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An Econometric Analysis into the Dynamics of Education Expenditure, Education Status and GSDP in Jammu and Kashmir State

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***Abstract* -This study aims to investigate the dynamics of Education Expenditure, Education Status and GSDP in Jammu and Kashmir State. By investigating a time series data set over the period of 14 years, the empirical results of Granger causality test indicate a bidirectional short run relationship between EEXP and GSDP, GER and GSDP and between GER and EEXP. Results of Fully Modified OLS (FM-OLS) indicate a significant positive relationship between EEXP and GSDP and significant negative relationship between GER and GSDP.**

Keywords: **Educational Expenditure, Educational Status, GSDP**

I.INTRODUCTION

Nowadays education is regarded as an investment for creating a knowledge economy. Education is considered as a proactive intervention for promoting and bringing desired change and development in the citizens of a nation not only for the personal development, health status, social inclusion and labour market prospects of individual learners, but also for the broader economic performance of countries (OECD, 2003). A well-educated and skilled population not only drives economic and social development but also ensures personal growth. The spread of education in society is the foundation of success in today's globalized world, where the real wealth of a country or state is not in its tangible natural resources but in knowledge (Economic Survey, J&K 2013-2014).

In the past, Jammu and Kashmir had very few educational institutions that were largely concentrated in the major towns but with the efforts of the state government, over the period, the education scenario improved in the state quite substantially. As a consequence of sustained investment in education sector, there has been an exponential growth of the institutional network. The number of educational institutions in public sector of State reached to 23,646 and those in private sector to 5,281. With increase in number of educational institutions in the state literacy rate has also increased exponentially from 18.58% in 1971 to 68.74% in 2011. Further to reduce the gender gap in literacy, a number of steps were taken-up and these include National Program for Education of Girls at Elementary level (NPEGEL), Establishment of Kasturba Gandhi Balika Vidyalas (KGBVs), Free Text-Books/ Scholarships, Community mobilization, Establishment of Women ITIs and Women wings in the existing ITIs, reservation of half of the seats for females in the Medical Colleges, Focus on adult female illiterates under Saakshar Bharat Mission (SBM) (Economic Survey, J&K 2013-2014).

Recognizing the importance of education, public spending on education sector increased rapidly during the successive five year plans. The plan outlay earmarked for Education sector in the state increased from Rs. 1519.60 Crores in the 10th five year plan (2002-07) to Rs. 2160.37 Crores during the 11th five year plan (2007-12). Further, the Gross Enrolment ratio for the state of J&K was 10.36% in 2007-08 which has increased to 18.2% in 2011-12. The enrolment has accordingly increased from 77,000 in 2004-05 to 1,35,264 in 2012-13. The overall enrollment in the Higher Education Sector including Universities, Private Institutions and Agriculture/ Medical Institutions has increased approximately to 2,77,000 in the 11th Five Year Plan. The State is also aiming at achieving this GER target of 22% by the end of 2020 (Economic Survey, J&K 2013-2014).

The impact of educational spending on economic growth is one of the critical problems in economic literature (Reza and Valeecha, 2012). Many economic growth models and theories have been developed over time related to education and economic growth by Adam Smith in the 18th century and Alfred Marshall in the 19th century, to address the question as to how investments in education influence the wealth of nations. Throughout the 20th century, modern professional economists (such as Jacob Mincer, 1974), Gary Becker, 1964) have been attempting to develop empirical estimates of the relationship between education and economic growth (Fadel and Miller, 2007). The theoretical growth literature emphasizes at least three mechanisms through which education may affect economic growth. First, expenditure in education can increase the skills of the human capital, which increases productivity and thus transitional growth toward a higher equilibrium level of output. (Hanushek and Wobmann, 2010). It is widely accepted that education creates improved citizens and helps to upgrade the general standard of living in a society. Therefore, positive social change is likely to be associated with the production of qualitative citizenry. It would seem to follow naturally that if more individuals

are educated, the wealth of nation would rise, since more education attracts higher wages and aggregately higher national income (Chika and Ogugua, 2014) Second, education can increase the innovative capacity of the economy and the new knowledge on new technologies, products, and processes that promote growth. (Hanushek and Wobmann 2010).Many Channels have been proposed through which education can promote growth, not merely the private returns to individuals, greater human capital but also a variety of externalities. For highly developed countries, the most frequently discussed externality is education investments 'fostering technological innovation, thereby making capital and labor more productive, generating income growth (Aghion *et.al*, 2009). Third, education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to successfully implement new technologies devised by others, which again promotes economic growth (Hanushek and Wobmann 2010)

