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Determinants of Education Development Index – A District Level Comparison of West Bengal and Kerala

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ABSTRACT

The Education Development Index (EDI) is a vital metric for assessing regional educational progress by incorporating both access and outcomes in primary education. Indicators representing Spatial density and availability of primary schools per 10000 populations has been given importance as access and enrolment of girls, backward caste children along with overall enrolment and primary completion rate has been incorporated in the Education Outcome Index. This study constructs a composite district wise EDI with the help of factorial analysis for Kerala and West Bengal over the period 2006–2016, using two sub-indices: Access Index and Education Outcome Index. Both states and their referred districts have been ranked in terms of Access, Outcome as well as Education Development Index. Whether inequality among districts is increasing or decreasing or remain stable over the years in terms of the composite index, coefficient of variation has been computed. A panel data regression is conducted to identify key socio-economic, policy, and infrastructural determinants affecting district-level education development.

Keywords: Education Development Index (EDI), Access and Equity in Education, Primary Education Outcomes, Panel Data Analysis, Regional Educational Disparities

Education is recognized as one of the major factors which can promote the freedom and capability of individuals by exploiting the available opportunities (Drèze and Sen, 1995). Education Development is a larger subject in which overall achievement of any Country or State or any district can be assessed in the sphere of education along with some policy suggestions about some important parameters in order to ensure equalization and development in a greater perspective in the education system (Planning Commission, GOI, 2001). In existing literatures, the concept and indicators considered for the construction of EDI has been seen to evolve in many ways in order to get a true picture of educational development of that region. Literally if a region has proper accessibility to educational institutions, literacy rate is at its best level, not only the gross enrolment rate but the enrolment rate of backward classes is appreciable, if the retention rate is good and on the basis of many more such criteria, we can mention any region as educationally developed. The purpose of universal access is to ensure access to schooling near home to all students of a particular age group regardless of environmental, infrastructural, social, cultural and financial disparities. Furthermore, Universal enrolment means that every child belonging to the age of six will be admitted to the first grade. In all developed countries, every six-year-old child is guaranteed admission to first grade as a basic right. However, in India, discrimination in this regard remains a significant concern. There are two main reasons behind this. Firstly, children of any age come to enroll themselves in first grade and

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secondly noticeable underdevelopment at primary level. Here an attempt has been made to verify the district wise education development of two states on the basis of some aspects like access to educational institutions with special reference to primary schools in terms of population as well as spatial density, Gross Enrolment Ratio as well as backward caste enrolment rate, Gender Parity Index in order to capture the gender aspect in respect of enrolment, Ratio of enrolment in grade V to enrolment in grade I in the same year in order to capture the primary completion rate.

Under this backdrop, this study broadly tries to investigate the issues of access, education outcome and determinants of the development of primary education at the district level with a special reference to Kerala and West Bengal over the decade, 2006-07 to 2016-17.

The specific objectives of the study can be stated as follows:

1. To investigate the factors affecting accessibility in primary educational institutions,
2. To analyze the indicators representing education outcome,
3. To examine the overall performance of districts in terms of composite Education Development Index,
4. To examine the determinants of Education Development Index using Panel Regression analysis.

Data Base and Methodology

This study is exclusively based on secondary data sources. District Report Cards available through DISE for the period 2006-07 to 2016-17 and District Census Handbook for the year 2001 and 2011 are the major sources for this study.

In order to know about availability of primary schools in terms of spatial density and population, two indicators have been considered for the present study namely, Number of primary schools per 10,000 population and Number of primary schools per 100 square kilometers. Education Outcome is represented by following five indicators such as Percentage of SC Enrolment, Percentage of ST Enrolment, Gross Enrolment Ratio, Gender parity Index, Enrolment in Grade V/ Enrolment in Grade I of the same year. Access Index and Education Outcome Index are calculated by combining two access indicators and five outcome indicators respectively with the help of Principal Component analysis (PCA).

Education Development Index (EDI) is constructed by combining two indices namely Access Index and Education Outcome Index with the help of PCA. EDI is computed as a composite index by considering each index as a variable. In order to measure the extent of disparities in case of EDI across the referred districts of two respective states during the decade, coefficient of variation has been computed.

Lastly, Panel Regression Analysis is used to determine the major determinants of EDI. Independent variables are some major infrastructure indicators, some of them are policy variables and remaining ones are some socio-economic factors of a district. Two separate models have been considered with same dependent and independent variable for two separate states during the period 2006-07 to 2016-17 by considering districts as cross section units. Here statistical software 'STATA' is used for the analysis. Thereafter we have to declare the given dataset as panel data, which comes out as strongly balanced for both models. Breusch and Pagan Lagrangian multiplier test for random effects has been carried out in order to check whether panel or OLS which is appropriate for current dataset. The p value of the above test has been turned out to be highly significant which implies panel is appropriate for the current model (see appendix 2). Then fixed effect linear regression model has been carried out. Lastly, Hausman test has been used here in order to check whether random or fixed effect model is suitable. Here the p value comes out to be highly insignificant which implies random effect model is appropriate and we get the same result for two separate models for two states (appendix 2). Therefore, for both panel models' random effect is appropriate.

