is no support or mixed support for Musgrave (1969), Mann (1980), Ram (1986), and Holmes et al. (1990).

Literature Review

This section briefly reviews several empirical research patterns, from accessible analyses on the particular issue. Mulamba (2009) investigated the causal relationship between GE and EG in SADC countries and found that EG Granger causes GE in the long and the short-run, which is stable with Wagner's hypothesis than Keynesian hypothesis. Husnain (2011) tested Wagnerian vs. Keynesian hypothesis and causality on three South Asian countries-Pakistan, India, and Sri Lanka-and found that GE in Pakistan is linked with EG both in Keynesian and Wagnerian sense. GE follows Wagner’s hypothesis in Sri Lanka, while in India, no evidence has been found on co-integration between GE and EG. Antonis et al. (2013) analyzed the Greek economy's causal relationship between GE and EG. They found a significant causal effect from EG to GE, supporting Wagner's hypothesis in Greece. Owolabi-Merus (2015) explored the Keynesian vs. Wagnerian outlooks on GE and EG in Nigeria, applying ADF (unit root test), Cointegration (Johansen), and Causality tests. They didn’t observe GE causing EG, and EG causes GE.

Using a dynamic approach, Abbasov & Aliyev (2018) estimated causality between EG and GE and found a satisfactory bi-directional short-run causality in all countries excluding Lithuania and Kyrgyz Republic. Despite the research supervised to test the validity of Keynesian and Wagner's hypotheses, there seems to be no consensus. Nevertheless, it should be stated that many of these studies have not reflected the panel dimension of modern econometric analysis for the dynamic properties of macroeconomic series through modern tools (i.e., tests of panel unit root, panel cointegration, and panel causality) to find country-specific evidence on correction by applying causality. This paper examines the validity of Keynesian and Wagner's hypotheses by using panel data from 10 emerging Asian countries between 2005 and 2022 and performing modern econometric tools.

Data

The analysis uses yearly datasets covering emerging Asian countries from 2005 to 2022 of the World Development Indicators (WDI) published by the World Bank (2023), including 10 emerging Asian countries: Bangladesh, China, India, Indonesia, Korea Republic, Malaysia, Philippines, Singapore, Thailand, and Turkey. In this empirical estimation, the study considered the following variables: real GDP as economic growth (EG), government expenditure (GE) includes education, health, consumption, defense, and agriculture, taking all variables in natural logarithms.

Methodology

This study applies various modeling issues in the causality framework. The paper performed Levin, Lin, and Chu (LLC) and Im–Pesaran–Shin (IPS) panel unit root tests to examine the panel series properties of the considered variables. Padroni and Kao's panel cointegration tests confirm the manifestation of a long-term association among variables. The Granger causality test established causality concerning considered variables and confirmed the validity of Keynesian and Wagner hypotheses in emerging Asian countries.

Panel Unit Autoregressive Root Tests

First-order autoregressive component:

$$EG_{it} = \rho_i EG_{i,t-1} + z'_{it}\gamma_i + \epsilon_{it} \quad (1)$$

Levin, Lin and Chu (LLC) test is the regression model

$$\Delta EG_{it} = \emptyset EG_{i,t-1} + z'_{it}\gamma_i + \sum_{j=1}^{p_i} \theta_{ij} \Delta EG_{i,t-j} + u_{it} \quad (2)$$

The Im, Pesaran and Shin (IPS) test is a set of Dickey–Fuller regressions

$$\Delta EG_{it} = \emptyset_i EG_{i,t-1} + z'_{it}\gamma_i + \epsilon_{it}$$

Notice that here $\emptyset$ is panel-specific, indexed by i, whereas $\Delta EG_{it} = \emptyset EG_{i,t-1} + z'_{it}\gamma_i + \sum_{j=1}^{p} \theta_{ij} \Delta EG_{i,t-j} + u_{it}$, $\emptyset$ is constant.

