Education and Economic Growth in India

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By

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Abstract

The paper focuses on the expenditure on education as determinant on economic growth. The study examine the relationship between education and economic growth in total number of states as a whole , Non special category states, special category states and North eastern states separately. We have considered Net State Domestic Product at Factor cost on constant prices (NSDP) and Per-capita Net State Domestic Product at Factor cost (PerNSDP)on constant price as proxy for economic growth. Using the panel least square with fixed and random effect NSDP and Per NSDP has regressed separately on Expenditure on education and Expenditure on education as a percentage of aggregate expenditure. The result of the study shows that expenditure on education is positively influencing the growth of the economy. But Expenditure on education as a percentage of aggregate expenditure is negatively influencing the economic growth in case of total states as a whole and Non special category states. However it is not showing significance for northeastern states.

Key words: education, economic growth, expenditure on education, north east state.

Introduction:

Education is one of the most powerful instruments for reducing poverty, inequality and enhances the competitiveness in the global economy. Therefore, ensuring access to quality education for all, in particular for the poor and rural population, is central to the economic and social development of India (education in India, World Bank). Education plays an integral part in the overall development of the personality. The government has come up with unique steps to make primary education compulsory for all. In simple words, elementary

education implies eight years of compulsory schooling that begins from the age of six. The government ensures to make elementary education free and compulsory for all.

In India elementary education is free and compulsory. Universalisation of elementary education is the constitutional commitment in India. Efforts have been made in the past to achieve the goal but despite spectacular quantitative expansion of educational facilities, the goal is still a far distant dream. The provision and use of elementary education services in India has been improving quite fast during the last decade. However, the development has not been uniform across the states and districts in the country. Development of a sound information system is critical for successful monitoring and implementation of any programme, particularly in social sectors. Design of a school information system was, therefore, accorded priority from the very beginning of the District Primary Education Programme (DPEP) in 1994, as a result of which the District Information System for Education (DISE) was developed by the National University of Educational Planning and Administration (NUEPA), New Delhi. Importance of an Educational Management Information System (EMIS) was reiterated when Sarva Shiksha Abhiyan (SSA) was launched in 2001. SSA guidelines envisage development of a community-owned and transparent EMIS, and preparatory activities of the programme included substantial strengthening of MIS infrastructure in all the States and Union Territories of the country.

The present study:

Annabi, Harvey and Lan (2007) says that since the emergence of the new growth theory in the 1980s, investments in education and human capital accumulation have been identified as a key determinant of long-run growth. All the economically developed nations are having high literacy rates. There are lot of literature says that education is the foundation for all kind of growth in an economy. In this context the present paper is prepared to look in to relationship between expenditure on education and expenditure on education as a percentage of aggregate expenditure by different state governments in India on economic growth by:

1) Total number of a states as a whole
2) Non special category states
3) Special category states
4) North-eastern states

According to the development and economic growth the states of the country is broadly divided in to two as Special category states and Non special category states. The states which are standing backward in developments are coming under the special category states. The states comes under Special category are Arunachal Pradesh, Assam Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram Nagaland and Sikkim. Rest of the states comes under Non special category.

Literature review:

Iihan (2001) says about the role of education in development. He has pointed that education in every sense is one of the fundamental factors of development. No country can achieve sustainable economic development without substantial investment in human capital. Education enriches people's understanding of themselves and world. It improves the quality of their lives and leads to broad social benefits to individuals and society. Education raises people's productivity and creativity and promotes entrepreneurship and technological advances. In addition to this it plays a very crucial role in securing economic and social progress and improving the income distribution of a state. Bhattacharjee(2003) Human capital is the most important agent of economic development and now it is realized that improvement in the quality of labour force can have dramatic effect s on the economic development. Human capital contributes to labour productivity. Education is necessary for development of both farm and non-farm practices. It is necessary for family maintenance and for proper management of time and resources for improvement in the social conditions.

Self and Grabowski (2003) examines the impact of education and on income growth in India during the period 1966-1996. The result of the study indicates that primary education has a strong causal impact on growth. Pradhan (2009) studied the causality between education and economic growth in India during the period between 1951-2001 using Error Correction Modelling. The variables used in the study are GDP as a proxy for economic growth and Government expenditure on education. The study confirms that there is uni-directional causality between education and economic growth in India. Mulkit (2012) investigated the long run relationship between public expenditure on education and economic growth in Bangladesh during the period 1995-2009. And the study shows that public spending in education has a positive and significant impact on economic growth in the long run.