RESULTS AND DISCUSSION

Access to Education

Adequacy of educational institutions not establishes any guarantee to its accessibility. We can easily get some idea about the adequacy of schools apparently through numerical data but to get an idea of its

actual accessibility we need to know how many schools are there in what density of total population and total area of any country or any state or any district. Distance to school is one of the major factors which is highly responsible for drop out (Paul 2001). Furthermore, appropriate location of schools is one of the suggestive measures for constructing a simple model for primary schools in rural areas (Kumar *et al.* 2003).

In order to get some idea about the proper accessibility of schools two access indicators mentioned in section II have been considered for the present study.

State Comparison

Here an attempt has been taken to compare access to primary schools between two referred states Kerala and West Bengal for selecting three years from the entire decade which are 2006-07, 2010-11 and 2016-17 in terms of two access indicators mentioned in section II.

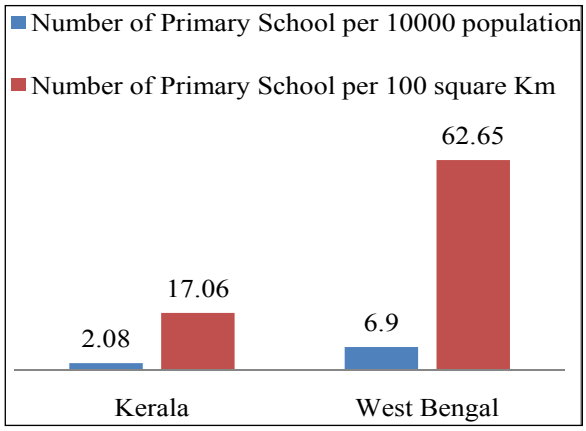


Fig. 1: Access to primary schools in Kerala and West Bengal - 2006-07

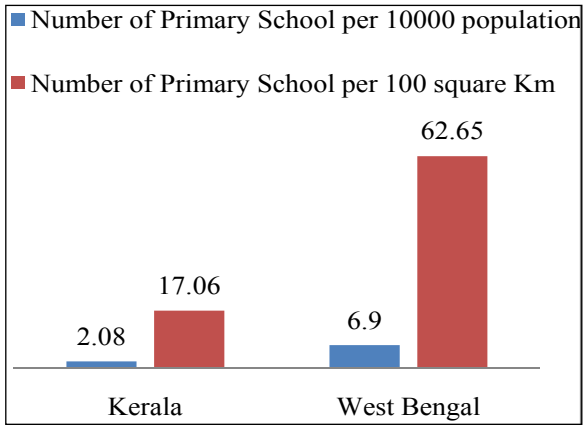
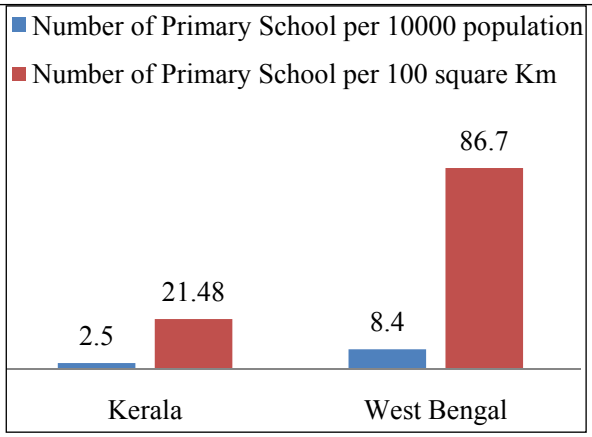


Fig. 2: Access to primary schools in Kerala and West Bengal - 2010-11



Source: *State Report Cards, DISE, 2006-07, 2010-11 and 2016-17*

Fig. 3: Access to primary schools in Kerala and West Bengal - 2016-17

As we can see from Fig. 1, 2 and 3 that spatial density of primary schools is much higher than availability in terms of population for both states and West Bengal is quite ahead in this regard. There is a rapid progress in primary education in West Bengal from 2008 to 2014, one of the contributing factors behind this progress are large number of primary schools per thousand child population compared to Kerala (Das 2015).

District comparison on the basis of Access Index

Access Index has been constructed by combining two indicators discussed in section II. There is a large variation among districts in terms of indicators representing Access to primary institutions for both states (table 1).

In Kerala, Kozhikode, Kannur and Pathanamthitta have been characterized as best. However, index values of all three districts have been deteriorated over the years. Ernakulam, Wayanad, Thrissur, Palakkad has been characterized as worst in terms of Access Index. Moreover, Improvement in index values has been noticed in Idukki, Kasaragod, Kollam and Thiruvananthapuram.

