



The Effectiveness of Government Elementary Education Expenditure on Dropout Rates in India

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Abstract: Since the independence of India, several changes have been made for financing education. It has been seen that the least importance is given to elementary education. This results in low literacy rates, high dropout rates, and even deprivation from elementary education. This study is an effort to evaluate the impact of public expenditure on education and its outcomes. The Fixed Effect panel regression model is taken for the analysis. The estimated results of the regression model revealed that public expenditure on education has long run positive sustainable impact on dropout rates. But there is no short-run significant impact of government educational expenditure on dropout rates, whereas per capita income has a significant impact on dropout rates. Further, the study analyses the determining factor for the outcome indicator. The results have shown huge variations in the impact of public expenditure on education among the states.

Index Terms - Elementary Education Spending, Dropout Rates, Per Capita Income, Fixed Effect Model

I. INTRODUCTION

The government plays a vital role in the growth and development of an economy, especially in under-developed and developing economies where per capita income and private investment are very low (Folster & Henrekson, 1999). The main motive behind most of the public expenditure is to provide public goods and services such as education, health, infrastructure, etc. The social sector has always been a pathway for providing sustainable development. Also, India has recognised the value of social sectors and has increased its expenditure in past years. According to Economic Survey (2021-2022), the Centre and state government is spending 8.6% of the GDP on the social service sector in the current financial year 2021-22, which in the absolute figure is 71.61 lakh crore. But in the previous year, the spending was 65.24 lakh crore which shows there is a growth of 9.8% in total spending of the social service sector. In the social sector, if we put some light on the expenditure on education and health, education spending is the same as the previous year, i.e., 3.1%, but in the health sector, there is a hike from the previous year, i.e., 1.8% to 2.1%. This study considers one of the important sub-sectors of social sector, namely, elementary education.

Many economic theories highlighted the importance of public spending on the education, such as human capital formation, economic growth, etc. (Romer, 1986). Human capital is defined as “*the stock of knowledge, skills, competences, and attributes embodied in individuals that facilitates the creation of personal, social, and economic well-being*” (OECD, 2001). People with better educational achievement are proved to be more productive and secure higher wages (Strauss & Thomas, 1998). But it has been seen that very less importance is given to the enhancement of the quality of education in developing countries. In this context, the UNESCO report (2000) states that around 130 million students dropped out in developing nations worldwide. In India, if we look at the figures of dropout rates at several levels of education, the dropout rate at primary, upper primary, and secondary school level is around 1.8%, 1.5%, and 17%, respectively. Also, approximately 30% of the students don't continue their education after matriculation (UDISE Report, 2019-20).

This study is an effort to evaluate the impact of public expenditure on education and its outcomes. We perform a panel correlation tests between public education expenditure and outcome indicators. Further, we developed the regression model for our study to investigate the effects of dropout rate as outcome indicator. The study analyse the determining factor for the outcome indicator.

II. REVIEW OF LITERATURE

There is a profuse contribution of literature that explains how public expenditure on education has a positive impact on educational outcomes in terms of growth in enrollment rates and decrease in dropout rates (Gupta et al., 2002; Al-Samarrai, 2003; De & Endow, 2008; Malik & Naveed, 2012; Boateng, 2014). However, many empirical studies show that there is no direct relationship between expenditure and educational outcomes (Mingat & Tan, 1998). Kaur & Mishra (2003) tried to analyse the impact of public expenditure on various levels of education. The data was taken from 15 different states of India. In this analysis, it was found that public expenditure has a larger effect on the primary level of education than on the secondary and tertiary levels. Roberts (2003) suggested that to get better educational outcomes, even if a nation is increasing its spending, it has to improve the efficiency and effectiveness of public education spending.

Many studies came out to highlight the reasons behind the high dropout rate. The first main reason for dropping out is the pressure of studying, and the second main reason is the family's financial situation (Islam & Pavel, 2011). Further, the most common reason behind dropouts in primary education found by researchers is the poor financial condition of the families (Khan et al., 2011). To arbitrate the impact of parents' interest on the results of urban schools, Jeynes (2007) introduces a systematic review of 52 studies. He found that the high chances of students dropout is due to less interest of parents in their child's education. Moreover, the other major reasons for students' drop out are hurdles in completing schooling like poor academic performance and low attendance (Roderick, 1993; Barsaga, 1995).

