Impact of Development Expenditure on Economic Growth in Haryana State : An Empirical Analysis

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Abstract

Purpose : Public expenditure was traditionally focused on maintaining law and order in society. However, in the last few decades, public expenditure has become a significant instrument of fiscal policy used by the government to boost economic activities. The present paper has evaluated the impact of development expenditure and its components on economic growth in the Haryana state of India.

Methodology : The secondary data used in this study spans the years 1990–1991 to 2019–2020. The impact of development spending on economic growth in Haryana was investigated in this study using the Granger causality test, vector error correction model, and Johansen co-integration technique.

Findings : Long-term results indicate that state development spending favors economic growth, confirming the Keynesian theory. Nonetheless, it is determined that non-development spending has a negligible negative impact on economic growth. Development spending hinders economic growth in the near term. Additionally, it was discovered that spending on social services has a short-term favorable impact on economic growth. On the other hand, spending on non-development and economic services had a negative effect.

Practical Implications : The report recommended that the administration and legislators need to examine how public funds are allocated regularly and implement any necessary adjustments for improved expenditure management.

Originality : The current paper evaluated the impact of development expenditure on the economic growth of Haryana. This is the first study that analyzed the impact of components of development expenditure on economic growth in the state.

Keywords : **development expenditure, economic growth, vector error correction model (VECM), Granger causality**

JEL Classification Codes : C32, C50, H50, O40, R50

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The impact of public expenditure on economic growth has been a debatable, ambiguous, and controversial issue among policymakers and different economic ideologists. Traditionally, public expenditure focused on maintaining law and order in society. However, in the last few decades, public expenditure has become a significant instrument of fiscal policy used by the government to boost economic activities (Agrawal & Nayak, 2013). Public expenditure growth and pattern are highly correlated with economic growth in all developing nations, including India (Joseph & Prarthna, 2015). In the context of public finance and policy,

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multifaceted issues such as whether public spending promotes economic growth, which parts of public spending are more productive, and how fiscal policy becomes long-term effective are all important to consider (Bruce & Turnovsky, 1999; Devarajan et al., 1996). Public expenditure is classified into general, social, and economic services. Expenditure on social and economic services is collectively called *development expenditure*, whereas general services come under non-development expenditure.

Efficient development spending also boosts social and economic productivity by improving people's access to healthcare, education, and other requirements. Still, not every public spending component yields the same results (Devarajan et al., 1996). Since the implementation of economic reforms in India, there has been an increasing trend in total public expenditure and development expenditure as a percentage of gross domestic product (GDP). Therefore, it is necessary and crucial to analyze whether an increase in development expenditure stimulates or deteriorates economic growth. This current study uses various econometric techniques to examine the effects of development expenditure and its constituents on economic growth in Haryana from 1990–1991 to 2019–2020.

Review of Literature

The literature has substantially discussed the link between public expenditure and economic growth. Public spending promotes the establishment of important industries, research and development, social and economic infrastructure, and other aspects of developing and underdeveloped nations (Singh, 1983). The first and foremost analysis of the role of public expenditure in economic activities was discussed by classical economists, and they advocated the *laissez-faire* policy in which they assumed that government intervention is not necessary for economic activities; it should only be focused on defense and administration work (on general services). According to classical economics, there are only two circumstances in which the government should meddle in the market: private investors are discouraged from investing because there is no profit and internal and external security issues. Later, a welfare state with a larger role for the government replaced the state. Then, the dynamic interaction between public expenditure and economic growth is mainly based on two contradictory views of public spending, known as Wagner's law and the Keynesian approach to public expenditure. Wagner's law, which Adolph Wagner created, was the first to specify the growing development of state and public activities. Based on this law, an increase in economic growth has a positive long-term impact on public expenditure, which means higher economic growth will result in higher public expenditure.

Conversely, the Keynesian hypothesis maintains that public spending positively affects economic growth; a unidirectional causal relationship exists between public spending and economic growth (Keynes, 1936). There are several studies in the literature that have tested these two contradictory hypothesizes and explored the impact of public expenditure on economic growth using various statistical and econometric tools (Barro, 1990; Devarajan et al., 1996; Ebaidalla, 2013; Ebaid & Bahari, 2019; Srinivasan, 2013). Gangal and Gupta (2013) analyzed that public expenditure significantly impacted India's economic growth. Abdullah and Maamor (2010) examined the validity of Wagner's hypothesis in Malaysia and observed that it is still relevant to the Malaysian economy. Wagner's law about Kuwait's economy was investigated by Ebaid and Bahari (2019); nonetheless, the findings favored the Keynesian theory. The Keynesian hypothesis was supported by the findings of Jiranyakul and Brahmasrene (2007) and Olugbenga and Owoye (2007), who examined the relationship between public expenditure and economic growth in various developed and developing nations. They found that public expenditure had a significant positive impact on economic growth. Another study by Anantha Ramu and Gayithri (2016) showed that public expenditure on non-productive areas inversely affects economic growth. From the above literature, it is concluded that some studies supported Wagner's law, whereas others supported the Keynesian hypothesis. Ray and Ray (2012) found no causality between public expenditure and GDP in India. According to research by Gangal and Gupta (2013) and Seshaiah et al. (2018), India's economic growth has benefited from overall public spending. These studies have examined the country's economic growth, but the

makeup of public spending has not been considered. With high regional variations in different states in the country, it is important to analyze the impact of public expenditure on economic growth at the state level. The present study focused on one of the highest per capita income states, Haryana, to analyze the relationship between development expenditure and economic growth from 1990–1991 to 2019–2020.

