Growth of Social Sector Expenditures on Education in India: A State Level Analysis

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Abstract

The claims of the Indian government that it is fully committed to address the issues of poverty eradication and social development have continued over time. The present paper attempts to understand the growth of social sector expenditures on education. For doing that it first checked whether the series of social sector expenditure on education for different states converges to a path having trend preserving properties, secondly, looked at the occurrence of structural break in the series and thirdly, analysed the growth of social sector expenditures on education for Indian states. Finally, the factors contributing to social sector expenditure on Indian education are tried to be found out. For studying growth rate of social sector expenditures on education, three alternative indicators are taken and structural break analysis of modern time series econometrics is employed. For finding out the factors, panel regression is done. There is evidence of interstate disparity with regard to break point as well as growth rate before and after break. For most of the states the growth rate has increased. The determinants such as net state domestic product, own tax revenue and fiscal deficit with one-year lag are found to affect social sector expenditures on education positively.

Keywords: *Social Sector Expenditures, Education, Structural Break, Own Tax Revenue, Fiscal Deficit*

1. Introduction

Education is the most effective tool for social, economic and political transformation. It enables an individual to gather knowledge and helps to apply that knowledge in a better way (Babalola, 2011). To development of human resource and empowerment in the stages of growth of a nation, education plays a vital role (Chakrabarty, 2011). It raises the level of skill and therefore productivity of worker and thus contributes to economic growth and development of the country (Ansari and Khan, 2018).
Only educated people can lead a healthy nation since the education is the most potent tool for socio-economic mobility and a key instrument for building an equitable and just society (Planning Commission, Govt. of India, 2013). Therefore, to become a healthy nation, nation should produce high quality of human resource i.e., human development andmust develop a problem free education system.

Economists like Adam Smith, Romer, Lucas and Solow all have prescribed education as an important factor and have over time developed many economic growth theories and models (Tamang, 2011). According to the 76th 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 (Bhattacharya, 2019).

Though it was transferred to concurrent list (i.e. concurrent with the central government or center) in 1976, yet the main responsibility of financing education still rested on the state governments (Chatterji et al., 2015).

India is spending on education around 4% of GDP as a public expenditure and around 2.5% of GDP as private expenditure; together it is spending around 6.5% of GDP on education (Motkuri and Revathi, 2020). The claims of the government that poverty eradication and social development generally are the main challenges and that it is fully committed to address these issues have continued over time. The performance of India in the social sector is far from satisfactory, and could have been much better (Dreze and Sen, 1995).

Given this background, the present study is an attempt to analyse social sector expenditures on education in the Indian states.

2. Overview of the literature

The survey of literature relating to social sector expenditure on education reveals that several works has been done relating to various issues of social sector expenditure on education. In this context, mention should be made of the names like; De and Endow (2008), Tamang (2011), Chatterji et al., (2015), Tasleem (2016), Ojha (2016), Tasleem (2016), Ansari and Khan (2018), Bhattacharyya (2019), Kaur (2020) among others.

De and Endow (2008) in their paper found that the share of public expenditure on education has been less than 4 percent as a proportion of GDP. Public expenditure on education in current prices has been growing at the rate of 13.4 percent per annum for the period 1990-91 to 2003-04. The rate of growth has slowed down in the current decade. Their study indicates that expenditure, when measured at constant prices, shows a much lower growth rate of only 6.5 percent for the same period. The analysis also finds that the central government has been playing an increasingly important role in state education finance. Tamang (2011) shows a long run relationship between education expenditure and economic growth. He showed that education expenditure per labour have a lesser impact on economic growth as compared to physical capital per labour. It is observed that a 1% increase in physical capital per labour will lead to 0.28% increase in GDP per labour, and a 1% increase in government expenditure on education per labour will lead to 0.11% increase in GDP per labour. Chatterji et al., (2015) found that the richer state spent in education is more compared to poorer states in India. They also argue that any political ideology doesn't affect the education expenditure in India. There is a negative association between child population share and education expenditure. Tasleem (2016) shows that percentage share of State government has declined and the share of central government has increased. There has been a trend between planned and Non planned expenditure on education. Share of former has increased and share of later has declined. No major trends have been found on Revenue and capital account expenditure. Ojha (2016) used computable general equilibrium (CGE) model, to analyse the impact of an increase in the former, financed by an increase in direct tax rates, on economic growth and income distribution in the Indian economy. The simulation results suggest that it is possible to increase investment in education in the resource constrained fiscal environment of the Indian economy, and reap the benefits in terms of a faster economic growth and an improved income distribution. In this study the results also suggest that secondary education needs to be accorded higher priority, though, not necessarily, at the cost of higher education. Finally, to maximize the benefits in terms of economic growth it is desirable that investment in physical capital be increased simultaneously with investment in human capital (education). Ansari and Khan (2018) found expenditure share on education by the state government has declined but