Test for Panel Cointegration

Consider the panel-data model

$$EG_{it} = GE'_{it}\beta_i + z'_{it}\gamma_i + \epsilon_{it} \quad (3)$$

The data-generating process for EG_{it} and GE_{it} is given by

$$EG_{it} = EG_{i,t-1} + \vartheta_{it} \qquad GE_{it} = GE_{i,t-1} + \vartheta'_{it}$$

Kao (1999, the regression model is

$$GE_{it} = \gamma_i + GE'_{it}\beta_i + \varepsilon_{it}$$

Kao (1999) proposes five test statistics. The $DF\ t$, the modified $DF\ t$, the unadjusted $DF\ t$, and the unadjusted modified $DF\ t$ are based on the DF regression

$$\hat{e}_{it} = \rho \hat{e}_{i,t-1} + v_{it} \quad (4)$$

The test statistics based on DF regressions are

$$DF\ t\ = \frac{t_\rho + \frac{\sqrt{6N}\hat{\sigma}_v}{2\hat{w}_v}}{\sqrt{\frac{\hat{w}_v^2}{2\hat{\sigma}_v^2} + \frac{3\hat{\sigma}_v^2}{10\hat{w}_v^2}}} \qquad \text{Modified } DF\ t = \frac{\sqrt{N}T(\hat{\rho}-1) + \frac{3\sqrt{N}\hat{\sigma}_v^2}{\hat{w}_v^2}}{\sqrt{3 + \frac{36\hat{\sigma}_v^4}{5\hat{w}_v^4}}}$$

The ADF (1979) test

$$\text{Unadjusted } ADF\ t = \sqrt{\frac{5t_\rho}{4}} + \sqrt{\frac{15N}{8}}$$

$$\text{Unadjusted modified } ADF\ t = \frac{\sqrt{NT}\,(\hat{\rho}-1) + 3\sqrt{N}}{\frac{\sqrt{51}}{5}}$$

The ADF regression is given by

$$\hat{e}_{it} = \rho \hat{e}_{i,t-1} + \sum_{j=1}^{p} \rho_j \Delta \hat{e}_{i,t-j} + v_{it}^* \quad (5)$$

The test statistic based on ADF regression is

$$ADF\ t\ = \frac{t_{ADF} + \frac{\sqrt{6N}\hat{\sigma}_v}{2\hat{w}_v}}{\sqrt{\frac{\hat{w}_v^2}{2\hat{\sigma}_v^2} + \frac{3\hat{\sigma}_v^2}{10\hat{w}_v^2}}}$$

Pedroni (2004) derives test statistics: The panel-specific- AR test statistics PP (1990) and ADF(1979) tests are

$$\text{Modified } Phillips - Perron\ t = TN^{-1/2} \sum_{t=1}^{N} \left(\sum_{t=1}^{T} \hat{e}_{i,t-1}^{2} \right)^{-1} \sum_{t=1}^{T} \left(\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i \right)$$

$$Phillips - Perron\ t = N^{-1/2} \sum_{t=1}^{N} \left(\hat{\sigma}_i^2 \sum_{t=1}^{T} \hat{e}_{i,t-1}^{2} \right)^{-1/2} \sum_{t=1}^{T} \left(\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i \right)$$

$$\text{ADF } t = N^{-1/2} \sum_{t=1}^{N} \left(\sum_{t=1}^{T} \hat{s}_i^{*2} \hat{e}_{i,t-1}^{2} \right)^{-1/2} \sum_{t=1}^{T} \hat{e}_{i,t-1} \Delta \hat{e}_{i,t}$$

Causality Test

Dumitrescu and Hurlin (2012) causality regression:

$$EG_{i,t} = \alpha_i + \sum_{k=1}^{K} \boldsymbol{\beta_{ik}} \boldsymbol{EG_{i,t-k}} + \sum_{k=1}^{K} \gamma_{ik} GE_{i,t-k} + \varepsilon_{i,t} \quad (6)$$

$$GE_{i,t} = \alpha_i + \sum_{k=1}^{K} \beta_{ik} EG_{i,t-k} + \sum_{k=1}^{K} \boldsymbol{\gamma_{ik}} \boldsymbol{GE_{i,t-k}} + \varepsilon_{i,t} \quad (7)$$

Empirical Results

If we look at Table 1 and Table 2, we see the nonstationary series, i.e., *I (0)* at their levels, although the first difference (period-to-period change) makes them stationary. This implies that statistical properties such as mean and variance are constant over time. Each series considered stationary in the same order may be written as *I (1)*; we can analyze whether the series is cointegrated.

Table 1: Panel Integration Test in the period of 2005 to 2022

Variables	Levin, Lin and Chu (LLC) Test			
	Critical Value Level		Critical Value 1st Difference	
	Without Trend	With Trend	Without Trend	With Trend
EG	-1.5899	-1.9613**	-5.0814***	-5.4442***
	(0.0559)	(0.0249)	(0.0000)	(0.0000)
GE	-1.0901	-1.1129	-3.2765***	-3.2485***
	(0.1378)	(0.1329)	(0.0005)	(0.0006)
Observations	180			

Note: The p-values are put in parentheses: * p < 0.10, ** p < 0.05, and *** p < 0.01.

