Returns to Education in West Bengal: The Role of Public Expenditure

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Abstract

The present paper examines patterns and growth of government expenditure on education in West Bengal. The growth rate of public expenditure on education is estimated with the semi-logarithmic stochastic regression model. Other relevant data and different indices (as developed by U-DISE and AISHE) are used to assess the relative educational performance of West Bengal vis-a-vis all India. There is a positive and significant impact of education on earnings in West Bengal and the rate of returns to education is estimated, on an average, 6.2 per cent per year. The estimated coefficient of interaction dummy in two period panel data of IHDS I and IHDS II analysis reveals the fact that returns to education for male is greater than that of female in rural areas but the reverse is true in the case of urban area in West Bengal. There is gender disparity in earnings also. The share of developmental expenditure on "Education, Art & Culture" in West Bengal is significantly high of 34.2 per cent as compared to other sectors like Medical (7.8%), Rural employment (11.5%), Housing & urban development (6.5%), Social security and welfare (9.4%), and Road transport (1.2%). The growth rate of public expenditure on education is also significantly 12.3 per cent per year during 1990-91 to 2014-15. General education shares about 98 per cent of total public expenditure on education and the share of technical education on public expenditure is only 1.66 per cent in 2014-15

Keywords: Education, Human Capital, Public Expenditure, Returns to Education.

JEL Classification: *H52, 124, 126, E24*

Introduction

Education is an important development priority for the government. The development expenditure of the government on education is a crucial determinant for the expansion of education. Expenditure on education is also considered an investment in human capital. An appropriate decision or proper plan of expenditure creates an opportunity to increase the expected returns to education. Education is considered as the heart of social and economic development. Education plays a stimulating role to accelerate economic growth. Education increases human capital, labour productivity, innovative capacity of the economy. It creates new knowledge, new technology, new products, and new processes that promote economic growth. Education also facilitates diffusion and transmission of new information and knowledge to accelerate economic growth. Knowledge is one of the key dimensions of human development. Investment in education and training promotes economic development through the enhancement of aggregate human

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capital which increases total productivity and earnings. Human capital is important for economic growth as it increases real earnings per worker and reduces poverty. In India, the average expenditure on education out of total household expenditure is different for different sectors viz. rural and urban households respectively. Education is considered as an important input for economic growth and human development. But duality in such input structure leads to duality in output structure resulting in disparities in wages and earnings, gender disparity, social disparity, inequality, unfavourable inclusion-exclusion, and rural-urban gaps. There is an increasing demand for technical and vocational education as compared to general education after the globalisation due to the well-paid labour market outcomes of vocational and technical education. In the existing literature of the subject, several attempts have been made to estimate returns to education at a macro level. There is no study to analyse patterns and growth of public expenditure on education in West Bengal during the reforms era and to estimate returns to education on earnings based on individual-level panel data. The present study is a modest attempt to fill up the gaps in the existing literature.

Database and Methodology

The study is based on dis-aggregated and aggregated secondary data collected from different sources and the major sources are: (i) Unit level (individual) two-period panel data of India Human Development Survey (IHDS I in 2004-05 and IHDS II in 2011-12) to assess impact of education on earnings with the help of Mincerian earning function, (ii) Unified District Information System for Education (U-DISE), NIEPA data for school education and All India Survey on Higher Education (AISHE), MHRD, GOI data for higher education to examine performance of West Bengal vis-à-vis India with different indicators in school education and Higher education respectively, (iii) Regarding the analysis of financial resource allocation on different types and levels of education we have resorted to Statistical Abstract (2015), Bureau of Applied Economics and Statistics (BAES), Government of West Bengal. We have also used (iv) NSS Report No. 575, *Education in India*, and NSS KI (71/25.2): *Key Indicators of Social Consumption in India: Education* to understand the extent of private expenditure per students at different levels of education, extent of private coaching and access to Computer and Internet facilities in West Bengal vis-a-vis India.

