

# PUBLIC EXPENDITURE ON EDUCATION AND ECONOMIC GROWTH: A STATE-LEVEL ANALYSIS IN INDIA

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## Abstract

**Purpose of the Study:** The aim of the study is to find the causal relationship between public expenditure on education and the economic growth of 28 states of India. The paper tries to provide an answer to the research question of whether or not there exists any causal relationship between public expenditure on education and economic growth in the states of India. It also aims to investigate whether public expenditure creates economic growth or economic growth is the cause of public expenditure.

**Methodology:** To examine the relationship between public expenditure on education and economic growth panel data of 28 states of India has been used in the study. To find the causal relation cointegration test has been applied. To examine the short-run and long-run dynamics between public expenditure on education and economic growth the study has adopted the Panel Vector Error Correction model.

**Main Findings:** The result of the study indicates that there exists a long-run relationship between public expenditure on education and economic growth. A unidirectional causality between Gross State Domestic Product (GSDP) and public expenditure on education is found in the long run. The meaning is that as growth takes place in the Indian states it pushes the government to increase its activities which stimulate an increase in public expenditure.

**Applications of this study:** This study can be useful for the formulation of government policy. It can also be useful for students and research scholars.

**Novelty/Originality of this study:** In this research work, a causal relationship is examined between economic growth and government expenditure especially in the education sector which is a major component of human resource development. All states are considered which are included in underdevelopment index and categorized as least developed; less developed and relatively developed states on the basis of some key socio-economic components.

**Keywords:** *Public Expenditure, Economic Growth, Panel Data, Causal Relation, Cointegration, Gross State Domestic Product.*

## INTRODUCTION

Education is the process through which the personality of individual changes in the desired direction by adopting different content depending on the age and needs of individuals (Zoran, 2015). It is one of the important components of the human resource development of a country. Education enables an individual to gather knowledge and it helps to apply that knowledge in a better way (Babalola, 2011) and as such it is one of the most empowering tools for an individual. Education has long been regarded as the crucial factor that drives economic growth. It provides the economy with requisite qualification and skilled manpower that can use its available resources properly. The new growth theory pioneered by Robert Lucas (1988) and Paul Romer (1986, 1990) underlined the importance of education in the growth process. They are assumed to be positive externalities associated with human capital formation (education and training) that prevent the marginal product of capital from falling (Taneja and Myer, 2013). Thus, educational development is the basic way for the sustainable economic growth of a country. Being an important component of human resource development, education has always attracted the attention of researchers, economists, policymakers and the government. The government is trying to improve the quality of its human resources by boosting investment in the education sector of the country. As education is the key factor for achieving growth, public financing on education has been a priority for governments of developing countries (Muktdair-Al-Mukit, 2012). According to the 76<sup>th</sup> amendment of the Indian Constitution, education is the subject under concurrent list and hence it is the joint responsibility of Central and State Government to maintain quality, quantity, and access to education. In this paper, an attempt has been made to find the causal relationship between public expenditure on education and economic growth by using panel data of the states of India.

## THEORETICAL FRAMEWORK

In explaining the nexus between public expenditure and economic growth there are several studies at the international, national and regional levels. But there are two main propositions that highlighted the possible direction of causality between these two variables. These are Wagner's law (1883) and the Keynesian hypothesis (1936). Wagner's law states that economic growth leads to an increase in government activities, which in turn increases government expenditure. According to Wagner, a

