International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Determinants of Public Expenditure on Education in India: An Empirical Analysis

Noopur Verma

Assistant Professor, Department of Economics, Rambriksh Benipuri Mahila Mahavidyalaya, Babasaheb Bhimrao Ambedkar Bihar University, Muzaffarpur

ABSTRACT

This paper tries to identify the major determinants of public expenditure on education in India using multiple regression analysis and their implication in policy analysis. The explanatory variables identified in the study are economic growth expressed in GDP per capita, the annual average growth rate of enrolment and certain policies related to education. In addition to these, the Indo-China War, 1962 and the introduction of India's new economic policy in 1991 have also been considered to have their respective influence on public expenditure on education. The major findings of the paper highlight the influence of the policies on public expenditure on education to be significant. Amongst all the educational policies identified in the study, the effect of NPE, 1986 has been most promising for the expenditure on education in the years following the introduction of the policy.

JEL Classifications: H52, I21

Keywords: Public Expenditure on Education, Economic Growth

INTRODUCTION

Public expenditure has always been subject to serious research investigation, particularly about its relation to economic growth. Structural changes in an economy have a significant impact on the public expenditure as can be ascertained from the economic reforms introduced in India in 1991, which may have altered the pattern of expenses incurred by the government. It is not only the economic reforms but also civil emergencies like war and depression that require a sizeable increase in their relative share of expenditure, to external forces like war influence the pattern and cause displacement effect (Peacock and Wiseman, 1961).

In the light of the above, the pattern of public expenditure on education in India has been examined in this study. In India, there are certain issues associated with the public expenditure on education. The Education Commission (1964-66) recommended for the allocation of 6.0 percent of Gross National Product (GNP) to education by 1985-86, for education to be adequately developed. The National Policy on Education (1968) accepted the recommendation, but this goal could not be achieved till the 1980s. Subsequently, the National Policy on Education (1986) restated this goal to be reached with the commencement of the eighth five- year plan (1992-97) which was reiterated in *Program of Action* (1992).

Public expenditure incurred in general and on education, in particular, has experienced expansionary as well as contractionary phase during the post-independence period. The expenditure on education as a proportion of GDP in 1951-52 was 0.64 percent, rose to 3.8 percent in 2010-2011 while, the expenditure on education as a percent of total public expenditure was 7.92 percent in 1951-52, and almost doubled

itself to the tune of 14.16 percent in 2010-11. However, the trend has not been smooth from 1951-52 to 2010-11, as the expenditure on education as a proportion of GDP reached its peak at 4.28 percent in 2000-01 and, expenditure on education as a percent of total public expenditure was 14.42 percent in the same year. The changing trend of the public expenditure on education in India in the post-independence period necessitates a study of the factors affecting public spending on education.

REVIEW OF LITERATURE

In identifying the determinants of expenditure on education, Shariff and Ghosh (2000) found that the expenditure on education increased in the states with low per capita income as compared to the states with higher per capita income. However, Chakrabarti and Joglekar (2006) identified that the expenditure on education increased in the states with high per capita NSDP. In analyzing the role of enrolment in education on expenditure on education, Adewuyi and Okemakinde (2012) have found it to be positive and significant for expenditure on the elementary level of education. Fernandez and Rogerson (2001), and Tilak (1993) have identified an increase in enrolment to be negatively related to the expenditure incurred on education.

Table 1: Determinants of Public Expenditure on Education as Identified in the Empirical Studies

Year	Author	Area of the study	Time Period	Determinants identified in the study
1989	Tilak	Latin American and the Caribbean region	1960-1985	GNP per capita, growth rate of GDP and in GNP per capita, external public debt
1993	Tilak	East Asia (ASEAN member countries)	1960-1990	GNP per capita
2000	Ranis, Stewart and Ramirez	Africa, Latin America & Caribbean, South America & Caribbean, South Asia, East Asia and the Middle East	1960-70, 1970-80 and 1980-92	Lagged GDP per capita growth rate, social exp. as a percentage of GDP, GER of female in primary school in 1965
2000	Shariff and Ghosh	All India	1980-1981, 1985-1986, 1990-1991, and 1995-1996	NSDP per capita

2001	Fernandez and Rogerson	48 states in the United States	1950-1970 and 1970-1990	Personal income, enrolment, population in the age-group of 5-17 and above 65
2006	Chakrabarti and Joglekar	15 major states in India	1980-81 to 1999-2000	NSDP, grants from the centre as a percentage of NSDP, population in the age group 5-24, reform in 1991
2008	AL-Yousif	GCC countries	1977-2004	GDP per capita growth rate
2012	Adewuyi and Okemakinde	Oyo and Lagos states, Nigeria	1990-2004	Government income, enrolment, and inflation

From the review, most of the studies have confined to the economic and demographic variables in identifying the determinants of the public expenditure on education. The impact of the structural breaks on public expenditure on education has not been focused upon largely. Although several studies are conducted to analyze the significance of P–W hypothesis in the Indian setting, the validation on social expenditure in general and education, in particular, has not been undertaken explicitly.