On the other hand, in West Bengal, Paschim Medinipur, Purulia, Kolkata, Dakshin Dinajpur, Bankura are good in terms of access to educational institutions. Kolkata is the district where the number of primary schools has increased by focusing mainly on spatial density rather than population. Index values of good districts either increased or remained stable over the years. North 24 Parganas, Jalpaiguri,

Table 1: Access Index –A District level analysis Kerala

Kerala	2006-07	2010-11	2016-17	West Bengal	2006-07	2010-11	2016-17
Alappuzha	0.641	0.45	0.535	Bankura	0.42	0.425	0.42
Ernakulam	0.195	0.21	0.16	Maldah	0.4	0.28	0.295
Idukki	0.147	0.13	0.355	Dakshin Dinajpur	0.365	0.46	0.4
Kannur	0.702	0.765	0.685	N.24 Parganas	0.165	0.095	0.155
Kasaragod	0.362	0.35	0.4	Haora	0.315	0.205	0.18
Kollam	0.359	0.355	0.43	Birbhum	0.265	0.36	0.31
Kottayam	0.531	0.53	0.43	Darjiling	0.08	0.19	0.21
Kozhikode	0.807	0.745	0.765	South 24 Parganas	0.115	0.2	0.185
Malappuram	0.569	0.58	0.525	Bardhaman	0.155	0.205	0.185
Palakkad	0.306	0.29	0.265	Kolkata	0.5	0.5	0.5
Pathanamthitta	0.69	0.715	0.66	Uttar Dinajpur	0.175	0.355	0.29
Thiruvananthapuram	0.362	0.345	0.42	Murshidabad	0.16	0.265	0.23
Thrissur	0.27	0.275	0.2	Nadia	0.17	0.21	0.19
Wayanad	0.182	0.125	0.185	Koch Bihar	0.375	0.415	0.34
Kerala	**0.398**	**0.38**	**0.38**	Paschim Medinipur	0.315	0.52	0.52
				Hugli	0.18	0.19	0.175
				Purba Medinipur	0.345	0.42	0.385
				Puruliya	0.515	0.475	0.515
				Jalpaiguri	0.255	0.325	0.085
				West Bengal	**0.215**	**0.27**	**0.255**

Source: *Author's calculation.*

Haora, Hugli, Bardhaman, South 24 Parganas are poor in terms of access. Hence it appears that districts which were lagging behind in terms of school numbers based on population are ahead in terms of spatial density of primary schools and vice-versa.

Education Outcome

Education Outcome refers to the extent to which school enrolment has been influenced directly or indirectly as a result of various policies adopted by the Government in two respective states over the past few years. In addition to gross enrolment, enrolment extent of girls as well as backward communities is also included in the discussion of education outcome status of primary aged children. Moreover, a crude measure of primary completion rate has also been considered in our present discussion.

State Comparison

In order to know the total number of children belonging to the age group of 6-14 years, who are actually enrolled in the schools, district wise Gross Enrolment Ratio (GER) data of primary category has been analyzed. Here a comparison has been made between two states for three decadal years 2006-07, 2010-11 and 2016-17. Therefore, in case of GER, there was disparity in the beginning but later the ratio of two states has been converged.

Two major problems observed in tribal education are discrimination and literacy rate. Despite multifaceted efforts to educate tribal or scheduled tribes in post-independence India, access to tribal education has not increased uniformly across the country. The progress made in tribal education till date is not entirely satisfactory. It has been pointed out by Chattoraj and Chand, 2015, that female literacy condition is poor in West Bengal and in this respect, Kolkata referred to be a good performing district but the present status of tribal literacy is poor in this district. In spite of special facilities, the expansion of education among tribal in our country has not materialized as expected. However, in terms of backward caste enrolment, West Bengal is ahead of Kerala, especially in terms of ST enrolment.

GPI refers to the ratio where we measure girl's enrolment in respect of boy's enrolment. When the

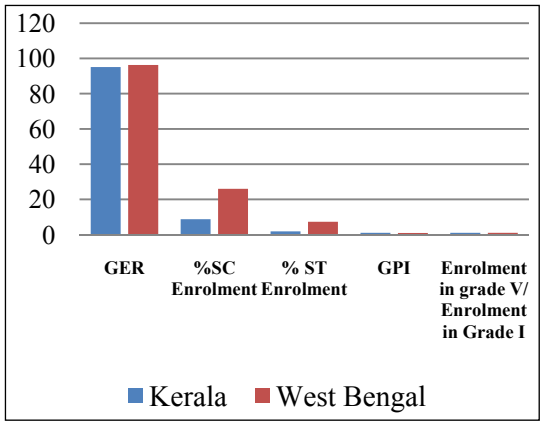
index value comes out to be 1 or greater than 1 that means enrolment of girls is equal to or greater than enrolment of boys. From 2010-11 to 2016-17, the percentage of girl's enrolment increases for Kerala but decreases for West Bengal. It has been found that over the years the percentage of girl's enrolment remains stagnant for the country as a whole. Girls' enrolment in Kerala consistently exceeded the national average, while West Bengal lagged behind except in 2011–12. So, Kerala is observed to be in a better position in terms of girl's enrolment than West Bengal.