unidirectional causality runs from economic growth to public expenditure. In contrast to Wagner's law, Keynes postulates that public expenditure is an exogenous factor that causes economic growth. Keynes suggests using public expenditure as a policy measure to generate employment and to induce economic activity. Thus, According to Keynes, a unidirectional causality runs from public expenditure to economic growth. [\(Singh and Sahni, 1984\)](#) in a study applied the Granger method to determine the direction and pattern of a causal relationship between public expenditure and national income. The study revealed that neither Wagnerian nor Keynesian direction of causality exists between the above two variables. [\(Abizadeh and Gray, 1985\)](#) found that only in the case of developing countries there exists a relationship between economic development and the growth of public spending. In the case of poor and developed countries, this relationship does not exist. [\(Gregoriou and Ghosh, 2009\)](#) conducted a study to investigate the impact of expenditure incurred by the government on the economic growth of 15 developing countries. The study found that the growth of the countries is affected by the expenditure incurred by the government. [\(Chandra, 2011\)](#), note that there exists a causal relationship between education expenditure and economic growth. This causality is found to be bi-directional. That is, on the one hand, expenditure on education creates economic growth on the other economic growth is the reason for the increase in public expenditure on education. According to the researcher through education, expenditure is the cause of economic growth, but it does not immediately take effect. Investment in education takes some time to affect the economic growth of a country. [\(Taiwo and Abayomi, 2011\)](#) made an attempt to examine the trend of government spending as well as its effects on the real GDP growth rate in Nigeria. The study covered the period from 1970 to 2008 and found real GDP to be positively related to recurrent and capital expenditure. By employing the cointegration technique [\(Muktdair-Al-Mukit, 2012\)](#) found a positive and significant impact of public spending in education on the economic growth of Bangladesh in the long run. The study found that as a result of a one percent increase in public expenditure in education, GDP per capita increases by 0.34% in the long run. [\(Chakraborty and Krishnankutty, 2012\)](#) examined whether the absolute expenditure on education or educational expenditure as a percentage of aggregate expenditure is influencing economic growth. The study shows that the educational expenditure positively and significantly influences the economic growth in all states of India. But, it is found in the study that educational expenditure as a percentage of aggregate expenditure does not have a significant influence on the economic growth of North Eastern states. [\(Ohlan, 2012\)](#) empirically investigates the causal relationship between public expenditure and economic growth in India using a vector autoregressive model (VAR) over the period 1950-2008. By employing Johansen's cointegration test the study found a long-run equilibrium relationship between government expenditure and GDP. Unidirectional causality is found running from government expenditure to economic growth. The study reports no short-run Granger causality between the above two variables in any direction. [\(Nasiru, 2012\)](#) investigates the relationship between government expenditure and economic growth. The researcher carried out the study in Nigeria for a period of 49 years from 1961 to 2010. To check the cointegration between government expenditure and economic growth the study employed the Bounds Test approach which is based on unrestricted Error Correction Model and Pairwise Granger Causality tests. The study revealed that no long-run relationship exists between government expenditure and economic growth in Nigeria only when the dependent variable is the real GDP of the country. However, government capital expenditure granger causes economic growth. A similar study conducted by [\(Hussin et al. 2012\)](#) examined the causality and long-run relationship between government educational expenditure and economic growth in the Malaysian economy for a period of 40 years from 1970 to 2010. By using Vector Auto Regression (VAR) method the study revealed that there exists a positive long-run relationship between GDP and government expenditure on education. Regarding Granger causality relationship the study found that economic growth is a short term Granger cause for education variable and vice versa. [\(Idrees et al. ,2013\)](#) examined the long-run relationship between public education expenditure and economic growth by analyzing heterogeneous panel data. The study applied the Kao and Pedroni's Residual- Based Panel Cointegration Test to check the existence of a long-run relationship between the variables. In order to determine the impact of public education expenditures on economic growth the researcher employed Fully Modified Ordinary Least Squares (FMOLS) method. It was found that a long-run relationship exists between public education expenditure and economic growth and public financing of education is an important determinant of economic growth. To investigate the long-run and short-run relationship between economic growth and human capital [\(Solaki, 2013\)](#) conducted a study in Greece for the period of 1961-2006. The researcher employed the Engle-Granger, the Phillips-Hansen cointegration tests, and the Johansen maximum likelihood method to search for cointegration in an education-real GDP per capita bi-variate model. The study found a positive long-run relationship between human capital and economic growth. [\(Menyah and Rufael, 2013\)](#) found a unidirectional causality between government spending and economic growth in Ethiopia during 1950-2007. The study revealed that growth in GDP was the cause of increasing public expenditure in Ethiopia, but government expenditure did not have any effect on promoting economic growth. According to [\(Zoran, 2015\)](#) for each of the world economies, the main source of long-term economic growth is knowledge. In each of the world economies, education and investment in human resources are given topmost priorities in their national strategy and national policy. The researcher argues that investment in knowledge may increase production capacity more than any other factor of production and transforms them into new products and processes. Because these investments in knowledge characterized by an increase in the rate of return on investment, the researcher argues that they are the key to long-term economic growth. [\(Dastidar and Chatterji, 2015\)](#) reported that in the case of India from 1980 onwards, education expenditures in primary, secondary and tertiary sectors positively affect GDP when the economy of the country started to shift from a state-directed economy towards a pro-business regime. [\(Mallick](#)

