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Composition of Public Expenditure and Economic Growth in India: A Time Series Analysis

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ABSTRACT

The purpose of the study is to analyze the dynamic link between government spending and economic growth for Indian Economy with the use of 44 years time series data and techniques. The empirical analysis of the study indicates the absence of short run causality between the variable in all the six models. The results showed that there is long run causality between Gross domestic product and Revenue expenditure in total as well as per capita term from GDP to Revenue expenditure. The study also found the Bi-directional causality from per capita total government expenditure and per capita Gross Domestic Product.
JEL Classification- O40, H54, C32, H50

Keywords: Government expenditure, Growth, Cointegration, Vector Error Correction Model, Causality, Time Series Analysis

The causal relationship between government spending and economic growth become the attractive area of research from last few decades. The share of public spending is continuously increasing in all the developing as well as developed countries. The government plays prominent role in the development of the country. The increasing public spending has the positive impact on the development and the growth of the country. The dynamic interaction between government expenditure and economic growth is mainly based on two contradictory views of public spending known as Wagnerian view and Keynesian view of public expenditure. Adolf Wagner gives the law of increasing state activities which is also known as the Wagner law of public expenditure. According to Wagner law the share of public expenditure will increases with the increase in the real national income of the country. The growth of public expenditure is determined by the growth of the real national Income. In other words the Wagner law states that the economic growth is the endogenous variable and the cause to the growth of the public expenditure. The directional of the causality between public expenditure and economic growth lie from economic growth to public expenditure in Wagner Law of increasing state activities.

In contrast to the Wagner law the Keynesian view of the public expenditure revealed that the public expenditure is the cause to the growth of the economy. According to the Keynesian view of public expenditure in case of recession it is the only public expenditure which can make the balance in the economy. In the situation of recession the expansionary fiscal policy will leads to the level of income and the demand in the economy. Keynesian View considers the public expenditure as an exogenous variable and direction of the causality is from public expenditure to economic growth.

There are a number of studies on the relationship between government expenditure and economic growth. The results of these studies are mixed. Some of the studies confirmed the validity of Wagner law such as Oxley (1994) for Britain, Islam (2001) for USA, Aregbegen (2006) for Nigeria, Narayan *et al.* (2009) for Fiji Island, Aziz and Abdul Kalam (2009) for Bengladesh etc. On the other side some studies concluded that the Wagner law does not exist such as Halicioglu (2003) for Turkey. Ju Huong (2006) for Chaina and Taiwan, Sinha *et al.* (2007) for Thailand, Aziz and Abbas (2010) for Pakistan etc. all of these studies are based on time series analysis of different periods.

The objective of the present study is to empirically analyze the causal relationship between government spending and economic growth for Indian economy. The main focus of the study is to analyze the impact of economic growth on various components of government spending (Revenue expenditure and Capital expenditure) in both total as well as per capita term.

The present paper is structured as fallows- the second section of the study shaded the light on the review of related literature on Wagner hypothesis and Keynesian hypothesis. The third section of the study provides some overview of public expenditure and GDP of Indian economy during the study period. The fourth section of the study provides the details of the data and methodology employed to analyze the objective of the study. The empirical findings and the results of the various time series techniques are listed in the fifth section of the study. The sixth section of the study concludes the research findings and also suggests some policy implication for the Indian economy.

Review of Literature

The relationship between public spending and economic growth has been widely discussed in the economic literature. The different studied found the different results with the use of time series and as well as cross sectional data for different period of time. Some of the studies are reviewed below:

Ashan *et al.* (1989) made an attempt to examine the causal relationship between government expenditure and national income in 24 OECD countries with the use of annual time series data. The findings of the study states that there is bi-directional causality between government expenditure and national and some of the countries follow the Keynesian hypothesis.

Bhat *et al.* (1991) observed the causality issue of government spending and national income in Indian states. The study utilized the Sims and Granger causality and multiple Rank 'F' test with use of annual time series data from 1969 to 1990. The results of the study revealed that the Indian states follow the Keynesian view of public expenditure.

Jackson, Fethi and Fethi (1999) attempted to analyze the dynamic causal link between government expenditure and national income for Northern Cyprus economy for period 1977 to 1996. The study confirmed the mixed evidence in support of Wagner hypothesis. The study also concluded that there is the unidirectional causality from government expenditure to national income which indicates the evidence of Keynesian hypothesis of public expenditure.