Research methodology:

Data source: data has been collected from Ministry of Human Resources Development Government of India for the period of five years from 2004-05 to 2010-11 for all the states of India. Collected data include expenditure on education (EXEDU) and the expenditure on education as a percentage of aggregate expenditure (EXPEDUAGG). Net State Domestic Product at Factor cost on constant prices (NSDP) and Per-capita Net State Domestic Product at Factor cost (PerNSDP)on constant price is collected from Hand Book of Statistics of Indian Economy.

Variables: NSDP and PerNSDP are taken as a proxy for the state economic growth. NSDP and PerNSDP is regressed on expenditure on education by states and the expenditure on education as percentage of aggregate expenditure.

Panel least square with fixed and random effect is used for testing the relationship between education and economic growth. The basic model for the study without fixed and random effect is as follows.

$$NSDP_{it} = \alpha_{it} + \beta_1 \, EXEDU_{it} + \beta_2 \, EXPEDUAGG_{it} + \mu_{it} \qquad (1)$$

$$PerNSDP_{it} = \alpha_{it} + \beta \, EXEDU_{it} + \beta \, EXPEDUAGG_{it} + \mu_{it} \qquad (2)$$

Whre i represent state and t represent the time and β_1, β_2 are coefficients . NSDP is Net State Domestic Product at Factor cost on constant prices EDU is state wise expenditure on education rupees in cores. And EXPEDUAGG is indicates the expenditure on education as a percentage of aggregate expenditure.. μ is the error term. In the base model we are incorporating the fixed effect and random effect alternatively and combined also because, each of the 28 states of India has independent educational system and policy for avoiding the individual effects and making it to fixed among all the sates we are using time specific and states specific fixed effect. And the same time the for avoiding the effects which are not stand for throughout the year we are using random effect for state specific and period specific. The model with fixed and random effect is as follows

$$NSDP_{it} = F_{it} + \beta_1 EXEDU_{it} + \beta_2 \, EXPEDUAGG_{it} + \mu_{it} \qquad (3)$$

$$PerNSDP_{it} = F_{it} + \beta_1 \, EXEDU_{it} + \beta_2 \, EXPEDUAGG_{it} + \mu_{it} \qquad (4)$$

$$NSDP_{it} = R_{it} + \beta_1 \, EXEDU_{it} + \beta_2 \, EXPEDUAGG_{it} + \mu_{it} \qquad (5)$$

$$\text{PerNSDP}_{it} = R_{it} + \beta_1 \, \text{EXEDU}_{it} + \beta_2 \, \text{EXPEDUAGG}_{it} + \mu_{it} \qquad (6)$$

Where F_i sates specific fixed effect and R_i states specific random effect. We have used STATA 11 software for the analysis

Result:

Table; 1 shows the result of the panel least square with fixed and random effect for the total states of India. The result of the F- test and Wald- test shows that the fitness of the entire models is satisfactory. The R- square for all the model is more than 0.8. Fixed effect is showing significant for both the model but Hausman test not showing significance so we can't decide among random effect or fixed effect, which effect is better in defining the relationship between the depended and independent variable in the study.

TABLE: 1 PANEL LEAST SQUARE WITH FIXED AND RANDOM EFFECTS FOR TOTAL STATES OF INDIA				
Independent variable	Model3: Fixed effect	Model 5: Random effect	Model4: Fixed effect	Model 6: Random effect
EXPEDUAGG	-.01109*** (0.00403)	-0.0125619*** (0.0042966)	-0.0056584*** (0.0035357)	-0.0039655*** (0.0038217)
EXEDU	0.44737*** (0.017089)	0.459913*** (0.0181155)	0.3563901*** (0.0149891)	0.3381154*** (0.0159808)
constant	2.847337*** (0.1110336)	2.770928*** (0.1973694)	7.594218*** (0.0973886)	7.711986*** (0.1368115)
Model summary				
R2	0.8439	0.8438	0.8227	0.8225
F- test	448.74***		385.16***	
FE F-test	843.66***		352.49***	
Wald chi^2		832.39***		615.89***
Hausman		-4.38		-11.27
No.of states	28	28	28	28
Total panel observation	196	196	196	196
Dependent variable :NSDP			PerNSDP	
Notes: 1. The Hausman test has χ2 distribution and tests the null hypothesis that unobservable individual effects are not correlated with the explanatory variables, against the null hypothesis of correlation between unobservable individual effects and the explanatory variables. 2. The Wald chi2 has χ2 distribution and tests the null hypothesis of insignificance as a whole of the parameters of the explanatory variables, against the alternative hypothesis of significance as a whole of the parameters of the explanatory variables. 3. The F test has normal distribution N(0,1) and tests the null hypothesis of insignificance as a whole of the estimated parameters, against the alternative hypothesis of significance as a whole of the estimated parameters. 4. ***, **, and *denote significance at 1, 5 and 10 percent level of significance respectively. FE is Fixed effect				