*et al.*, 2016) investigates the impact of educational expenditure on economic growth in 14 major Asian countries. The study utilizes balanced panel data for 39 years from 1973 to 2012. With the help of panel cointegration tests, the study found the existence of a long-run relationship between educational expenditure and economic growth in all the selected countries of Asia. For short and long-term Granger causality the study adopted the panel vector error correction mechanism (P-VECM). Unidirectional Granger causality is found in all the countries running from economic growth to educational expenditure. In these countries, educational expenditure is the result of economic growth both in the short-run and long-run. But, only in the long-term expenditure on education causes economic growth in all the countries. (Ray *et al.*, 2019) examined the causal relationship between government expenditure and economic growth in the states of India that are in different phases of economic development. The study used panel unit root, panel co-integration, and panel causality approaches and found that in relatively developed and less developed states, growth in the real sector causes an increase in public expenditure, in line with Wagner's hypothesis. In the least developed states, the causality is found to be bidirectional from both capital and revenue expenditure to growth and from growth to capital and revenue expenditure.

Thus various studies have been conducted regarding the relationship between overall government expenditure and economic growth in different countries as well as in different states of India. Studies have also been conducted on the relationship between government education expenditure and economic growth at international and national levels. But no significant study has been conducted to investigate the relationship between government education expenditure and economic growth in different states of India that are in different phases of economic development. The present study is an attempt to fill up this gap in the literature. This study attempts to find the causal relationship between public expenditure on education and economic growth in some selected states of India. The paper tries to provide an answer to the research question whether or not there exists any causal relationship between public expenditure on education and economic growth in the states of India and whether the relationship is unidirectional or bidirectional.

## METHODOLOGY

### DATA SOURCE

This paper is entirely based on secondary data. Panel data has been used in the study consisting of 28 states and each state cover a period of seven years from 2008-09 to 2014-15. Among the 28 states, there are ten least developed states, twelve less developed states and six relatively developed states which have been selected on the basis of the Underdevelopment Index published by the Ministry of Finance, Government of India. The underdevelopment index includes ten sub-components which are as follows: monthly per capita consumption expenditure (MPCE), education, health, household amenities, poverty rate, female literacy, percent of SC-ST population, urbanization rate, financial inclusion, and connectivity. According to the index the states whose score on (under)development index is 0.6 and above, can be labeled as "least developed" states, states whose score is below 0.6 and above 0.4 are labeled as "less developed" states, while states whose score is below 0.4 are "relatively developed" states. On the basis of this, the states have been categorized as follows-

**Table 1:** Categorisation of States as per Underdevelopment Index

Least Developed States	Less Developed States	The relatively Developed States
Arunachal Pradesh (0.73)	Andhra Pradesh (0.52)	Goa (0.05)
Assam (0.71)	Gujarat (0.49)	Kerala (0.09)
Bihar (0.76)	Haryana (0.40)	Maharashtra (0.35)
Chattisgarh (0.75)	Himachal Pradesh (0.40)	Punjab (0.35)
Jharkhand (0.75)	Jammu & Kashmir (0.50)	Tamil Nadu (0.34)
Madhya Pradesh (0.76)	Karnataka (0.45)	Uttarakhand (0.38)
Meghalaya (0.69)	Manipur (0.57)	
Odisha (0.80)	Mizoram (0.49)	
Rajasthan (0.63)	Nagaland (0.55)	
Uttar Pradesh (0.64)	Sikkim (0.43)	
	Tripura (0.47)	
	West Bengal (0.55)	

(Figures in brackets are the underdevelopment index of the states)

**Source:** Ministry of Finance, Government of India

In this paper, the Gross State Domestic Product (GSDP) has been considered as a proxy for economic growth. Data on GSDP has obtained from the Handbook of Statistics on the Indian States published by Reserve Bank of India. Public expenditure data has been collected from various issues of Analysis of Budgeted Expenditure on Education published by the Ministry of Human Resources Development, Government of India.