Ageli (2013) tested the validity of Wagner law for Saudi Arabia. The study used the annual time series data of 42 years to find the causal relationship between government expenditure and economic growth. The study found that the economic growth is causing to the growth of public expenditure in Saudi Arabia or the study concluded that the economy of the Saudi Arabia have the evidence in support of Wagner's Law of increasing state activities.

Khundrakpam (2013) studied the interaction between public spending and economic growth. The author utilized the annual time series data from 1960 to 1997. The empirical finding of the study states that the direction of the causality is from public spending to national income in India. The study also explained that the impact of government spending on national is acceptable only at a particular level. After that level the positive impact of public spending is turned into the negative. The study concludes that there should be a balance between the level of government spending and investment for economic growth.

Marjit, Joydeh & Ritwik, studied the composition of government expenditure and its impact on economic growth in India with the use of Panel Techniques. The empirical findings of the panel analysis revealed that capital expenditure has positive effect on growth whereas the Revenue expenditure has negative on economic growth.

Njuru *et al.* (2014) utilized the VAR technique to analyze the impact of various components of public expenditure with time series data form period 1963 to 2012 for Kenya. The findings of the study concluded that the increase in the recurrent expenditure leads to a significant increase in investment.

Al-Shatti (2014) investigated the causal relations between public spending and economic growth for Jorden. The study utilized the time series data from 1993 to 2013. The empirical analysis of the study found that there is not causal relationship between both the variables.

Lukman, Serifat and Owolabi (2015) employed the bound test approach to test the relationship between government expenditure and economic growth in Nigeria with the use on annual time series data of 41 years. The results of the autoregressive distributed leg model concluded that the variables are cointegrated. The results of the error correction model states that there is long run causality between both the variable and the revenue and capital expenditure has the positive impact on the economic growth.

Public expenditure and economic growth in India an overview

After the independence the level of public expenditure is continuously increasing in India. To achieve the object of the maximum social welfare and to promote the economic growth the government has increased the expenditure in all the sectors. The share of public revenue expenditure in total Government expenditure has increased from 65.41 to 83.41 percent from 1950-51 to 2007-08 (Verma & Arora, 2010). In terms of capital expenditure the share was increasing from 1950 to 1970 but after 1970 there is decline in the share of capital expenditure which is not a good sign for a developing country like India (Pethe and Lalvani, 1999). The growth rate of gross domestic product of India was 3.5 in the period of 1950 to 1980. After that there is slight increase in the growth rate of GDP of India. In last decade there is Continuous increase in the growth rate of GDP in India.

Table 1: Government expenditure and economic growth in India (in Billion)

Year	Revenue Expenditure	Capital Expenditure	Total Expenditure	GDP
1970-71	31.30(55.65)	24.94(44.34)	56.24	5897.86
1980-81	144.10(63.29)	83.58(36.70)	227.68	7985.06
1990-91	735.16(69.81)	317.82(30.18)	1052.98	13478.89
2000-01	2778.39(85.33)	477.53(14.66)	3255.92	23484.81
2010-11	10407.23(86.92)	1566.05(13.07)	11973.28	49185.33

Sources: *Compiled by Author from various issues of Handbook of Indian Economy Published by Reserve Bank of India.*

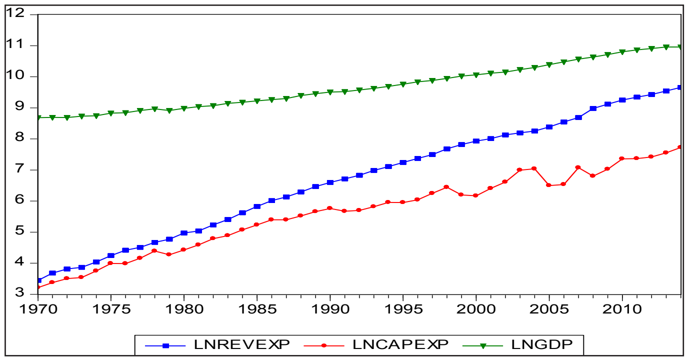

Fig. 1: Trends in Per Capita Revenue, Capital and GDP in India (in Logarithmic Value)

The above Table 1 and Fig. 1 show that there is continuously increase in revenue expenditure. The government revenue expenditure is increasing with the increase in the GDP. While the series of capital expenditure even have the increasing trend but there are some fluctuations in the capital expenditure series.