Therefore, investment in education is vital for economic growth and the society. Expenditure on education shows how much a country spends on Schools, Universities, Public and Private institutions that support the increase in Gross Enrollment ratio and ultimately an increase in output of an economy. In this backdrop this study is an attempt to examine the dynamics pertaining to education expenditure, education status, and GSDP in Jammu and Kashmir State.

II.DATA COLLECTION

Time series annual data over a period of 14 years (2000-2001 to 2013-2014) has been collected from secondary sources. Education Expenditure on Higher Education by Central Government in Jammu and Kashmir State has been collected from the reports of Ministry of Human Resource Development (MHRD), India while as Education Expenditure on Higher Education by State Government and GSDP at Factor Cost for the State of Jammu and Kashmir has been collected from the Economic Survey, J&K published by the Directorate of Economics & Statistics, J&K. Data for Gross Enrollment Ratio has been collected from the reports of Ministry of Human Resource Development (MHRD), India.

Variables and Acronyms used in study

1. Education Expenditure as EEXP
2. Gross Enrollment Ratio in Higher Education as GER used a proxy of education status
3. Gross State domestic product as GSDPG

III.METHODOLOGY

Firstly, Percentage Change in Higher Educational Expenditure (by Central and State Government), GER in Higher Educational and GSDP has been calculated. To test stationarity of data, the Augmented Dickey Fuller (ADF) test has been applied. An appropriate lag length has been chosen by using Akaike Information Criteria (AIC). Granger Causality test has been used to ascertain the short-term causality among the GSDP, EEXP and GER. Fully Modified Least Squares (FM-OLS) regression has been applied to check whether the variables show long run relationship or not?.

Eviews-8 (Enterprise Edition) has been used for data analysis of Time Series data.

IV.DATA ANALYSIS AND INTERPRETATION

Table I shows the percentage change scores in Higher Education expenditure (by central and state government) and GSDP. Higher Education Expenditure by Central has increased over the period of study but at a diminishing rate, with rapid growth in initial years of study (2000-2001 to 2003-2004) followed by a diminishing smooth growth over the remaining years of study. Higher Education Expenditure by State Government has shown a rapid fluctuating growth during 2001-2001 to 2008-2009 however the growth in Higher Education expenditure by State Government over the remaining years of study has been quite smooth. GSDP of Jammu and Kashmir has shown minor variations in growth, touching the peak in 2002-2003 and lowest growth in 2008-2009.Further, years that have shown highest growth in Higher Education Expenditure is followed by the highest growth in GSDP.

GER has shown an exponential growth during the years 2005-2006, 2006-2007 and 2011-2012. However, GER has shown a smooth growth over the remaining years of study.

Results of unit root test

To ensure that any spurious relationship does not occur, which may arise as a result of carrying out econometric analysis on time series data without subjecting them to test for unit root, data is subjected to test of stationarity. By stationarity of time series data, we mean that statistical properties such as mean, variance, autocorrelation etc. are constant over time. To obtain meaningful statistics as descriptors of future behavior, it is important to stationarize time series data (Gujarati at. el, 2012). Therefore, in the present study, Augmented Dickey-Fuller test has been used for checking the stationarity of the variables. The null hypothesis of the Augmented Dickey-Fuller test states that series has a unit root.

