INDIAN DEVELOPMENT POLICY REVIEW
Vol. 3, No. 1, 2022, 95-106

URL : www.esijournals.com

Public Expenditure and Economic Growth in Haryana: An Empirical Verification

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Article History

Received : 14 April 2022
Revised : 19 May 2022
Accepted : 25 May 2022
Published : 18 June 2022

Citation

Tilak Raj & Vikas (2022). Public Expenditure and Economic Growth in Haryana: An Empirical Verification. *Indian Development Policy Review*, Vol. 3, No. 1, pp. 95-106.

Abstract: Haryana is a developing economy and its growth is led by government expenditure in various ways. This expenditure is also an important instrument of the fiscal policy to stabilize the state economy. The aim of this study is to analyse the impact of the public expenditures (revenue and capital) on the economic growth of Haryana, with the time span 1991-2017. The long run relationship between economic growth and government expenditure is tested by using ARDL (Auto Regressive Distributed Lag) model, however, the direction of causality has been tested with the help of Granger Causality Test. The empirical results of ARDL model found weak but significant results during studied period. There is uni-directional causality exists from economic growth to capital expenditure i.e., confirmed by the results of Granger Causality test.

Keywords: Economic growth, Government expenditure, ARDL and Granger causality.

INTRODUCTION

The government expenditure is a debatable issue from classical economist to sustain economic performance. Now a day's also, government expenditure became a debatable issue whether it enhanced economic growth. Keynesian hypothesis has been set as a base to debate from the effectiveness of public expenditure on economic growth. The fiscal instrument of government policy can be considered discretionary expansionary when government deliberately change its expenditure pattern to stabilize the economy. This type of expenditure pattern may create fiscal deficit and can be cover from tax revenues. A deficit as because of government expenditure will be uplifted the economy by its long run effects.

The main objective of Haryana economy being a richer state in India is to sustain

economic growth with poverty alleviation, the creation of employment and investment in social and physical infrastructure. So, for that the government focused on various activities through expenditure which are helpful in economic growth.

Government capital expenditure is the expenditure incurred by government on certain projects (building of new hospitals, roads, electricity, communications etc.) in order to improve and promote welfare of its citizen for a long period of time i.e. more than one year. However, revenue expenditure (short period or recurrent) is basically recurring expenditure on wages and salary, consumables items which include stationeries, drugs for health services, etc.

The state of Haryana is one of the major states in India with great natural and human resource that can guarantee sustainable economic growth and development. It remains unclear that whether Haryana state economy follow public expenditure (Keynesian views) to enhance economic growth. For this, the present study covered the time span from 1990-91 i.e. after economic reforms (1990-91 to 2016-17). This study is covered the time period less than 30 years, so, the range of suitable statistical techniques with reliability and accuracy is limited. So, ARDL model along with bound test procedure is generally the suitable approach in finding the effectiveness of public expenditure (revenue and capital) on economic growth where the sample of the data is small.

The focus of this paper is to provide an econometric model by examining the impact of revenue and capital expenditure on economic growth in Haryana. The remaining part of the paper is organised as follows. Theoretical underpinning of the study is covered in the section II. Section II describe of data analysis and methodology. Results will cover under the section IV and the section V will deal the conclusion and policy implications.

II. REVIEW OF LITERATURE

We have taken various studies at international and national level to find out the results regarding hypothesis, relationship and causality direction between government expenditure and economic growth.

A number of study found that public expenditure is positively associated with economic growth. However, few studies show the inconclusive results for association between government expenditure and economic growth (Khundrakpam, 2003; Badigen and Cetinta, 2004; Kumar, 2009; Chimobi, 2009; Afzal and Abbas, 2010 and Magazzino, 2012).

The contradictory results are occurred due to various reasons. The root causes of contradictory results may be, wrong period of the study and inappropriate econometrics methods. In this study, the effectiveness of revenue and capital expenditure on economic growth of Haryana will be checked.