Data and Methodology

Data

The study used the secondary data of public finance of India and all the data is taken from various issues of Budget estimates, the economic survey of India, Handbook of Indian economy published by Reserve bank of India etc. The nominal data has been converted into real by the use of GDP deflator. The period of the study is from 1970 to 2014. The growth of Gross domestic product has been used as the proxy for the economic growth. All the variables have also been converted into logarithmic form to get the stationary at lower level.

Methodology

The study utilizes various time series techniques to analyze the relation between gross domestic product and economic growth in India such as Unit Root Test, Engle Granger cointegration test, Johansen coitegration test and Vector error correction method etc.

Model Specification-

The functional relationship between various variables of the study is specified as follows:

- Model- 1 lnREVEXP = f (lnGDP)
- Model-2 lnCAPEXP =f (lnGDP)
- Model-3 lnGOVEXP =f (lnGDP)
- Model-4 ln(REVEXP/POP) = f [ln(GDP/POP)]
- Model-5 ln(CAPEXP/POP) =f [ln9GDP/POP)]
- Model-6 ln(GOVEXP/POP)=f [(ln(GDP/POP)]

Where ln=Loggrithmic value of the variable, REVEXP =Revenue expenditure, CAPEXP= capital expenditure, GOVEXP= total government expenditure, GDP= gross domestic product and pop= population.

Unit Root Test (ADF Test)

Most of the macroeconomic time series are non-stationary. So it's necessary to test the stationary properties of the variables before the analysis. The present study used the Augmented Dickey Fuller Test of unit root to test the order of integration of the variable. A variable is said to be non-stationary if the mean and the variance of the series is time variant and the regression analysis of non-stationary variables leads to the problem of spurious regression (Engle and Granger, 1987) and the problem of spurious regression exists due to the time trend in both the variables. Augmented Dickey fuller test (Dickey and Fuller, 1979) is specifying the three different forms of unit root test which are given below:

With Drift-

$$\Delta \ln GDP = \gamma_0 + \gamma_2 \ln GDP_{t-1} + \sum_{i=1}^{i=m} \alpha_i \Delta \ln GDP_{t-i} + \varepsilon_t \quad \ldots(1)$$

With Drift and Trend-

$$\Delta \ln GDP = \gamma_0 + \gamma_2 \ln GDP_{t-1} + \gamma_3 t + \sum_{i=1}^{i=m} \alpha_i \Delta \ln GDP_{t-i} + \varepsilon_t \quad \ldots(2)$$

Without Drift and Trend-

$$\Delta \ln GDP = \gamma_2 \ln GDP_{t-1} + \sum_{i=1}^{i=m} \alpha_i \Delta \ln GDP_{t-i} + \varepsilon_t \quad \ldots(3)$$

Here the H0 - γ_2 =0 in all the three equations of ADF Test and if the Null hypothesis will be rejected then is will be the case of stationary series and if the value of gamma is equal to zero then the series is said to be non stationary. If a series will be non-stationary at level then the same process will be applied on the first difference of the series that is known as the first difference stationary series.

Cointegartion Test

We employed the Engle-Granger Two Step Procedure and the Johansen and Julisus Techniques to find the cointegration between the variables. The Engle Granger Two step method (1987) is based on the assumption that the estimated series of residuals must be stationary for the cointegration relationship between the variable. In other words it states that linear combination of the variables must be stationary in order to find the cointegration between the variables. There are some limitations of the Engle Granger Method of cointegration such as small sample bias (Banerjee *et al.* 1986), parametric instability (Hendry & Mizon, 1990) etc. As the Engle Granger cointegration method is not free from the limitation so we also utilizes the Johansen and Julselius (1990) test of cointegration. The Johansen method of cointegration is based on the maximum likelihood ratio tests for the number of cointegration vectors. The Johansen and Julselius have given two test to test the number of cointegrating vector-Trace Statistics and Maximum Eigen Value Test. The likelihood ratio statistics for the trace statistic and max statistics are as define below,

$$\lambda_{trace}(r) = -T \sum_{t=r+1}^{\rho} \ln(1-\hat{\lambda}) \quad \ldots(4)$$

Here $\hat{\lambda}_{r+1}, \ldots\ldots\ldots \hat{\lambda}_p$ are the estimated p-r smallest Eigen values. The null hypothesis of the Trace statistics that there are at most r cointegrating vectors (while r=0 or 1). The Max statistics,

$$\lambda_{\max}(r, r+1) = -T \ln(1-\hat{\lambda}) \quad \ldots(5)$$

In the Max statistics the null hypothesis of r cointegrating vector is tested against the alternative hypothesis that r=1 or r=2 or r=3 etc. as the cointegration tests are very sensitivity to the number of legs. So we select the Schwartz Criterion (SC) for the determination of number of Legs.

