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An Empirical Testing of Wagner's Law in South Asia: A Panel Unit Root and Cointegration Analysis

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Abstract

The study strives to assess short-run and long-run relationship between government expenditure and GDP per capita in South Asian region using panel data over the period 2001-2014. To investigate this relationship Wagner's hypothesis has been estimated which support the existence of long-run relationship between economic growth and growth of public expenditure. The methodology includes both Pedroni's and Kao's residual based cointegration tests which confirmed that the variables used in the model are cointegrated. Granger causality test exhibits that there is causation from government final consumption expenditure to GDP per capita. Error-correction model has been also used to check short-run dynamics. The study found both short- and long-term relationship between government expenditure and GDP per capita. Hence the study confirms the validity of Wagner's Law.

Keywords: Wagner's law, GDP, panel unit root, cointegration, error correction model (ECM).

JEL Classification: C32, E62

1. Introduction

Continuous expansion of Gross Domestic Product (GDP) and increasing size of public expenditure explains the recent development of world economies. All countries of the world, regardless of its size, small or big, have witnessed rising government outlays over the last sixty years. For this reason, the relationship between GDP and government expenditure is regarded as one of the most discussed research focus in the discourse of economic development. There are two views, Keyenes and Wagner, on relationship between economic growth and government expenditure (Suleiman, 2010). The government expenditure is an exogenous factor in economic growth in Keynesian hypothesis. On the other hand, the observation of Wagner reveals that higher public expenditure is a consequential product

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of rising GDP, Wagner (1883). A number of studies have been conducted to examine the Wagner's Law empirically and found puzzling results for different country perspectives.

A German economist, Adolph Wagner put forward a law of increasing public expenditure in 1893 known as Wagner's hypothesis (WH) or Wagner's Law. Perhaps he was very first economist to offer a direct economic account of the rising public expenditures. It has been claimed by Musgrave and Musgrave (1984) that Wagner's anticipation regarding the trends to be materialised fifty to hundred years later as development of modern industrial society would give upheaval to rising political pressure for social progress and a continuous increase in public sector.

Most often, government expenditure aimed at reducing poverty (Fan, Hazell and Thorat, 2000). However, if public expenditure fails to promote economic growth, it will not generate enough income to mobilise resources to finance government expenditure (Bataineh, 2012). For this reason, around different parts of the world, Wagner's law has been a subject of extensive pragmatic investigation. However, there is no visible attempt made to analyse the long run relationship between government expenditure and GDP by using panel data in case of South Asia.

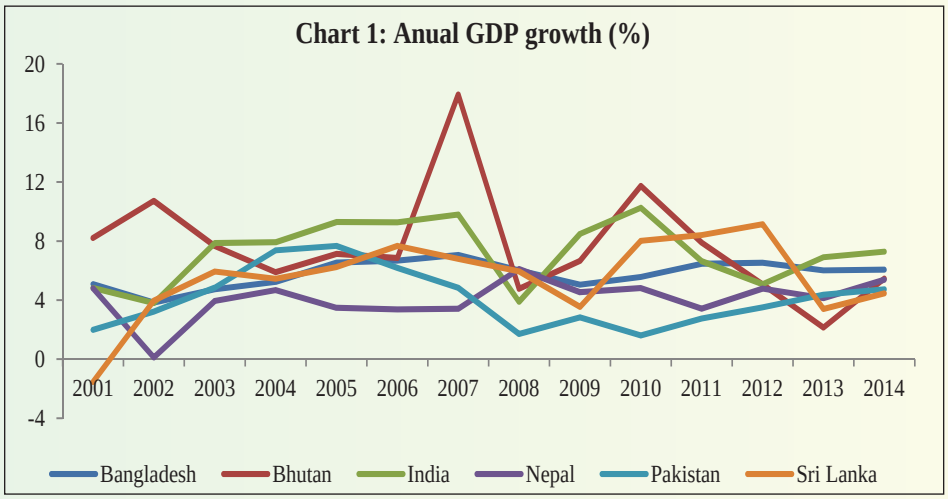
The increasing public expenditure may not translate into better economic performance for many countries (Nurudeen and Usman, 2010). It is of great research significance to understand whether last decade reasonable economic growth has contributed to rising government expenditure in South Asia. Therefore, understanding of these two major macroeconomic variables will be fundamental importance for the policy makers of this region. This study aims at empirically assessing the short- and long-run relationship government final consumption expenditure and GDP per capita of South Asian countries for period covering 2001-2014. The study also aims to give some policy recommendations based on the results found.

The paper is structured as follows. Section 3 outlays a review of related literatures on this issue. Section 4 discusses on the source of data and methodology applied. Section 5 specifies the hypothesised model of Wagner's Law to examine the validity of Wagner's law. Section 6 reports the analysis of results using empirical data. Section 7 concludes the discussion and provides direction on future research.