Some of the important indicators to analyse data to infer results of the study are: Intensity of institutes, Literacy rate, Gross enrolment ratio (GER), Gender parity index, Pupil-teacher

ratio, Financial Resource allocation (% share) to different types and levels of education, Physical infrastructure & equipment facilities in schools, and Average private expenditure per student by types and levels of education.

We have calculated the annual average compound growth rate of relevant variables by using the semi-logarithmic stochastic regression equation.

We have considered the following standard Mincer Earning function as (Model 1)

$$\ln w = \alpha + \beta S + \gamma_1 E + \gamma_2 E^2 + \text{“}\delta_k X_k + u$$

where, w= hourly wages (in Rs.), S= years of schooling, E=Experience which is defined as (age minus years of schooling minus 6 yrs.), X_k are other socio-economic and demographic explanatory variables such as Caste dummy (X_1)=1 for Non-SC/ST and =0 for SC/ST, place of residence (X_2)=1 for urban and =0 for rural, Gender dummy (X_3)=1 for male and =0 for female, education of the head of the family (X_4) in years of schooling, marital status (X_5) =1 for married persons and =0 for never married, ability (a proxy variable) (X_6)=1 for a person being able to speak in English and =0 for not able to speak English, occupation category or sector (X_7)=1 for agriculture and =0 for non-agriculture, and u is the error term. The estimated coefficient (β) of education (S) is the rate of return per year educational attainment.

In the extended model, the variable S is replaced by a series of dummy variables (for different levels of education) referring to the completion of education level to estimate the impact of different levels of education on earnings. The Extended or augmented Mincer earning function is as (Model 2)

$$\ln w = \alpha + \text{“}\beta_j S_j + \gamma_1 E + \gamma_2 E^2 + \text{“}\delta_k X_k + u$$

Where S_j denotes the j^{th} level of education (primary, middle, secondary, High secondary, graduate and above) and it is defined as S_j=1 for the j^{th} level of education and =0 otherwise. Illiterate is considered a base category.

We have used Two-Period Panel Data Analysis which is very useful for policy analysis and the method is ideally suited to estimate the return to education. The specification of the model is as follows:

$$\ln w_{it} = \alpha + \delta_0 d2_t + \beta S_{it} + \gamma_1 E_{it} + \gamma_2 E^2_{it} + \text{“}\delta_k X_k + a_i + u_{it},$$

where, t=2004-05, 2011-12, a_i contains unobserved ability, and time dummy (d2) =1 for 2011-12 and =0 for 2004-05.

The model allows different intercepts across time to account for aggregate productivity gains and inflation. We have considered Breush-Pagan (BP-LM) test for testing the random effect (RE) model. The advantage of RE model is that it allows generalising the inferences beyond the sample used in the model. A dummy variable (Male=1 and female=0) and its interaction effect with years of schooling is used in the regression model as one of the explanatory variables to assess gender disparity (differential performance) in returns to education.

Results and Discussion

Returns to education: Analysis of Regression results

The estimated regression results of the Mincerian earnings function are summarised in Table 1 and Appendix 1. Analysis of regression results reveals that the coefficient of years of schooling is being significantly positive which implies that education promotes earnings in West Bengal. On average, economic private return to education is estimated to be 6.2 per cent per year of educational attainment in West Bengal (model 1). In regression model 2, the value of the coefficient of education is increasing with levels of education which implies that returns to education on earnings increase with an increase in levels of education. The estimated coefficient of interaction dummy in two period panel data analysis (appendix 1) reveals the fact that returns to education for male is greater than that of female in rural areas (the coefficient of the variable 'sdm1f0' is significantly (5.4% level) positive of 0.01657) but the reverse is true in the case of urban area (the coefficient of the variable 'sdm1f0' is highly significant (less than 1% level) and negative of -0.0796) in West Bengal.