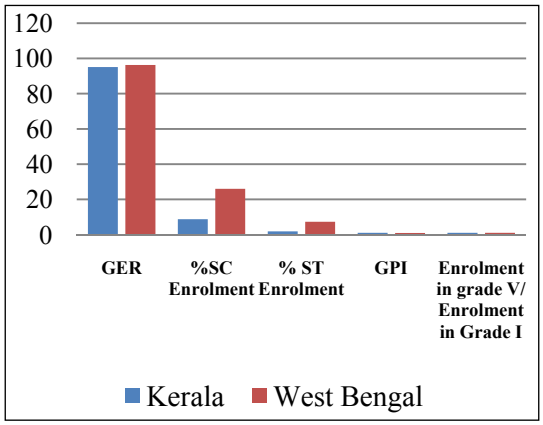
Crude Primary Completion Rate is the ratio of Enrolment in Grade V to Enrolment in Grade I in the same year. Like Gender Parity Index if the index value comes out to be 1 then it means in a given academic year enrolment in grade V is greater than enrolment in Grade I. Therefore, a higher percentage of children enrolling in grade V mean a higher rate of completion of the entire primary cycle or in other words low incidence of dropout rate. It is necessary to mention here that in Kerala, the dropout rate is almost nonexistent but there exist a certain percentage of dropout rate in most of the districts in Bengal. Therefore, Primary completion rate in Kerala has been greater than that of Bengal over the years and also less variation among district has been noticed in Kerala compared to West Bengal.

The information that emerges from the comparative discussion of two referred states (Fig. 4, 5 and 6) is that there is no severe inequality in education outcome between two states.

District comparison on the basis of Education Outcome Index (EOI)

Outcome Index has been constructed by combining five indicators with the help of PCA (appendix 1). Now inter district disparity in terms of EOI of two

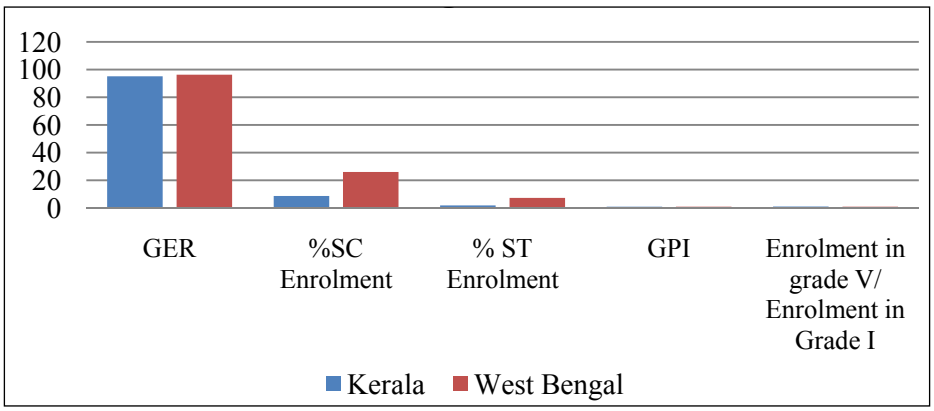




Source: *State Report Cards, DISE, 2006-07 and 2010-11*

Fig. 4: Status of Education Outcome in Kerala and West Bengal - 2006-07

Fig. 5: Status of Education Outcome in Kerala and West Bengal - 2010-11



Source: *State Report Cards, DISE, 2016-17*

Fig. 6 : Status of Education Outcome in Kerala and West Bengal - 2016-17

referred states has been discussed below (table 2).

In Kerala, Palakkad and Pathanamthitta consistently have been characterized as best district in terms of EOI. Whereas Kasaragod have been characterized as worst in this regard. On the other hand, in West Bengal, Paschim Medinipur, Jalpaiguri and Purulia, are good in terms of EOI. On the other hand, Darjiling and Purba Medinipur are poor in this regard.

Education Development Index (EDI) – A District Level Analysis

Composite index called Education Development Index is constructed with the help of principal component analysis by considering Access Index and Education Outcome Index. Now an attempt has been taken to consider the state and district variation in terms of the composite index (table 3).

Pathanamthitta, Kozhikode, and Kannur consistently rank highest in terms of EDI, with Pathanamthitta is leading due to strong performance in SC enrolment, primary completion rate, and school availability. The actual scenario is districts which are educationally developed on the basis of index value, have very poor backward caste enrolment percentage over the years and vice versa. Pathanamthitta is the only exception where the GER is poor but this district is quite ahead in terms of SC enrolment percentage. Districts like Idukki, Ernakulam, Thrissur, Kasaragod, and Wayanad remain among the poorest performers.

In case of West Bengal best districts in terms of EDI are Paschim Medinipur, Kolkata, Purulia, Bankura, Dakshin Dinajpur and Koch Bihar. Except backward caste enrolment, the performance of Kolkata has been good in other aspect like Access, GPI and Crude primary completion rate. Therefore, SC enrolment is highest in Cooch Behar and lowest in Howrah which supports the argument of Joy Karmakar (2016). Now when we talk about the worst performing districts, Darjiling, North 24 Parganas, Murshidabad and Haora has been the worst ones over the years in terms of EDI. Uttar Dinajpur initially ranked low in the composite index but improved over time, despite consistently having the lowest primary completion rate.