Many studies have tried to put forward different reasons for students' dropout. Research in USA pick out one main reason for dropping out of schooling by many students is their workload of doing homework and tiresome classes. They face problems in time management for different activities they want to do. They don't want to spend most of their time on those things in which they are not interested, or they are spending too much time with those who are also not interested in studies. The main reason students leave their school is fear of failure. (Bridgeland et al., 2006; Agbenyega & Klibthong, 2013). However, some socio-economic factors are also the cause of dropout for children. These causes are expensive education, family pressure of doing jobs and earning money instead of higher education, and early marriages (Abdullah-Al-Mamun et al. (2012); Rani, 2011). Moreover, researchers found that poor infrastructure is also a reason for dropouts. It includes poor quality of education, language barriers in teaching, inattention of teachers and safety and security of girls in schools. Furthermore, researchers also found poor infrastructure, poor educational quality, language barriers, poor attention of teachers, safety and security of girls in school, and distance of the school from home, as a few crucial reasons for dropout (Colclough et al., 2000; Hunt, 2008).

III. ANALYSIS OF PUBLIC EXPENDITURE ON EDUCATION

The use of public expenditure analysis for the assessment of the performance of public service delivery is a common trend nowadays. Especially in the education sector, it acts as an essential tool for the assessment of the efficacy of government spending. Since, it is important to get a detailed inspection of the budget while assessing the performance of education service delivery, using this method, the analysts are getting a deeper insight into the role of public spending in the education sector.

3.1 Public Expenditure on Elementary Education

Table 3.1 Public Expenditure on Elementary Education (*in Cr.*)

S. No.	States/Year	2005-06	2010-11	2015-16
1	ANDHRA PRADESH	2360	4084	5663
2	ARUNACHAL PRADESH	130	272	473
3	ASSAM	1420	3114	4744
4	BIHAR	2674	4969	5460
5	CHHATTISGARH	780	2085	3563
6	GOA	63	159	238
7	GUJARAT	2205	6245	10830

8	HARYANA	857	3043	5076
9	HIMACHAL PRADESH	619	1502	2017
10	JAMMU & KASHMIR	331	856	3687
11	JHARKHAND	1079	2684	3645
12	KARNATAKA	2667	5350	9373
13	KERALA	1390	2697	4995
14	MADHYA PRADESH	1934	4148	8321
15	MAHARASHTRA	4773	11919	19756
16	MANIPUR	177	226	511
17	MEGHALAYA	155	385	639
18	MIZORAM	138	263	407
19	NAGALAND	163	295	471
20	ORISSA	1257	3372	4212
21	PUNJAB	535	915	2659
22	RAJASTHAN	2751	5921	10517
23	SIKKIM	87	10	307
24	TAMIL NADU	2003	5991	11094
25	TRIPURA	183	320	531
26	UTTARAKHAND	499	1492	1841
27	UTTAR PRADESH	4770	10963	27033
28	WEST BENGAL	2105	4843	6691

Source: MHRD

The public expenditure on elementary education in all Indian states is shown in table 3.1. The highest expenditure made in 2005-06 and 2010-11 was by Maharashtra, and in 2015-16 the highest expenditure was made by Uttar Pradesh. We can clearly see from table 3.1 that overall expenditure has increased over time (from 2005-06 to 2015-16) by all the states. One more interesting point we can observe from here is that the growth of increase in expenditure was more during 2005-06 to 2010-11 rather than from 2010-11 to 2015-16, by most of the states. Only Jammu & Kashmir, Manipur, Punjab, Sikkim, and Uttar Pradesh showed more growth in the 2010-11 to 2015-16 period than the previous one.

3.2 Per Capita Income

Table 3.2 Per Capita Income (Nominal, in Rs.)

S. No.	States/Year	2005-06	2010-11	2015-16
1	ANDHRA PRADESH	28223	58733	108002
2	ARUNACHAL PRADESH	28171	60961	116985
3	ASSAM	18396	33087	60817
4	BIHAR	8223	19111	30404
5	CHHATTISGARH	20117	41165	72991
6	GOA	84721	168024	334576
7	GUJARAT	37780	77485	139254
8	HARYANA	42309	93852	164963
9	HIMACHAL PRADESH	36949	68297	135512