TABLE I STATISTICS OF VARIABLES USED IN STUDY (IN CRORES)

Year	Central Higher Educational Expenditure[1]	Percentage change in Central Higher Educational Expenditure	States Higher Educational Expenditure[2]	Percentage change in States Higher Educational Expenditure	GSDP at Factor Cost[3]	Percentage change in GSDP at Current Price at Factor Cost	GER Higher Education[4]	Percentage change in GER of Higher Education
2000-2001	2000	-	50.28	-	16700	-	8.5	-
2001-2002	2150	7.5	60.12	19.57	18039	8.01	8.9	4.7
2002-2003	2702	25.67	60.77	1.08	20236	12.17	9.1	2.24
2003-2004	3220	19.17	70.02	15.22	22195	9.6	9.3	2.19
2004-2005	3408	5.83	70.79	1.09	24265	9.32	9.7	4.3
2005-2006	3620	6.22	80.29	13.41	26537	9.36	12.56	29.48
2006-2007	3955	9.25	90. 89	13.2	29030	10.59	15.6	24.2
2007-2008	4127	4.34	80.94	-10.94	31793	9.51	15.9	1.92
2008-2009	4480	8.55	90. 45	11.74	32932	3.58	16	0.62
2009-2010	4769	6.45	110	21.61	34973	6.19	16.3	1.87
2010-2011	4871	2.13	130.16	18.32	37014	5.83	16.7	2.45
2011-2012	4933	1.27	150.08	15.3	40770	10.14	22.8	36.52
2012-2013	5210	5.61	170.09	13.33	43627	7	24.1	5.7
2013-2014	5314	2	200.03	17.6	46561	6.72	25.8	7.05

Source[1, 4] MHRD; Source[2, 3] Economic Survey, J&K

As inferred from Table 2, probability value of ADF t-statistics for all the variables at level is more than 0.05 which means that null hypothesis cannot be rejected or the variables has a unit root or the variables are non-stationary. Further, Table 2 indicates the results of Augmented Dickey-Fuller test when the series has been converted into first difference. It can be inferred from the Table II that probability value of ADF t-statistics for all the variables is less than 0.05 when converted into first difference which means that null hypothesis can be rejected or the variables do not contain unit root or the variables are stationary.

TABLE II AUGMENTED DICKEY FULLER TEST (ADF)

Symbol	Level		First Difference	
	ADF Test t-statistics	Probability	ADF Test t-statistics	Probability
GSDP	-3.026421	0.0631	-2.689463	0.0109
EEXP	-2.057306	0.2621	-1.707561	0.0403
GER	-1.978860	0.2910	-3.835602	0.0160

Exogenous: Constant
Lag length: Automatic based on AIC, MAXLAG=3
Deterministic Terms: Intercept

Results of Granger Causality Test

The Granger Causality Test follows the following equation:
$Y_t = a_0 Y_{t-1} + \cdots + a_p Y_{t-1} b_1 X_{t-1} + \cdots b_p X_{t-p} + U_t.$
….Equation (1)
$X_t = c_0 X_{t-1} + \cdots + c_p X_{t-1} d_1 Y_{t-1} + \cdots d_p Y_{t-p} + V_t.$ …. Equation (2)

Where Y_t is the dependent variable that is GSDP and X_t represents the other variables that is EEXP and GER used for testing bilateral causality in a linear autoregressive model. The equations incorporate the lagged values of dependent and independent variables meaning that lagged value of X influence Y in Equation (1) and lagged values of Y influence X in Equation (2). In the above equation, U_t and V_t are disturbances assumed to be uncorrelated.

Granger causality test was performed on stationary data to determine the short run causal relationship among the variables. The number of lags included in the equation was 2 based on Akaike information criteria (AIC). Table 3 indicates the bilateral causality of one variable with another. Result of Table 3 show that EEXP and GSDP have bidirectional causality as there probability value is equal to 0.0495 and 0.0305 respectively. Since, the probability value of both EEXP and GSDP is less than 0.05 meaning that EEXP causes GSDPG and GSDPG causes EEXP. The

casual relationship between EEXP and GSDP can be explained as; expenditure in education can increase the skills of human capital, which increases productivity and thus transitional growth toward a higher equilibrium level of output. Further, education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to successfully implement new technologies devised by others, which again promotes economic growth (Hanushek and Wobmann, 2010)

Furthermore, results show bidirectional causality between GER and GSDP which means that GER causes GSDP and GSDP causes GER. It follows naturally that if more individuals are educated, the wealth of nation would rise, since more education attracts higher wages and aggregately higher national income.