Percentage of SC and ST enrolment are intra class

Table 2: Education Outcome Index - A District level analysis of Kerala and West Bengal

Kerala	2006-07	2010-11	2016-17	West Bengal	2006-07	2010-11	2016-17
Alappuzha	0.483	0.530	0.304	Bankura	0.505	0.516	0.552
Wayanad	0.377	0.442	0.477	Kolkata	0.417	0.353	0.588
Idukki	0.386	0.375	0.364	Darjiling	0.488	0.418	0.431
Kasaragod	0.396	0.261	0.225	N-24 Parganas	0.393	0.56	0.450
Kollam	0.549	0.556	0.633	Bardhaman	0.471	0.533	0.561
Palakkad	0.390	0.584	0.612	Haora	0.411	0.403	0.446
Kozhikode	0.342	0.403	0.369	Murshidabad	0.392	0.432	0.469
Malappuram	0.329	0.489	0.396	Birbhum	0.527	0.509	0.498
Pathanamthitta	0.522	0.394	0.754	Jalpaiguri	0.561	0.624	0.535
Kannur	0.292	0.357	0.331	Koch Bihar	0.519	0.518	0.58
Thiruvananthapuram	0.503	0.495	0.596	Puruliya	0.438	0.429	0.706
Ernakulam	0.351	0.392	0.393	Hugli	0.475	0.523	0.493
Thrissur	0.496	0.458	0.393	Maldah	0.469	0.470	0.501
Kottayam	0.391	0.304	0.586	Dakshin Dinajpur	0.542	0.495	0.518
Kerala	**0.434**	**0.431**	**0.406**	Nadia	0.473	0.511	0.499
				S-24 Parganas	0.533	0.501	0.545
				Purba Medinipur	0.371	0.320	0.443
				Paschim Medinipur	0.634	0.429	0.581
				Uttar Dinajpur	0.373	0.428	0.546
				West Bengal	**0.528**	**0.480**	**0.534**

Source: *Author's calculation using PCA.*

Table 3: Education Development Index – A District level analysis of Kerala and West Bengal

Kerala	2006-07	2010-11	2016-17	West Bengal	2006-07	2010-11	2016-17
Alappuzha	0.562	0.490	0.419	Bankura	0.462	0.470	0.486
Kottayam	0.461	0.417	0.508	Koch Bihar	0.447	0.466	0.460
Idukki	0.267	0.252	0.359	Maldah	0.434	0.375	0.398
Malappuram	0.449	0.534	0.460	Darjiling	0.284	0.304	0.320
Kannur	0.497	0.561	0.508	Haora	0.363	0.304	0.313
Thiruvananthapuram	0.432	0.42	0.508	Hugli	0.327	0.356	0.334
Ernakulam	0.273	0.301	0.276	Puruliya	0.476	0.452	0.610
Kozhikode	0.574	0.574	0.567	Jalpaiguri	0.408	0.474	0.310
Palakkad	0.348	0.437	0.438	Bardhaman	0.313	0.369	0.373
Kasaragod	0.379	0.305	0.312	Kolkata	0.458	0.426	0.544
Thrissur	0.383	0.367	0.296	Purba Medinipur	0.358	0.370	0.414
Wayanad	0.279	0.283	0.331	Murshidabad	0.276	0.348	0.349
Kollam	0.454	0.455	0.532	Nadia	0.321	0.360	0.344
Pathanamthitta	0.606	0.555	0.707	Dakshin Dinajpur	0.453	0.477	0.459
Kerala	**0.416**	**0.405**	**0.393**	N.24 Parganas	0.279	0.327	0.302
				Birbhum	0.396	0.434	0.404
				Paschim Medinipur	0.474	0.474	0.550
				South 24 Parganas	0.324	0.350	0.365
				Uttar Dinajpur	0.274	0.391	0.418

Source: *Author's calculation.*

indicators. Primary schools in districts where backward caste enrollment is very low also find that there may not a single SC or ST child in a class. That is why although those districts are ahead in terms of infrastructure and learning achievement but are recognized as worst performers in terms of EDI. This fact holds true for both states.

Education Development: A Convergence Analysis

In order to measure the extent of disparities in EDI across the referred districts during the period 2006-07 to 2016-17 in both states Kerala and West Bengal, coefficient of variation is computed year wise (Fig. 7 and 8).

The disparity between the districts of Kerala initially increased till 2011-12 and thereafter reached 22 percent in 2012-13 which remained the lowest disparity percentage in this decade and then the percentage again increased and reached the initial level. So, inter district disparity remains almost stable for Kerala.

The coefficient of variation shows that inter-district disparity in West Bengal's EDI declined until 2010–11 (15%), then rose sharply, peaking in 2015–16, before slightly dropping to 21% in 2016–17.