Tables 3 and 4 are Pedroni and Kao panel cointegration tests, which suggest that the considered series are cointegrated. For Pedroni cointegration tests are significant at the 1% and 5% levels within and between dimensions for Modified

variance ratio, Modified Phillips-Perron t, Phillips-Perron t, and Augmented Dickey-Fuller t (Table 3).

Table 2: Panel Integration Test in the period of 2005 to 2022

Variables	Im, Pesaran and Shin (IPS) Test			
	Critical Value Level		Critical Value 1st Difference	
	Without Trend	With Trend	Without Trend	With Trend
EG	2.2792	0.1209	-4.6247***	-3.8052***
	(0.9887)	(0.5481)	(0.0000)	(0.0001)
GE	4.9471	-1.9313**	-5.7358***	-6.3824***
	(1.0000)	(0.0267)	(0.0000)	(0.0000)
Observations	180			

Note: The p-values are put in parentheses: * p < 0.10, ** p < 0.05, and *** p < 0.01.

Table 3: Panel Cointegration Test in the period of 2005 to 2022

Dimension		Pedroni Test	
		Without Trend	With Trend
Within Dimension	Modified variance ratio	-4.2072***	-3.6204 ***
		(0.0000)	(0.0001)
	Modified Phillips-Perron t	1.9054**	2.6484***
		(0.0284)	(0.0040)
	Phillips-Perron t	-2.0498 **	-2.5668***
		(0.0202)	(0.0051)
	Augmented Dickey-Fuller t	-2.5088***	-3.0195***
		(0.0061)	(0.0013)
Between Dimension	Modified Phillips-Perron t	3.0318***	4.0576***
		(0.0012)	(0.0000)
	Phillips-Perron t	-2.2235**	.
		(0.0131)	(.)
	Augmented Dickey-Fuller t	-1.7676**	-2.3289***
		(0.0386)	(0.0099)
Observations		180	

Note: The p-values are put in parentheses: * p < 0.10, ** p < 0.05, and *** p < 0.01.

Table 4 shows the Kao panel cointegration tests, Modified Dickey-Fuller t (10% significant), Dickey-Fuller t (1% significant), Augmented Dickey-Fuller t (5% significant), Unadjusted modified Dickey-Fuller t (10% significant), and Unadjusted Dickey-Fuller t (1% significant). Tables 3 and 4 imply a long-term association exists between EG and GE in emerging Asian countries.

The Keynesian principle believes causation runs from GE to EG, and GE is exogenous. This principle supports using GE as a mechanism to affect EG and adjust short-run variability. Table 5 is causality tests, and the results show a positively statistically significant short-run effect from GE→EG, support to the Keynesian hypothesis in Bangladesh (at 1% level) and the Philippines (at 1% level) and both country's regression coefficient is significantly different from 0 which support Bird (1970), Beck (1979), and Ansari (1993).

Table 4: Panel Cointegration Test in the period of 2005 to 2022: Kao Test

Kao Test	
Modified Dickey-Fuller t	-1.4706*
	(0.0707)
Dickey-Fuller t	-2.3426 ***
	(0.0096)
Augmented Dickey-Fuller t	-2.2522**
	(0.0122)
Unadjusted modified Dickey-Fuller t	-1.5554*
	(0.0599)
Unadjusted Dickey-Fuller t	-2.3822***
	(0.0086)
Observations	180

Note: The p-values are put in parentheses: * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Contrary to the Keynesian view, the results show a positively statistically significant short-run effect from EG→GE, supporting Wagner's hypothesis in China (1% significant), Singapore (5% significant) and Thailand (1% significant) each country's regression coefficient is significantly different from 0 which support Gupta (1967), Beck (1981) and Ahsan et al. (1996).

Also, the study indicates the presence of both Keynesian and Wagner's Hypothesis on GE and EG in India (1% significant), Indonesia (1% significant), Korea Republic (1% significant), Malaysia (1% significant), and not valid of both Keynesian and Wagner's Hypothesis on GE and EG in Turkey (support Owolabi-Merus,2015).