Vector Error Correction Model-

According to Engle and Granger (1987) if two non-stationary series are co integrated then a vector autoregression in the first difference will leads to problem of misspecification. In our study both the series are non-stationary and are cointegrated so we employed the Vector error correction model proposed by Granger (1986) and Granger and Engle (1987). VECM is the more compressive method to use the test of causality when variables are cointegrated. The cointegration Error Correction models for the study are as followed,

$$\Delta \ln GDP_t = \alpha_1 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln REVEXP_{t-i} + \delta_1 ECT_{t-1} + \varepsilon_{1t} \quad \ldots(6)$$

$$\Delta \ln GDP_t = \alpha_2 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln CAPEXP_{t-i} + \delta_2 ECT_{t-1} + \varepsilon_{2t} \quad \ldots(7)$$

$$\Delta \ln GDP_t = \alpha_3 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln GOVEXP_{t-i} + \delta_3 ECT_{t-1} + \varepsilon_{3t} \quad \ldots(8)$$

$$\Delta \ln PCGDP_t = \alpha_4 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln PCGDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln PCREVEXP_{t-i} + \delta_4 ECT_{t-1} + \varepsilon_{4t} \quad \ldots(9)$$

$$\Delta \ln PCGDP_t = \alpha_5 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln PCGDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln PCCAPEXP_{t-i} + \delta_5 ECT_{t-1} + \varepsilon_{5t} \quad \ldots(10)$$

$$\Delta \ln PCGDP_t = \alpha_6 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln PCGDP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln PCGOVEXP_{t-i} + \delta_6 ECT_{t-1} + \varepsilon_{6t} \quad \ldots(11)$$

In the above model specification if coefficient of Error Correction term and the coefficient of legged value of independent variables will be significantly different from zero then it will be the evidence of the causality between the variables.

RESULTS OF THE ANALYSIS

Results of Unit Root Test-

The results of ADF Test of Unit root test are reported in Table 2.

Table 2: Results of Unit root ADF Test

Variable	Level		First Difference	
	C	C & T	C	C& T
REVEXP	5.4389	4.7179	6.0827	5.7701
CAPEXP	3.8936	1.6168	-2.5473	-8.0655
GOVEXP	9.1003	4.3357	-0.0068	-4.5270
GDP	-1.7714	-2.7556	-1.9014	-2.1302
PCREVEXP	4.9657	5.9876	10.2914	6.2514
PCCAPEXP	5.2967	0.9050	-0.7478	-6.1763
PCGOVEXP	4.6005	1.3257	-4.3308	-6.0157
PCGDP	7.0585	1.2585	7.0585	1.2582
lnREVEXP	-1.7971	-1.3926	-5.7754*	-5.8617*
lnCAPEXP	-1.2533	-3.3108	-8.0721*	-8.1126*
lnGOVEXP	-0.9295	-2.9802	-8.6399*	-8.6360*
lnGDP	2.2843	-2.48400	-5.7875*	-6.4465*
lnPCREVEXP	-1.3331	-1.6269	-5.5193*	-5.5217*
lnPCCAPEXP	-1.2957	-3.3376	-7.9230*	-7.9571*
lnPCGOVEXP	-0.8114	-3.2445	-8.3992*	-8.3402*
lnPCGDP	-3.3679	-1.6105	-5.4375*	-7.2534*

(*) indicate significant at 5 percent level. C, C& T stands for Constant, Constant and Trend respectively.

Source: Author's Computation.

The result of the ADF Test Indicates that all the variables are non-stationary at level and the first difference of the variables. To make the variables stationary all the variables transformed into logarithmic form. After the log transformation of all the variables are stationary at first difference or the variables are I (1).

The results of the Engle - Granger two step methods are reported in Table 3 for the first step of the test. The results revealed that all the model have the spurious regression problem as the value of R square is Greater than the Value of the Durbin-Watson Test statistics which is the thumb rule of the spurious regression. According to Engle and Granger if the regression has the spurious problem then there is no cointegration. But to find the cointegration between the variables we should test the unit root properties of the estimated residuals series which is the second step of the Engle Granger cointegration Method.