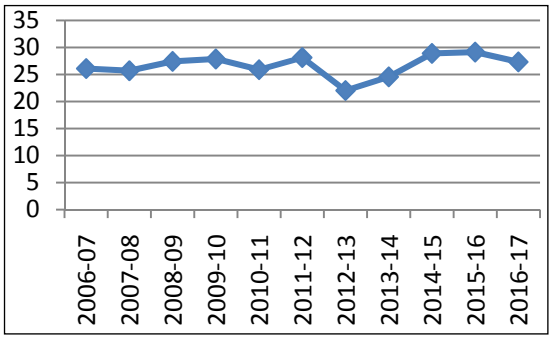
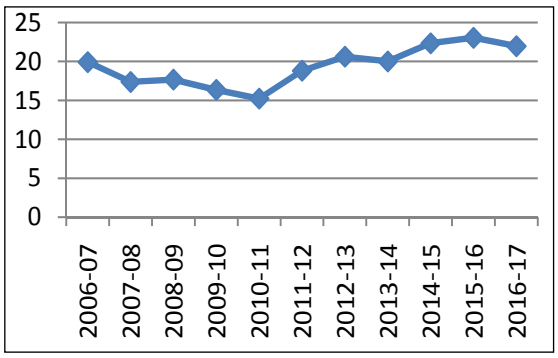


Fig. 7: Coefficient of variation (CV) of Education Development Index in districts of Kerala



Source: *Author's Calculation Source: Author's Calculation*

Fig. 8: Coefficient of Variation (CV) of Education Development Index in districts of West Bengal

Determinants of Education Development Index (EDI)- A Panel Regression Analysis

In this section an attempt has been taken to discuss about the determinants of EDI with the help of Panel regression analysis. It is a district wise analysis of both states Kerala and West Bengal for the period 2006-07 to 2016-17. The purpose of the analysis is to identify those factors on the basis of which a well-defined comparative analysis can be done through the identification of fundamental differences in the level of education development of the two states over the years. Here EDI is considered as dependent variable and the independent variables are: Pupil teacher ratio (PTR), Percentage of schools having Professionally Trained Teacher (PTT), Percentage of schools received Teaching Learning Material Grant (TLM Grant), Percentage of schools received School Development Grant (SDG Grant), District Per Capita Income (DPCI), Percentage of beneficiaries receiving incentives such as textbook and uniform (Previous year) (BRI), Percentage of Private school in a district (PS).

In table 4, list of independent variables with their expected signs are displayed against the dependent variable. Except Pupil Teacher Ratio, remaining independent variables are positive in nature.

Table 4: Expected sign of independent variables

Dependent variable: EDI	
Independent Variables	**Expected Sign**
PTR	Negative
PTT	Positive
SDG Grant	Positive
TLM Grant	Positive
DPCI	Positive
BRI	Positive
PS	Positive

The random effect result of two states is presented in table 5 and 6.

Pupil teacher ratio (PTR) expresses the relationship between total enrolment in schools of primary category and total teachers in schools of primary category. It is a qualitative indicator of education and negative in nature which means higher the ratio lower will be the effectiveness of learning. Increase in the value of this type of policy indicators is the responsible factors for explaining why student lose interests in classroom teaching in recent times (Das 2013). Therefore, teaching learning process is hampered by overcrowded classroom as well as insufficient teaching staff in comparison to student strength and as a result overall development of

Table 5: Panel Regression Result: A District level analysis of West Bengal

Random-effects GLS regression Number of obs = 209						
Group variable: district Number of groups = 19						
R-sq: within = 0.1408					Obs per group: min = 11	
between = 0.1105					avg = 11.0	
overall = 0.0283 max = 11					Wald chi2(7) = 23.70	
Corr (u_i, X) = 0 (assumed)					Prob > chi^2 = 0.0013	
Dependent variable: EDI						
	Coef.	***Std. Err.***	***z***	***P>|z|***	***[95% Conf. Interval]***	
PTR	-.0008535	.0004706	-1.81	0.070	-.0017758	.0000689
PTT	.0004018	.0001681	2.39	0.017	.0000723	.0007313
SDG Grant	-.000342	.0002089	-1.64	0.102	-.0007514	.0000674
TLM Grant	-.0000798	.0000894	-0.89	0.372	-.000255	.0000954
DPCI	6.40e-08	7.83e-07	0.08	0.935	-1.47e-06	1.60e-06
BRI	.0080942	.0028931	2.80	0.005	.0024238	.0137646
PS	.0011156	.0004881	2.29	0.022	.0001589	.0020723
Constant	.3820022	.0428699	8.91	0.000	.2979787	.4660258

Source: *Author's calculation using Panel Regression Analysis.*

Table 6: Panel Regression Result –A District level analysis of Kerala

Random-effects GLS regression Number of observation = 154						
Group variable: district Number of groups = 14						
R-sq: within = 0.0812			Obs per group: min = 11			
between = 0.3208				avg = 11.0		
overall = 0.1533				max = 11		
Wald chi2(7) = 14.03						
Corr (u_i, X) = 0 (assumed)			Prob > chi^2 = 0.0507			
Dependent variable: EDI						
	Coef.	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
PTR	-.0036861	.0011718	-3.15	0.002	-.0060029	-.0013693
PTT	.0006099	.0003023	2.02	0.044	.0000174	.0012024
SDG Grant	8.99e-06	.0005414	0.02	0.987	-.0010522	.0010702
TLM Grant	.0000502	.0002215	0.23	0.821	-.0003839	.0004843
DPCI	4.65e-07	1.20e-07	3.88	0.000	2.28e-07	7.02e-07
BRI	.0029621	.0033909	0.87	0.382	-.0036839	.0096082
PS	.0044046	.0017479	2.52	0.012	.0009788	.0078304
Constant	.4824879	.0935053	5.16	0.000	.2992209	.6657549

Source: *Author's calculation using Panel Regression Analysis.*

education got affected adversely. As expected, the variable has negative and significant impact upon EDI for both states. The p value for Kerala is statistically significant at the 0.05 level. Districts of Kerala consistently have much lesser SCR and PTR than actual norm which creates an advantageous ambience for its overall development in Education. Even the situation is improving for West Bengal also.