Table 5: Panel Var-Granger Causality Wald Test in the period of 2005 to 2022

Country	Hypothesis	P-value	Inference
1. Bangladesh	$GE \xrightarrow{does\ not\ Granger} EG$	0.873	**WH** does not hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.000	**KH***** hold
2. China	$GE \xrightarrow{does\ not\ Granger} EG$	0.000	**WH***** hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.447	**KH** does not hold
3. India	$GE \xrightarrow{does\ not\ Granger} EG$	0.000	**WH***** hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.003	**KH***** hold
4. Indonesia	$GE \xrightarrow{does\ not\ Granger} EG$	0.000	**WH***** hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.001	**KH***** hold
5. Korea Republic	$GE \xrightarrow{does\ not\ Granger} EG$	0.002	**WH***** hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.004	**KH***** hold
6. Malaysia	$GE \xrightarrow{does\ not\ Granger} EG$	0.000	**WH***** hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.000	**KH***** hold
7. Philippines	$GE \xrightarrow{does\ not\ Granger} EG$	0.774	**WH** does not hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.000	**KH***** hold
8.	$GE \xrightarrow{does\ not\ Granger} EG$	0.000	**WH***** hold

Singapore	$EG \xrightarrow{does\ not\ Granger} GE$	0.267	**KH** does not hold
9. Thailand	$GE \xrightarrow{does\ not\ Granger} EG$	0.013	**WH**** holds
	$EG \xrightarrow{does\ not\ Granger} GE$	0.203	**KH** does not hold
10. Turkey	$GE \xrightarrow{does\ not\ Granger} EG$	0.193	**WH** does not hold
	$EG \xrightarrow{does\ not\ Granger} GE$	0.608	**KH** does not hold

Note: Keynesian Hypothesis: **KH** and Wagner Hypothesis: **WH**; The p-values are put in parentheses: * p < 0.10, ** p < 0.05, and *** p < 0.01.

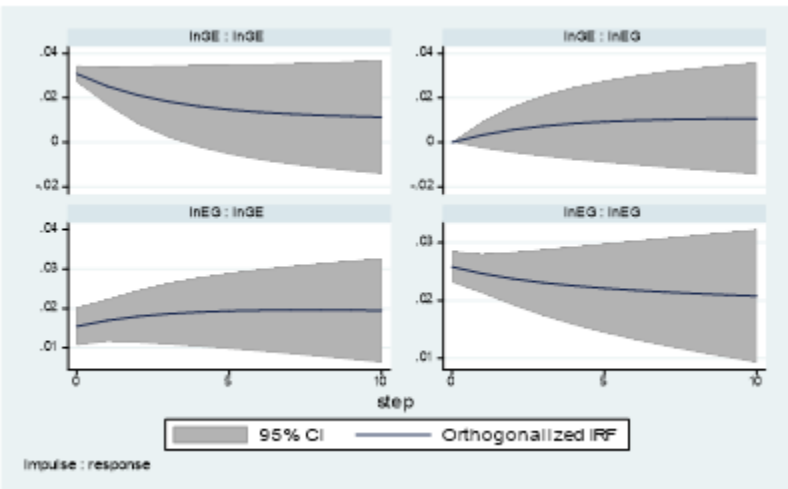

Figure 1: Impulse Response Function (IRF)

The reaction of an endogenic variable to one of the innovations is exposed in the impulse response function (IRF), which is a key tool in empirical causal investigation and policy efficacy analysis. It sketches one standard deviation shock to one of the advances and the consequences on the present and future values of the endogenous variable. Figure 1 response on GE: positive response gradually increases, and GE remains in the positive region over the period. Implies that the shocks to EG impact positively GE both in the short term and the long term. Analogously, response to EG:

positive response gradually increases over the period, and EG remains in the positive region. This means that shocks to GE positively impacted EG.

Table 6: PVAR Selection Order Criteria

Selection order criteria
Sample: 2008 - 2016

No. of obs = 90
No. of panels = 10
Ave. no. of T = 9.000

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	.9999651	20.12599	.2145995	-51.87096	-11.87401	-28.00313
2	.9999588	16.47489	.17044	-37.52282	-7.525106	-19.62195
3	.9999475	.0099025	1	-44.98819	-19.9901	-30.0708
4	.9999536	.0101193	1	-35.98836	-15.98988	-24.05444

Table 6 represents the PVAR selection order criteria for appropriate lag length. Corresponding to Akaike's Information Criteria (AIC), the ideal lag length is 3, and according to Bayesian Information Criteria (BIC), the ideal lag length is 1 because a lower AIC or BIC value shows a better fit. Though the Bayesian Information Criteria (BIC) is good for True models and consistent estimation, the study preferred BIC.