still, State government contributes more than one-third of total expenditure on education, their share in the total has been declining much after 2001-02, while the Centre's share has increased during the same period. Also found that the share of planned expenditure incurred by both central and state government combined also show some trends. The share of planned expenditure has increased and share of Non-planned has declined from 79.67 in 2001-02 to 60.59 percent in 2014-15. Major trends have been found in the intra-Sectoral allocation of public expenditure on education in India. The share of elementary education in total expenditure on education was around 45 percent in the study period. The percentage share of secondary education has also found in declining trends. The share of the Tertiary sector in total expenditure first increased and then declining. Bhattacharyya (2019) in her paper established a one-way relationship between Gross State Domestic Product and public expenditure in education in the long run. Another long run relationship is also found between public expenditure in education and economic growth for 28 states of India from 2008-09 to 2014-15. Kaur (2020) explored the inclinations in the progress and financing of education and health in India. Education sector in India shows signs of biasness, with more expenditure being incurred on elementary level of education. States like Madhya Pradesh, Jharkhand, Rajasthan and Bihar are found to be spending more on education in comparison to other states and UT's. The gender parity index in education till date shows preference for males to females. India also lags behind other nations in government's expenditure as percentage of Gross Domestic Product.

These above studies suggest that there is dearth in the literature regarding the growth performance of social sector expenditures on Indian education using state level data and by employing modern time series econometrics. The present study comes in the footsteps of earlier studies in India, but it is different in that it studies growth performance of social sector expenditures on education using state level data employing structural break analysis of modern time series econometrics. Thus, the present paper is an attempt to fill the gap in the existing literature.

Given this research gap, the objective of this study are: First, to check whether the series of social sector expenditures on education in different Indian states converges to a path having trend preserving properties. Secondly, to check the existence of structural break in the series. Thirdly, to analyse the growth of social sector expenditure on education for Indian states. Finally, it is imperative to make out factors contributing to social sector expenditure on Indian education.

Rest of the paper is organized as: Section 3 discusses methodology and data source. In subsection 3.1 the methodology for studying growth of social sector expenditure on education using Sen (2003) approach of endogenous structural break and also methodology for finding out factors contributing to social sector expenditure on Indian education are discussed. In subsection 3.2 data sources are discussed. Section 4 presents the results of analysis and Section 5 presents the summary and conclusion.

3. Methodology and Data

3.1 Methodology

For finding out the growth rate of social sector expenditures on education, Sen (2003) approach is adopted. Three alternative indicators are taken for measuring social sector expenditures on education, percentage of Social Sector Expenditure on education (SSEE), percentage of Gross State Domestic Product expenditure on education (GSDPE) and percentage of Per-Capita expenditure on education (PCEE). While finding out the

determinants, the above three indicators are taken as dependent variable in the regression equations and named as Model A, Model-B and Model-C respectively.