A bi-directional causal relationship is found between GER and EEXP as there probability values are less than 0.05. Several factors influence the degree of education enrollment. First, richer a country, the larger would public funding to increase the degree of educational enrollments. Second, enrollment rates depend on the price of higher education. If higher public funding per student is allowed by policy makers at higher education level more enrollments will be witnessed in educational institutions followed by the decrease in marginal private cost without removing the benefits of education (Bergh and Fink, 2004).

TABLE III GRANGER CAUSALITY TEST RESULT

Null Hypothesis	F-statistics	Probability
EEXP does not Granger Cause GSDP	0.23553	0.0495
GSDP does not Granger Cause EEXP	0.53504	0.0305
GER does not Granger Cause GSDP	0.44947	0.0431
GSDP does not Granger Cause GER	0.66954	0.0438
GER does not Granger Cause EEXP	1.83805	0.0220
EEXP does not Granger Cause GER	1.53406	0.0272

Results of Fully Modified Least Squares (FM-OLS)

Having established short run casualty among the variables, Fully Modified OLS has been performed to determine the long run relationship among the variables. FM-OLS was developed by Phillips and Hansen (1990) for providing optimal estimates to Co-integrating regressions. This method modifies least squares to account for serial correlation effects and endogeneity among the regressors resulting from Co-integrating relationship (Peter C. B. Phillips, 1993).

Fully Modified OLS (FM-OLS) has been performed by taking GSDP as the dependent variable while as EEXP and GER are taken as independent variables. Results of FM-OLS presented in Table 4, indicate a significant positive relationship between EEXP and GSDP since the coefficient of EEXP is equal to 0.251987 with the probability value of 0.0207, meaning that with 1 unit increase in EEXP, GSDP will increase by 0.251987. These findings indicate; resources that are committed to the education play a central role in economic growth. Apart from the expenditure on other sectors, educational expenditure will have a greater effect on economic growth through the multiplier effect than capital expenditure which is usually a lump sum. Thus, public education expenditure that targets the citizens directly such as meal subsidy to students and incentives to teachers, will not only increase the quality of education, but have a great impact on economic growth. Further, efficient utilization of public education expenditure is as important as the amount allocated for greater impact on economic growth (Urhie, 2013).

Significant negative relationship has been found between GER and GSDP since the coefficient of GER is equal to -0.183172 with the probability value of 0.0140 meaning that with 1 unit increase in GER, GSDP will decrease by 0.183172. Since, quantity of enrollments does not necessarily increase the GSDP, quality of education also matters. It is important to note that a hundred percent enrolment rate may not guarantee rapid economic growth rate. On the contrary, few and highly talented citizens in the economy could make a huge difference in economic growth through the discovery of relevant technologies. Certain quality measure that state can focus on is the repetition rate, pupil –teacher ratio, teacher qualification and experience, international comparative test scores etc. (Urhie, 2013).

Coefficient of Adjusted R square explains the total variation in the value of dependent variable explained by the variation in independent variable. The value of Adjusted R square lies between 0 and 1, the value of 1 means that whole of variation in the value of dependent variable is explained by the value of variation in independent variable while as value of 0 means that no variation in dependent variable is explained by independent variable. Since the value of Adjusted R square model is equal to 0.121699 meaning that 12.16 percent of variation in dependent variable is explained by independent variable (Gujarati et.al, 2012)

Coefficient of Durbin Watson Test explains the amount of autocorrelation in the residuals. The value of Durbin Watson lies between 0 and 4. If the value of Durbin Watson is equal to two then there exists no autocorrelation but if the value is less than two then there

exists positive autocorrelation and if the value is higher than 2 than there exist negative autocorrelation (Kohler, 1994). Since our value of Durbin Watson is 1.944651which is closer to 2 so we can conclude there is no autocorrelation in the residuals.