Table 7: PVAR Stability: Modulus of each Eigenvalue

Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
.9924755	0	.9924755
.7170052	0	.7170052

All the eigenvalues lie inside the unit circle.
pVAR satisfies stability condition.

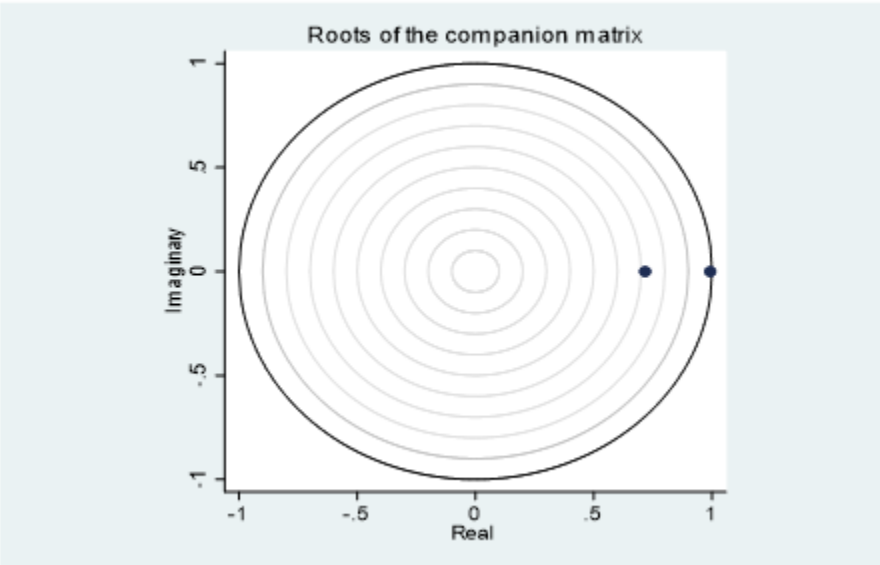

Figure 2: PVAR Stability: Modulus of Each Eigenvalue

The PVAR stability condition is shown in Table 7 and Figure 2, and all the eigenvalues within the unit circle suit the PVAR stability function since the modulus of each eigenvalue is firmly less than 1 (see Table 7 and Figure 2).

Conclusion

The validity of Keynesian and Wagner's proposition finds a long-term affiliation between government expenditure and economic growth by applying econometric methods of cointegration and causality to panel data from 2005 to 2022 for the emerging Asian 10 countries.

The study performs the Levin, Lin, and Chu (LLC); Im, Pesaran, and Shin (IPS) tests to assess the level of integration; Pedroni and the Kao panel cointegration tests to assess whether cointegration exists; and the Granger causality test to govern causal and effect variables. And the estimation results show a positively significant short-run effect from GE→EG support to the Keynesian hypothesis in Bangladesh and the Philippines and a short-run effect from EG→GE support to Wagner's hypothesis in China, Singapore, and Thailand. Also, directs the presence of both Keynesian and Wagner's Hypotheses

on GE and EG in India, Indonesia, the Korean Republic, and Malaysia and the non-existence of both Keynesian and Wagner's Hypotheses on GE and EG in Turkey. Moreover, impulse response functions illustrate that economic growth/government expenditure will positively impact GE/EG in the short term and long term. Therefore, outcomes are reliable with economic theory because, with more income, people tend to spend more, leading to more consumption and creating demand for production; investment goes up, leading to economic growth and, inversely, government expenditure.

References

Ahsan, S. M., Kwan, A. C., & Sahni, B. S. (1996). Cointegration and Wagner's hypothesis: time series evidence for Canada. *Applied Economics, 28*(8), 1055-1058.

Akaikei, H. (1973). Information theory and an extension of maximum likelihood principle. In Proc. 2nd Int. Symp. on Information Theory (pp. 267-281).

Al-Faris, A. F. (2002). Public expenditure and economic growth in the Gulf Cooperation Council countries. Applied Economics, 34(9), 1187-1193.

Ansari, M. I. (1993). Testing the relationship between government expenditure and national income in Canada, employing Granger causality and cointegration analysis. *Managerial Finance, 19*(7), 31-46.

Ansari, M. I., Gordon, D. V., & Akuamoah, C. (1997). Keynes versus Wagner: public expenditure and national income for three African countries. Applied Economics, 29(4), 543-550.