Table 1 Estimated Regression results of Mincer's earnings function: Panel Random-effects model: Dep. variable= log (wage)

Explanatory Variables	Model 1		Model 2	
	Coef.	P>|z|	**Coef.**	P>|z|
Constant	0.874	0.000	1.002	0.000
Time dummy (d2)	0.527	0.000	0.549	0.000
Years of schooling	0.062	0.000	---	---
primary1	---	---	0.065	0.056
middle1	---	---	0.307	0.000
secondary1	---	---	0.376	0.000
High secondary1	---	---	0.697	0.000
Graduate & above1	---	---	1.060	0.000
Experience (E)	0.031	0.000	0.028	0.000
Experience$(E)^2$	-0.0004	0.000	-0.0004	0.000
Caste (X_1)	0.108	0.000	0.099	0.001
Place of residence (X_2)	0.283	0.000	0.284	0.000
Gender (X_3)	0.301	0.000	0.341	0.000
Education of head (X_4)	0.013	0.001	0.016	0.000
Marital status (X_5)	0.104	0.008	0.103	0.008
English ability (X_6)	0.497	0.000	0.346	0.000
Major Occupation (X_7)	-0.030	0.208	-0.025	0.289
Wald chi2	3305.41		3510.68	
Prob> chi2	0.000		0.000	
R-sq: within=	0.501		0.512	
between=	0.569		0.587	
overall=	0.550		0.566	
No. of obs	2868		2868	
No. of groups	1434		1434	

The private rate of return to education on earnings per year for different levels of education is estimated at 1.7% for primary, 9.0% for middle, 22.8% for secondary, 50.4% for High

secondary and 62.9% for graduate and above. The coefficient of time dummy variable (d2) is also statistically significant which implies that the real wage income is increased as an impact of education in West Bengal during 2004-05 to 2011-12. Caste, sex, marital status, parental education, ability to English speaking, place of residence, sector of work, etc. are found to be important and statistically significant variables that influence returns to education on earnings in West Bengal.

Patterns and Growth of Public expenditure on education

The total developmental expenditure of the state of West Bengal on different heads including 'Education, Art, and Culture' is increased from Rs. 34563 million in 1990-91 to Rs. 603125 million in 2014-15 with an impressive average compound growth of 12.7 per cent per year. Table 2 shows the growth and structural distribution of such developmental expenditures of the state of West Bengal on different heads during 1990-91 to 2014-15. It is observed that the percentage share of developmental expenditure of the state on 'Education, Art and Culture' is significantly high compared to the expenditure on other heads but such share is decreased from 39.8 per cent in 1990-91 to 34.2% in 2014-15. The growth rate of public expenditure on education, art and culture in West Bengal is estimated at 12.3% per year during 1990-91 to 2014-15.

Table 2 Growth and Distribution (%) of Developmental Expenditure of the State of West Bengal on Education & other Heads

	1990-91	2000-01	2010-11	2014-15	Growth Rate(%)
Heads					
Total	100.0	100.0	100.0	100.0	12.7
Education, Art and Culture	39.8	37.5	40.4	34.2	12.3
Agricultural Research and Education	0.4	0.5	0.3	0.2	9.1
Medical	9.3	8.6	8.1	7.8	11.7
Family Planning, Public Health, Sanitation and Water Supply	5.3	6.0	2.8	3.2	8.6
Labour and Employment	0.8	0.5	0.4	0.5	9.6
Rural Employment	6.0	1.3	1.5	11.5	8.6
Special Programme for Rural Development	1.0	0.1	0.8	0.5	13.9
Special Areas Programme	1.7	3.0	2.2	2.4	13.8
Roads and Bridges	2.7	2.9	1.3	1.1	8.3
Road Transport	1.3	1.7	1.5	1.2	11.3
Energy	1.0	1.2	0.8	0.6	13.7
Housing and Urban Development	5.6	6.7	8.8	6.5	15.1
Social Security and Welfare	2.5	3.3	11.8	9.4	22.1
Others	22.7	26.7	19.3	20.8	

Source: Annual Financial Statements of the Government of West Bengal.