Specification of Model and Research Methodology

This study is descriptive and analytical. Both qualitative and quantitative methods were used to analyze the data. The study mainly focused on different components of development expenditure divided into two major heads: social and economic services, which are health, education, housing, energy, social security, family welfare, rural development, urban development etc.

The present study primarily uses secondary data from 1990–1991 to 2019–2020. The data for various variables has been collected from the Reserve Bank of India (RBI) Handbook of Statistics on the Indian States, Centre for Monitoring Indian Economy (CMIE), and various annual issues of the statistical abstract of Haryana. Annual time-series data on GSDP, total development expenditure, social services expenditure (SSE), economic services expenditure (ESE), and non-developmental (ND) expenditure have been gathered. The Gross State Domestic Product (GSDP) variable used in the study has been taken at constant prices for the base year 2011–2012. Both models utilize the Real Per Capita Gross State Domestic Product (PCGSDP) as a stand-in for economic growth. The data gathered from diverse sources were tabulated and examined using suitable statistical and econometrics methods, including measures of central tendency, compound growth rate, correlation, vector error correction model (VECM), Granger causality test, and co-integration. MS Excel E-views software was used to interpret the data to achieve the study's goals.

Equations (1) and (2) represent the overall functional form of the model used to estimate how development expenditure (DEV), SSE, ESE, and ND expenditure affect GDP.

$$PCGSDP = f(DEV) \quad (1)$$

$$PCGSDP = f(SSE, ESE, \text{and } ND) \quad (2)$$

Based on the aforementioned variables, two models were created. The link between PCGSDP and total development spending is shown in Equation (1), while the relationship between PCGSDP and components of development and non-development expenditure is shown in Equation (2). An alternative measure of economic growth is the PCGSDP. The reason for including these variables is that they promote society's social and economic productivity by affecting people's levels of education and health and fulfilling other needs. All the variables were taken in a natural logarithm to avoid the problem of heteroscedasticity. The study used the following specifications of variables (Equations 3 and 4) to fulfill the objectives:

$$\text{Model 1: } LPCGSDP = f(LDEV) \quad (3)$$

$$\text{Model 2: } LPCGSDP = f(LSSE, LESE, LND) \quad (4)$$

where,

LPCGSDP: Logarithm (Log) value of the PCGSDP at factor cost.

LDEV: Logarithm (Log) value of the development expenditure.

LSSE: Log value of social services expenditure.

LESE: Log value of economic services expenditure.

LND: Log value of non-development expenditure.

The data must be stationary for further economic analysis; therefore, the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test have been used to test the stationarity properties of the variables. The standard technique of the Johansen co-integration test has been used to determine co-integrated vectors in the long run. The VECM was applied once the co-integration of the variables was confirmed (Kumari & Malhotra, 2015; Saxena & Bhadauriya, 2013). An additional rationale for employing VECM is that every variable has been discovered to be stationary at the initial difference and co-integrated, creating an ideal setting for utilizing VECM for data analysis. The Schwarz Information Criterion (SIC) and Akaike Information Criterion (AIC) were used to determine the best lag selection. Based on both criteria, only one lag has been determined to be suitable for analyzing the association between the variables in the current study. The Granger causality test has been used to assess the short-run causal relationship.

Vector Error Correction Model (VECM)

Vector autoregressive (VAR) and VECM are two techniques that modern econometricians created for examining the dynamic relationship between variables. VAR contains a system of simultaneous equations and is used where all the variables are stationary at the level or first difference (without co-integration). However, suppose the variables are not stationary at the level. In that case, the VAR framework must be modified to estimate the relationship between the non-stationary variables. The VECM is a special case of VAR; it can be used in situations where the variables are stationary at first difference [i.e., I(1)] and there are at least one or more co-integrating equations (Usman et al., 2017). The long-run functional form of the models is described in Equations (5) and (6), and the error correction term (ECT) is defined in Equation (4).

Model 1:

$$\Delta LPCGSDP_t = \alpha + \beta \Delta LDEV_{t-1} + \mu_t \qquad (5)$$

$$\Delta LPCGSDP_t = \alpha + \sum_{i=1}^{k-1} \theta_i \Delta LPCGSDP_{t-1} + \sum_{i=0}^{k-1} \beta_i \Delta LDEV_{t-1} + \omega ECT_{t-1} + \varepsilon_t$$

$$ECT_{t-1} = (LPCGSDP_{t-1} - \alpha - \beta\, LDEV_{t-1})$$

$$\begin{bmatrix} \Delta LPCGSDP_t \\ \Delta LDEV_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \end{bmatrix} + \sum_{i=1}^{n} \begin{bmatrix} \beta_{11,i} & \beta_{12,i} \\ \beta_{21,i} & \beta_{22,i} \end{bmatrix} \times \begin{bmatrix} \Delta LPCGSDP_{t-1} \\ \Delta LDEV_{t-1} \end{bmatrix} + \begin{bmatrix} \omega_1 \\ \omega_2 \end{bmatrix} \times (ECT_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \end{bmatrix}$$