Perron (1989) proved that in the presence of structural break the standard unit root test is not consistent against trend stationarity (TS) and has suggested a procedure for testing unit root in the presence of one-time structural break in the series. Zivot and Andrews (1992) criticized Perron procedure for finding out the break point, as it was based primarily on visual inspection of data and argued that break point should be endogenously determined. Sen (2003) proved that the power of Zivot and Andrews (1992) test procedure is low and it can be improved by considering maximum F statistic.

To calculate the maximum F-statistic for the null hypothesis, Sen (2003) applied the F-statistic in accordance with

$$F_T^{Max} = Max_{T_b \in \{[\lambda_0 T],[\lambda_0 T]+1,\ldots,T-[\lambda_0 T]\}} F_T(T_b)$$

Here T_B is the break point which is a constant fraction of the sample size T i.e. $T_B = \lambda^C T$ with the current break fraction $\lambda^C \in (0,1)$ and the smallest integer function.

The following equation which admits both changes in the level and growth of the series have been employed:

$\Delta \ln Y_t = a + bDU_t + ct + gDT_t + d\ln Y_{t-1} + \Sigma ej \Delta \ln Y_{t-j} + e_t$

Here c is the co-efficient of time, b and g are respectively the coefficients of DU_t and DT_t Logarithms of the dependent variables is taken as regressand.

c represents growth rate for the entire sample period, if g is not statistically significant. But if g is statistically significant, c represents growth rate before structural break whereas the growth rate after structural break is (c+g).

$DUt = 1$ if $t > T_\gamma$

$= 0$ otherwise

$DT_t = t - T_\gamma$ if $t > T_\gamma$

$= 0$ otherwise

Here T stands for period and γ stands for time break i.e, $\gamma = T_B/T$, T_B being break to determine the nature of the series, the test criteria are to select the series as TS if the estimated value of F is significant at the chosen level (compared with the critical values provided by Sen (2003)) and is DS otherwise.

For finding out factors contributing to social sector expenditures on Indian education, panel regression analysis is done. The variables considered are net state domestic product, own tax revenue and fiscal deficit with one-year lag, all in current prices. Tax performance of a state is often measured by the ratio of own tax revenue to its SOP. Given the taxable capacity, a state's actual revenue collection will depend among other things, on tax effort made and efficiency of the tax collection machinery. A state's capacity to spend depends on transfers from the Centre. Even if the tax effort is low, this effect can be nullified by the transfers from the Centre. Transfers from the Centre comprise tax share and grants. Grants have plan and

non-plan components. Also there is a statutory as well as a discretionary component. The concept of fiscal deficit means the excess of expenditure over revenue excluding borrowings. The extent of fiscal deficit varies across the states. The rationale for including it is that the deficit of last year can render an influence on the spending decisions of the coming year. But the kind of influence will depend on the extent of deficit. The tax effort and the deficit position can influence the spending capacity of the states, irrespective of the income level and this can influence social spending.

3.2 Data

The present study is based on secondary time series data for the period of 1990-91 to 2018-19. The data has been collected from State Finances: A Study of Budgets, Handbook of Statistics of the Indian Economy, Reserve Bank of India Bulletin, National Accounts Statistics, Central Statistics Office, Economic survey of India and other published sources. Here 19 major states of India like Andhra Pradesh (AP), Assam (AS), Bihar (BH), Goa (GO), Gujarat (GJ), Haryana (HR), Himachal Pradesh (HP), J&K (JK), Karnataka (KA), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Nagaland (NL), Odisha (OD), Punjab (PB), Rajasthan (RJ), Tamil Nadu (TN), Uttar Pradesh (UP) and West Bengal (WB) are considered for which all the data on required variables are available.

4. Results of estimation

Three alternative indicators are taken for capturing social sector expenditures on education as mentioned before: percentage of Social Sector Expenditure on education (SSEE), percentage of Gross State Domestic Product expenditure on education (GSDPE) and percentage of Per-Capita expenditure on education (PCEE).

4.1 Result of test on convergence

For examining the nature of the three above mentioned indicators for the different states i.e., whether follows difference stationary (DS) or trend stationary (TS), test on convergence is done whose result are presented in Table 1.