Table 3: Results of Engle Granger Cointegartion Test –First Step

Model	Variable	Coeff.	t-val.	Std.Er.	R-Square	Adj R-Square	DW-Stat	F-Stat
1	LnGDP	2.5258	39.01*	0.0628	0.9725	0.9718	0.0832	1522.459 (0.0000)
	C	-17.7462	-28.23*	0.6284				
2	LnGDP	1.6846	0.067*	25.0253	0.9357	0.9342	0.30479	655.2664 (0.0000)
	C	-10.6742	0.653*	-16.3346				
3	LnGDP	2.3212	38.27*	0.0606	0.9714	0.9708	0.1511	1465.218 (0.0000)
	C	15.4261	-26.20*	0.5886				
4	LnPCGDP	3.3390	22.65*	0.1454	0.9278	0.9260	0.076	527.015 (0.0000)
	C	-9.79984	-23.08*	0.4245				
5	LnPCGDP	2.10136	0.129*	0.1295	0.8548	0.8513	0.2423	241.451 (0.0000)
	C	-7.0056	0.378*	0.37826				
6	LnPCGDP	-8.5285	-21.86*	0.3899	0.9256	0.9238	0.1141	510.7420 (0.000)
	C	3.0192	22.59*	0.1336				

(*) indicate significant at 5 percent level; Source: Author's Computation.

Table 4: Results of Unit root ADF Test for Residuals

Model	Disturbance Term	With Constant	With Constant and Trend
Model 1	μ_1	-2.41156	2.71268
Model 2	μ_2	-2.78639*	-2.5763
Model 3	μ_3	-2.4568	-2.2163
Model 4	μ_4	-2.31976	2.1268
Model 5	μ_5	-2.53288	-2.1399
Model 6	μ_6	-2.3265	-1.6100

(*) indicate significant at 5 percent level; Source: Author's Computation.

The results of the ADF Test states that only model 2 have the cointegration between the variable. All other models have no cointegration, as the residuals are non-stationary at level. In order to verify the results of the Engle-Granger Two Step Method the study also used the Johansen and Julselius Method of cointegration.

Table 5: Results of Johansen and Julselius Test of Cointegration

Model	Test	Hypothe-sized No. of CE(s)	Eignvalue	Trace Statistics	0.05 Critical value	Prob.
1	Trace Test	r=0	0.2280	11.5650	15.4947	0.1790
		r=1	0.0101	0.4371	3.8414	0.5085
	Max. Test	r=0	0.2220	11.1278	14.2646	0.1479
		r=1	0.0101	0.4371	3.8414	0.5085
2	Trace Test	r=0	0.2026	11.3305	15.4947	0.1920
		r=1	0.0363	1.5928	3.8414	0.2069
	Max. Test	r=0	0.2026	9.7376	14.2646	0.2297
		r=1	0.0363	1.5928	3.8414	0.2069
3	Trace Test	r=0	0.2153	10.4680	15.4947	0.2464
		r=1	0.0008	0.0371	3.8414	0.8471
	Max. Test	r=0	0.2153	10.4308	14.2646	0.1851
		r=1	0.0008	0.0371	3.8414	0.8471
4	Trace Test	r=0	0.3256	16.3234	15.4947	0.0374*
		r=1	0.0040	0.1681	3.8414	0.6817
	Max. Test	r=0	0.3253	16.1552	14.2646	0.0248*
		r=1	0.0040	0.1681	3.8414	0.6817
5	Trace Test	r=0	0.2888	16.1258	15.4947	0.0401*
		r=1	0.0511	2.1509	3.8414	0.1425
	Max. Test	r=0	0.2888	13.9749	14.2646	0.0555*
		r=1	0.0511	2.1509	3.8414	0.1425
6	Trace Test	r=0	0.3043	15.0835	15.4947	0.0576*
		r=1	0.0049	0.2031	3.8414	0.6522
	Max. Test	r=0	0.3043	14.8803	14.2646	0.0399*
		r=1	0.0049	0.2031	3.8414	0.6522

(*)indicate significant at 5 percent level; Source: Author's Computation.

The table 5 presents the results of Johansen test of Cointegration. The result of Trace and Maximum Eigen Value statistics indicates that there is one cointegration equation in all the models as the hull hypothesis of at least one cointegration relationship between the variables is accepted on the 5 percent level of significance.