Model 2:

$$\Delta LPCGSDP_t = \alpha + \beta \Delta LSSE_{t-1} + \varphi \Delta LESE_{t-1} + \gamma \Delta LND_{t-1} + \mu_t \qquad (6)$$

$$\Delta LPCGSDP_t = \alpha + \sum_{i=1}^{k-1} \theta_i \Delta LPCGSDP_{t-1} + \sum_{i=0}^{k-1} \beta_i \Delta LSSE_{t-1} + \sum_{i=0}^{k-1} \varphi_i \Delta LESE_{t-1} + \sum_{i=0}^{k-1} \gamma_i \Delta LND_{t-1} + \omega ECT_{t-1} + \varepsilon_t$$

$$ECT_{t-1} = (LPCGSDP_{t-1} - \alpha - \beta\, LSSE_{t-1} - \varphi\, LESE_{t-1} - \gamma\, LND_{t-1})$$

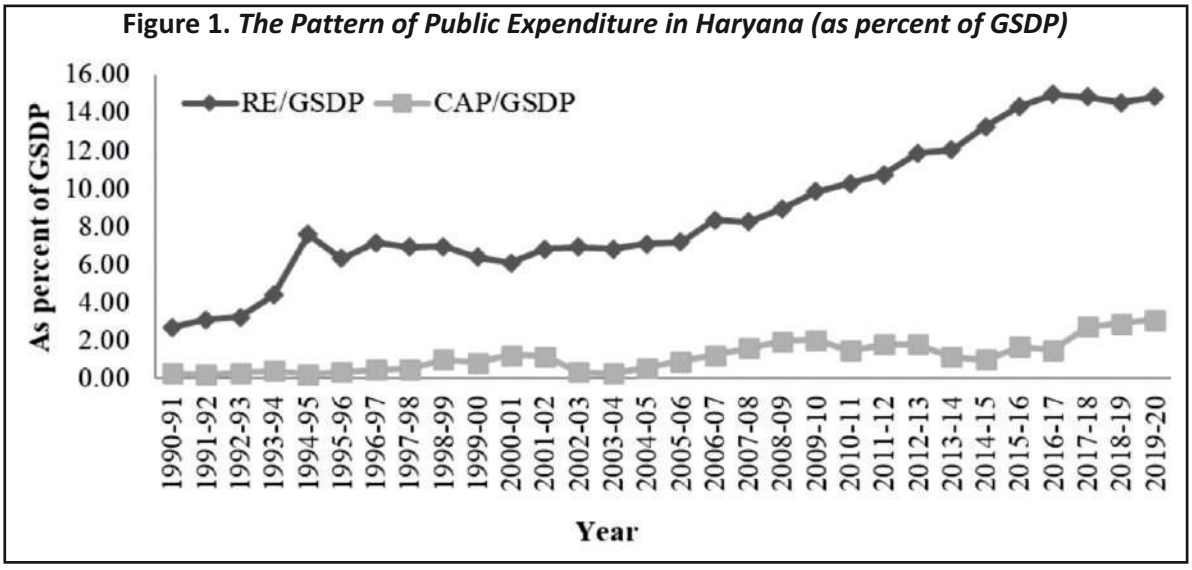
$$\begin{bmatrix} \Delta LPCGSDP_t \\ \Delta LSSE_t \\ \Delta LESE_t \\ \Delta LND_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{bmatrix} + \sum_{i=1}^{n} \begin{bmatrix} \beta_{11,i} & \beta_{12,i} & \cdots & \beta_{14,i} \\ \beta_{21,i} & \beta_{22,i} & \cdots & \beta_{24,i} \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{41,i} & \beta_{42,i} & \cdots & \beta_{44,i} \end{bmatrix} \times \begin{bmatrix} \Delta LPCGSDP_{t-1} \\ \Delta LSSE_{t-1} \\ \Delta LESE_{t-1} \\ \Delta LND_{t-1} \end{bmatrix} + \begin{bmatrix} \omega_1 \\ \omega_2 \\ \omega_3 \\ \omega_4 \end{bmatrix} \times (ECT_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \end{bmatrix}$$

Analysis and Results

Analyzing the Trend and Structure of Public Expenditure in Haryana

India is a federal economy, meaning state governments are responsible for grassroots development since they can better understand local problems and provide solutions. The public expenditures incurred by the state government are broadly classified into revenue and capital expenditure. The government uses revenue expenditures (RE) for daily operations, whereas capital outlays (CAP) eventually lead to the formation of assets. The percentage of capital expenditure and revenue spending in the state's income (GSDP) is shown in Figure 1. It is visible that the share of RE growth is greater than capital outlay during the entire study period. During 1990–1991, the gap between RE and CAP was minimal. Over the years, this gap has increased and reached a maximum in 2016–2017. After that, a marginal reduction in this gap was observed, and in 2019–2020 it was 11.74%.