In the light of the above, the present study seeks to analyze the influence of a few important factors in general, and the effect of economic growth in particular on public expenditure on education in India.

METHODOLOGY AND DATABASE

In this section, we describe the research methods adopted in this study to analyze the determinants of public expenditure on education in India. It also describes the variables, the rationale for their identification as possible determinants, the specification of the model, the procedure of estimating the model, and the sources of data.

Operational Definitions and Choice of Variables

The public expenditure refers to real expenditure by the Centre and state governments. The expenditure on education has been restricted to revenue expenditure by education department only.

Public expenditure on elementary, secondary, university & higher and technical levels of education has been considered in the present study, along with the expenditure on the total education sector. The levels of education have been defined as per the definition given by the Ministry of Human Resource Development (MHRD). The elementary level of education comprises of grade one to eight. The secondary level of education comprises of both secondary as well as the senior secondary level of education. The higher level of education has been bifurcated into university & higher level and technical level of education.

The study has used four measures for public expenditure on education:

1. Annual rate of growth in public expenditure on education:[i]

Annual average growth rate of public expenditure on education (GR) refers to average increase in public expenditure on education over a year's period.

2. Per student expenditure on education:

Per student expenditure on education (PSE) is derived by dividing the total public expenditure on education with the total number of students by level[ii]

3. Public expenditure on education as percent of GDP:

Public expenditure on education as a percent of GDP refers to the share of public spending on education in the GDP of the country

4. Public expenditure on education as a percentage of total government expenditure:

Public expenditure on education as a percentage of total revenue expenditure shows the share of public expenditure on education in the revenue expenditure by the government in all sectors.

The explanatory variables used in this study are as follows:

Economic variables

Economic growth may have a positive influence on the public expenditure on education, i.e., expenditure on education may increase to generate human capital for further growth of the economy. However, increasing economic growth may lead to a decline in the public expenditure on education if resources are prioritised towards other sectors of the economy.

As identified by Wagner, the public expenditure (current value) depends partly on its value in the preceding period and partly upon its growth from the preceding to the present period. Public expenditure (lagged value) as an explanatory variable helps in determining the variation in the current level of spending (Prakash and Chowdhury, 1994).

GDP (at 2004-05 prices) has been used as a proxy for economic growth wherein GDP per capita has been identified to be the function of public expenditure on education.

Public expenditure on education as a lagged variable has been identified as one of the determining factors of public spending in the current year.

Policy variables

To identify the influence of educational policies on public expenditure on education, three policies about education have been identified, which are National Policy on Education (1968), National Policy on Education (1986), and Samagra Shiksha Abhiyan (2000). The Constitutional amendment (CA) in 1976 has also been identified to be influencing the public expenditure on education as education was transferred to concurrent list. It implies that education became a subject of concern of both Centre and state governments with the promulgation of the amendment in 1976, before which it was under the purview of the state governments.

Also, the effect of the war period, as well as the structural change of the economy on public expenditure on education, has been accounted for using dummy variables. The war period has been identified as, Indo-China War in 1962 and structural change in the economy has been designated as the year 1991 when the New Economic Policy (NEP)[iii] was introduced. The effect may be visible in the initial few years of the policy framed as well as in the aftermath of war; this effect may have a tendency to taper off in the long run. These dummies are so created, so as to assume the value ‘one’ for four years following the war/policy, otherwise ‘zero’. It has been assumed that the policies in general and the war in particular may not have a long-term effect.

Education-related variable

Enrolment has been considered as one of the determinants of public expenditure on education. With the increase in enrolment, more resources must be diverted towards education, thereby leading to a rise in expenditure. If a particular level of education experiences an increase in enrolment, the relative share of

expenditure allotted to the other levels of education may have reduced. The enrolment by stages of instruction has been considered in the study. The annual growth rate of enrolment has been used as the education-related variable.