Expenditure on education as a percentage of aggregate expenditure (EXPEDUAGG) is negatively significant at one percent. Expenditure on education (EXEDU) is positively

significant one percent for all the models. Moreover constant is positively significant at one percent for all the four models.

Form the below table .2 shows the result of panel least square with fixed and random effect for Non special category states. The result of the Non special category states also shows the similar result as the total states as a whole. . The result of the F- test and Wald- test shows that it is significant at one percent. The R- square for all the model is more than 0.8. Fixed effect is showing significant for both the model but Hausman test not showing significance. Expenditure on education as a percentage of aggregate expenditure (EXPEDUAGG) is negatively significant at one percent and Expenditure on education (EXEDU) is positively significant one percent for all four the models. Moreover constant is positively significant at one percent for all the four models

TABLE: 2 PANEL LEAST SQUARE WITH FIXED AND RANDOM EFFECTS FOR NON SPECIAL CATEGORY STATES				
Independent variable	Model3: Fixed effect	Model 5: Random effect	Model4: Fixed effect	Model 6: Random effect
EXPEDUAGG	-0.0184792*** (0.0059098)	-0.0187489*** (0.005844)	-0.0104494*** (0.0054313)	-0.0187489*** (0.005844)
EXEDU	0.500576*** (0.0260576)	0.501635*** (0.0257352)	0.3899559*** (0.0239475)	0.501635*** (0.0257352)
constant	3.131926*** (0.1676345)	3.126789*** (0.261033)	7.109862*** (0.1540597)	3.126789*** (0.26133)
Model summary				
R2	0.8439	0.8438	0.8370	0.8698
F- test	333.93***		256.76***	
FE F-test	988.93***		529.70***	
Wald chi^2		681.82***		681.82***
Hausman		0.9541		-194.05
No.of states	17	17	17	17
Total panel observation	119	119	119	119
Dependent variable :NSDP			PerNSDP	
Notes: 1. The Hausman test has χ2 distribution and tests the null hypothesis that unobservable individual effects are not correlated with the explanatory variables, against the null hypothesis of correlation between unobservable individual effects and the explanatory variables. 2. The Wald chi2 has χ2 distribution and tests the null hypothesis of insignificance as a whole of the parameters of the explanatory variables, against the alternative hypothesis of significance as a whole of the parameters of the explanatory variables. 3. The F test has normal distribution N(0,1) and tests the null hypothesis of insignificance as a whole of the estimated parameters, against the alternative hypothesis of significance as a whole of the estimated parameters. 4. ***, **, and *denote significance at 1, 5 and 10 percent level of significance respectively. FE is Fixed effect				

In case of special category states also F-test and Wald test is significant and having R square more than 0.8 for all the four models. At the same time fixed effect is showing significance

and Hausman test not showing significance. Constant and expenditure on education (EXEDU) is positively significant one percent is for all the four models.

However expenditure on education as a percentage of aggregate expenditure (EXPEDUAGG) is negatively significant at one percent only model 3 and model 5 that is in case of NSDP. But it is not showing significance for model 4 and model 5 that is for the dependent variable PerNSDP. Table. 3 show the detailed result of panel least square with fixed and random effect for special category states.