Note: Annual average compound Growth rate of expenditure during 1990-91 to 2014-15

The growth rate of development expenditure on the social sector and welfare is very significant of 22.1% in West Bengal; the share of this sector also increases from 2.5% in 1990-91 to 9.4% in 2014-15. The share of developmental expenditure on agricultural research and education, medical, family planning, public health, sanitation and water supply, labour and employment decrease during this period. The growth rates of expenditure on infrastructure development like road transport, energy, housing and urban development, rural development, special area programme in West Bengal are found to be significantly high during 1990-91 to 2014-15.

Component-wise analysis of developmental expenditure on 'Education, Art and Culture' reveals that the share of such expenditure on general education is the highest of 98.18 % followed by technical education (1.66%), Art and Culture (0.11%) and Sports and youth services (0.04%) in West Bengal during 2014-15 (Table 3). Further, within general education, the share of public expenditure on secondary education is the highest of 45.95% followed by elementary education (41.25%), higher education (11.43%) in 2014-15 (Table 4). The growth of expenditure on general education is found to be 12.3 per cent per year and the growth of expenditure on elementary education is 13.2% per year in West Bengal during 1990-91 to 2014-15. The annual growth rate of public expenditure on technical education in West Bengal is estimated at a significantly high of 12.8% during 1990-91 to 2014-15.

Table 3 Distribution (%) of Expenditure on Education, Art and Culture in West Bengal

Types of education	1990-91	2000-01	2010-11	2014-15	Growth
General Education	96.55	96.57	97.41	98.18	**12.3**
Technical Education	1.83	1.73	1.96	1.66	**12.8**
Sports and Youth Services	1.16	1.44	0.53	0.04	**2.2**
Art and Culture	0.47	0.27	0.10	0.11	**4.2**
Gross Total (%)	100	100	100	100	
Gross Total (Rs. in Million)	1374.8	1956.9	4564.3	6938.1	**12.2**

Source: Statistical Abstract, 2015, Govt. of West Bengal.

Table 4 Distribution (%) of Expenditure on General Education by the levels of education in West Bengal

Levels of General Education	1990-91	2000-01	2010-11	2014-15	Growth
Elementary Education	36.58	33.54	40.39	41.25	**13.2**
Secondary Education	47.08	47.20	46.03	45.95	**11.9**
University and Other Higher Education	13.66	15.33	12.10	11.43	**11.2**
Adult Education	0.56	0.28	0.05	0.09	**1.8**
Language Development	0.37	0.29	0.26	0.24	**11.1**
Others	1.76	3.36	1.16	1.04	**9.5**
Total	100	100	100	100	**12.3**

Source: Statistical Abstract, 2015, Govt. of West Bengal.

Major Issues in Education System in West Bengal

(i) The increasing cost of education

Private expenditure on education refers to the payments of course fees including tuition fee examination fees and other compulsory payments, purchase of books, stationery and uniforms, expenses on conveyance, private coaching, etc. An analysis of NSS data reveals that average private expenditure per student on education varies greatly by types of education (general, technical and vocational) in West Bengal as well as India (Figure 1). Private expenditure per student in technical education in West Bengal (India) is 8.7 times (9.3 times) higher than that of in general education in 2014; the corresponding figure in 2007-08 was 11 times in West Bengal and 13 times in India. Private expenditure per student in general education is increased at the rate of 25% per year in India and 19% per year in West Bengal during 2007-08 to 2014; the corresponding growth rate of private expenditure on technical education is 12% in West Bengal and 14% in India. Further, private expenditure per student increases with the levels of general education (Figure 2). In West Bengal (India), Post Graduate course is 4.1 times (3.5 times) more costly than the expenditure on primary education. Private expenditure on education also varies significantly across rural-urban areas. The average expenditure per student in primary education is Rs. 8670 in the urban area and Rs. 2159 in a rural area during academic session 2013-14 in West Bengal.