Table 6: Results of VECM Model

Model	Direction of Causality	ECT	Coeff.	Std. Err.	T-value	P-Value
1	lnGDP ⇒ lnREVEXP	ECT1	-0.0283	0.0135	-2.6891	0.0438*
	LnREVEXP ⇒ lnGDP	ECT2	-0.0234	0.0121	-1.9353	0.0621
2	lnGDP ⇒ lnCAPEXP	ECT3	-0.1271	0.0799	-1.5898	0.1206
	lnCAPEXP ⇒ lnGDP	ECT4	-0.0280	0.0201	-1.3912	0.1727
3	lnGDP ⇒ lnGOVEXP	ECT5	-0.0662	0.0375	-1.7652	0.0860
	lnGOVEXP ⇒ lnGDP	ECT6	-0.0349	0.0195	-1.7912	0.0817
4	lnPCGDP ⇒ lnPCREVEXP	ECT7	-0.0414	0.0070	-2.0663	0.0465*
	lnPCREVEXP ⇒ lnPCGDP	ECT8	0.0100	0.0032	3.1104	0.0038*
5	lnPCGDP ⇒ lnPCCAPEXP	ECT9	-0.0329	0.0452	-0.7284	0.4713
	LnPCCAPEXP ⇒ lnPCGDP	ECT10	0.8323	0.1748	4.7599	0.0000*
6	lnPCGDP ⇒ lnPCGOVEXP	ECT11	-0.0079	0.0027	-2.9274	0.0061*
	lnPCGOVEXP ⇒ lnGDP	ECT12	-0.0076	0.0026	-2.9422	0.0058*

(*) indicates significant at 5 percent level; Source: Author's Computation.

The results of Vector Error correction method for long run causality are shown in the table 6. The empirical results of the VECM analysis states that in model 1 there is one way causality between Gross domestic product and revenue expenditure and the direction of the causality lie from GDP to revenue expenditure. The results also indicates that in model 4 there is bi-directional causality between per capita GDP and per capita revenue expenditure while in case of model 5 the Uni-directional causality was found from per capita capital expenditure to per capita GDP. The results also indicate the Bi-Directional causality in model 6 between per capita total government expenditure and per capita GDP. The VECM Model fails to find the causality for model 2 and 3 i.e. between GDP and capital expenditure and revenue expenditure respectively.

Table 7: Results of Short Run Causality test or Wald Test

Model	Direction of Causality	F-Statistics	P-value
1	lnGDP ⇒ lnREVEXP	1.6861	0.1852
	LnREVEXP ⇒ lnGDP	0.3140	0.6281
2	lnGDP ⇒ lnCAPEXP	0.5026	0.6049
	lnCAPEXP ⇒ lnGDP	1.4319	0.2388
3	lnGDP ⇒ lnGOVEXP	0.9865	0.3729
	lnGOVEXP ⇒ lnGDP	0.1005	0.9043
4	lnPCGDP ⇒ lnPCREVEXP	1.9360	0.1443
	lnPCREVEXP ⇒ lnPCGDP	0.6442	0.5250
5	lnPCGDP ⇒ lnPCCAPEXP	0.3245	0.7229
	LnPCCAPEXP ⇒ lnPCGDP	0.2481	0.8627
6	lnPCGDP ⇒ lnPCGOVEXP	0.1612	0.8511
	lnPCGOVEXP ⇒ lnGDP	0.1626	0.8499

(*)indicate significant at 5 percent level; Source: Author's Computation.

The results of the Wald test to find the short run causality between the variables are reported in table 7. The empirical result of the Wald test indicates that there is absence of short run causality between the variables in all the models of the study. In short there is no causality between the variables for short run as the null hypothesis of no causality has been accepted at 5 percent level of significance.

Table 8: Diagnostic Test results

Model	Direction of Causality	Normality Test	ARCH Test	Serial correlation LM Test
1	lnGDP ⇒ lnREVEXP	2.3016	0.6064	8.5477*
	LnREVEXP ⇒ lnGDP	20.7477*	0.0473	0.1894
2	lnGDP ⇒ lnCAPEXP	6.3390*	0.2084	5.8165
	lnCAPEXP ⇒ lnGDP	18.8481*	0.4007	0.1910
3	lnGDP ⇒ lnGOVEXP	86.0940	2.9020	1.1287
	lnGOVEXP ⇒ lnGDP	19.7640	0.5952	0.1548
4	lnPCGDP ⇒ lnPCREVEXP	4.0148	0.5247	6.94170
	lnPCREVEXP ⇒ lnPCGDP	20.5425	0.0596	1.50299

5	lnPCGDP ⇒ lnPCCAPEXP	5.0074	0.0957	6.2287
	LnPCCAPEXP ⇒ lnPCGDP	4.8686	0.0762	7.2301
6	lnPCGDP ⇒ lnPCGOVEXP	14.4549	0.2826	3.7738
	lnPCGOVEXP ⇒ lnGDP	14.221	0.271	1.7182

(*)indicate significant at 5 percent level; Source: Author's Computation.