Authors	*Countries*	*Period of the study*	*Methods*	*Conclusion/Findings*
Chow et al., 2002	UK	1948-97	Granger causality	Money supply and national income affect public expenditure positively.
Abu-Bader and Abu-Qarn, 2003	Egypt, Syria and Israel	1963-98	Granger causality	Government expenditure positively associated with economic growth.
Muhlis and Hakan, 2003	Turkey	1965-2000	Granger causality	There was no any significant direction between economic growth and public expenditure.
Huang, 2006	China	1979-2002	Granger causality test, Toda-Yamamoto	No association between growth and public expenditure.
Kumar et al. 2012	New Zealand	1960-2007	ARDL	Uni-directional relationship from economic growth to public expenditure
Kalam and Aziz, 2009	Bangladesh	1976-2007	Granger causality	Strong positive association from national income to government expenditure.
Abdullah and Maamor, 2010	Malaysia	1970-2007	ARDL Bounds test	National income has a significant positive impact on government expenditure
Govindaraju et al., 2010	Malaysia	1970-2006	ARDL	One way causal direction from government expenditure to real GDP.
Rahman et al., 2010	Pakistan	1971-2006	Toda-Yamamoto, Granger causality test	Unidirectional causality from GDP to public expenditure
Balamurali and Sivarajasingam , 2010	Sri Lanka	1977-2009	Granger causality	Bi-directional relationship between public expenditure and GDP.
Azgun, 2010	Turkey	1980-2009	Granger causality	Causality direction from GDP to public expenditure.
Pahlavani et al., 2011	Iran	1960-2008	Toda-Yamamoto causality test Granger causality test	Positive effectiveness from economic growth to aggregate government expenditure.
Magazzino, 2012	Italy	1960-2008	Granger causality	Government expenditure affects economic growth positively.
Ebaidalla, 2013	Sudan	1970-2008	Granger Causality	Short run and long run association and positive direction from government expenditure to growth of GDP.
Singh and Sahni, 1984	India	1950-81	Granger causality test	There is no causal relationship between economic growth and government expenditure.
Mohsin *et al.* 1992	India	1950-89	Co-integration, Granger Causality test and ECM	Causal direction exist from government expenditure to economic growth
Verma and Arora, 2010	India	1950-2007	ARDL, Granger causality	Uni-directional relationship from economic growth to public expenditure
Narayan et al., 2012	India	1987-2009	Panel co-integration	Obey the Keynesian hypothesis of government expenditure to economic growth.
Gangal & Gupta, 2013	India	1998-2012	Co-integration, granger causality	One way causality direction from government expenditure to economic growth.
Adil et al., 2017	India	1970-2013	ARDL	Existence of Keynesian hypothesis of government expenditure to economic growth.

Source: Authors' analysis based on literature review

III. METHODOLOGY FRAMEWORK

(i) Data and Variables: In this study, annually data has been used with the time span of 1991-2017. The data have been obtained from the reports of study of state finances (various issues) published by Reserve Bank of India. The CAGR of variables have calculated with the help of OLS method.

To measure the effects on economic growth by government expenditure this study uses gross state domestic product (GSDP) as economic growth where as government expenditure (revenue and capital) is uses for public expenditure. The following specification has been set to analyse the long run relationship of government expenditure and economic growth.

$$LGROWTH = f(LREV, LCAP)\ldots\ldots\ldots \text{ Eqn. 1.}$$

Where LGROWTH is the economic growth, LREV is revenue expenditure, LCAP represents capital expenditure and L mean transformation in to natural log.