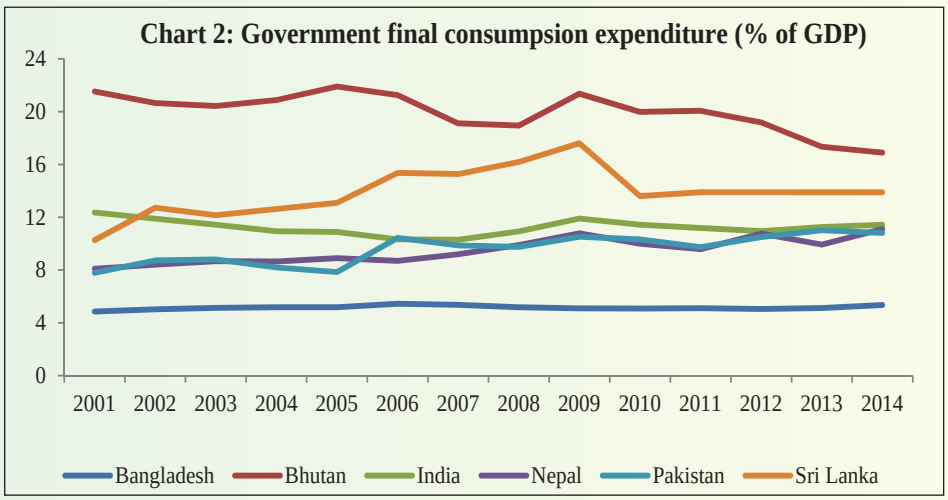
2. Cross country scenario: Some Stylized Facts

The main objective of the study is to assess short- and long-run relationship between government final consumption expenditure and GDP per capita of South Asian countries and hence the testing the validity of Wagner's law. The relationship between government final consumption expenditure and GDP growth depends on the countries historical trend, geographical location, social indicators, environment, population and the structure of the economy etc. The country with higher growth may have higher expenditure and vice versa. In this paper panel data series is used and the result may not be appropriate for a specific country.

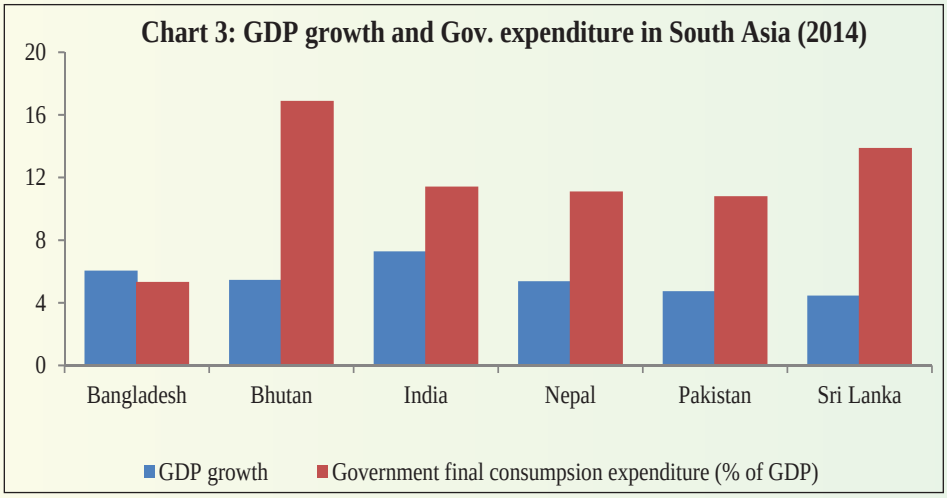
The above chart depicts that south Asian countries' economy is growing in a similar pattern. The recent trend of GDP growth of the countries' is upward and within a range of 4 to 7. India has the highest GDP growth (7.9 percent) recorded in 2014 and Bangladesh is on second position (Chart 1).



It is observed that in Bhutan, government final consumption expenditure as percentage of GDP is higher than any other countries in South Asia region. On the other hand, this amount is the lowest in case of Bangladesh. However the of government final consumption expenditure as percentage of GDP is downward in case of Bhutan and constant in case of Bangladesh. On contrary, India and Pakistan have rising trend (Chart 2).



The above bar graph shows that in 2014, government final consumption expenditure as percentage of GDP is higher than GDP growth in all the countries except Bangladesh. In Bhutan and sri lanka this difference between expenditure and growth is higher (chart 3).



3. Review of Related Literature

Wagner proposed the notion that there is a long-run tendency for government activities to grow with total economic activity in the late 19th century (Wagner, 1883; 1912). As stated by Wagner the share of its public expenditure in total expenditure increases as the real income per capita of a country increases. Three reasons can justify this type of claim: (1) the cultural and welfare services, (2) the regulatory and administrative functions of the states, and (3) the state participation to mobilise resources large-scale projects for technological needs.