The results of various diagnostic tests to test the efficient of the model are reported in table 8. The results of the normality test states that model 1 and 2 have the problem of normality, as the null hypothesis of normal distribution has been rejected at 5 percent level of significance. The results of ARCH Test for Heteroscadasticity states that all the models are good fit. Model 1 has the problem of serial correlation as stated by the LM Test for serial correlation. So we can conclude that overall all the models are good fit to the data.

Summary Statistics

The results of the summary statistics of all the variable of the study are reported in table 9 which indicates that the value of Skewness is around to zero implies that the distributions of all the variables are normal as it's well know that if the value of the Skweness is zero then the distribution will be normally distributed. The normality of all the variables are also verified by the Jarque –Bera test as the null hypothesis of normally distribution is accepted at 5 percent level (as indicated by the P- value of the JB Test). Whereas in case of Kurtosis the results states that the variables are not mesokurtic as the value is less than 3.

CONCLUSION

The present study empirically analyzed the impact of Gross Domestic Product on government revenue and capital expenditure. The study utilized the time series data from 1971 to 2014. To find the causal nexus between the various components of Government spending and economic growth the study employed various time series data techniques such as Unit root test, Cointegration Test and Vector Error Correction Method etc. The study found that the ADF test failed to reject the null hypothesis of unit root at level for all the variables of the study and showed that all the variables are stationary at first difference after the transformation of series into the log series. The empirical results of Engle Granger Two Step Method states there is no evidence of cointegration in all the six model of the study as the residual series of all the models have the unit root at level. In Contrast to the Engle Granger Two Step Method the findings of the Johansen and Julselius test for cointegration confirmed that there is one cointegration vector relationship between the variables in all the models. The causality analysis of the Vector Error Correction Model reveled that there is Uni-direction long run causality from GDP to Revenue Expenditure. While there is Bidirectional causality between Per Capita GDP and Per capita revenue expenditure in long run. The results also indicates that the One way causality from Per Capita

Table 9: Summary Statistics of the variables

Variable	Mean	Median	Std.Dev.	Skewness	Kurtosis	JB Stat.	Prob.	Sum Sq. Dev.
LNPCCAPEXP	-1.195	-1.052	0.970	-0.319	2.066	2.289	0.318	39.497
LNPCREVEXP	-0.164	-0.039	1.543	-0.109	1.807	2.634	0.268	100.060
LNPCGOVEXP	0.185	0.264	1.397	-0.112	1.830	2.542	0.281	82.001
LNPCGDP	2.886	2.777	0.445	0.586	2.132	3.807	0.149	8.327
LNCAPEXP	5.541	5.701	1.215	-0.295	2.005	2.397	0.302	62.018
LNREVEXP	6.572	6.713	1.792	-0.117	1.802	2.668	0.263	134.833
LNGOVEXP	6.920	7.016	1.645	-0.121	1.822	2.593	0.274	113.700
LNGDP	9.621	9.523	0.687	0.323	1.901	2.914	0.233	19.816

(*)indicate significant at 5 percent level.

Source: Author's Computation.

Capital Expenditure to Per Capita GDP. Whereas the Bi-directional causality exist between Per Capita Total government expenditure and per Capita GDP in long run and the direction of the causality is from GDP per capita to Per Capita government expenditure. The study concluded that growth of GDP is the causal factor for the increase in the revenue expenditure in both total as well as per capita term. The most important findings of this study is that the per capita capital expenditure is the cause to the growth of the economy so it's necessary to increase the per capita capital expenditure which implies that as the population increases the government should increase the expenditure which will leads to the development of the society and can increase the level of economic growth such as expenditure on infrastructure, expenditure on the creation of new assets which are able to contribute in the economic growth in long run and future growth. The study suggests that the fiscal policy of the government should more focus on the capital expenditure.

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