(ii) Co-integration with ARDL: To analyse the effectiveness of government expenditure on economic growth this study implements the ARDL bounds testing approach to co-integration due to several merits given by Pesaran et al., 2001. The bounds test is simple procedure as compared to Johansen & Juselius (1990) multivariate technique of co-integration. It permits co-integrating relationship in the lag relationship environment. Second, like as other techniques i.e. Engle & Granger (1987) of unit root testing, pre testing of stationarity of the data does not require by it. All approaches require that the variables to be integrated at same order i.e. *I*(1). On the other hand, ARDL model can be used when the regressor is *I*(0) or *I*(1) but crash in the order *I*(2). Thirdly, this method is most appropriate for small sample studies.

$$\Delta Log(GROWTH)_t = l_0 + \sum_{i=1}^{m} l_1 \Delta Log(GROWTH)_{t-i} + \sum_{i=0}^{m} l_2 \Delta Log(REV)_{t-i} + \sum_{i=0}^{m} l_3 \Delta Log(CAP)_{t-i} + z_1 Log(GROWTH)_{t-1} + z_2 Log(REV)_{t-1} + z_3 Log(CAP)_{t-1} + \mu_t \ldots\ldots\ldots eqn.2$$

Where Δ represents difference, REV is revenue expenditure, CAP is capital expenditure and z_1, z_2, z_3 are the long run elasticities of the model. Log is natural log transformation and μ_t of white noise error term.

Ho. $z_1 = z_2 = z_3 = 0$ (no co-integration)

and H_1. $z_1 \neq z_2 \neq z_3 \neq 0$ shows co-integration (long run association) among competeting variables.

Moreover, Pesaran and Shin (1999) and extended by Pesaran Shin and Smith (2001) gives the long run elasticaties of the variables through ARDL model. The main advantage of ARDL model is applicability of the model on the variable when they are I(0) or I(1). Pesaran et al. (2001) bound test procedure is exercise to test the relationship among variables in the long run. In the bound tests procedure if the value of F is larger than the upper bounds, then it is confirmed that there is co-integration among variables (rejection of null hypothesis).

(iii) Pair wise Granger Causality Test: Moreover, test of co-integration describe the presence of causal association among the competitive variables but not provide the way of causality between variables. For that we will conduct the Granger causality test.

4. EMPIRICAL RESULTS AND DISCUSSION

The compound annual growth rate of capital expenditure was maximum i.e 23.82 percent per annum followed by total government expenditure (18.19 percent) and revenue expenditure (14.46 percent) respectively during period 1990-91 to 2016-17. Moreover, in the same period the growth rate of GSDP of Haryana was recorded 15.25 percent per annum (see in table 1). The growth rate of capital expenditure i.e. 23.83 percent is a good sign for the sustain growth of Haryana economy because capital expenditure project will create long term initiatives for private investor at domestic level and through FDI.

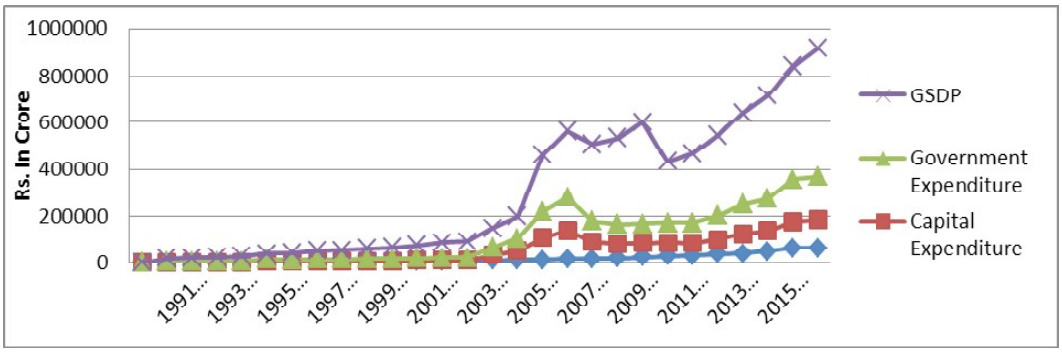

Figure 1: Trends in government expenditure and GSDP of Haryana (1991 to 2015)

Table 1: Trends in Public Expenditure and GSDP of Haryana (1990-91 to 2016-17)

(Rs. in Crore)