10	JAMMU & KASHMIR	23240	40089	73215
11	JHARKHAND	18326	34721	52754
12	KARNATAKA	28967	66951	148108
13	KERALA	36958	69943	148133
14	MADHYA PRADESH	16631	32453	62080
15	MAHARASHTRA	41965	84858	146815
16	MANIPUR	20251	28336	55447
17	MEGHALAYA	24885	43766	68836
18	MIZORAM	26698	50956	114055
19	NAGALAND	33792	55582	82466
20	ORISSA	18846	39537	65993
21	PUNJAB	36199	69582	118858
22	RAJASTHAN	20275	44644	83426
23	SIKKIM	30252	108972	245987
24	TAMIL NADU	31239	62251	142028
25	TRIPURA	26668	46050	84267
26	UTTARAKHAND	14221	26698	47118
27	UTTAR PRADESH	29441	73819	147936
28	WEST BENGAL	24720	47245	75992

Source: MOSPI

Table 3.2 shows the per capita income in different states for the periods 2005-06, 2010-11, and 2015-16. It varies greatly in different states. The per capita income is highest in Goa followed by Sikkim and Haryana, and it is least in Bihar followed by Uttarakhand and Manipur. With the increase in growth and prosperity of India, there is an increased trend for all States from 2005-06 to 2015-16.

3.3 Dropout Rates of Elementary Education

Table 3.3 Dropout Rates of Elementary Education (in %)

S. No.	States/Year	2005-06	2010-11	2015-16
1	ANDHRA PRADESH	9.6	5.4	6.72
2	ARUNACHAL PRADESH	15.9	18.7	10.82
3	ASSAM	11.2	8.6	15.36
4	BIHAR	11.4	6.4	
5	CHHATTISGARH	9.7	5.4	2.91
6	GOA		1	0.73
7	GUJARAT	4.3	4.3	0.89
8	HARYANA	12.7	6.2	5.61
9	HIMACHAL PRADESH	2.8		0.64
10	JAMMU & KASHMIR	8.5	5.3	6.79
11	JHARKHAND	17	10.5	5.48
12	KARNATAKA	2.1	3.6	2.02
13	KERALA	1.3		

14	MADHYA PRADESH	7.3	8.6	6.59
15	MAHARASHTRA	6.2	2.1	1.26
16	MANIPUR		9.1	9.66
17	MEGHALAYA	22.5	12.7	9.46
18	MIZORAM	3.2	12	10.1
19	NAGALAND	8.9	5.2	5.61
20	ORISSA	7	6.1	2.86
21	PUNJAB	8.9	1.8	3.05
22	RAJASTHAN	14.9	10.8	5.02
23	SIKKIM	5.7	7.1	2.27
24	TAMIL NADU	2	1.2	
25	TRIPURA	4	11.9	1.28
26	UTTARAKHAND	14.1	11.1	4.04
27	UTTAR PRADESH	11.5	5.8	8.58
28	WEST BENGAL	11.5	6.5	1.47

Source: EPWRF

Table 3.3 shows the elementary school dropout rates for the Major States of India in 2005-06, 2010-11, and 2015-16. In 2005-06, the least and highest dropout rates were in Kerala (1.3%) and Meghalaya (22.5%), respectively. States like Tamil Nadu (2%), Karnataka (2.1%), Himachal Pradesh (2.8%), and Mizoram (3.2%) have respectively lower dropout rates, whereas Arunachal Pradesh (15.9%), Rajasthan (14.9%), Uttarakhand (14.1%), and Haryana (12.7%) have respectively higher dropout rates. In 2010-11, the least and highest dropout rates were in Goa (1%) and Arunachal Pradesh (18.7%), respectively. A great improvement, in terms of dropout rates, has been made by Punjab, Uttar Pradesh, Maharashtra, and Jharkhand. On the other hand, a disappointing result is shown by Tripura, Mizoram, and Sikkim, because of an increase in dropout rates over the period of time. In 2015-16, the least and highest dropout rates were in Himachal Pradesh (0.64%) and Assam (15.36%), respectively. Dropout rates of Himachal Pradesh (0.64%), Goa (0.73%), and Gujarat (0.89%) were below 1%. Maximum states show positive results related to dropout rates over the period of time.

IV. THE PROBABILITY TEST

Before performing the panel data analysis, first, we will enquire whether there should be a pooling of data in the first place, or unspooling of data will give us better results. To do so, we have performed probability tests described in the following sub-sections.

4.1 Fixed Effect or LSDV Model

In this study we have taken Fixed Effect panel regression model for the analysis. For this we have gone through F-test. In this F-test, the pooled OLS model is considered as a restricted model and the Fixed Effects model is considered as an unrestricted model.