TABLE IV RESULTS OF FULLY MODIFIED LEAST SQUARES (FM-OLS)

Variable	Coefficient	t-statistic	Probability
C	18.33505	4.062428	0.0019
EEXP	0.251987	1.338564	0.0207
GER	-0.183172	-1.588142	0.0140
Adjusted R-squared	0.121699	Durbin-Watson stat	1.944651

V.CONCLUSIONS AND POLICY IMPLICATIONS

This study examined the linkage between Education Expenditure, Education Status and GSDP in Jammu and Kashmir State. Annual data for Education Expenditure on Higher Education by Central Government and GER in Higher education of Jammu and Kashmir State has been collected from the reports of Ministry of Human Resource Development (MHRD), India while as Education Expenditure on Higher Education by State Government and GSDP at Factor Cost for the State of Jammu and Kashmir has been collected from the Economic Survey, J&K. Granger causality test indicated a bidirectional short run relationship between EEXP and GSDP, GER and GSDP and between GER and EEXP. Fully Modified OLS (FM-OLS) has been performed to determine the long run relationship among the variables, taking GSDP as the dependent variable while as EEXP and GER are taken as independent variables, results of FM-OLS presented indicate a significant positive relationship between EEXP and GSDP and significant negative relationship has been found between GER and GSDP.

Since result show a positive and significant relationship between education expenditure and GSDP in Jammu and Kashmir State. Resources that are committed to the education will no doubt contribute to economic growth of the state. In order to have greater impact of educational expenditure on economic growth in Jammu and Kashmir, expenditure on education should be coupled with other factors such as efficient utilization of public education expenditure, empowering families economically so as to reduce their reliance on their children's labour for household chores, thereby releasing them to go to school (Okojie, 2002), greater government investment in health and nutrition to complement education (Fadiya, 2010),

The negative impact of GER on GSDP in Jammu and Kashmir can be mitigated by focusing on quality rather than on quantity. Certain quality measure that state can focus on is the repetition rate, pupil –teacher ratio, teacher qualification and experience, international comparative test scores etc. If the state is able to produce, few and highly talented citizens it can make a huge difference in economic growth through the discovery of relevant technologies (Urhie, 2013).

Understanding why some schools in a particular country have better education outcomes than others is crucial if aggregate education outcomes are to be improved. To improve education outcomes effectively further research is needed not only in exploring input differences across schools but also on how schools and administrators manage these resources. Micro based studies are much better suited to inform on the best mix of inputs at the school level (Samarrai, 2003).

Budgeted resources intended for education may be diverted to other sectors of the government budget or leakage from the system may occur. Further, budgeted resources intended for specific items may be spent in other areas of the education budget. For example, the budget for instructional materials may be diverted to pay transport allowances for local education officers. Obviously, if resources are being reported as being spent on education but are actually being spent elsewhere then these resources cannot impact on education outcomes. In addition to this the same information is being used by education policy makers and planners to budget for education provision. If this information is wrong then resource allocation decisions will be made with incorrect information and will lead to inefficiency. Identifying the magnitude of leakage and misspending are important aspects of the public expenditure management system that should be adequately addressed through the audit institutions of government (Samarrai, 2003)

Variations in the composition of public education expenditure are also likely to lead to differences in education outcomes across schools and countries. The composition of resources and institutions that govern the use of these resources plays a central role in translating resources into better schooling outcomes (Samarrai, 2003) (Urhie, 2013) argued that other factors aside public education expenditure that promote education should be given prompt attention by the government. Also, efforts should be made to address issues that could serve as obstacles to increased education. These include the level of dependency ratio and urbanization. The impact of high

dependency ratio could be mitigated through tax policies that recognize such. More so, the challenges of urbanization could be stemmed by enacting policies and programs that encourages the citing of industries in the rural areas.

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