Year	*Revenue Expenditure*	*Capital Expenditure*	*Government Expenditure (in total)*	*GSDP*
1990-91	1933.07	463.67	2396.74	13636.43
1991-92	2274.02	452.81	2726.83	16339.25
1992-93	2379.34	576.67	2956.01	17343.3
1993-94	3401	308.02	3709.02	22131.3
1994-95	6272.92	638.9	6911.82	26244.77
1995-96	5275.35	769.86	6045.21	29788.93
1996-97	6767	1063.98	7830.98	35642.38

contd. table 1

Year	*Revenue Expenditure*	*Capital Expenditure*	*Government Expenditure (in total)*	*GSDP*
1997-98	6617.17	1188.26	7805.43	38649.07
1998-99	7018.89	1561.67	8580.56	43645.99
1999-00	6952.45	1406.71	8359.16	48909.93
2000-00	7181.37	1977.5	9158.87	58183.35
2001-02	8656.49	2071.98	10728.47	65505.23
2002-03	9342.16	1239.85	10582.01	72527.91
2003-04	10117.19	22900.01	33017.2	82861.76
2004-05	11407.1	41718.13	53125.23	93561.46
2005-06	12639.91	97230.83	109870.7	244736
2006-07	16362.14	123549.8	139911.9	283693
2007-08	17526.88	71913.15	89440.03	329285
2008-09	20534.73	62598.86	83133.59	367912
2009-10	25257.37	59387.69	84645.06	431262
2010-11	28310.2	58547.95	86858.15	260621.3
2011-12	32014.9	54085.72	86100.62	298688.3
2012-13	38071.73	64120.08	102191.8	341351.2
2013-14	41764.33	83887.94	125652.3	388916.6
2014-15	49117.86	88433.71	137551.6	437462.1
2015-16(RE)	64860.48	113620.1	178480.6	485184
2016-17(BE)	64883.63	119979.5	184863.2	547396.1
CAGR% per annum	14.469	23.82	18.19	15.25

Source: computed from reports on study of state finances, RBI (various issues)
BE- Budget Estimates, RE- Revised Estimates.

The ARDL model test can be applicable where the series are integrated at level and first difference but not for second difference. Moreover, unit root test in ARDL procedure is for ensuring that none of the series is integrated at *I* (2). In the extended step, we have used ADF, DF-GLS and PP unit root testing of stationarity. The outcomes of the model are provided in the table 2 and confirmed the unit root (non-stationary) at levels. Once the variables transformed at first difference they became stationary. So, it is concluded that stationarity of the variables is at *I* (1).

Lag Selection Criterion

To analyse the long run elasticities of the ARDL we have taken lag selection criterion which is given in the table 3.

Table 2: Unit root test

	ADF		*PP*		*DF-GLS*	
Variable	*Level*	*1 difference*	*Level*	*1Difference*	*Level*	*1difference*
LGROWTH	0.7599	0.0006***	0.7599	0.0006***	0.0777**	0.0000***
LREV	0.8698	0.0001***	0.8425	0.0001***	0.5313	0.0000***
LCAP	0.7951	0.0004***	0.7993	0.0004***	0.6796	0.0000***

Source: Authors' own calculations.

, * indicates the significance level at 5% and 1% respectively.

Table 3: Lag Length Criterion

Lag	*Log L*	*H Q*	*L R*	*F P E*	*A I C*	*S C*
0	-2.86731	0.54745	NA	0.000334	0.510201	0.658309
1	60.63953	4.08053*	104.9243*	2.95e-06	-4.22952	-3.63709
2	69.94487	-3.9953	12.94656	3.02E-06*	-4.25608*	-3.21932*
3	73.82016	-3.43796	4.380768	5.35E-06	-3.81045	-2.32937

Note: *indicates lag order selected by criterion.

The lag selection criterion according to the FPE, AIC and SC founds the 2 lag are suitable to run the ARDL and granger causality model in the long run. However, according to Lutlepohl (2005) AIC criterion is the most appropriate for small sample series.