Table 4.1 F-test for the Fixed Effects

	DOR
RRSS	41.36
URSS	21.44
df1	138
df2	125
F-stat	8.93

F-critical*	2.84
Ho	Reject

*At 1% significant

The F-test result for dropout rates is presented in Table 4.1. The F-test has the null hypothesis that there is no significant relationship between public expenditure on education and dropout rates. The result shows that the F-statistic for dropout rates is significantly higher than the F critical value. Thus, test suggests rejecting the null hypothesis. We can now assume that there is a significant relationship between public expenditure on education and dropout rates. This shows F-test is in the favour of our fixed effect model.

4.2 Serial Correlation Tests

Table 4.2 Baltagi-Wu LBI test for Fixed Effects

S.No.	Dependent Variables	Baltagi-Wu LBI statistic
1	Drop-out Rates	1.819

The second question is the problem of serial correlation. The Baltagi-Wu LBI statistic presented in Table 4.2 for dropout outcome indicator and the test statistics rejects the null hypothesis of no first-order serial correlation.

V. SPECIFICATION OF THE MODEL

The model is formed with dropout rates being the dependent variable and independent variables being total expenditure on elementary education and per capita income. Generally, there is positive relationship between these variables, but we are here interested to know the effectiveness of public expenditure on education and per capita income on dropout rates. Accordingly, the model is specified in the following form:

$$\ln(Y_{it}) = \alpha_i + \beta_1 \ln(EXP_{it}) + \beta_2 \ln(PCI_{it}) + u_{it} \dots\dots\dots(1)$$

Y_{it} = Dropout rates indicator of the state i at time t

EXP_{it} = Total expenditure on elementary education of the state i at time t

PCI_{it} = Per capita income of the state i at time t

L_n = Natural logarithm

u_{it} = The panel error term

α_i = State-specific intercepts

VI. EMPIRICAL ANALYSIS

In this section, we tested the poolability of the data and the data was found to be poolable with a fixed effect method. We applied the panel data LSDV model to examine the impact of public education expenditure and per capita income on dropout rate outcome indicators and the variations of the parameter coefficients across the States. Here, we state the expectations of the expenditure and per capita income on the dependent variable. Public spending and per capita income are expected to have a negative relation with drop-out rates, which means the lowest estimated coefficients have the highest impact.

6.1 Effectiveness of Government Educational Expenditure on Drop-out rates

Table 5.1 Effect of Public Expenditure on Education and Per Capita Income on Dropout Rates

Variable	Coefficient	Std. Err.	t-Statistic	Prob.
Total Exp. on Education	-0.005	0.05	-0.101	0.918
Per Capita Income	-0.464	0.11	(-3.93)***	0.000
Constant	4.750	0.62	(7.57)***	0.000
R2	0.82			

Adj. R2	0.80			
No. of Groups	15			
Total no. of observations	150			

*denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

The fixed effects estimated results on drop-out rates are presented in (Table 5.1). The coefficient of public education expenditure on drop-outs rates is -0.005. It means that drop-out rates decreased by 0.005% points per increase in public education expenditure. But the t-statistic is only -0.101. It means that it is not statistically significant. In short, public expenditure on education doesn't have any influence on dropout rates. In the same way, dropout rates declined by -0.464 % points per unit increase in per capita income. The coefficient is significant at the 1 % level with a t-statistic -3.93. It means when 1 % increase in per capita income there is 0.464 % point reduction in dropout rates. The per capita income has more impact than public expenditure on dropout rates.

Table 5.2 Estimated Coefficients of Dummy Variables for Drop-out rates.

S.No.	States	Coeff.	Std. Err.	t-value	p-value	Rank
1	Andhra Pradesh	8.020	0.20	(16.63)***	0.000	13
2	Assam	7.908	0.20	(15.99)***	0.000	11
3	Bihar	7.935	0.23	(13.86)***	0.000	12
4	Gujarat	7.818	0.20	(15.59)***	0.000	10
5	Haryana	7.083	0.23	(10.17)***	0.000	3
6	Karnataka	7.546	0.20	(14.31)***	0.000	7
7	Kerala	4.750	0.60	(7.84)***	0.000	1
8	Madhya Pradesh	7.434	0.20	(13.61)***	0.000	5
9	Maharashtra	7.326	0.20	(13.08)***	0.000	4
10	Orissa	7.780	0.20	(15.2)***	0.000	9
11	Punjab	7.639	0.21	(13.52)***	0.000	8
12	Rajasthan	8.197	0.20	(17.44)***	0.000	15
13	Tamil Nadu	6.984	0.20	(11.41)***	0.000	2
14	Uttar Pradesh	7.517	0.22	(12.47)***	0.000	6
15	West Bengal	8.066	0.20	(16.81)***	0.000	14

*denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

The Table 5.8 showed the impact analysis on drop-out rates between the 15 States of India. Rajasthan, West Bengal, Andhra Pradesh, Bihar and Assam showed a lower impact on dropout rates. The impact is higher in the States Madhya Pradesh, Maharashtra, Haryana, Tamil Nadu and Kerala. The medium impact is seen in the States like Gujarat, Orissa, Rajasthan, Karnataka and Uttar Pradesh.