Figure 1 Expenditure (Rs.) per student by types of education in West Bengal vis-à-vis India, 2014

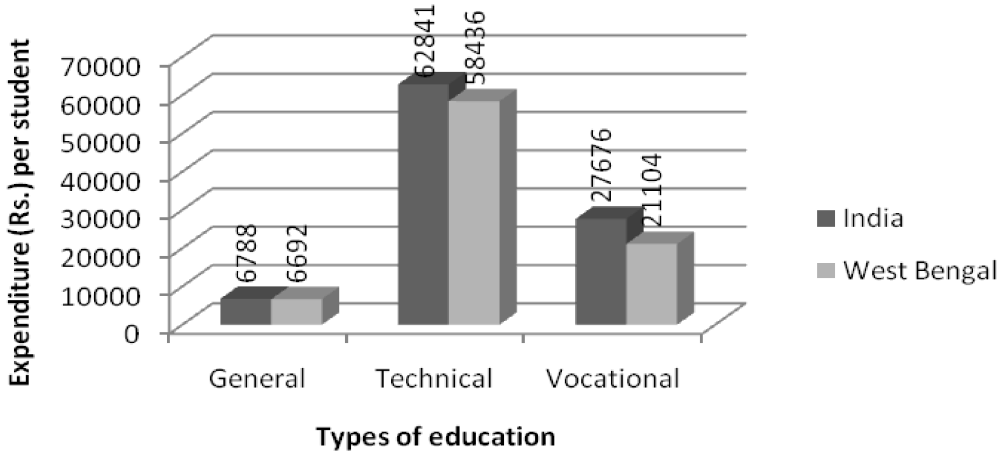


Figure 2 Average Expenditure (in Rs.) per student pursuing general education in West Bengal & India, 2013-14

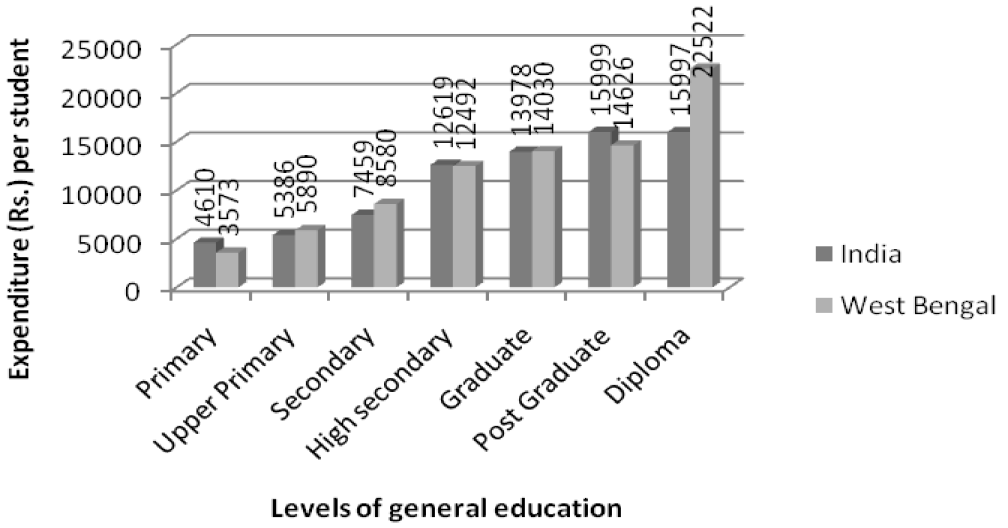
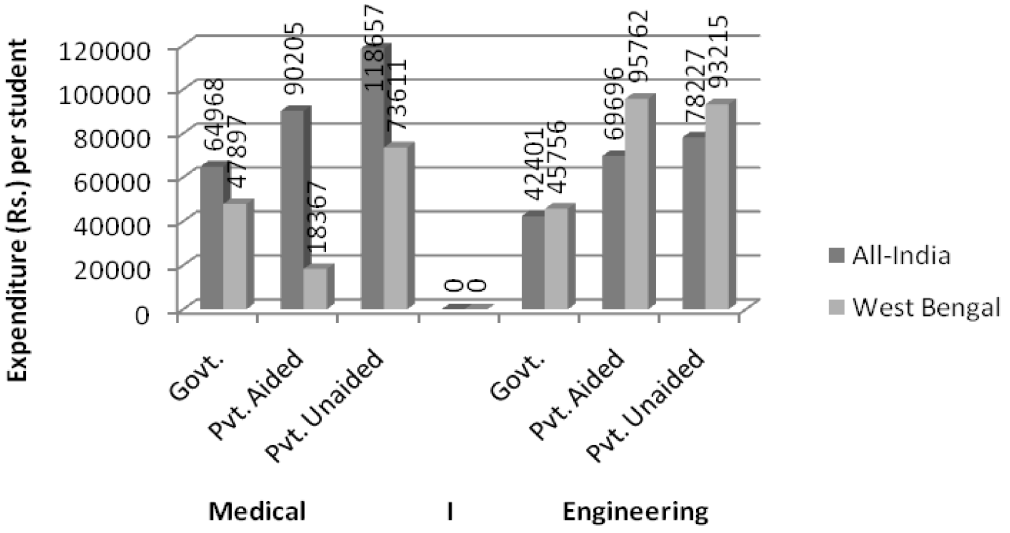