In all, the following variables are used in the study:

Table 2: Identification of Variables

S. No.	Variable	Notation of the variable
1.	Public expenditure on education (in Rs. Crore)	PE
2.	Annual average growth rate of public expenditure on education (in %)	$GRPE$
3.	Per student expenditure on education (in Rs.)	PSE
4.	Public expenditure on education as a percent of Gross Domestic Product (in %)	PE/GDP
5.	Public expenditure on education as a percent of total revenue expenditure (in %)	PE/TE
6.	Economic Growth (GDP per capita in Rs. Crore)	GDP/N
7.	Annual average growth rate of GDP (in %)	$GRGDP$
8.	Enrolment by stages of instruction	EN
9.	Annual average growth rate of enrolment by stages of instruction (in %)	$GREN$
10.	Indo-China War (1962) where D=1, for 1963-64 to 1966-67, otherwise 0	D_1
11.	National Policy on Education (1968) where D=1, for 1968-69 to 1972-73, otherwise 0	D_2
12.	42nd Constitutional Amendment (1976) where D=1, for 1976-77 to 1979-80, otherwise 0	D_3
13.	National Policy on Education (1986) where D=1, for 1986-87 to 1989-90, otherwise 0	D_4
14.	New Economic Policy (1991) where D=1, for 1991-92 to 1994-95, otherwise 0	D_5
15.	SSA (2000) where D=1, for 2000-01 to 2003-04, otherwise 0	D_6

Specification of the Model

The objective of the study is to identify the factors determining public expenditure on education. The time-period of the study has been designated as 1951-52 to 2010-11, spanning eleven five-year plan periods.

The public expenditure on education is the dependent variable. The independent variables are economic growth expressed as GDP/GDP per capita as a lagged variable, enrolment in the current period and the war and policies as the dummy variables.

The multiple regression equation (Semi-Log) employed to analyze the effect of the determinants on public expenditure on education has been given below:

$$LnPE_t = \alpha + \beta_1 GDP_{t-1} + \beta_2 EN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$$

The regression equation identified for annual average growth rate of expenditure on education is as mentioned below:

$$GRPE_t = \alpha + \beta_1 GRGDP_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots (1)$$

The regression equation identified for per student expenditure is as mentioned below:

$$\text{Ln}PSE_t = \alpha + \beta_1 (GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t \ldots\ldots\ldots\ldots (2)$$

The regression equation identified for expenditure on education as a percent of GDP is as mentioned below:

$$\text{Ln}(PE/GDP)_t = \alpha + \beta_1 (GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t \ldots. (3)$$

The regression equation identified for expenditure on education as a percent of total revenue expenditure of the government is as mentioned below:

$$\text{Ln}(PE/TE)_t = \alpha + \beta_1 (GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t \ldots.. (4)$$

β_1, β_2, β_3, β_4, β_5, β_6, β_7 and β_8 represent a change in public expenditure on education due to change in GDP in period t-1, enrolment by stages of instruction in period 't', and D_1, D_2, D_3, D_4, D_5 and D_6 as dummy variables, respectively.

In the regression equation, D represents the time dummy,

Where D = 1, for 't' four years after war/policies, 0 otherwise

$\varepsilon_t \sim N(0, \sigma^2)$ is the stochastic error term.

Estimation Procedure

Time series analysis has been undertaken to study the determinants of public expenditure on education in 1951-52 to 2010-11.

The Augmented Dickey-Fuller test has been used to check the presence of unit root in the data pertaining to public expenditure on education and annual average growth rate of public expenditure on education both at the aggregate level and by levels of education.[iv]

The various assumptions of the linear regression model and autocorrelation in the data have also been checked. The significance of the statistical results has been tested using Student's t- test, the coefficient of determination, and analysis of variance as well.

Sources of Data

The study is based on time-series analysis and relies on secondary data sources. Owing to the lack of a

single source of data, varied data sources have been used.

- Data on expenditure on education from 1991-92 to 2010-11 has been extracted from *Analysis of Budgeted Expenditure* which is an annual publication by MHRD.
- Data on expenditure on education from 1951-52 to 1990-91 has been extracted from *Budgetary Resources for Education (1951-52 to 1993-94).* The document is a compilation of the expenditure on education during 1951-52 to 1993-94 and has been published by MHRD in the year 1995.[v]
- Data on enrolment has been collected from *Education in India* for the period 1951-52 to 1974-75 and *Selected Educational Statistics* (SES) has been the data source for enrolment from 1975-76 to 2006-07.
- *Statistics of school education* has been used to collect data on enrolment in the elementary and secondary level of education from 2007-08 to 2010-11.
- *Statistics on higher and technical education* has been used to provide data on higher and technical level from 2007-08 to 2009-10.
- *All India Survey on Higher Education* has been the source for the same level in 2010-11.
- Data on total revenue expenditure of the government has been extracted from *Budgetary Resources on Education in India (1951-52 to 1993-94), Analysis of Budgeted Expenditure* (various years), and *Indian Public Finance Statistics* (various years).