VII. THE DETERMINING FACTORS FOR OUTCOME INDICATOR

In this section, we consider an important point whether the impact of public expenditure and per capita income of the 15 states on outcome indicators is determined or not. For example, to see whether the highest impact on outcome indicators by a particular state is through high per capita income or high expenditure or other things. For this, we divided the impacts into three types for the states on each outcome indicator according to their highest efficient coefficients. The ranking from 1 to 5 states has the highest impact, whereas states ranging from 6 to 10 are considered as medium impact. The states, ranging from 7 to 15 are considered as lower impact. In the case of per capita income, average growth rates are used for ranking the 15 States. States with the highest ranking from 1 to 5 are considered as high per capita income states followed by middle-income states ranking from 6-10. The states with lower income ranking from 7-15 are considered with low

per capita income. This impact analysis and determination are clearly done in the following table for dropout rates outcome indicators.

Table 7.1 Impact analysis on Drop Out Rates (DOR)

DOR	High Exp.	Medium Exp.	Low Exp.	High Income	Medium Income	Low Income
High Impact	Tamil Nadu, Maharashtra	Kerala, Madhya Pradesh	Haryana	Haryana Tamil Nadu, Maharashtra	Kerala	Madhya Pradesh
Medium Impact	Uttar Pradesh	Karnataka, Gujarat	Orissa, Punjab	Punjab, Gujarat	Karnataka	Uttar Pradesh, Orissa
Low Impact	Bihar, West Bengal	Andhra Pradesh	Rajasthan Assam		West Bengal, Andhra Pradesh, Rajasthan	Bihar, Assam

The states with high expenditure and high per capita income and their high impact is high on dropout rates are seen in Tamil Nadu and Maharashtra (Table 7.1). Madhya Pradesh has medium expenditure on education and lower per capita income, but the impact is higher. Though high expenditure is seen in Bihar, West Bengal, and Andhra Pradesh they showed lower impact on dropouts. The higher impact of the public education expenditure on the dropout rates is seen in Madhya Pradesh, Kerala, Tamil Nadu, Maharashtra, Gujarat, Uttar Pradesh, Orissa, Punjab, and Haryana, whereas a lower impact is seen in Bihar, West Bengal, Andhra Pradesh, Rajasthan and Assam.

VIII. CONCLUSION

Since the independence in India, several changes have been made for financing education. It has been seen that the least importance is given to elementary education. This results in low literacy rates, high dropout rates, and even deprived of elementary education. In recent years, a positive improvement is observed in elementary education but still according to a national household survey commissioned by Government of India (SRI, 2005) 7.8 million children are out of the picture of having primary education. This study examines how public expenditure on elementary education affects dropout rates.

The estimated results of the regression model revealed that public expenditure on education has long run positive sustainable impact on dropout rates. But there is no short-run significant impact of government educational expenditure on dropout rates, whereas per capita income has a significant impact on dropout rates.

Further, we analyzed the impact of examining public elementary education expenditure and per capita income on school dropout rates. The results have shown huge variations in the impact of public expenditure on education among the states. But these variations do not explain the states' proximity to achieve the full literacy rate, primary gross enrollment ratios, and reduction in dropout rates. Whereas, these variations reflect the inefficiency in translating public education spending into desired education outcomes. Public expenditure on education per se will not necessarily produce progress toward the MDG.

To achieve the MDG education target of literacy rate, gross primary enrollment and dropout rates, public education spending alone cannot bring colossal progress. There are several other factors that influence greatly such targets, for example, on the demand side – health, adult literacy, and poverty; and on the supply side – efficient, effective resource management and quality. Any increase in expenditure without addressing these aspects can never be an effective expenditure. A high amount of input costs will be absorbed by the higher outlays, and thus it will increase the inefficiency of the expenditure. Therefore, there is a need for change in the education programs because increasing expenditure may increase the enrollment rates at first, but it cannot last long.

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