## MODEL SPECIFICATION AND ECONOMETRIC APPLICATION

Since this paper analyses, the causal relationship between public expenditure on education and economic growth in 28 states of India for a time period of 6 years, the model used is the panel data model. The cointegration tests are applied to determine the existence of a long-run relationship between educational expenditure and economic growth of the states. Since cointegration requires that the variables should be cointegrated of the same order, the panel unit root test has been applied to the series to check the order of integration. The study has employed LLC (Levin et al., 2002) and IPS (Im et al., 2003) panel unit root tests. (Idrees et al., 2013), (Mallick et al., 2016) and (Ray et al., 2019) have also used the LLC and IPS panel unit root tests to check the order of integration. Using Kao (1999) and the Pedroni (2004) panel cointegration test the causality between public education expenditures and economic growth is verified. After employing the panel unit root and panel cointegration tests, panel Vector Error Correction Mechanism (P-VECM) has been applied to check the direction of causality between economic growth and public expenditure on education. Few other studies have also applied the cointegration test and Error Correction model to check the causality between the above two variables. These are (Chang, 2002), (Burney, 2002), (Verma and Arora, 2010) and (Srinivasan, 2013).

## RESULTS AND DISCUSSION

### PANEL UNIT ROOT TEST

To test the panel cointegration among variables, at first step we have to examine the order of integration of the panel series under consideration. For cointegration, variables must be integrated of the same order. In the present study LLC (Levin et al., 2002) unit root test has been applied to check the order of integration. The LLC test is designed on the principles of the ADF test, but it allows for heterogeneity of the intercepts across panel members (Ray et al., 2019). The null hypothesis of the LLC test is that panels contain a unit root. Since this is too restrictive Im et al., (2003) test of unit root is also conducted. The result of the tests is presented in table 1.

**Table 2:** Results of the LLC Panel Unit Root Test (Individual Intercept)

Variables	LLC Statistic	IPS Statistics
GSDP	1.26180 (0.8965)	4.94944 (1.0000)
$\Delta$ GSDP	-49.0473 (0.0000)*	-9.62012 (0.0000)*
EDUEXP	1.88025 (0.9700)	3.92531 (1.0000)
$\Delta$ EDUEXP	-21.4401 (0.0000)*	-6.56067 (0.0000)*

\* Indicates statistical significance at 1% level. Figures in parentheses are p values.

The results of the panel unit root tests show that the variables are I (1). That is, all the variables are non-stationary at the level. But when we take the first difference they become stationary. Table 1 shows that we can reject the null hypothesis that the panel contains unit root at a 1% level of significance. Since all the variable is integrated of the same order now we can apply Pedroni's (1999, 2004) cointegration tests to check the long-run relationship between economic growth and public expenditure on education. Kao's (1999) panel cointegration test has also been applied in the present study.

### PANEL COINTEGRATION TEST

Pedroni (1999, 2004) has proposed a cointegration technique to test the presence of long-run relationships among integrated variables. Pedroni's test is a residual-based test for the null hypothesis of no cointegration for dynamic panels. In this test, both the short-run dynamics and the long-run slope coefficients are permitted to be heterogeneous across individual members of the panel (Pedroni, 1999). He defines kinds of test statistics; one is pooling residuals within the dimension and the other, between dimension. The results of the panel cointegration test are presented in table 2 and table 3.