Based on the arguments build by this law it also indicates a direction of causality from national income to public sector expenditure. Under this law, public expenditure is considered as endogenous to the growth of national income. On the contrary, pubic spending is considered as an exogenous policy instrument in national income accounting under the Keynesian view. A large number of studies empirically validated the law both in developing and developed countries using time series as well as cross-sectional data sets. There are at least seven versions of the Wagner's law. Magazzino (2010) represented the seven versions of the Law.

Table 1: Seven versions of Wagner's law

No	Version	Equation
1	Peacock- Wiseman (1961)	$\ln GE = a + b \ln GDP + u_t$
2	Gupta (1967)	$\ln(GE/P) = a + b \ln(GDP/P) + u_t$
3	Goffman (1968)	$\ln GE = a + b \ln(GDP/P) + u_t$
4	Pryor (1969)	$\ln GCE = a + b \ln GDP + u_t$
5	Musgrave (1969)	$\ln(NGE/ NGDP) = a + b \ln(GDP/P) + u_t$

6	Mann (1980)	$\ln(NGE/ NGDP) = a + b \ln GDP + u_t$
7	Murthy (1994)	$\ln(E/GDP) = a + b \ln(GDP/P) + c \ln(BDef/GDP)$

Source: Magazzino (2010)

Note: G*E* stands for government expenditure, *GDP* stands for gross domestic product, *GCE* stands for government consumption expenditure, *NGE* for nominal government expenditure, *NGDP* for nominal GDP, *P* for Population, E for expenditure and *BDef* for Budget Deficit.

On the different types of the econometric methodology applied, the empirical works on Wagner's Law can be divided in to two groups (Sideris, 2007). Firstly, early studies which are performed until the mid-1990s, assume stationary data series and apply simple OLS regressions to test alternative versions of the law (Ram, 1987; Courakis et al., 1993). Secondly, cointegration-based studies, which are performed from the mid-1990s and on, test for cointegration between government expenditure and national income (and occasionally population). Early studies of this group use the Engle and Granger (1987) methodology. However, more recent works apply the Johansen (1988) technique. Most of the recent studies also perform Granger causality tests to indicate the direction of causality between the variables (Henrekson, 1993; Murthy, 1994; Ahsan et al., 1996; Biswal et al., 1999; Kolluri et al., 2000; Islam, 2001; Al-Faris, 2002; Burney, 2002; Wahab, 2004). However, the empirical studies have yielded mixed and sometimes contradictory results. Some of these conflicting findings have been attributed to the various econometric methodologies used, and to the application of this law on different economies during alternative time periods (Bohl, 1996).

Using data of British Economy over the period of 1870-1913, Oxley (1994) found evidence congruent with Wagner's hypothesis. Long-run validity of Wagner's hypothesis applied to People's Republic of China for 1952-1992 has been reported by Cotsmoitis et al. (1996). Using both the Granger and Holmes and Hutton statistical procedures to test the income-expenditure hypothesis for three African countries (Ghana, Kenya and South Africa), for the period of 1957 to 1990, Ansari et al. (1997) found that there is no long-run relationship between government expenditure and national income. However, only Ghana shows evidence of government expenditure being caused by national income in short-run which supports Wagner's hypothesis.

The traditional Wagner's hypothesis in the case of Greece using disaggregated data of public expenditure has been tested by Clethsos and Kollias (1997). They reported that Wagner's Law is only valid in the expenditure related to military incidentals.

Karagianni et al. (2002) employs six alternative functional forms of Wagner's law using data for EU-15 countries covering the period 1949-1998 and found no long-term relationship between government spending and income, with few exceptions in sub-cases in Finland, Italy and the Netherlands. The experience of five economies, namely- USA, UK, France, Germany and Italy covering the period of 1870-1900 has been analysed by Florio and Colautti (2005). They found evidence in support of Wagner's Law. Halicioglu (2005) found that Wagner's Law does not hold in the case of adopted traditional form for

Turkey as there is no cointegration and no causality in line with the proposed implications of the law. However, he finds a long-run relationship between the share of government in GDP and real per capita income growth, which is in line with the law. Using an error-correction model, Akitoby et al. (2006) examined the short- and long-run behaviour of government spending with respect to output for 51 developing countries. The study finds evidence that government spending and total output tends to rise over time in developing countries which is congruent with Wagner's hypothesis.