Table 1: Results of test on convergence for Social Sector Expenditures on Education

SSEE	TS states	AS, GO, MH and TN
	DS States	AP, BH, GJ, HR, HP, JK, KA, KL, MP, NL, OD, PB, RJ, UP and WB
GSDPE	TS STATES	AS, BH, MP and NL
	DS States	AP, GO, GJ, HR, HP, JK, KA, KL, MH, OD, PB, RJ, TN, UP and WB
PCEE	TS states	AS, BH, GO, GJ, HR, MP, MH, NL, OD and TN
	DS States	AP, HP, JK, KA, KL, PB, RJ, UP and WB

It is found that for SSEE among the 19 states only 4 states i.e., AS, GO, MH and TN follows TS and rest of the states follows DS. As DS possesses stochastic trend, so no definite conclusion can be drawn from those states.

Similarly, for GSDPE among the 19 states only 4 states i.e., AS, BH, MP and NL follows TS and rest of the states follows DS.

But for PCEE among the 19 states, 10 states i.e., AS, BH, GO, GJ, HR, MP, MH, NL, OD and TN follows TS and rest of the states follows DS. Hence for appropriate conjecture about the growth process only states following TS are considered.

4.2 Result of test on Structural Break

The break point of the sample states is found out and is presented in Table 2.

Table 2: Break Year of the States for Social Sector Expenditures on Education

SSEE	**Break Year**	**Name of the State**
	2017-18	AS
	2010-11	GO
	2002-03	MH
	2001-02	TN
GSDPE	**Break Year**	**States**
	1992-93	MP, NL
	2004-05	BH
	2009-10	AS
PCEE	**Break Year**	**States**
	1991-92	MH, PB, TN
	2000-01	MP
	2003-04	BH
	2006-07	OD
	2007-08	AS, HR
	2009-10	GO, GJ

Regarding break point, for SSEE, for the state AS the break point is found in the year 2017-18. For the state GO, the break point is found in the year 2010-11. For the state MH, the break point is found in the year 2002-03. This may be due to the reason that in the year 1999 Government of MH introduces Maharashtra Prohibition of Ragging Act. For the state TN the break point is found in the year 2001-02may be due to the fact that in the year 1993 Government of TN introduced the policy Learning Without Burden under the chairperson Prof. Yaspal and in the year 2000 central Government take a project of Sarva Siksha Abhiyan.

For GSDPE, for the states MP and NL the break point is found in the year 1992-93. For the state BH, the break point is found in the year 2004-05 may be that in the year 2000 and 2001, central Government takes project of Sarva Siksha Abhiyan and child's right to free and compulsory education. For the state AS, the break point is found in the year 2004-05.

For PCEE, for the states MH, PB and TN the break pointsare found in the year 1991-92may be due to the reason that in the year 1989, 4thFebruary, Government of MH introduced Mahatma Phule Shikshan Yojana and in 1988 Government of TN introduce National Curriculum framework.For the state MP the break point found in the year 2000-01.For the state BH the break point is found in the year 2003-04.For the state OD the break point is found in the year 2006-07 may be that in the year 2000, Government of OD introduced The Orissa Education Amendment Act and Establishment, Recognition and management of

Private College – Amendment Rules.For the states AS and HR, the break point is found in the year 2007-08.For the states GO and GJ the break point is found in the year 2000-01.

4.3 Result of Growth of SSE on Education

Growth rate of the SSE on education are determined for the sample states and are presented in Table 3.