The elasticities in the long-run are shown in Table 4. The results suggested that revenue expenditure has a positive impact on economic growth in the long-run. The elasticity of revenue expenditure is 0.27 percent, which specified that one percent rise

Table 4: ARDL – Long Run Elasticities

Variable	*Coefficient*	*Std. Error*	*t-statistic*	*Probability*
LGROWTH(-1)	0.1343	0.1561	0.8601	0.4004
LREV	0.2729	0.1082	2.5208	0.0208**
LCAP	0.105	0.04534	2.3164	0.0319**
LCAP(-1)	0.0698	0.0612	1.1406	0.2682
LCAP(-2)	0.1725	0.0574	3.0062	0.0073***
C	1.9122	0.3322	5.755	0.0000***

Source: Authors' own calculations.

,* indicates level of significance at 5% and 1% respectively.

in revenue expenditure in the current year, will lead to 0.27 percent increase in economic growth. This suggested that revenue expenditure increase economic growth. Further, elasticity of capital expenditure is 0.10 percent in the current year shows that one percent rise in capital expenditure would increase the economic growth by 0.10 percent. Moreover, in the long-run, the elasticity of capital expenditure at lag two is 0.17 percent, which be a sign of positive role of capital expenditure on economic growth of Haryana.

Table 5: Other Statistical Values

R-squared	0.9882	Mean dependent var	6.9592
Adjusted *R*-squared	0.9852	Akaike info. criterion	-2.5577
S.E.	0.0607	Durbin–Watson	1.9691
Sum squared residuals	0.0701	Serial Correlation LM Test	0.8383
F-statistic(probability)	320.72 (0.0000)	Heteroskedasticity Test	0.4992

Source: Authors' own calculations.

The values of R- Squared and adjusted R-Squared are quite high i.e. 0.9882 and 0.9852, which is a good sign of the estimated model. Moreover, the value of F-statistic (probability) i.e 320.72 (0.0000) and Durbin–Watson (1.96) is also a good indication of our model. Our estimated model is free from the problem of serial correlation and heteroskedasticity which confirmed by the their respective value of test i.e LM test (0.8383) and Heteroskedasticity Test (0.4992).

The long run of the model for the economic growth can be expressed as follows:

$$Growth_t = 1.9122 + 0.2729\ REV_t + 0.105\ CAP_t$$

In table 6, the existence of long run association among growth, revenue expenditure and capital expenditure is confirmed by ARDL bound test (*F* statistic i.e 12.72 is larger than upper bound i.e. 4.16 at 5 percent level of significance).

Table 6: Bounds Test Statistic

F- Statistics 12.72 and k= 2	*Significance level*			
Critical Value Bounds	10%	5%	2.5 %	1 %
I 0	3.02	3.62	4.18	4.94
I 1	3.51	4.16	4.79	5.58

Source: Authors' own calculations.

In addition, the long-run fitness of the parameters (coefficients) is examined by employed the CUSUM (cumulative sum) test is shown in the in Figure. 2. In the figure 2, the straight lines shows the critical bounds limit at five percent level of significance, since the plot of this test does not cross the critical value line indicating a stable long-run relationship among the variables, moreover, we can suggest that parameter are stable in the long run.