Determinants of Public Expenditure on Education: Results and Analysis

This section presents the empirical examination of the effect of economic growth on public expenditure on education and, of the determinants of public expenditure on education**.** To identify the impact of other variables on the public expenditure on education, along with the economic growth, a multiple regression analysis has been undertaken.

An analysis of the effect of the determinants on total education sector.

The influence of the explanatory variable on public expenditure on education has been analyzed, while controlling for the effect of other variables.[vi]

Table 3: Determinants of Public Expenditure on Education

$LnPE_t = \alpha + \beta_1 GDP_{t-1} + \beta_2 EN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$				
	$Ln(PE/GDP)_t$	$LnPSE_t$	$Ln(PE/TE)_t$	$GRPE_t$
$GRGDP_{t-1}$	-	-	-	0.38 (1.28)
$(GDP/N)_{t-1}$	0.00*** (5.10)	0.00*** (15.71)	0.00** (2.15)	-
$GREN_t$	-0.03** (-2.36)	-0.03*** (-2.72)	0.003 (0.85)	0.06 (0.17)
D_1(Indo-China War, 1962)	-0.06 (-0.37)	-0.22** (-2.35)	-0.08* (-1.92)	-4.04 (-1.09)
D_2 (NPE, 1968)	0.11 (0.77)	-0.07 (-0.78)	-0.06 (-1.58)	-0.93 (-0.28)
D_3 (CA, 1976)	0.28* (1.92)	0.14 (1.46)	-0.06 (-1.37)	-5.48 (-1.51)

D_4(NPE, 1986)	0.47*** (3.24)	0.33*** (3.58)	0.09** (2.11)	-0.09 (-0.03)
D_5 (NEP, 1991)	0.34** (2.38)	0.23** (2.48)	0.04 (1.03)	-8.22** (-2.26)
D_6 (SSA,2000)	0.16 (1.06)	0.19* (1.97)	-0.04 (-0.85)	-9.15** (-2.53)
Constant	0.37*** (2.72)	6.75*** (77.75)	2.28*** (58.36)	7.89*** (3.17)
Adjusted-R^2 F- stat df	0.55 9.82*** 58	0.89 60.65*** 58	0.22 3.033*** 58	0.10 1.80 57

Notes: Figures in parentheses refer to t- statistic

The figures above t-statistic values refer to the coefficients.

***significant at 1% level, **significant at 5% level, and *significant at 10% level

df refers to the degree of freedom.

Public expenditure on education as a percent of GDP. The statistical results connote that with one percent increase in the growth of the economy, the share of expenditure on education in GDP has been increasing over the period of the study, even after controlling for the other variables. The coefficient for the expenditure on education as a percent of GDP is statistically significant and has a negative value with respect to the annual average growth rate of enrolment in total education sector; hence, with the increase in the annual average growth rate of enrolment by one percent, the share of public expenditure on education in GDP has declined by 0.03 percent.

The coefficient for the share of total expenditure on education in GDP has been negative, but not statistically significant onD_1(Indo-China War, 1962). The coefficients are statistically insignificant for the share of expenditure on education in GDP with respect to D_2 (NPE, 1968) and also, D_6 (SSA, 2000). The coefficient with respect to D_3 (Constitutional amendment, 1976) is statistically significant, and positive for the share of public expenditure on education in GDP. The coefficient obtained is positive and statistically significant with respect to D_4 (NPE, 1986) as well. The share of expenditure on education in GDP has been increasing with the formulation of NPE in 1986. The coefficient with respect to D_5 (NEP, 1991) has been significant, and surprisingly yields positive value at aggregate level of education. The reforms had a positive impact on the share of expenditure on total education sector in GDP.

Per student expenditure on education. Table 3 shows the relationship of per student expenditure on education with economic growth, the annual average growth rate of enrolment in the total education sector and structural breaks in the given period of the study.

The coefficient highlights a significant as well as positive influence of GDP per capita on per student expenditure in the total education sector. The coefficient of the annual average growth rate of enrolment is statistically significant, but negatively related to per studentexpenditure. The decline in per-student expenditure on education implies that with the increase in the annual average growth rate of enrolment, the government has been unable to mitigate the gap between the increase in enrolment and expenditure on education.

The coefficient for the structural break in 1962 implies negative significance on per student expenditure; the war period witnessed a decline in the expenditure on per student in total education sector. It is to be noted that public expenditure on education had declined in the years following the 1962 War, and as

enrolment increased, the allocation on per student witnessed a decline. The statistical results for per student expenditure are like that of public expenditure on education as a percent of GDP, on NPE, 1986 and the NEP, 1991. The value of the coefficient on SSA, 2000 has been positive and statistically significant for per student expenditure on education.