There are also a number of studies conducted at country level for South Asian countries. Based on bivariate as well as trivariate framework, Kalam and Aziz (2009) empirically investigated Wagner's Law, using Bangladesh data from 1976 to 2007. The study finds evidence in favour of the law for Bangladesh, both for short- and long-run. They reported that there is a long-run conintegration relationship among real government expenditure, real GDP and the size of population where government expenditure is positively associated with the real GDP, per capita GDP and population size. Verma and Arora's (2010) study endeavors to inspect the validity of Wagner's Law in India over the period FY 1951 to FY 2008. It found evidence in favour of Wagner's Law in all six versions of the law proposed by different economists which indicates there is a long-run relationship between economic growth and growth of public expenditure. Afzal and Abbas (2010) apply time series econometric techniques to reinvestigate the validity of Wagner's Law in Pakistan covering the data for period of 1960-2007. They found no evidence of long-run relationship between government expenditure and national income. They also not found any direction of causality between these two variables. Kesavarajah (2012) examines the empirical validity of Wagner's law in the Sri Lankan economy using time series annual data over the period from 1960 to 2010. Based on six versions of Wagner's Law, the study finds the existence of short-run relationships between public expenditure and economic growth. However, in long-run, the study finds no strong evidence to support the Wagner's hypothesis. Rana (2014) empirically analyses the association between economic growth and government expenditure from the perspective of Bangladesh covering the period 1973 to 2012. The study reports that there is a significant long run relationship between government expenditure and gross domestic product for Bangladesh which validates the Wagner's hypothesis.

Lahirushan and et. al (2015) identify the impact of government expenditure on economic growth in Asian Countries using econometrical techniques of cointegration, panel fixed effects model and granger causality in the context of panel data of Asian countries; Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India and Bhutan from 1970 to 2013. The paper found a momentous positive impact of government expenditure on gross domestic production and a long-run relationship between government expenditure and growth in Asian countries.

In this paper, it has been strived to examine the empirical validity of Wagner's Law in South Asia region for the period of 2001-2014. It is another attempt from the existing

literature that applies panel data estimation method for South Asia region. In other words, previously no other study focused on testing the validity of Wagner's law for South Asia as a whole using panel data. This study will apply advanced econometric techniques like panel unit-root and cointegration analysis. Moreover, it will also encompass sophisticated econometric tools like Granger causality test to detect the causal flow between the variables and error-correction mechanism to fine tune the findings using empirical data. Hopefully, this research will provide new insights and will add value to existing empirical evidence regarding the phenomenon of Wagner's Law.

4. Data and Methodology

Panel data of respective variables are ranged from 2001 to 2014. Data on GDP per Captia (GDPC) are collected from UNCTAD database website. Here, Government Final Consumption Expenditure is regarded as government or public expenditure. Data on Government Final Consumption Expenditure to GDP ratio (GFCE) and Budget Deficit to GDP ratio (BDEF) have been collected from World Development Indicators (WDI). Here, Afghanistan and Maldives are excluded from the analysis as data on respective variables for these two countries are not reported regularly. Therefore, 6 South Asian countries (Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka) have been considered as cross-sectional units for the study. So, total number of observation is 84.

The empirical analysis in this study is carried out using five tests to check the stationarity of the series namely- Levin, Lin and Chu (2002), Breitung (2000), Hadri (1999), and Im, Pesaran an Shin (2003), Augmented Dicky-Fuller (1979) and Phillips-Perron (1988) tests. To examine whether the dependent variable is cointegrated with the explanatory variables Johansen-Juselius test for cointegration using two procedures Pedroni and Kao Residual Cointegration tests have been applied. Granger Causality test has been reported to examine whether there is causality among variables. Finally, short run dynamics i.e. error-correction model is estimated once equilibrium relationship among the variables is determined.

5. Specification of the Model

To examine the long-run equilibrium relationship between the government final consumption (GFCE) and GDP per capita (GDPPC) and budget deficit to GDP ratio (BDEF) of South-Asia region, the following simple model has been specified:

$$(lnGFCE_t) = \beta_1 + \beta_2(lnGPDPC_t) + \beta 3(lnBDEF_t) + U_t \quad \ldots\ldots..(1)$$

Where, $lnGFCE_t$ = Logarithm of Government Final Consumption Expenditure to GDP ratio in period t; $lnGPDPC_t$ = Logarithm of GDP per capita in period t, $lnBDEF_t$ = Logarithm of Budget Deficit to GDP ratio in period t, U_t =Stochastic error term.

6. Analysis of Results

6.1. Testing for Integration

To check the integration i.e. stationarity properties of data the presence of unit root is to be tested. This study sorts out the matter by applying several panel-based unit root

tests namely, Levin, Lin and Chu (2002), Breitung (2000), Im, Pesaran and Shin (2003), Augmented Dicky-Fuller (1979), and Phillips-Perron (1988) that are similar to tests carried out on a single series. Interestingly, these investigators have shown that panel unit root tests has more strength than unit root tests applied to individual series because the information in the time series is enhanced by that contained in the cross-section data. Moreover, in contrast to individual unit root tests which have complicated limiting dispersals, panel unit root tests lead to statistics with a normal distribution in the limit (see Baltagi, 2001).