Figure 3 Average Expenditure (in Rs.) per student pursuing Medical and Engineering education in West Bengal & India, 2013-14



The different components of technical and professional education are medical, engineering, law, management, information technology, vocational courses, and other courses. There are

three types of institutions which are government (State and Central), private aided and private unaided. As far as the medical stream is concerned, the expenditure per student pursuing in this stream is lower in West Bengal compared with all India level for all types of institutions whether it is government or private. On the other hand, the expenditure per student on engineering education is higher in West Bengal compared to all India in each type of institution in 2013-14 (Figure 3). Thus, there is a possibility of outward movements of students from West Bengal to other states for engineering education and inflows of students from other states to West Bengal for medical education.

(ii) Excessive dependence on private coaching

Private coaching is an important issue in the education system of West Bengal. The proportion of students who are taking private coaching in school and higher education is 78.4% in West Bengal and 25.9% in India. In West Bengal, students are taking private coaching even at higher levels of education also (Figure 4). In school education, as the level of education increases the dependence on private coaching is also increases (Figure 5).

Figure 4 Percentage of students taking private coaching in levels of Higher education

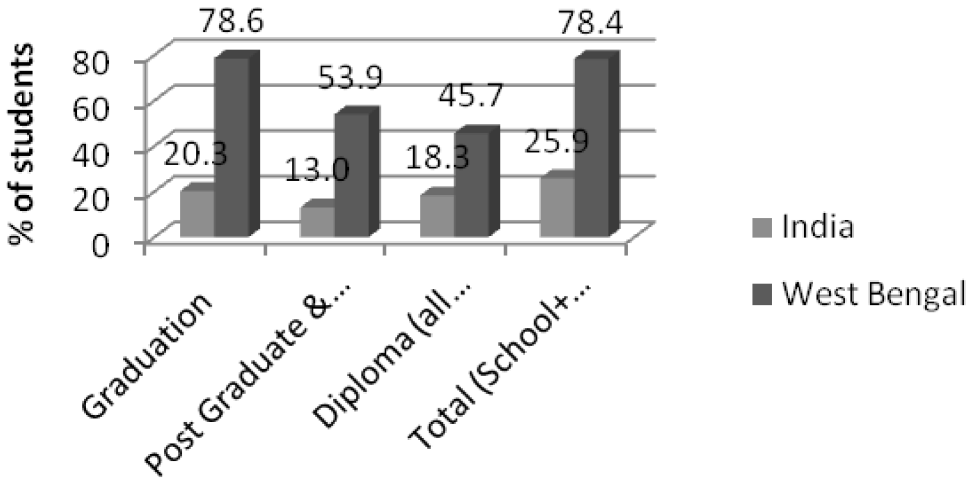
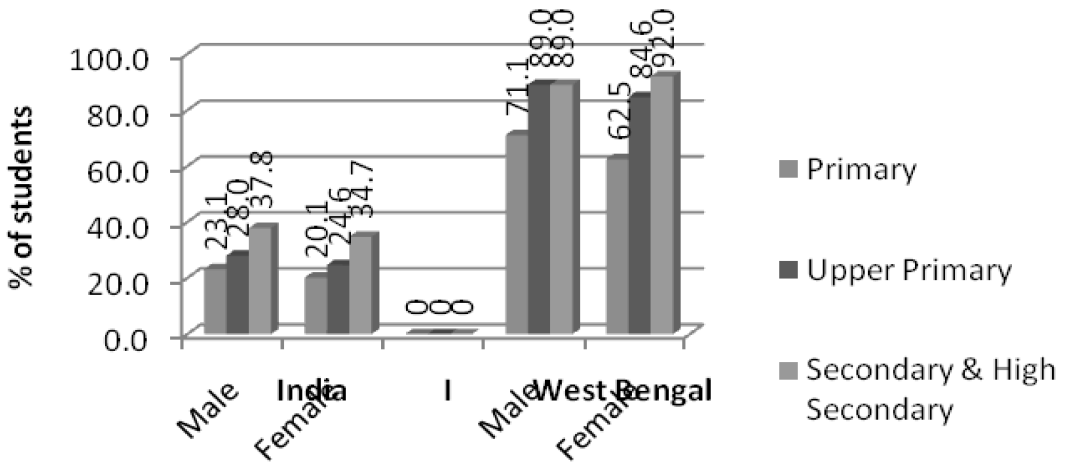