TABLE: 3 PANEL LEAST SQUARE WITH FIXED AND RANDOM EFFECTS FOR SPECIAL CATEGORY STATES				
Independent variable	Model3: Fixed effect	Model 5: Random effect	Model4: Fixed effect	Model 6: Random effect
EXPEDUAGG	-0.0113188*** (0.0060795)	-0.0104704*** (0.0073705)	-0.0056055 (0.0054313)	-0.0069237 (0.0056122)
EXEDU	0.4071518*** (0.0242403)	0.4306364*** (0.0292538)	0.3314124*** (0.0205358)	0.3142576*** (0.022213)
constant	2.139275*** (0.1594924)	1.972792*** (0.2384766)	8.171072*** (0.135118)	8.302432*** (0.1679669)
Model summary				
R^2	0.8191	0.8190	0.8095	0.8092
F- test	144.92***		135.99***	
FE F-test	275.71***		120.72***	
Wald chi^2		224.65***		208.83***
Hausman		0.9541		-6.28
No.of states	11	11	11	11
Total panel observation	77	77	77	77
Dependent variable :NSDP			PerNSDP	
Notes: 1. The Hausman test has χ2 distribution and tests the null hypothesis that unobservable individual effects are not correlated with the explanatory variables, against the null hypothesis of correlation between unobservable individual effects and the explanatory variables. 2. The Wald chi2 has χ2 distribution and tests the null hypothesis of insignificance as a whole of the parameters of the explanatory variables, against the alternative hypothesis of significance as a whole of the parameters of the explanatory variables. 3. The F test has normal distribution N(0,1) and tests the null hypothesis of insignificance as a whole of the estimated parameters, against the alternative hypothesis of significance as a whole of the estimated parameters. 4. ***, **, and *denote significance at 1, 5 and 10 percent level of significance respectively. FE is Fixed effect				

Table.4 shows the result of panel least square with fixed and random effect for North eastern states. In case of North eastern states also F-test and Wald test is significant and having R square more than 0.8 for all the four models. At the same time fixed effect is showing significance and Hausman test not showing significance. Constant and expenditure on education (EXEDU) is positively significant one percent is for all the four models. But expenditure on education as a percentage of aggregate expenditure (EXPEDUAGG) is not showing any kind of significance for the north eastern states for all the four models.

TABLE: 4 PANEL LEAST SQUARE WITH FIXED AND RANDOM EFFECTS FOR NOTH-ESTERN STATES				
Independent variable	Model3: Fixed effect	Model 5: Random effect	Model4: Fixed effect	Model 6: Random effect
EXPEDUAGG	-0.006238 (0.0055135)	-0.003704 (0.0063705)	-0.00261 (0.0047574)	-0.0070871 (0.0062824)
EXEDU	0.4932391*** (0.0279689)	0.5147298*** (0.0317696)	0.3940569*** (0.0241331)	0.3519754*** (0.0312423)
constant	1.201741*** (0.186927)	1.033144*** (0.2504826)	7.815996*** (0.1612911)	8.139484*** (0.224272)
Model summary				
R2	0.8712	0.8705	0.8529	0.8489
F- test	155.55***		133.33***	
FE F-test	275.71***		122.63***	
Wald chi^2		262.70***		126.95***
Hausman		-3.04		-6.48
No.of states	8	8	8	8
Total panel observation	56	56	56	56
Dependent variable :NSDP			PerNSDP	
Notes: 1. The Hausman test has χ2 distribution and tests the null hypothesis that unobservable individual effects are not correlated with the explanatory variables, against the null hypothesis of correlation between unobservable individual effects and the explanatory variables. 2. The Wald chi2 has χ2 distribution and tests the null hypothesis of insignificance as a whole of the parameters of the explanatory variables, against the alternative hypothesis of significance as a whole of the parameters of the explanatory variables. 3. The F test has normal distribution N(0,1) and tests the null hypothesis of insignificance as a whole of the estimated parameters, against the alternative hypothesis of significance as a whole of the estimated parameters. 4. ***, **, and *denote significance at 1, 5 and 10 percent level of significance respectively. FE is Fixed effect				

Findings:

- State wise expenditure on education has a positive and significant impact on the economic growth for all models as well as all as total states s taken as whole, special category states, Non special category states and Northeastern states. In case of the Net Sate Domestic Product as well Per-Capita Net State Domestic Product.

- Expenditure on education as a percentage of aggregate expenditure is having a negative impact on the overall economic growth. In case of total states taken as a whole, non special category states and special category states for model 3 and model 5. But in case of special category states model.4 and model 6 and north eastern states it is not showing significance

Concussion:

This paper examines whether the expenditure on education in an absolute term and expenditure on education as percentage of aggregate expenditure is influencing the economic growth. The study has been done in four different categories as total number of states as a whole, Non Special category states, Special category states and North East State for better

understanding. It is clear from the study that expenditure on education is having a positive and significant influence on economic growth in the entire category. But expenditure on education as percentage of aggregate expenditure is not showing significances for North Eastern States.

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