Except IPS test, all of the aforementioned tests assume that there is an identical unit root process across the relevant cross-sections (referred to in the literature as pooling the residuals along the within-dimension). The LLC and Breitung tests employ a null hypothesis of a unit root using the following basic Augmented Dickey Fuller (ADF) specification:

$$\Delta y_{it}=\alpha y_{it-1}+\sum\beta_{ij}\Delta y_{it}+X_{it}\delta+\upsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots(2)$$

Where y_{it} refers to the pooled variable, X_{it} represents exogenous variables in the model such as country fixed effects and individual time trends, and ν_{it} refers to the error terms which are assumed to be mutually independent disturbances. As indicated above, it is also assumed that $\alpha=\rho-1$ is identical across the six cross-sections, but the lag order for the difference terms across the six sectors is allowed to vary. On the contrary, the less restrictive IPS test (and other widely used tests such as the ADF Fisher Chi-square) estimates a separate ADF regression for each of the six cross sections to allow for individual unit root processes; *i.e.,* ρ_i may vary across cross sections (referred to in the literature as pooling the residuals along the between-dimension).

At first, panel unit root tests on the relevant variables given in equation (1) above at level, have been implemented. However, all the tests statistics found that the null hypothesis of unit root cannot be rejected for all the three variables. This is a clear indication of non-stationarity problem for all the variables at level. Therefore, the tests for unit root need to be conducted for all the three variables at first differenced from.

Table 2 reports panel unit root test of the variables involved at first differenced from. It is evidential from Table 2 that for two variables GFCE and BDEF, the null hypothesis of unit root can be rejected for all three models based on the test statistics reported under five testing procedures. For GDPPC, all the tests procedures have rejected the null hypothesis unit root with trend. In a nutshell, the hypothesis of non-stationarity can be rejected in most of the cases for all three variables once they are first differenced.

Table 2: Panel Unit Root test of the Variables

Variables	LLC		Breitung		IPS		ADF		PP	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
At Level										
lnGFCE	-3.26*	0.00	-0.63	0.26	-1.21	0.11	16.98	0.15	20.48	0.06
lnGDPPC	-4.96*	0.00	2.09	0.98	-1.93*	0.03	18.80*	0.04	20.59*	0.02
lnBDEF	-2.23*	0.01	-1.84*	0.03	-0.75	0.23	13.07	0.22	16.48	0.08
At first differenced										
lnGFCE	-6.63*	0.00	-2.28*	0.01	-3.30*	0.00	32.10*	0.00	58.24*	0.00
lnGDPPC	-3.00*	0.00	-2.30*	0.01	-2.12*	0.02	18.45*	0.01	26.55*	0.00
lnBDEF	-9.55*	0.00	-3.19*	0.00	-6.28*	0.00	51.12*	0.00	90.31*	0.00

Source: Author's estimation based on WDI (2015) and UNCTAD (2015) data and using econometric software (E-views).

Note: LLC=Levin, Lin, Chu (2002), IPS=Im, Pesaran, Shin (2003), ADF=Augmented Dickey-Fuller (1979), PP=Phillips-Perron (1988). The other statistics are described in detail in Breitung (2000). The statistics are asymptotically distributed as standard normal with a left hand side rejection area. A * indicates the rejection of the null hypothesis of non-stationarity (LLC, Breitung, IPS, ADF and PP) at least on the 5per cent level of significance.

Now, it is therefore necessary to turn to panel cointegration techniques in order to determine whether a long-run equilibrium relationship exists among the non-stationary variables in level form.

6.2. Panel Cointegration Analysis

To determine whether a cointegrating relationship exits, the recently developed methodology proposed by Pedroni (1999) is employed. Basically, it employs four panel statistics, four weighted panel statistics and three group panel statistics to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration. In the case of panel statistics, the first-order autoregressive term is assumed to be the same across all the cross sections, while in the case of group panel statistics the parameter is allowed to vary over the cross sections. If the null is rejected in the panel case, then the variables of equation (1) are cointegrated for all the sectors. On the other hand, if the null is rejected in the group panel case, then cointegration among the relevant variables exists for at least one of the sectors. Similar type of procedure is followed in Kao's residual cointegration test.