Figure 5 Percentage of students taking private coaching in levels of school education



(iii) Poor physical infrastructure facilities

Table 5 depicts school infrastructure (physical facilities and equipment) in West Bengal vis-a-vis India. The performance of West Bengal in respect of the percentage of schools with a separate room for Head Master, schools with playground facilities, library facilities, and computer facilities, etc. is observed to be lower as compared to those of the national average. Only 2.66% of schools have a Librarian in West Bengal. Today, a computer is essential in school education. The percentage of schools with the computer in working conditions is only 6.38 in West Bengal and 14.11 in India.

Table 5 School Infrastructure: physical facilities and equipment in West Bengal vis-a-vis India, 2016-17

Indicators	West Bengal	India
Percentage of Schools with:	(%)	(%)
school building	99.19	98.32
separate room for Head Master or principal	24.68	55.31
with ramp	58.30	61.31
Toilet facilities	98.42	91.34
playground facilities	40.87	61.98
Electric connection	79.13	60.81
library facilities	77.05	82.96
Librarian	2.66	5.02
Computer in working conditions	6.38	14.11

Source; U-DISE, Flash Statistics, NIEPA, 2016-17

(iv) Low access to computer and internet facilities

An analysis of NSS data (71st Round) on education survey reveals that 6.1% of rural households in India possessed a computer and the said figure for West Bengal is only 3.1% in 2014. The proportion of households having access to internet facility is 16.1% in rural India and 8.1% in rural West Bengal. Among the persons of the age group of 14-29 years, only 13.5% can operate the computer in West Bengal as against the national average of 18.3% in rural areas. Appropriate action is to be taken urgently to improve school infrastructure and use of equipment facilities especially to improve the ability to use computer and internet facilities in education West Bengal.

(v) Poor performance in Higher Education

An analysis of the All India Survey on Higher Education (AISHE) data reveals that West Bengal shares 7.7 per cent population in the age group of 18-23 years in India. But the contribution of West Bengal to the number of a higher education institution is 4.8% of Indian universities and 3.4% of colleges. The number of colleges per lakh population (18-23 years) is 12 in West Bengal and 28 in India during 2017-18; it was 9 in West Bengal 25 in India during 2012-13. Pupil-Teacher ratio is 33 in West Bengal and 25 in India during 2017-18. The percentage of part-time teachers in the total number of teachers is quite high of 18.77% as compared to an

All-India average of 7.37% in 2017-18.