Public expenditure on education as a percent of total revenue expenditure. The multiple regression equation employs share of education expenditure in total revenue expenditure as the dependent variable, while GDP per capita (with lag), the annual average growth rate of enrolment at the aggregate level of education, and structural breaks have been identified as the independent variables.

The coefficient is statistically significant and positive for the share of education in revenue expenditure of the government on the growth of the economy. The coefficient for the share of education in the total revenue expenditure is negative and statistically significant in the aftermath of the Indo-China War in 1962. As analyzed by Nagarajan (2005), there was a downward displacement of the expenditure on social and development services as a consequence of the crises of 1962, but it was found to be statistically insignificant. The period following the Indo-China War (1962) witnessed a decline in the share of education at the aggregate level in the total revenue expenditure of the government, as identified by the results. The coefficient on NPE, 1986 is statistically significant for the share of expenditure on education in revenue expenditure.

The annual average growth rate of public expenditure on education. The coefficient is statistically significant and has negative value with the reform period. The growth rate of expenditure at aggregate level has declined with the introduction of NEP in 1991. The fall in the annual average growth rate of public expenditure on total education sector could be attributed to the priority allotted to the other sectors of the economy so as to attain higher growth rates of the economy. The annual average growth rate of public expenditure on education shares a negative relationship with the implementation of SSA in 2000. It was expected that the growth rate of public expenditure would increase with the implementation of a flagship program undertaken by the government; however, the statistical results have been surprising in this regard.

A comparative analysis of level-wise expenditure on education.

The analysis of the influence of the economic, policy and education-related variables on the public expenditure on education by levels has been undertaken in this section. The effect of economic growth on public expenditure on each level of education has been focused upon while controlling the impact of other variables.

Public expenditure on education as a percent of GDP. The expenditure on education by levels as a percent of GDP is the dependent variable and GDP per capita (with lag), annual average growth rate of enrolment at respective levels of education and an array of policy variables along with a war period identified as dummy variables are the independent variables.

Table 4: Determinants of Public Expenditure on Education by Levels as a Percent of GDP

$$\mathrm{Ln}(PE/GDP)_t = \alpha + \beta_1(GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$$

	Elementary	Secondary	University & Higher	Technical
$(GDP/N)_{t-1}$	0.00***	0.00***	0.00***	0.00***

	(5.93)	(5.58)	(4.70)	(3.31)
$GREN_t$	-0.03** (-2.21)	-0.01 (-0.88)	-0.01 (-1.17)	-0.001 (-0.61)
D_1(Indo-China War, 1962)	-0.13 (-0.76)	-0.17 (-0.71)	-0.17 (-0.84)	-
D_2 (NPE, 1968)	0.12 (0.77)	0.30 (1.39)	0.22 (1.23)	-0.003 (-0.4)
D_3 (CA, 1976)	0.31* (1.89)	0.50** (2.08)	0.51** (2.47)	-0.02 (-0.20)
D_4(NPE, 1986)	0.52*** (3.19)	0.68*** (2.90)	0.66*** (3.33)	0.30*** (4.00)
D_5 (NEP, 1991)	0.38** (2.32)	0.59** (2.55)	0.41** (2.11)	0.27*** (3.65)
D_6 (SSA,2000)	0.18 (1.09)	0.25 (1.03)	0.18 (0.90)	0.02 (0.19)
Constant	-0.61*** (-4.10)	-1.33*** (-7.49)	-1.89*** (-12.66)	-2.38*** (-38.46)
Adjusted-R^2 F- stat df	0.61 12.27*** 58	0.47 7.53*** 58	0.45 6.86*** 58	0.41 5.57*** 46

Notes: Figures in parentheses refer to t- statistic
The figures above t-statistic values refer to the coefficients
***significant at 1% level, **significant at 5% level, and *significant at 10% level
df refers to degree of freedom

The coefficients for each level of education are statistically significant and are positive onincreasing in GDP per capita. The findings suggest that with the rise in the GDP per capita, the share of expenditure on education in GDP has been increasing for elementary, secondary, university & higher and technical levels of education. The coefficient obtained ongrowth rate of enrolment is statistically significant and negative in case of elementary level of education. With the increase in the annual average growth rate of enrolment at the elementary level, the share of public expenditure on elementary education in GDP has declined.

The coefficients with respect toConstitutional amendment in 1976 are statistically significant, and positive for each level of education, except technical education. The effect of NPE, 1986 and NEP, 1991 on every level of education has been the same as on the share of expenditure on the total education sector in GDP. The coefficients denote an increase in the percent share of expenditure on each level of education in GDP in the reform period.