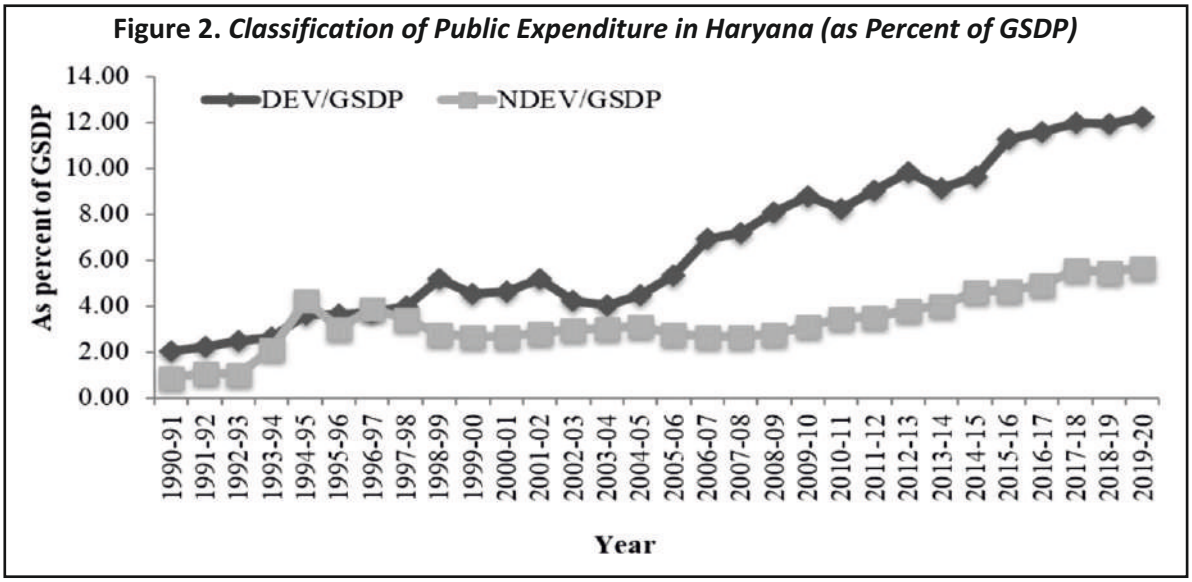
Figure 1. ***The Pattern of Public Expenditure in Haryana (as percent of GSDP)***



Composition of Total Public Expenditure in Haryana

RE and CAP are further categorized into development and ND expenditure. The expenditure path of the Haryana government, which gives importance to development expenditure, has been analyzed in the present study. Figure 2 shows Haryana's development and ND expenditure as part of GSDP. Along with total public expenditure, both developmental expenditure and ND expenditure of Haryana state have grown faster during the study period. In the GSDP for 1994–1995 and 1996–1997, non-development spending was allocated more than development spending. In the rest of the study period, development expenditure dominates over ND expenditure, and in 2015–2016, the gap between development and non-development expenditure was the highest. Development expenditure varied from 2.06% to 12.24% in the study period, showing an increasing trend. The share of ND expenditure remained between 0.90% and 5.67% during the study period. The annual growth rate of total public expenditure (TPE), DEV, and GSDP is shown in Appendix (Figure A1), representing that TPE and DEV's growth rate is much higher than GSDP's. The growth rate of GSDP was always positive during the study period; however, TPE growth was negative in 1995–1996, 1997–1998, 1999–2000, and 2002–2003. DEV had negative growth from 1999 to 2000 and 2002 to 2003.

Figure 2. ***Classification of Public Expenditure in Haryana (as Percent of GSDP)***

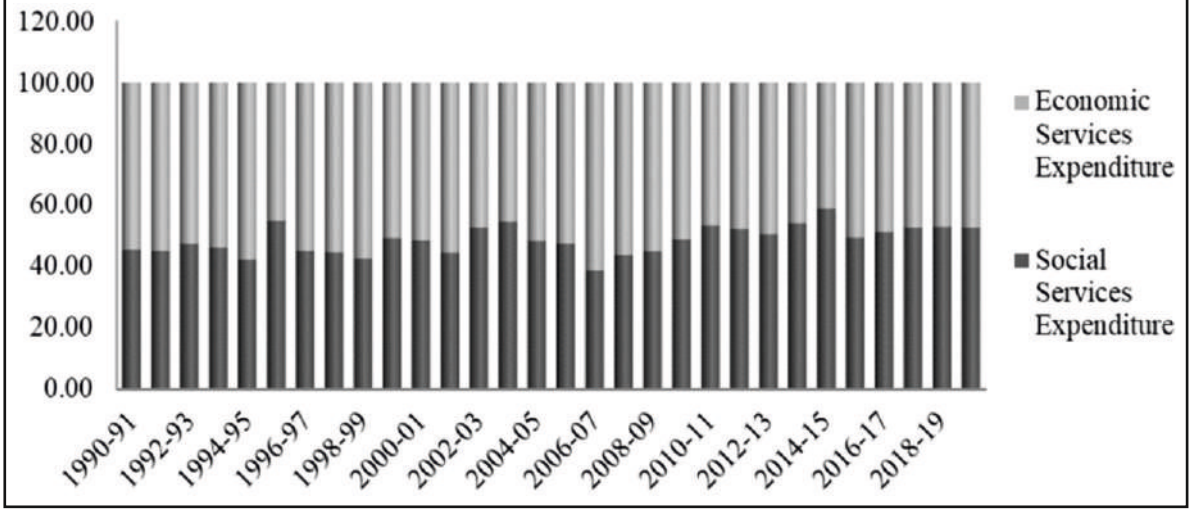


The Pattern of Development Expenditure in Haryana

Development expenditure consists of expenditure on economic and social services. These services lead to society's economic and social development, and expenditure on general services is known as non-development expenditure. Education, sports, the arts and culture, public health, and urban development are all examples of funded social services. Financial services encompass spending on profitable endeavors such as farming and related fields, water management and prevention of flooding, rural growth, industry and minerals, transportation, science and technology, and energy. Figure 3 depicts the share of social and ESE in total development expenditure. It shows that social services' share varies from 38 to 55%.

In contrast, the share of economic service expenditures ranges from 41 to 72%. From 1990–1991 to 2009–2010, ESE exceeded SSE except in 1995–1996, 2002–2003, and 2003–2004. In 2006–07, the share of ESE was highest. After that, SSE exceeded ESE, and its share was more than 50% of total development expenditure.