Table 3: Panel Cointegration Tests

Procedure 1	Pedroni Residual Cointegration Test					
	Panel Statistics				Group Statistics	
	Statistic	Prob.	Weighted Statistic	Prob.	Statistic	Prob.
PP statistic	-2.27*	0.01	-4.12*	0.00	-3.67*	0.00
ADF statistic	-2.45*	0.01	-3.21*	0.00	-3.40*	0.00
Procedure 2	Kao Residual Cointegration Test					
	Statistics	Prob.	Residual Variance		HAC Variance	
	-1.99	0.02*	0.939284		0.666941	

Source: Author's estimation based on WDI (2015) and UNCTAD (2015) data and using econometric software (E-views). Note: The Kao statistics are described in detail in Kao and McCoskey (1998).A * indicates the rejection of the null hypothesis of no cointegration (Pedroni) or cointegration (Kao and McCoskey) at least on the 5 per cent level of significance.

As it is evidential from the findings reported in Table 3 that PP statistic and ADF statistic is found out to be statistically significant at 5 per cent level of significance. For group statistics, in a similar fashion, PP statistic and ADF statistic is found out to be statistically significant at 5 per cent level of significance. Therefore, out of four statistics used in Pedroni's residual cointegration test, all statistics are found out to be statistically significant. Test statistics value for Kao's residual based cointegration test also found out to be significant at 5 per cent level. Thus, using the test statistics value from both procedures, it can be argued that the variables used in the model are cointegrated.

6.3. Tests for Granger Causality

These empirical results analyze the relationship between government expenditure and GDP growth in order to investigate the validity of either the Wagnerian approach or the Keynesian stance or both concerning the direction of causality. Therefore, this study applies the Granger causality test in a context of panel data in order to determine the direction of causality between government expenditure and economic growth in a panel of Asian countries.

The null hypothesis in each case is that the variable under consideration does not "Granger cause" the other variable. The results are as follows:

Table 4 : Granger Causality Tests Results

Dependent variable	Direction of causality	F value	Probability	No. of lags	Decision
lnGFCE lnGDPPC	lnGDPPC→ lnGFCE	1.38	0.29	2	Do not Reject
	lnGFCE→ lnGDPPC	3.20	0.03		Reject
lnGFCE lnBDEF	lnBDEF → lnGFCE	1.02	0.46	2	Do not Reject
	lnGFCE → lnBDEF	0.67	0.71		Do not Reject

Source: Author's estimation based on WDI (2015) and UNCTAD (2015) data and using econometric software (E-views). Note: * denotes significant at 5 percent level.

The test results represent in Table 4 reveals that "Granger cause" goes from government final expenditure to GDP growth only, since the null hypothesis (lnGFCE does not Granger cause lnGDPPC) can be rejected at 5 percent level of significance (Table 4). The relationship between government final expenditure and GDP growth is unidirectional and validate Wagner's law.

On the contrary, there exists no "Granger cause" from lnGDPPC to lnGFCE which ignores the Keynesian stance. Similarly, there is no "Granger cause" from lnBDEF to lnGFCE, and from lnGFCE to lnBDEF at 5 percent level of significant.

6.4. Short-run Dynamics: Error Correction Model (ECM)

As it has been supported by the above tests of cointegration that there exists cointegrating relationship between lnGFCE and other variables, the next task will be the estimation of short-run dynamics models for correction. This is because though there is a long run relationship between the variables as in cointegration tests, however, in short run they may drift apart i.e. there may be disequilibrium. Therefore, the error term has been treated as the equilibrium error, which is to tie the short run behavior of the variables.

Results show that the estimated error correction term of the variable lnGDPPC is 26 per cent which is the short run equilibrium error. If there any short run shocks lead the system in disequilibrium then it requires more than 3 years to reach in the long equilibrium (Table-5).

Table 5: Error-Correction Model

Error Correction	D(lnGFCE)	D(lnGDPPC)	D(lnBDEF)
Cointegrating Equation	0.053681* (2.20854)	-0.264877 (-1.37531)	0.143036* (3.43223)
D(lnGFCE(-1))	-0.285124* (-2.14261)	4.713170 (0.93603)	-0.220980 (-0.96851)
D(lnGFCE(-2))	-0.205380 (-1.59637)	-2.865375 (-0.58860)	-0.290362 (-1.31630)
D(lnGDPPC(-1))	-0.000243 (-0.06325]	0.336827* (2.32009)	0.002657 (0.40389)
D(lnGDPPC(-2))	0.006101 (1.43790]	0.099549 (0.62006)	0.014463* (1.98809)
D(lnBDEF(-1))	0.062991 (0.83534]	-0.906075 (-0.31755)	-0.334403* (-2.58641)
D(lnBDEF(-2))	0.031991 (0.47523]	-2.642514 (-1.03743)	-0.010280 (-0.08907)
C	-0.192084 (-0.77085)	26.93802* (2.85700)	-0.616668 (-1.44335)
R-squared	0.149003	0.351245	0.423897
Adj. R-squared	0.046297	0.272947	0.354367
F-statistic	1.450770	4.486005	6.096627

Source: Author's estimation based on WDI (2015) and UNCTAD (2015) data and using econometric software (E-views). Note: Figure in parentheses denotes t-statistics. * denotes significant at 5 per cent level.