Per student expenditure on education. Table 5 depicts the relationship of per student expenditure on education with economic growth, annual average growth rate of enrolment at respective levels of education, and structural breaks in the given period of the study.

Table 5: Determinants of Per Student Expenditure on Education by Levels

$$\text{Ln}PSE_t = \alpha + \beta_1(GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$$

	Elementary	Secondary	University & Higher	Technical
$(GDP/N)_{t-1}$	0.00*** (16.35)	0.00*** (7.79)	0.00 (1.21)	0.00*** (-6.30)
$GREN_t$	-0.3*** (-2.68)	-0.01* (-1.70)	-0.002 (-1.02)	-0.01*** (-2.84)
D_1(Indo-China War, 1962)	-0.30*** (-2.68)	-0.40*** (-3.06)	-0.24*** (-3.26)	-
D_2 (NPE, 1968)	-0.50 (-0.48)	-0.06 (-0.51)	-0.31*** (-4.66)	-0.13 (-1.00)
D_3 (CA, 1976)	0.14 (1.21)	0.32** (2.46)	-0.57 (-0.76)	0.03 (0.25)
D_4(NPE, 1986)	0.36*** (3.26)	0.37*** (2.86)	0.16** (2.23)	0.24* (1.79)
D_5 (NEP, 1991)	0.24** (2.18)	0.31** (2.42)	0.05 (0.65)	0.27** (2.03)
D_6 (SSA,2000)	0.21* (1.89)	0.17 (1.28)	-0.06 (-0.84)	0.11 (0.83)
Constant	5.91*** (59.27)	8.02*** (82.87)	9.46*** (174.19)	11.61*** (107.63)
Adjusted-R^2	0.90	0.68	0.44	0.61
F- stat	67.81***	16.67***	6.59***	11.17***
df	58	58	58	46

Notes: Figures in parentheses refer to t- statistic

The figures above t-statistic values refer to the coefficients

***significant at 1% level, **significant at 5% level, and *significant at 10% level

df refers to degree of freedom

The coefficients show a significant as well as the positive influence of GDP per capita on per student expenditure at elementary and secondary levels of education. The coefficient is statistically significant and negative for per student expenditure at the technical level of education on GDP per capita. The coefficient of the annual average growth rate of enrolment is statistically significant, but negatively related to per student expenditure at elementary, secondary and technical levels of education.

The coefficient for the Indo-China War in 1962 suggests negative influence of war on per student expenditure on education by levels. The years following the war witnessed a decline in the share of expenditure on per enrolment. The coefficient on National Policy on Education, 1968 is significant and negative for per student expenditure at University& higher level of education. Due to the stress given upon allocation of two- thirds to school education and one-third to higher education[vii], per student expenditure at University& higher level of education may have declined in proportion to the increasing enrolment at this particular level of education. The coefficient is statistically significant and positive on the 42nd Constitutional amendment in 1976 that is, the expenditure on per student at the secondary level of

education has been increasing in the years following the amendment. The coefficients are statistically significant and positive as well on NPE, 1986 and economic reforms, 1991 for secondary education. The coefficient for per student expenditure has been positive and statistically significant on SSA, 2000 at the elementary level of education only.

Public expenditure on education as a percent of total revenue expenditure. Table 6 shows the relationship of the share of expenditure on education by levels in total revenue expenditure of the government with GDP per capita, the annual average growth rate of enrolment at respective levels of education, and certain policies as well as a war period.

Table 6: Determinants of Public Expenditure on Education by Levels as a Percent of Total Revenue Expenditure

$$Ln(PE/TE)_t = \alpha + \beta_1(GDP/N)_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$$

	Elementary	Secondary	University & Higher	Technical
$(GDP/N)_{t-1}$	0.00*** (8.04)	0.00*** (5.01)	0.00* (1.68)	0.00 (-0.54)
$GREN_t$	-0.01 (-1.52)	-0.01 (-1.34)	0.00 (0.09)	-0.001 (-0.45)
D_1(Indo-China War, 1962)	-0.14*** (-3.54)	-0.17* (-1.84)	-0.16** (-2.43)	-
D_2 (NPE, 1968)	-0.07* (-1.99)	0.07 (0.90)	-0.04 (-0.74)	0.07 (0.74)
D_3 (CA, 1976)	-0.03 (-0.75)	0.12 (1.33)	0.17** (2.60)	-0.13 (-1.36)
D_4(NPE, 1986)	0.12*** (3.09)	0.26*** (2.94)	0.26*** (4.04)	0.11 (1.22)
D_5 (NEP, 1991)	0.06 (1.55)	0.26*** (2.96)	0.11* (1.78)	0.13 (1.45)
D_6 (SSA,2000)	-0.02 (-0.40)	0.06 (0.69)	0.04 (0.57)	-0.1 (-1.08)
Constant	1.36*** (38.16)	0.80*** (11.79)	0.17*** (3.63)	-0.73*** (-9.67)
Adjusted-R^2 F- stat df	0.74 21.51*** 58	0.49 7.96*** 58	0.36 5.06*** 58	0.06 1.44 46