Figure 3. ***Social and Economic Services Expenditure (as Percent of Development Expenditure)***



However, the financial year 2015–2016 was an exception when the share of economic services was 50.56% and the share of SSE was 49.44%.

Results of Unit Root Test

Unit root tests at levels and first differences have been applied to find co-integration among variables. The standard tests, namely the ADF test (1979) and the PP test (1992), are used to investigate the presence of unit roots. After the log transformation, the variables are stationary at the first difference, i.e., presented in Table 1. The Appendix Table A1 summarizes/descriptive statistics of all the variables.

Table 1. ***Findings of Unit Root Test***

Variables	ADF		PP	
	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
LPCGSDP	1.0000	0.0069*	1.0000	0.0062*
LDEV	0.9025	0.0000*	0.9567	0.0003*
LSSE	0.9181	0.0004*	0.9178	0.0005*
LESE	0.8696	0.0000*	0.8952	0.0000*
LND	0.6573	0.0002*	0.6542	0.0002*

Note. The one-sided *p*-values of the ADF and PP tests are based on MacKinnon (1996); * Significant at 1%.

The table shows the results of unit root tests where the null hypothesis assumes that the variable is non-stationary and has a unit root. It is observed that no variable is stationary at level I(0), whereas all variables become stationary after taking the first difference, I(1). Therefore, the null hypothesis is rejected at the first difference.

Identifying the Order of Co-integration

The study used Johansen and Juselius's (1990) co-integration method to investigate integration and the long-run relationship between variables (as given in Tables 2 and 3). This test incorporates two tests simultaneously, i.e., the Trace test (λ_{trace}) and the maximum Eigenvalue test (λ_{max}).

The long-run relationship between the dependent variable LPCGSDP and the independent variables has been checked by applying the co-integration test. Tables 2 and 3 present the Johansen co-integration test results for the selected variables for Models 1 and 2. The null hypothesis is that there is no long-term relationship among the variables. The values of the Trace statistic and max-Eigen statistic are higher than their critical values, which show that a long-term relationship exists between development expenditure and economic growth in Haryana in Model 1. Similar results have also been found in Model 2. A long-term relationship exists between SSE, ESE, ND

Table 2. ***Results of the Johansen Co-integration Test for Model 1***

H_0	Eigenvalue	λ_{trace}	Critical Value	Prob.**	λ_{max}	Critical Value	Prob.**
None*	0.438	17.105	15.494	0.028	16.161	18.264	0.024
At most 1	0.033	0.944	3.841	0.331	0.944	3.841	0.331

Source : Computed by Researcher. **at a 5% level of significance.

Note. *Rejection of the H_0 at the 5%; ***p*-values are based on MacKinnon et al. (1996).

Table 3. ***Results of the Johansen Co-integration Test for Model 2***

H_0	Eigenvalue	λ_{trace}	Critical Value	Prob.**	λ_{max}	Critical Value	Prob.**
None*	0.616	50.386	47.856	0.028	26.841	27.584	0.032
At most 1	0.399	23.545	29.797	0.220	14.260	21.131	0.344
At most 2	0.252	9.284	15.494	0.339	8.150	14.264	0.363
At most 3	0.039	1.134	3.841	0.286	1.134	3.841	0.286

Source : Computed by Researcher. **at a 5% level of significance.

Note. *Rejection of the H_0 at the 5%; ***p*-values are based on MacKinnon et al. (1996).

and economic growth. Therefore, we may reject the null hypothesis that no co-integrating equation is at a 5% significance level.

Estimation of the Long-Run and Short-Run Coefficients for Model 1

After finding one or more co-integrations among variables, it is possible to apply VECM to evaluate the long-run and short-run causal relationship between the selected variables. Furthermore, the Granger causality test has been used after applying the VECM to ascertain the direction of causality between development expenditure and economic growth. Table 4 presents the calculated and illustrated coefficients of the co-integration equation for the variables in Model 1. The results of co-integrated variables have been estimated by taking the log values of the variables. The coefficient results also indicated the elasticity of variables. In this case, development expenditure (DEV) is the independent variable, while PCGSDP is the dependent variable. The findings show that, over time, development spending has a substantial positive relationship with economic growth. The results revealed that a 1% increase in development expenditure stimulated the economic growth rate by 0.51%. Consequently, results supported the Keynesian hypothesis (similar results also found by Ebaid & Bahari, 2019; Gangal & Gupta, 2013; Kaur & Mishra, 2017).

Long-run Equation (Co-integration Equation) for Model 1:

$$ECT_{t-1} = 1.00\,LPCGSDP_{t-1} - 0.51LDEV_{t-1} - 0.65 \qquad (7)$$

$$LPCGSDP_{t-1} = 0.51LDEV_{t-1} + 0.65 \qquad (8)$$

Table 4 shows the short-run results for Model 1 based on ECM. The lagged coefficient of ECT indicated the speed of adjustment toward equilibrium, which should be negative and statistically significant to confirm the presence of the long-run relationship among the variables (Gujarati, 2009). Moreover, it demonstrates that the deviation is

Table 4. ***Results of Model 1***

***LPCGSDP* = *f* (*LDEV*)**							
Long-run				**Short-run**			
Variable	**Coefficient**	**S.E.**	***t*-statistics**	**Variable**	**Coefficient**	**S.E.**	***p*-value**
***LPCGSDP* (–1)**	1.00			***ECT* (–1)**	–0.15	0.05	0.007*
***LDEV* (–1)**	–0.51	0.03	–20.30	***LPCGSDP* (–1)**	0.04	0.19	0.852
C	–0.65			***LDEV* (–1)**	–0.06	0.04	0.020**
				C	0.06	0.01	0.000

Various Diagnostic Check Results	
R-Square	0.713
Adjusted *R*-Square	0.691
Jarque–Bera Test (*p*-value)	0.184
Breusch–Pegan-Gogfrey Test (*p*-value of Chi-Square)	0.198
Breusch–Gogfrey Test (*p*-value of Chi-Square)	0.993

Source : Computed by Researcher. **SE:** Standard Error.