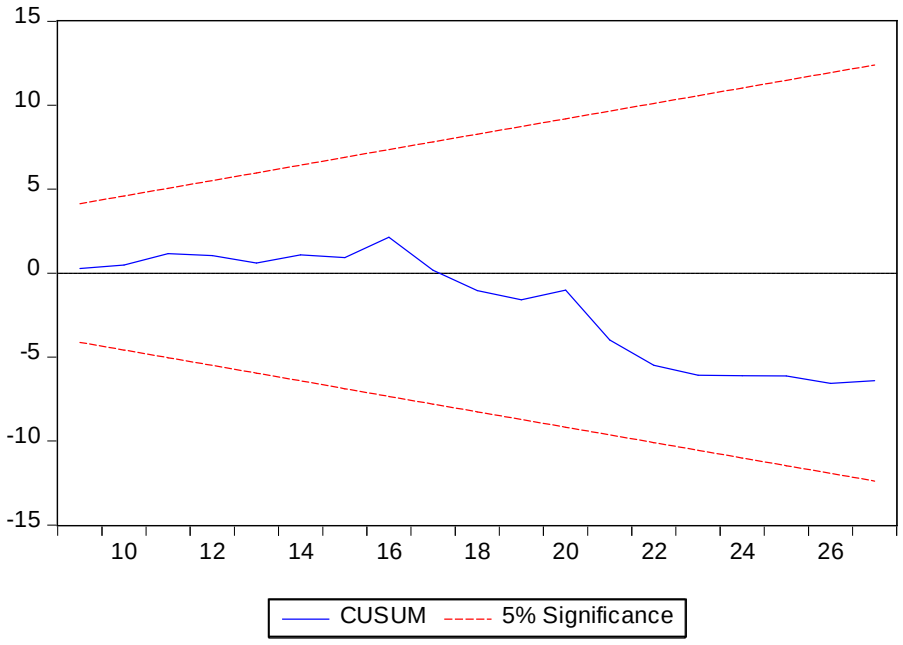

Figure 2: CUSUM Test

Source: Authors' own calculations.

After checking the association among the variables in the long run, if there is co-integration then its mean the presence of causal association among the competitive variables but does not confirm the direction of causality. So for that, we have checked the direction of causality between them with the help of granger causality test (the outcomes are provided in table 7).

The results (given in table 7) show that there is one way (uni-directional) causality is running from economic growth (GSDP) to capital expenditure. No causality was found from government expenditure i.e revenue and capital expenditure to economic growth during the studied period. This implies that any increased in government expenditure does not granger cause to economic growth of Haryana.

Table 7: Granger Causality Test

Granger Causality Variable Pair	*Lag Length (AIC criterion)*	*F-Statistics*	*p-value*	*Causality Direction*
LREV and LGROWTH	2	0.309	0.7376	LGROWTH ≠ LREV (no causality)
LGROWTH and LREV	2	1.0528	0.3675	LREV ≠ LGROWTH (no causality)
LCAP and LGROWTH	2	7.4976	0.0037***	LGROWTH → LCAP (uni-directional)
LGROWTH and LCAP	2	0.5865	0.5655	LCAP ≠ GROWTH (no causality)

Source: Authors' own calculations.

Note: ***indicates significance level at 1%.

V. CONCLUSION AND POLICY IMPLICATIONS

The study concludes that public expenditure in Haryana had a significant relationship with economic growth. This study is an analysis of the effectiveness of public expenditure (revenue and capital expenditure) on economic growth of Haryana (India). To discuss the impact of public expenditure in Haryana (India), this study used the time period from 1991-2017, and investigated the causality approach of revenue and capital expenditure on the economic growth in the state of Haryana. The long run association between economic growth (GSDP) and government expenditure has been find out with the help of ARDL bound test procedure. The results of ARDL bound test employed the existence of co-integration between government expenditure and economic growth in Haryana during studied period. However, government expenditure has been increasing during studied period, but the rate of growth could not exceeded growth in state income. The causality from economic growth to capital expenditure is a good sign for the state economy.

The Granger causality results confirm the evidence of uni-directional causality moving from state income to government expenditure. Based on the results, the study recommends that increase in public spending in the state of Haryana is a natural process of industrialisation. It is suggested that rapid economic growth in Haryana requires wide improvement in infrastructure along with public transport, health services, education, and welfare schemes. These will increase the growth of government expenditure. Fiscal policy makers should focus on development expenditure and curtail non-development expenditure to improve fiscal health of the State. The government should focus more on capital expenditure than revenue expenditure for long run stabilisation of the economy.

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