Percentage of schools having professionally trained teachers (PTT) has again positive and significant influence on Education Development. It is very important for teachers to be professionally trained to sense the child psychology in a right manner and treat them accordingly. In Kerala not only Government regular teachers but Government contractual and private teachers are equally professionally trained and due to this fact, we are getting a sound effect of trained teachers on development of primary education. The coefficient is positive and highly significant for both states at 0.05 levels although in West Bengal it has been observed that majority of Government regular teachers are professionally trained and this propensity is still significantly less among Government contractual and private teachers. At this moment we are all aware of the fact that the importance of contractual teachers is increasing as there are various problems related to transfer, absenteeism, non-academic pressure etc. associated with Government regular teaching staff employed in Government schools. Official non-teaching duties are sometimes cited as important causes of absence (Kremer *et al.* 2005). On the other hand, with growing penetration of private schools the requirement for professionally trained teachers in those schools is also broadening these days.

Economic wellbeing of any region is essential to ensure every prerequisite in the path to achieve development in primary education. It cannot be said that the development of primary education is absolutely certain if the region is economically sound but it can be admitted that the economic stability of a region is one of the necessary pre conditions in the path to achieve considerable success in several dimensions of social development. Here the coefficient of District Per Capita Income (DPCI) is positive and significant in case of Kerala but positive and insignificant for West Bengal.

From table 7 we can see the trends of PCNSDP for both states over a decade. It has been clear that the gap has gradually increased over time and although West Bengal known to be the largest state than Kerala in terms of area and population pressure, the income of the state has not grown as fast. This could be a possible reason for the above result.

Table 7: Per capita net state domestic product (PCNSDP) at current price in Kerala and West Bengal– Trends over time

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Kerala	41318	46865	54560	62114	69943	97912	110314	123388	135537	148133	166246
West Bengal	27823	31567	35487	41039	47245	51543	58195	65932	68876	75992	82291

Source: *Statistical Handbook, West Bengal, BAES, 2006-07 to 2016-17.*

There are actually three types of grants that every school receives each year which are School Maintenance Grant, School Development Grant (SDG) and Teaching Learning Material grant (TLM). Here in our analysis, we consider only later two. In SDG, five thousand rupees are sanctioned to each primary school every year to access various school equipment such as blackboards, mats and to buy chalks, dusters, registers and other office equipment. In TLM five hundred rupees are sanctioned to each teacher every year to buy various teaching aids like charts, posters, models etc. The coefficient of both type of grant is negative and insignificant for West Bengal but positive and insignificant for Kerala which imply financial assistance provided by Government in the form of school equipment and teaching aids is just irrelevant to explain the development of primary education in both states. Although the dominance of private schools increased in Kerala but the government schools is not at all endangered. Although the grant percentages for both states show a decline over time, but still Kerala is ahead of West Bengal and as a result at least the coefficient comes out to be positive for Kerala (table 8).

The coefficient of **percentage of private school in a district (PS)** has been positive and significant impact upon EDI in Kerala and West Bengal. Despite the percentage gap that exists between two states, therefore the impact has been the same over the years. Private schools have an influential impact upon overall education development measured in terms of gross enrolment as well as girl's enrolment and primary completion rate in both states. The advantages of this type of schools lies in better teacher and student attendance, low pupil teacher ratio and better-quality teaching. Poor performance of public school is the most important cause of private school existence rather than increasing income (Muralidharan and Kremer 2007). In Kerala the result is quite obvious but in West Bengal, even the contribution of fewer private schools to its education development is noticeable at the moment. The coefficient is positive and highly significant at 0.05 levels for both states.

Table 8: Trends of Grant percentage in Kerala and West Bengal

	2006-07	2010-11	2016-17
Kerala			
% schools received			
TLM	91.3	92.8	70.6
SDG	95.1	91.0	71.6
% Grants utilized			
TLM	100.6	98.0	97.3
SDG	99.5	97.8	98.0
West Bengal			
% schools received			
TLM	76.4	66.8	1.6
SDG	76.2	61.6	73.4
% Grants utilized			
TLM	91.1	91.4	84.5
SDG	88.8	83.5	91.1

Source: *State Report Cards, DISE, 2006-07 to 2016-17.*

Here attempts have been taken to investigate whether the **incentives provided by the Government in the form of textbook and uniform (BRI)** to primary school children have any direct impact on education development or not. It has been observed that in Bengal, as the dominance of Government schools is observed in a greater extent, incentives have a major role on education development. On the other hand, incentives have a positive and insignificant impact on education development in Kerala as significant enrolment pressure has been observed in private schools. Privatized schools are present in a greater percentage in south Indian states and that's why the state share to education sector from GSDP is less in comparison to East Indian states (Behera and Sahoo 2019). Incentives are mainly useful for them who

cannot be able to afford even the basic requirements to attend the school. This non affordability is observed especially among children from backward caste, many of whom are economically disabled that they usually take decision to continue schools based on that minimum incentive they receive. So, for West Bengal, this indicator has larger impact on Education Development compared to Kerala as in this state enrolment in Government schools as well as enrolment of backward caste children both are on a higher side (table 5).