Note. LPCGSDP is the Dependent Variable; * at 1% significant, **at 5% significant.

corrected yearly from the short-run to the long-run equilibrium. The results showed that the ECT for the co-integrating equation with economic growth as a dependent variable is negative, which is also significant at the level of one percent. The ECT demonstrated that 15% of disequilibrium is adjusted in a year by the independent variable.

Model 1: $D(PCGSDP) = C(1) * (PCGSDP(-1) - 0.51 * LDEV(-1) - 6.55) + C(2) * D(PCGSDP(-1)) + C(3) * D(LDEV(-1)) + C(4)$ (9)

The results revealed that the lag value of LPCGSDP positively impacts economic growth; however, it was not statistically significant. In contrast, the lag value of LDEV has a markedly detrimental effect on economic growth in the short term. Additionally, the model's fitness is shown by the R^2 value, which is determined to be 0.713. The null hypothesis (H_0), which stated that "there is no significant impact of state development expenditure on economic growth in the state over the study period," was also rejected by the study.

Diagnostic Check of the Residual of Model 1

The Jarque–Bera test determines whether the residue is normal. The Jarque–Bera test accepts the null hypothesis that the variables are normally distributed, and the test's results (*p*-value > 5%) indicate that the residual is also normally distributed. The assumption that the residuals have constant variance is also The null hypothesis of this test: that the residuals are homoscedastic. The results of this test (as *p*-value > 5%) accepted the null hypothesis, which means the residuals are homoscedastic. On the other hand, the Breusch–Godfrey (BG) test is used to examine whether or not the presence of serially correlated is present in residuals. The null hypothesis of this test is that the error terms are not correlated. The results of this test accepted the null hypothesis as the *p*-value was higher than the level of 5%, which means there is no problem of autocorrelation in the variables.

Estimation of the Long-run and Short-run Coefficients for Model 2

After finding one or more co-integrating among variables (see Table 3), the coefficient of the co-integrating equation for the variables of Model 2 has been estimated and presented in Table 5. The results of co-integrated variables have been estimated by taking the log values of the variables. The results of coefficients also represented the elasticity of variables. In this model, the PCGSDP has been considered the dependent variable, and SSE, ESE, and ND are the independent variables. According to the results, SSE is significantly positively related to long-term economic growth. The outcomes revealed that a 1% increase in SSE stimulated the economic growth rate by 4.59%. Similarly, ESE is also significantly positively related to economic growth, demonstrating that a 1% increase stimulates economic growth by 5.11%. On the other hand, ND expenditure has a negative impact on economic growth, as a 1% increase in this expenditure reduces economic growth by 0.61%; however, it was not significant.

Table 5. ***Results of Model 2***

LPCGSDP = f (LSSE, LESE, LND)							
	Long-run				**Short-run**		
Variable	**Coefficient**	**S.E.**	***t*-statistics**	**Variable**	**Coefficient**	**S.E.**	***p*-value**
LPCGSDP (–1)	1.00			***ECT* (–1)**	–0.06	0.01	0.002*
LSSE (–1)	–4.59	1.02	–4.52	***LPCGSDP* (–1)**	0.54	0.14	0.001*
LESE (–1)	–5.11	0.96	–5.31	***LSSE* (–1)**	0.11	0.05	0.043**
LND (–1)	0.61	0.46	1.33	***LESE* (–1)**	–0.03	0.03	0.287
C	–4.62			***LND* (–1)**	–0.05	0.02	0.027**
				C	0.01	0.01	0.082
Various Diagnostic Check Results							
R-Square						0.742	
Adjusted *R*-Square						0.700	
Jarque–Bera Test (*p*-value)						0.629	
Breusch–Pegan–Gogfrey Test (*p*-value)						0.086	
Breusch–Gogfrey Test (*p*-value of Chi-Square)						0.089	

Source : Computed by Researcher. **SE:** Standard Error.

Note. LPCGSDP is the Dependent Variable; * at 1% significant, ** at 5% significant.

Long-run Equation (Co-integration Equation) for Model 2:

$$ECT_{t-1} = 1.00\,LPCGSDP_{t-1} - 4.59LSSE_{t-1} - 5.11\,LESE_{t-1} + 0.61LND_{t-1} - 4.62 \quad (10)$$

$$LPCGSDP_{t-1} = 4.59LSSE_{t-1} + 5.11LESE_{t-1} - 0.61LND_{t-1} + 4.62 \quad (11)$$

The short-run findings for the Model 2 based on ECM are depicted in Table 5. The results showed that the ECT for the co-integrating equation with economic growth as a dependent variable is negative, which is also significant at the level of one percent. The ECT demonstrated that the independent variables adjust 6% of disequilibrium annually.