Table 3: Growth rate of Social Sector Expenditures on Education

SSEE	State	Growth Rate	
		Before break	After break
	Assam	-0.0022	-0.435
	Goa	-0.0087	-0.0443
	Maharashtra	0.0277	0.0001
	Tamil Nadu	-0.01	-0.01
GSDPE	State	Growth Rate	
		Before break	After break
	Assam	0.031	0.031
	Bihar	0.034	0.084
	Madhya Pradesh	0.399	0.399
	Nagaland	0.293	0.054
PCEE	State	Growth Rate	
		Before break	After break
	Assam	0.0534	0.0727
	Bihar	0.089	0.136
	Goa	0.103	0.079
	Gujarat	0.046	0.046
	Haryana	0.065	0.065
	Madhya Pradesh	0.077	0.102
	Maharashtra	0.071	0.071
	Odisha	0.036	0.036
	Punjab	0.071	0.066
	Tamil Nadu	0.0534	0.0727

For SSEE, the growth rate of SSE on education in Assam before break is negative i.e., 0.0022% though after break growth rate of SSE on education increased but still it is negative i.e. -0.435%. For Goa, it can be said that before break the growth rate of SSE on education is negative i.e., -0.0087% but after break it increased still negative i.e., -0.0443%. For Maharashtra the growth rate of SSE on education before break is positive i.e., 0.027% whereas growth rate of SSE on education after break has decreased but positive i.e., 0.001%. For the state Tamil Nadu, the growth rate of SSE on education before break and after break has no change and it is negative i.e., -0.01%.

The result of growth for GSDPE suggests that for the state Assam the growth rate before break and after break has no change with positive 0.031%. It can be said that for the state Bihar the growth rate of GSDPE is positive i.e., 0.034% but after break it has increased i.e., 0.084%. For the state Madhya Pradesh, the growth rate of GSDPE before and after break has no change but positive i.e., 0.399%. It can be said that for the state Nagaland the growth rate

of GSDPE before break is positive i.e., 0.293% but after break it has decreased but still positive i.e., 0.054%.

Result of growth for PCEE shows that, for the state Assam the growth rate of per-capita expenditure on education before break is positive i.e., 0.0534 % but after break it has increased i.e., 0.0727%. For Bihar the growth rate of per-capita expenditure on education before break is positive i.e., 0.89 % but after break it has increased i.e., 0.136%. For Goa the growth rate of Per-Capita Expenditure on education before break is positive i.e., 0.103 % but after break it although diminished but still positive i.e., 0.079%. For Gujarat the growth rate of Per-Capita expenditure on education before break and after break remained same i.e., 0.046 %. For Haryana the growth rate of Per-Capita Expenditure on education before break and after break remain same i.e., 0.065 %. In case of Madhya Pradesh, the growth rate of Per-Capita Expenditure on education before break is positive i.e., 0.077% but after break it diminished but still positive i.e., 0.102%. For Maharashtra the growth rate of Per-Capita Expenditure on education before break and after break remain same i.e., 0.071 %. Odisha showed the growth rate of Per-Capita expenditure on education before break and after break to be same and positive i.e., 0.036 %. In case of Punjab the growth rate of Per-Capita Expenditure on education before break is positive i.e., 0.071% but after break it decreased but positive i.e., 0.066%.

4.4 Result of determinants of PCEE

The paper tries to find out the factors that affect social sector expenditures on education. For doing this the PCEE measure of SSE on education has been considered where 10 states are found to follow TS and thus 10 states are considered for panel regression. The variables considered are net state domestic product, own tax revenue and fiscal deficit with one-year lag, all in current prices. Result of panel regression for finding out the determinants of social sector expenditures on education is presented in **Table 4.**

Table 4: Result of Determinant analysis of PCEE

Explanatory variable	Coefficient	t statistic	Prob. Value
C	3.808***	2.472	0.0141
LNSDP	-4.4518***	-7.4026	0
LNFD	-0.0337	-1.1883	0.2358
LNOTR	4.1567***	8.147	0
LNSDP*LNSDP	0.2899***	5.486	0
LNFD*LNFD	0.0058***	3.759	0.0002
LNOTR*LNOTR	0.0555	1.2279	0.2206
LNSDP*LNOTR	-0.3279***	-3.561	0.004
LNFD*LNOTR	-0.00297**	-1.2239	0.0221
Adj R-squared	0.9825		
F- Statistic	945.836		

The panel regression result suggests that State domestic product, fiscal deficit, own tax revenue have significant and positive effect on social sector expenditures on education.
The relationship between social sector expenditure on education and state domestic product, fiscal deficit, and own tax revenue are found to be non-linear.