Notes: Figures in parentheses refer to t- statistic
The figures above t-statistic values refer to the coefficients
***significant at 1% level, **significant at 5% level, and *significant at 10% level
df refers to degree of freedom

The coefficients are statistically significant and positive for the share of expenditure on education in total revenue expenditure of the government on the growth of the economy for each of the level of education,

except technical education. The coefficients on the annual average growth rate of enrolment at respective levels to influence the share of expenditure at related educational levels in total revenue expenditure have not been statistically significant.

The coefficient on the war period is negatively significant for each level of education. The years following the Indo-China War (1962) witnessed a decline in the share of expenditure on education by levels in the total revenue expenditure of the government. The coefficient on the Constitutional Amendment, 1976 to have an influence on the share of education in total revenue expenditure of the government is significant and is positive for the share of expenditure atUniversity& higher level of education. The coefficient implies that the share of university & higher level in total revenue expenditure of the government has increased in the years following the transfer of education to the concurrent list in 1976. The coefficients are statistically significant for NPE, 1986 for each level of education, except technical education. The coefficients on the reform period are statistically significant and positive for the share of secondary and university & higher levels of education in revenue expenditure of the government.

The annual average growth rate of public expenditure on education. Table 7 shows the influence of annual average growth rate of GDP as well as of enrolment and six structural breaks on the annual average growth rate of public expenditure on education.

Table 7: Determinants of Annual Average Growth Rate of Expenditure on Education by Levels

$$GRPE_t = \alpha + \beta_1 GRGDP_{t-1} + \beta_2 GREN_t + \beta_3 D_1 + \beta_4 D_2 + \beta_5 D_3 + \beta_6 D_4 + \beta_7 D_5 + \beta_8 D_6 + \varepsilon_t$$

	Elementary	Secondary	University & higher	Technical
$GRGDP_{t-1}$	0.47 (1.74)	0.19 (0.65)	0.65 (1.67)	0.82 (1.14)
$GREN_t$	0.33 (1.23)	0.12 (0.74)	0.28* (1.85)	-0.004 (-0.04)
D_1(Indo-China War, 1962)	-4.68 (-1.37)	-2.90 (-0.78)	-6.09 (-1.26)	-
D_2 (NPE, 1968)	1.250 (0.41)	2.67 (0.80)	2.08 (0.47)	-4.91 (-0.62)
D_3 (CA, 1976)	-6.58* (-1.97)	-5.46 (-1.45)	0.62 (0.13)	-7.59 (-0.88)
D_4(NPE, 1986)	-0.05 (-0.02)	0.47 (0.13)	2.12 (0.44)	-1.88 (-0.22)
D_5 (NEP, 1991)	-7.77** (-2.32)	-7.78** (-2.12)	-7.65 (-1.59)	-3.57 (-0.41)
D_6 (SSA,2000)	-6.63* (-1.99)	-11.19*** (-3.06)	-9.24* (-1.91)	-10.23 (-1.18)
Constant	6.26*** (2.89)	8.71*** (4.08)	4.19 (1.58)	6.08 (1.21)
Adjusted-R^2 F- stat df	0.15 2.24** 57	0.14 2.17** 57	0.17 2.42** 57	(-0.88) 0.48 45

Notes: Figures in parentheses refer to t- statistic
The figures above t-statistic values refer to the coefficients
***significant at 1% level, **significant at 5% level, and *significant at 10% level
df refers to degree of freedom

It is only at university & higher level of education that growth rate of expenditure has increased with one percent increase in the growth rate of enrolment at this particular level of education.
The coefficient on the 42nd amendment to the Constitution is statistically significant for the growth rate of expenditure at elementary level of education. The results imply a decline in the growth rate of expenditure on elementary education in the four years following the transfer of education to the concurrent list. The coefficients for annual average growth rates of expenditure at elementary and secondary levels of education are statistically significant and negative on the reform period. The annual average growth rate of expenditure at school level has declined in the reform period. The coefficient obtained for the other levels of education are negative, but not significant even at 10% level. The coefficients are negative and statistically significant for the annual average growth rates of expenditure at elementary, secondary, and higher level of education in the years following the implementation of SSA in 2000. The decline in the annual average growth rates of expenditure at secondary and higher levels of education is in coherence with the anticipation of declining shares of the respective levels with due importance given to the elementary level of education. However, the negative annual average growth rate of expenditure on elementary education with the introduction of SSA in 2000 is quite inexplicable.