**Table 3:** Results of the Pedroni's Cointegration Test

Panel Cointegration Test	Statistic	
	Individual Intercept	Individual Intercept and Trend
	Within Dimension	
Panel V- Statistic	1.057115 (0.1452)	3.835275 (0.0001)*
Panel rho- Statistic	0.389342 (0.6515)	3.287839 (0.9995)
Panel pp- Statistic	-4.980224 (0.0000)*	-8.742328 (0.0000)*
Panel ADF- Statistic	-4.707913 (0.0000)*	-6.427270 (0.0000)*
	Between Dimension	
Group rho-Statistic	2.428.729 (0.9924)	5.059801(1.0000)
Group pp-Statistic	-10.23338 (0.0000)*	-10.35779 (0.0000)*



Group ADF- Statistic	-7.267303 (0.0000)*	-6.839565 (0.0000)*
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**Table 4:** Result of the Kao's Panel Cointegration Test

ADF	-3.087188(0.0010)*
Residual variance	2.72E+09
HAC variance	2.93E+09

\*Indicates significance at 1% level. Figures in parentheses are p values.

The null hypothesis is no cointegration.

Pedroni ADF has an automatic lag length selection using SIC. Newey-West automatic bandwidth selection and Bartlett kernel are used.

Kao assumes an individual intercept and no deterministic trend. Kao's ADF has an automatic lag length selection using SIC.

Results of Pedroni's cointegration test shows that in the case of individual intercept, out of the seven statistics four statistics have probability values closer to zero, which indicates rejection of the null hypothesis of no cointegration. These statistics are Panel pp- statistic, Panel ADF-statistics, group pp- statistics and group ADF-statistics. Again, in the case of individual intercept and trend out of the seven statistics, five statistics indicate the rejection of the null hypothesis at a 1% significance level. Hence, from the cointegration test, it is found that the statistics support a panel cointegration between GSDP and expenditure on education. In the case of Kao test, the cointegration is significant at 1% level. Thus, it can be concluded that there exists a long-run relationship between public education expenditure and economic growth. Now, we can apply the panel VECM model to examine the short-run and long-run dynamic relationships between public educational expenditure and economic growth.

#### PANEL VECTOR ERROR CORRECTION MECHANISM (P-VECM)

The result of the P-VECM model is presented in table 4.

**Table 5:** Result of the Panel VECM model

DEPENDENT VARIABLE	SOURCES OF CAUSATION (INDEPENDENT VARIABLE)		
	SHORT RUN		LONG RUN
	$\Delta$ GSDP	$\Delta$ EDUEXP	ECT
$\Delta$ GSDP	-----	6.377636 (0.0412)**	0.169150[5.957674]
$\Delta$ EDUEXP	2.095292 (0.3508)	-----	-0.039955 [-4.028687]*

Figures in parentheses are p values and figures in brackets are t-statistics. \*, and \*\* indicates the significance level of 1% and 5% respectively. Lag length is selected by using the Akaike information criterion (AIC) and Schwarz information criterion (SIC).

Table 4 shows the long-run and short-run dynamics of public expenditure on education and economic growth. The panel vector error correction indicates that there is no long-run causality running from public education expenditure to GSDP. But there is short-run causality running from education expenditure to GSDP. The P-VECM supports long-run causality running from GSDP to public expenditure on education. Therefore, the study confirms that there is unidirectional causality from GSDP to public expenditure in the long run.

#### CONCLUSION

This study tries to examine the causal relationship between public expenditure on education and economic growth in 28 states of India. By using the panel unit cointegration test it is found that there exists a long-run relationship between public expenditure on education and economic growth. To examine the short-run and long-run relationships between public educational expenditure and economic growth the study has adopted the P-VECM model and found that public education expenditure causes economic growth in the short run, not in the long run. But vector error correction supports that in the long-run increase in GSDP can cause an increase in public expenditure. That is, unidirectional causality between GSDP and public expenditure on education is found in the long run. This result is in line with Wagner's hypothesis which states that a secular increase in national income has led to a significant increase in the absolute amount of public expenditure. Growth in the real sector in a developing economy propels the government to spend on utilities demanded by the public. Thus, we can say that as growth takes place in the Indian states it propels the government to increase its activities which stimulate an increase in public expenditure.

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