Model 2: $D(LPCGSDP) = C(1)*(LPCGSDP(-1) - 4.59*LSSE(-1) + 5.11*LESE(-1) - 0.61*LND(-1) - 4.62) + C(2)*D(LPCGSDP(-1)) + C(3)*D(LSSE(-1)) + C(4)*D(LESE(-1)) + C(5)*D(LND(-1)) + C(6)$ (12)

In the case of the short run, the results revealed that the lag value of LPCGSDP has a significant positive impact on its value. Similarly, social service expenditure (LSSE) lag value has also significantly impacted economic growth. Moreover, the findings demonstrated that the lag value of economic services expenditure (LESE) negatively impacted economic growth; however, it was not statistically significant. In the short run, non-development expenditure (LND) lag value significantly negatively impacts economic growth. Furthermore, the value of R^2 is 0.742, which indicates that the independent variables explained 74% variability of the dependent variable and presented the model fitness.

Diagnostic Check of the Residual of Model 2

The Jarque–Bera test is applied to check residual normality. The null hypothesis of the Jarque–Bera test is that the variables are normally distributed, and the results of this test (as *p*-value > 5%) accept the null hypothesis,

meaning the residual is normally distributed. The results of the Breusch–Pagan–Godfrey test (as *p*-value > 5%) showed no heteroscedasticity problem. Moreover, the null hypothesis of the Breusch–Godfrey (BG) test was also accepted, which means that there is no problem with autocorrelation in the variables. Furthermore, the stability of coefficients has been tested by CUSUM and CUSUM Square tests, shown in Figure B1 of the Appendix. The results of both tests showed that the coefficients are stable in the long run as the blue line or plot values are not touching the critical line (red lines).

Results of the Granger Causality Test

The findings of the co-integration test (Tables 2 and 3) confirmed the causal relationship among the selected variables in the long run; however, it does not indicate the causality direction. Consequently, to analyze the direction of causality, the present study has applied the pairwise Granger Causality test on the target variables in both Models; the findings are presented in Table 6. The null hypothesis (H0) tested here is that "there is no causality between the study variables." The empirical findings confirmed the unidirectional causality from DEV to PCGSDP, SSE to PCGSDP, PCGSDP to ND, ESE to SSE, SSE to ND, and ESE to ND. Moreover, it was also found that the development expenditure (DEV) in Model 1 and SSE in Model 2 caused economic growth (PCGSDP) in the short run. Therefore, the findings confirmed the presence of the Keynesian hypothesis in the states' economy. Moreover, economic growth causes ND expenditure, ESE causes SSE, whereas SSE and ESE cause ND.

Table 6. ***Results of the Granger Causality Test***

Pairs of the Variable	*F*-Statistics	*p*-value	Causality (at 0.05 level)
LDEV and *LPCGSDP*	8.0502	0.0087	Yes*
LPCGSDP and *LDEV*	1.5076	0.2305	No
LSSE and *LPCGSDP*	5.112	0.0146	Yes*
LPCGSDP and *LSSE*	2.416	0.1115	No
LESE and *LPCGSDP*	2.835	0.0793	No
LPCGSDP and *LESE*	1.709	0.2032	No
LND and *LPCGSDP*	3.398	0.0510	No
LPCGSDP and *LND*	4.179	0.0283	Yes*
LESE and *LSSE*	4.694	0.0195	Yes*
LSSE and *LESE*	1.835	0.1821	No
LND and *LSSE*	3.377	0.0517	No
LSSE and *LND*	4.745	0.0188	Yes*
LND and *LESE*	0.529	0.5959	No
LESE and *LND*	3.701	0.0404	Yes*

Source : Computed by Authors. *at 5% level of significance.

Conclusion and Policy Implications

The study has shown that the share of revenue expenditure is always higher than capital outlay in GSDP during the study period. Moreover, the development expenditure is more than the non-development expenditure except for 1994–1995 and 1996–1997. On a disaggregated level, from 1990–1991 to 2009–2010, economic services expenditure was more than social services expenditure except in 1995–1996, 2002–2003, and 2003–2004 in total development expenditure. Except for 2015–2016, social services expenditures accounted for more than 50% of

all development expenditures from 2007 to 2008 and beyond. In the analysis using the VECM, the impact of state development expenditure on economic growth is positive in the long run. The findings of the study supported the Keynesian hypothesis of public expenditure. In the long run, social and economic services expenditure positively impacts economic growth; however, non-development expenditure has a non-significant negative impact on economic growth.

Moreover, in recent years, the government has shifted toward social services expenditure to improve people's living standards. Also, it has positively impacted economic growth in the short and long run. Economic services expenditure negatively impacts economic growth in the short run, indicating that direct investment in economic activities takes time to show an effect on economic growth. It also makes the overall impact of development expenditure on economic growth negative in the short run. Regarding causality's direction, there is short-term unidirectional causality between development spending and economic growth, social services spending and economic growth, economic growth and non-development spending, and economic services spending and non-development spending for social services and growth. The findings of this study may help the government and policymakers modify the existing policies and budgetary allocations for different sectors. There should be a uniform and steady increase in development expenditure. The wide variations of the development expenditure should be reduced to a certain extent for efficient utilization so that the rule of uniformity in the development process can be followed.

Limitations of the Study and the Way Forward

The present study analyzed the state development expenditure intensely based on secondary data sources, which were quantitative. If outcomes of different sub-heads are evaluated separately with corresponding expenditure, then it will be more beneficial for efficient budget allocation on subheads. Also, if the government's component-wise public revenue is analyzed and compared with public expenditure, the state's financial situation could be more straightforward, which can help policymakers. If the interstate comparison at the component level could be examined, it could help the state analyze its position in various terms.