So for the effect of state domestic product, fiscal deficit, and own tax revenue one needs to calculate the marginal effect.

Marginal effect and Wald test statistics of the determinants are calculated and are presented in Table 5.

Table 5: Marginal Effects and result of Wald test Statistic of the Determinants of PCEE

Variable	Marginal Effects	Wald Statistic
ln SDP	33.28	19.96*
ln FD	39	33.50**
ln OTR	46.78	53.59**

The marginal effect of state domestic product is positive and statistically significant. The positive influence of state domestic product (SDP) on PCEE may be explained because rate of economic growth measured by SDP may increase PCEE. There exists a U- shaped association between state domestic product and PCEE i.e. with more economic growth PCEE at first declines but after a certain level, further increase in state domestic product leads to increase in PCEE.

The marginal effect of fiscal deficit is positive and statistically significant. There exists a U shaped association between fiscal deficit and PCEE. Higher fiscal deficit may reduce PCEE up to a certain level but after that it reverses its direction.

It is also found that the marginal effect of own tax revenue is positively associated with PCEE implying higher own tax revenue generate more government revenue that may enhance expenditures on education sector.

5. Summary and Conclusion

The present paper is based on secondary time series data for the period of 1990-91 to 2018-19 and attempts to study growth performance of social sector expenditures on education using state level data employing structural break analysis of modern time series econometrics. Three alternative indicators are taken for measuring social sector expenditures on education, percentage of Social Sector Expenditure on education, percentage of Gross State Domestic Product expenditure on education and percentage of Per-Capita expenditure on education. For determining factors affecting social sector expenditure on education using panel regression, net state domestic product, own tax revenue and fiscal deficit with one-year lag are considered.
The result indicates that for each of SSE and GSDPE, 4 states follow TS. But for PCEE, 10 states i.e., AS, BH, GO, GJ, HR, MP, MH, NL, OD and TN follows TS process.

Regarding break point, there is interstate disparity observed. Result of growth for SSEE shows that for the state Assam and Goa after break growth increased. On the other hand, For the state Maharashtra the growth rate of SSE on education reduced after break. For the state Tamil Nadu, the growth rate of SSE on education before break and after break has no change and it is negative. The result of growth for GSDPE suggests that for Assam the growth rate of GSDP expenditure on education before and after break has no change. On the other hand, for Bihar the growth rate after break has increased. For the state Madhya Pradesh, the growth rate of GSDP expenditure on education before and after break has no change. Also it can be said that for the state Nagaland, the growth rate after break decreased. Result of growth for PCEE shows that, for Assam and Bihar, the growth rate after break has increased, for Goa the growth rate after break diminished, for Gujarat and Haryana the growth rate before and after break remained same. For Madhya Pradesh the growth rate after break increased. For

Maharashtra and Odisha, the growth rate before and after break remained the same. For the state Punjab the growth rate after break decreased. While finding out factors affecting social sector expenditures on Indian education, all the variables considered like net state domestic product, own tax revenue and fiscal deficit with one-year lag are found to affect PCEE positively. The relationship among per capita social sector expenditure on education on state domestic product, fiscal deficit and own tax revenue are found to be non-linear. There exists a U- shaped association between state domestic product and PCEE as well as fiscal deficit and PCEE. It is also found that own tax revenue is positively associated with growth of PCEE which implies that higher own tax revenue may generate government revenue that may enhance expenditure on education sector.

Thus the present analysis reveals that in order to foster growth of social sector expenditures on Indian education, any policy changes that will lead to increase in economic growth and higher own tax revenue should be emphasised.

In the present paper structural break analysis is done using one-time endogenous structural break method. It will be interesting to test for multiple structural breaks in time series data may be agenda of future research.

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