Antonis, A., Constantinos, K., & Persefoni, T. (2013). Wagner's hypothesis versus Keynesian hypothesis: Evidence from pre-WWII Greece. Panoeconomicus, 60(4), 457-472.

Beck, M. (1979). Public sector growth: a real perspective. Public Finance= Finances Publiques, 34(3), 313-356.

Beck, M. (1981). Government spending: trends and issues. Praeger Publishers.

Bird, R. M. (1970). The Growth of Government Spending in Canada Canadian Tax Foundation. Suite, 1200, 595.

Biswal, B., Dhawan, U., & Lee, H. Y. (1999). Testing Wagner versus Keynes using disaggregated public expenditure data for Canada. Applied Economics, 31(10), 1283-1291.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American statistical association, 74(366a), 427-431.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels.

Economic Modelling, 29(4), 1450-1460.
Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. Econometrica: journal of the Econometric Society, 251-276.
Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3):424{438.
Gupta, S. P. (1967). Public Expenditure and Economic Growth a Time-Series Analysis. Public Finance-Finances Publiques, 22(4), 423-454.
Hall, A. R. (2005). Generalized method of moments. Oxford university press.
Hamilton, J. D. (1994). Time Series Econometrics. Princeton U. Press, Princeton.
Holmes, J. M., & Hutton, P. A. (1990). On the casual relationship between government expenditures and national income. The Review of Economics and Statistics, 87-95.
Husnain, M. I. (2011). Keynes versus Wagner: Aggregated and disaggregated analysis of public expenditure in selected South Asian countries. International Research Journal of Finance and Economics, 67, 46-52.
Im, K. S., Pesaran, M.H. & Shin, Y. (2003). Testing for unit roots in heterogeneous Panels. Journal of Econometrics, 115, 1, 57-74.
Johannesburg).
Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. Journal of econometrics, 90(1), 1-44.
Keynes, J. M. (1936). General Theory of Employment, Interest and Money. London: Macmillan.
Koop, G., & Poirier, D. J. (1995). An empirical investigation of Wagner's hypothesis by using a model occurrence framework. Journal of the Royal Statistical Society: Series A (Statistics in Society), 158(1), 123-141.
Kumar, S., Webber, D. J., & Fargher, S. (2012). Wagner's Hypothesis revisited: cointegration and causality tests for New Zealand. Applied Economics, 44(5), 607-616.
Levin, A., Lin, C. & Chu, C. (2002). Unit root tests in panel data: asymptotic and finite Sample properties. Journal of Econometrics, 108, 1, 1-24.
Lütkepohl, H. (2005). New introduction to multiple time series analysis. Springer Science & Business Media.
Maddala, G.S.& Wu, S (1999). A comparative study of unit roots with panel data and a New simple test. Oxford Bulletin of Economics and Statistics, 61,631-651.
Mann, A. J. (1980). Wagner's hypothesis: An econometric test for Mexico, 1925-1976. National Tax Journal (pre-1986), 33(2), 189.
Mulamba, K. C. (2009). Long-run relationship between government expenditure and economic growth: evidence from SADC countries (Doctoral dissertation, University of

Musgrave, R. A. (1969). Fiscal systems (No. HJ141 M79).

Newey, W. K., & West, K. D. (1987). A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. Econometrica: Journal of the Econometric Society, 703-708.

Owolabi-Merus, O. (2015). Re-examining the Wagner's Hypothesis Versus Keynesian Hypothesis: Evidence from Nigeria. International Letters of Social and Humanistic Sciences, 57, 142-146.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. Oxford Bulletin of Economics and statistics, 61(S1), 653-670.

Phillips, P. C., & Ouliaris, S. (1990). Asymptotic properties of residual based tests for cointegration. Econometrica, 58(1), 165-193.

Ram, R. (1986). Causality between income and government expenditure: a broad international perspective. Public Finance= Finances publiques, 41(3), 393-414.

Schwarz, G. (1978). Estimating the dimension of a model. The annals of statistics, 6(2), 461- 464.

Sims, C. A. (1980). Macroeconomics and reality. Econometrica: journal of the Econometric Society, 1-48.

Wagner, A. (1883) Three extracts on public finance. In Classics in the theory of public finance (pp. 1-15). Palgrave Macmillan, London.

World Bank, 2019. World Development Indicators (WDI) Online Database. Washington D.C., USA: The World Bank.