7. Conclusion

Throughout the paper, it has been strived to examine the relationship between GDP per capita or budget deficit to GDP ratio and government final consumption expenditure using time series data of South Asian countries over the period of 2001 to 2014. This empirical investigation has found out the long-run relationship among these variables within the cointegration and error-correction framework. Two procedures of conducting Johansen-Juselius test for cointegration for panel data provides results indicating cointegrating relationship among these variables. Granger causality test has been applied to explore out the causality between the dependent and independent variables. There is an indication of unidirectional causality between government final consumption expenditure and and GDP growth. The error-correction term in most of the cases are found significant.

All this findings mentioned above provides a clear indication that there is exists both short- and long-term relationship between government expenditure and per capita GDP. In turn, it's a clear indication of validation of Wagner's law in South Asia, i.e. rise in GDP per capita is associated with high growth rate in government final consumption expenditure. However, this study is not free from limitations. This study uses data from 2001 onwards due to unavailability of data. Future research initiative may overcome this situation by using national level data for all eight South Asian countries. But a caution should be followed

in this regard as the data sources will not be uniform. Researches should find some sort of technique to unify and standardise data collected from national sources.

References

Afzal, M. and Abbas, Q., "Wagner's law in Pakistan: Another look". Journal of Economics and International Finance VOL. 2 No. 1, January, 2010, pp. 012-019.

Ahsan, S.M., Kwan, A.C.C., Sahni, B.S., "Cointegration and Wagner's Hypothesis: Time Series Evidence for Canada". Applied Economics, VOL. 28, 1996, pp. 1055-1058.

Akitoby, B., Clement, B., Gupta, S., Inchauste, G., "Public spending, voracity, and Wagner's Law in developing countries". European Journal of Political Economy, VOL. 22, 2006, pp. 908-924.

Al-Faris, A.F., "Public Expenditure and Economic Growth in the Gulf Cooperation Council Countries". Applied Economics, VOL. 34, 2002, pp. 1187-93.

Ansari, M.I., Gordon, D.V., Akuamoah, C., "Keynes versus Wagner: public expenditure and national income in three African countries". Applied Economics, VOL. 29, 1997, pp. 543-550.

Baltagi, Badi H., "Econometric Analysis of Panel Data, 2nd edition". John Wiley & Sons LTD., 2001.

Bataineh, A. I. M., "The Impact of Government Expenditures on Economic Growth in Jordan". Interdisciplinary Journal of Contemporary Research Business, VOL. 4 No. 6, 2012, pp. 1320-1338.

Biswal, B., Dhawan, U., Lee, H.Y., "Testing Wagner versus Keynes Using Disaggregated Public Expenditure Data for Canada". Applied Economics, VOL. 31, 1999, pp. 1283- 1291.

Breitung, J., "The local power of some unit root tests for panel data; in Baltagi, B. (ed.): Advances in Econometrics 15. Nonstationary panels, panel cointegration, and dynamic panels, JAI Press, Amsterdam, 161-178, 2000.

Burney N.A., "Wagner's hypothesis: evidence from Kuwait using cointegration tests". Applied Economics, VOL. 34, 2002, pp. 49-57.

Cotsomitis. J.A., Harnhirun. S., Kwan. A.C.C., "Co-integration Analysis and the Long-Run Validity of Wagner's Hypothesis: Evidence from the People's Republic of China". Journal of Economic Development, VOL. 21 No. 2, 1996.

Courakis, A.S., Moura-Roque, F., Tridima,s G., "Public Expenditure Growth in Greece and Portugal: Wagner's Law and Beyond". Applied Economics, VOL. 25, 1993, pp. 125- 134.

Dickey and Fuller., "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root". Econometrica, VOL. 49, 1979, pp. 1057-1072.

Engle, R.F., Granger, C.W.J., "Co-integration and error-correction: representation, estimation and testing". Econometrica,VOL. 55, 1987, pp. 251-276.

Fan, S., Hazell, P., & Thorat, S., "Government spending, growth and poverty in rural India". American journal of agricultural economics VOL. 82 No 4, 2000, pp. 1038-1051.

Florio, M. and Colautti, S., "A Logistic Growth Theory of Public Expenditures: A Study of Five

Countries over 100 Years". Public Choice, VOL.122, 2005, pp. 355-393.

Granger, C.W.J. and Newbold, P., "Spurious Regression in Econometrics," Journal of Econometrics, VOL. 2, 1974, pp. 111-20.