CONCLUSION

In terms of access to educational institutions and backward caste enrolment, West Bengal comes out to be the better performed state than Kerala.It is clear that the problem of inter district disparity in West Bengal and Kerala is one of alarming magnitude, but also of great complexity. Although some districts hold good rank in terms of EDI but substantial improvement is needed in those districts in terms of many useful indicators and vice versa. In short, Kolkata, Bankura, Paschim Medinipur, Hugli from West Bengal and Pathanamthitta, Kollam, Kottayam, Alappuzha and Kannur from Kerala are best in terms of EDI. On the other hand, Uttar Dinajpur, Drajiling, Maldah, Murshidabad from West Bengal and Wayanad, Idukki, Malappuram, Palakkad, Kasaragod from Kerala are the worst performing districts in this regard. Educationally undeveloped districts have high gross enrolment as well as backward caste enrolment and vice versa. Both states need to intensify their effort to reduce regional inequality in achieving socio economic development.

EDI in Kerala and West Bengal is shaped by several key factors. As expected, Pupil teacher ratio has negative and significant impact upon EDI for both states. The presence of professionally trained teachers has a strong positive impact in both states, while financial grants—both for teaching materials and school development—are statistically insignificant. District per capita income significantly contributes to EDI in Kerala but not in West Bengal. Government school incentives are more impactful in West Bengal, whereas private school dominance in Kerala reduces their effect. Lastly, the share of private schools shows a significant positive influence on EDI in both states, enhancing enrolment and completion rates.

The whole scenario would have been different if there is enough allocation to education, if population is controlled, if there are no barriers to girl's education, accessibility and availability of schools is ensured and if there is no apathy on behalf of parents (Aruna, 1999) as well as Government etc. which can easily hinder the path which has been undertaken long ago in order to achieve development at any level of education.

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APPENDIX

1. An example of the calculation of weights using PCA for EOI is given below:

PCA (EOI) – 2016-17 (Kerala)

Component Matrix

	Component 1	Component 2
GER	-.580	-.133
%SC Enrolment	.777	.379
% ST Enrolment	-.656	.573
GPI	.592	-.520
CPCR	.610	.513

Extraction Method: Principal Component Analysis

Calculation of Weights

	Factor 1	Factor 2	Normalized by scaled to unity sum		Weight	Normalized Weight
GER	0.3361	0.0178	**0.16**	0.02	0.1072	0.19
%SC Enrolment	0.6034	0.1434	**0.29**	0.14	0.1943	0.34
%ST Enrolment	0.4302	0.3286	0.21	**0.32**	0.1056	0.18
GPI	0.3506	0.2708	0.17	**0.26**	0.0858	0.15
CPCR	0.3721	0.2627	0.18	**0.26**	0.0858	0.15
Explained variation	2.0924	1.0233			Total Weight = 0.5787	1
Sum of squared factor loading	3.116					
Explained/Total	0.67	0.33				

Source: *Author's Calculation.*

Similarly, all other indices have been constructed (Results will be available on demand).

2. Results of Breusch and Pagan Lagrangian multiplier test and Hausman test:

Correlation between independent variables has been checked before applying the panel regression analysis. A strong and negative correlation has been found between percentage of female teacher in schools and Pupil teacher ratio and District per capita income and again female teacher percentage. Therefore, by observing the scope of the paper the variable named percentage of schools having female teacher has been dropped in order to avoid multicollinearity problem.

Results of Breusch and Pagan Lagrangian multiplier test for districts of two states are displayed below:

❒ Breusch and Pagan Lagrangian multiplier test for random effects – West Bengal

ediaieoi[district,t] = Xb + u[district] + e[district,t]

Estimated results:

	Var	sd = sqrt (Var)
ediaieoi	.0056646	.0752634
e	.0009985	.0315996
u	.003722	.0610084

Test: Var(u) = 0

chibar2(01) = 531.46

Prob > chibar^2 = 0.0000

❒ Breusch and Pagan Lagrangian multiplier test for random effects – Kerala

ediaieoi[district,t] = Xb + u[district] + e[district,t]

Estimated results:

	Var	sd = sqrt(Var)
ediaieoi	.0126735	.1125767
e	.0024671	.0496694
u	.0026282	.0512655

Test: Var(u) = 0

$chibar^2(01) = 190.02$

$Prob > chibar^2 = 0.0000$

Results of Hausman test for districts of two states are displayed below:

❒ Hausman test – West Bengal

Test: Ho: difference in coefficients not systematic

$chi^2(7) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B)$

= 8.52

$Prob > chi^2 = 0.2893$

(V_b-V_B is not positive definite)

❒ Hausman test – Kerala

Test: Ho: difference in coefficients not systematic

$chi^2(7) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B)$

= 6.70

$Prob > chi^2 = 0.3492$

(V_b-V_B is not positive definite)