Authors' Contribution

Dr. Kirti conceived the idea and developed qualitative and quantitative designs to undertake the empirical study, extracted research papers of high repute, filtered these based on keywords, and generated concepts and codes relevant to the study design. Dr. Bimla Langyan verified the analytical methods and supervised the study. The numerical computations were done by Dr. Kirti using E-Views. Dr. Bimla Langyan finalized the manuscript in consultation with the other author.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Appendix

Table A1. ***Summary Statistics of Variables***

Variables	*PCGSDP*	*DEV*	*SSE*	*ESE*	*ND*
Mean	89946.42	19382.87	9914.989	9467.884	8931.566
Median	72932.91	8298.295	3969.935	4328.360	4979.825
Maximum	197310.4	70044.06	36960.05	33084.01	32470.11
Minimum	41973.98	1474.850	670.85	804.00	644.3800
Std. Dev.	47925.53	20593.24	10943.74	9701.249	8975.353

Figure A1. ***Annual Growth Rate of TPE, DEV, and GSDP***

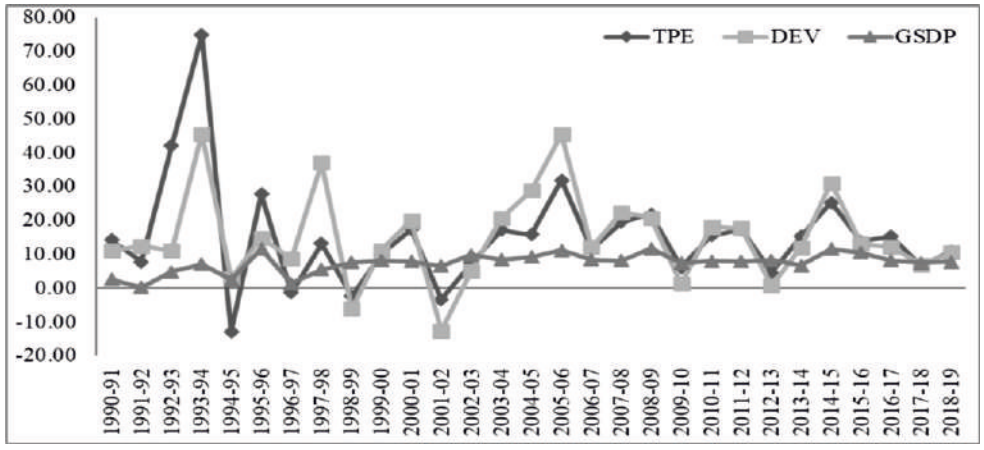
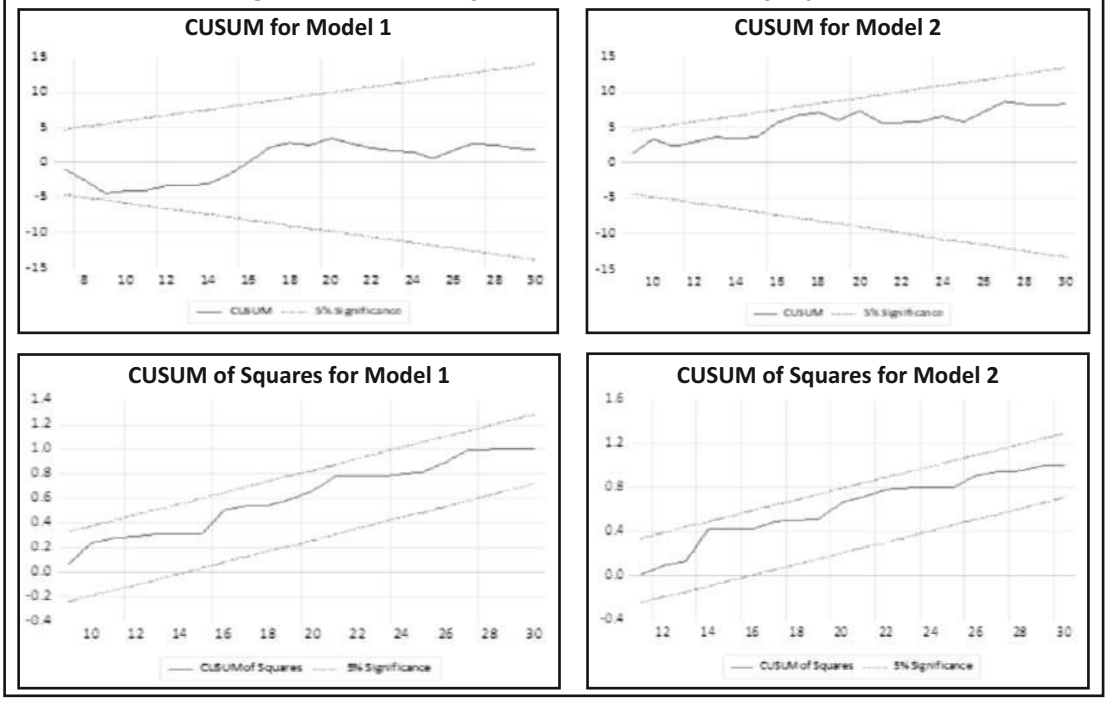


Figure B1. ***Results of CUSUM and CUSUM of Squares***



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