Gupta, S.P., "Public Expenditure and Economic Growth: A Time-Series Analysis". Public Finance, VOL. 22, 1967, pp. 423-461.

Islam, A.M., "Wagner's Law Revisited: Cointegration and Exogeneity Tests for the USA". Applied Economics Letters, VOL. 8, 2001, pp. 509-515.

Im, K.S., Pesaran, M.H., Shin, Y., "Testing for unit roots in heterogeneous panels". Journal of Econometrics, VOL. 115, 2003, pp. 53-74.

Johansen S., "Statistical analysis of cointegration vectors". Journal of Economics Dynamics and Control, VOL.12, 1988, pp. 231-254.

Johansen S. and Juselius, K., "Maximum Likelihood Estimation and Inference on Cointegration– with Applications to the Demand for Money". Oxford Bulletin of Economics and Statistics, VOL. 52 No. 2, 1990, pp. 169–210.

Levin, A., Lin, C.F., Chu, C., "Unit root tests in panel data: Asymptotic and finite sample properties". Journal of Econometrics, VOL. 108, 2002, pp. 1-24.

Karagiannic S., Pempetzoglou, M. and Strikou, S., "Testing Wagner's Law For The European Union Economies". The Journal of Applied Business Research, VOL. 18 No. 4, 2002, pp. 107- 114.

Kao, C, and McCoskey, S., "A residual-based test of the null of cointegration in panel data". Econometric Reviews, VOL. 17, 1998, pp. 57-84.

Kesavarajah, M., "Wagner's Law in Sri Lanka: An Econometric Analysis". ISRN Economics. VOL 2012, 2012.

Kolluri. B.R., Panik, M.J., Wahab, M.S., "Government expenditure and economic growth: evidence from G7 countries". Applied Economics, VOL. 32, 2000, pp. 1059-1068.

Halicioĝlu F., "Testing Wagner's law for Turkey, 1960-2000". Review of Middle East Economics and Finance. VOL. 1 No. 2, 2003, pp. 129-40.

Henrekson, M., "Wagner's Law - A Spurious Relationship?" Public Finance, VOL. 48 No. 2, 1993, pp. 406-415.

Magazzino, C., "Wagner's law and augmented Wagner's law in EU-27. A time-series analysis on stationarity, cointegration and causality". Munich Personal RePEc Archive, 2010.

Lahirushan, K. P. K. S., & Gunasekara, W. G. V., "The Impact of Government Expenditure on Economic Growth: A Study of Asian Countries". World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic and Management Engineering, VOL. 9 No 9, 2015.

Mann, A. J., "Wagner's Law: An Econometric Test for Mexico, 1925-76". National Tax Journal, VOL. 33, No. 2, 1980, pp. 189-201.

Murthy V., "Wagner's Law, Spurious in Mexico or Misspecification: a reply". Public Finance, VOL. 49 No. 2, 1994, pp. 295-303.

Nurudeen, A. and Usman, A., "Government expenditure and economic growth in Nigeria, 1970-2008: A disaggregated analysis". Business and Economics Journal, VOL. 4 No. 1, 2010, pp.1-11.

Oxley, L., "Cointegration, causality and Wagner's Law: A Test for Britain 1870-1913". Scottish Journal of Political Economy, VOL. 41, 1994, pp. 286-298.

Pedroni, P., "Critical values for cointegration tests in heterogeneous panels with multiple regressors". Oxford Bulletin of Economics and Statistics, VOL. 61, Special Issue, 1999, pp. 653-670.

Peacock, A. T., & Wiseman, J., "The Growth of Public Expenditure in the United Kingdom". Cambridge: NBER and Princeton: Princeton University Press, 1961.

Phillips, P. C. B., Perron, P., "Testing for a Unit Root in Time Series Regression". Biometrika VOL. 75 No. 2, 1988, pp. 335–346.

Pryor, F. L., "Public Expenditures in Communist and Capitalist Nations". The Journal of Finance, VOL. 24 No. 5, 1969, pp.1032-1034.

Ram, R., "Wagner's Hypothesis in Time-Series and Cross-Section Perspectives: Evidence from "Real" Data for 115 Countries". The Review of Economics and Statistics, VOL. 69 No. 2, 1987, pp. 194-204.

Wahab, M., "Economic Growth and Government Expenditure: Evidence from a New Test Specification". Applied Economics, VOL. 36, 2004, pp. 2125-2135.

WDI (2016). http://databank.worldank.org/data/reports.aspx?source=world development-indicators#selectedDimension_WDI_Series

UNCTAD Stat (2016). http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx

Verma, S. and Arora, R., "Does the Indian Economy Support Wagner's Law? An Econometric Analysis". Eurasian Journal of Business and Economics, VOL. 3 No. 5, 2010, pp. 77-91.