Gross Enrolment Ratio (GER) in Higher Education in West Bengal is 18.7% in 2017-18 which is lower than that of All India (25.8%). GER in higher education for scheduled castes (SC) and scheduled tribes (ST) in West Bengal is also very low; GER for SC is 13.8% and for ST it is only 9.9%. Male GER is greater than female GER. but it is interesting to note that Gender Parity Index in West Bengal (India) increases from 0.76 (0.88) in 2012-13 to 0.88 (0.97) in 2017-18 with an annual growth rate of 2.14% (1.53%) during 2012-13 to 2017-18. The annual average compound growth rate of female enrolment in Under Graduate course through regular mode (which is the major component of Higher Education) during 2012-13 to 2017-18 is 5.9% in West Bengal and 4.8% in India as compared to growth rate of male enrolment of 0.4% in West Bengal and 2.9% in India. Female enrolment in Ph.D. is increased at the rate of 17.7% per year from 2012-13 to 2017-18 in West Bengal.

Regarding Out-turn/Pass-Out in Higher Education in West Bengal it is observed that a total of 385507 students pass- out at various levels of higher education (from certificate course to Ph.D. level) in West Bengal during 2017-18; UG shares 73.11% in total pass-out students followed by PG students (16.84%) and Diploma (8.29%). Job creation for such a huge number of (general) educated persons is not an easy task to the Government.

(vi) City-centric intensity of schools

School education comprises of different levels of education: Primary, Upper Primary, High and Higher Secondary. The total number of schools in West Bengal is 64970 (excluding SSKs/ MSKs and Private Schools) in 2014-15. The number of schools varies across districts. The average number of schools per sq. km in West Bengal is increased from 0.71 in 2011-12 to 0.73 in 2014-15. The number of schools per sq km is a maximum of 11.37 in Kolkata followed by Howrah (1.88), Hooghly (1.24), North 24 Parganas (1.18), Purba Medinipur (0.90), and Nadia (0.85) in 2014-15. The growth rate of the number of schools in West Bengal is estimated at 3.3 per cent during 2011-12 to 2014-15. The backward districts like Purulia, West Medinipur, Koch Behar, Dakshin Dinajpur, Malda, and Murshidabad remain above the state average growth rate of the number of schools. The correlation coefficient between the number of schools per sq. km of the geographical area of the district in 2011-12 and the growth rate of the number of schools during 2011-12 to 2014-15 is significant of -0.57 which implies that there is a palpable indication of convergence in the intensity of school education in West Bengal.

IV. Conclusions and policy prescriptions

Education is an important development priority for the government. The impact of education on earnings is positive and real wage income is increasing significantly. The rate of returns to education on earnings is increasing with an increase in levels of education. On average, the rate of returns to education is estimated at 6.2 per cent per year. The share of public expenditure on education in West Bengal is significantly high compared to other sectors. There is an impressive growth of public expenditure on education (12.3 per cent per year) but the share of developmental expenditure on education is declined from about 40 per cent in 1990-91 to 34 per cent in 2014-15 in West Bengal. General education dominates the system of education. General education shares 98.18% of public expenditure on education and the share of such expenditure on technical education is only 1.66% in 2014-15 in West Bengal. The study identifies some major issues in the education system of West Bengal such as increasing cost of education, excessive dependence on private coaching and part-time teachers, poor infrastructure and equipment facilities, low access to computer and internet facilities, poor performance in higher education and city-centric educational institutions. Positive aspects are the female participation in education is increasing significantly in rural areas in West Bengal and there is an indication of convergence in education across districts in West Bengal.

Policy prescriptions:

1. There is an urgent need for reforms in the education system in West Bengal toward the expansion of quality education and skill development. The development of physical infrastructure and equipment facilities and human resources management should be the priority agenda. Appropriate strategies should be taken to reduce dependence on private coaching.
2. The share of public development expenditure on technical and professional education should be increased. Some Job –oriented professional courses and training courses may be incorporated in general education institutes. Emphasis should also be given on the effective use of existing infrastructure facilities and resources.
3. Special attention should be given on enrolment in higher education among the backward community living in backward districts especially in Jungle Mahal districts.
4. Access to computer and internet facilities should be improved. Emphasis should also be given on reading, writing and speaking English.

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