SUMMARY AND CONCLUSIONS

The study seeks to identify the determinants of expenditure on education. The multiple regression equation seeks to identify the effect of economic growth on public expenditure on education while controlling for the other variables.
The share of expenditure on education in GDP is significantly and positively relatedwith the increase in the growth of an economy, at aggregate as well as at every level of education while controlling for the effect of other variables. The coefficients for per student expenditure identify the significance of economic growth at every level of education, except university& higher level. Per student expenditure at technical level shares a negative relationship with the growth of the economy that is with the increase in GDP per capita, the expenditure on per enrolment at the technical level of education has declined. The share of education in total revenue expenditure has been increasing with the growth of the economy at the aggregate level and elementary, secondary and university & higher level of education.
Although studies have identified the expenditure on education as a percent of GDP to be a better measure of public expenditure on education, the analysis of per student expenditure on education has given a better understanding of the influence of the variables in general and economic growth in particular on the expenditure on education. The findings for the annual average growth rate of expenditure on education do not hold significance onsome variables.
It had been anticipated that the expenditure on education would have relatively declined in the reform period; however, the share of education in GDP, as well as expenditure per enrolment, has increased with the introduction of NEP in 1991. It is the annual average growth rate of expenditure on education that has been witnessing a decline in the years following implementation of the reforms in the economy. Besides, per student expenditure has been identified to be increasing at aggregate in general and elementary in

particular in the years adopting the goals of SSA, 2000, but the annual average growth rates of public expenditure at similar levels have been found to be decreasing in the same period.

In understanding the implication of war as well as policies on educational expenditure, it has been identified that the war in 1962 has affected the share of expenditure on education in total revenue expenditure, despite the increase in the revenue expenditure in the same period. The decline in perstudent expenditure on education in the aftermath of the Indo-China War, 1962 joins the dots with the decline in the share of expenditure on education in total revenue expenditure of the government.

Amongst all the educational policies identified in the study, the effect of NPE, 1986 has been most promising for the expenditure on education in the years following the introduction of the policy. The role of the central government ought to be lauded for having increased its share in the expenditure on education with the formulation of NPE in 1986.

Policy Recommendations

The policies have largely focused upon the allocation to be made to the elementary level of education. Though, interim adjustments to other levels of education have been made in the budgetary documents, it does not justify the absence of concrete policy to have been formulated on secondary, university & higher and technical levels of education. Also, the allocation to education by levels should be such to maintain a balance between levels of education.

Merely advocating for an allocation of 6 percent of GNP to education will not suffice (Tilak, 2007); planned efforts are to be made to increase the share of education in GNP. The target can only be achieved if it is to be made a goal, and step- wise increment of share in GNP is adhered to by the policy makers.

Limitations of the study and future directions

The study has attempted to identify certain factors that influence the public expenditure on education. The determinants identified in this regard are economic growth, enrolment and policies related to education and the economy.

The total expenditure comprises of revenue expenditure and capital expenditure. The capital expenditure on education at the aggregate and by levels has not been included in the study, as data related to the same on education by levels is not available in exact detail. The focus of the study is on public expenditure on education as a result we have not considered household expenditure, the expenditure by the private institutions, external aid and other sources of educational finance.

Future direction may involve an analysis of public expenditure on education by the central and state governments separately which would help in identifying the dynamics in the federal relations in allocating funds to education, as well as the process of allocation of resources to the total education sector by levels of education.

ENDNOTES

1. The annual average growth rate has been computed for every variable by the formula: $[(P_{t+1}-P_t)/P_t]*100$, where P_{t+1}= value in the year t+1, P_t= value in the year t.
2. The enrolment by stages of instruction includes enrolment in both government and private institutes, while the expenditure has been restricted to the spending by the government only.
3. The years following the introduction of the New Economic Policy in 1991 have been referred to as the reform period.

4. Refer Tables A1, A2 in Appendix.
5. Data on expenditure on technical education has been available from 1964-65 onwards in Budgetary Resources of education (1951-52 to 1993-94).
6. The dummy variables have been so identified in order to assume 1 for 't'= four years after the structural break, otherwise 0. The study had also analyzed the effect of the structural breaks where the dummy would assume '1' for 't' after the structural break, 0 otherwise (refer tables A3, A4, A5 and A6 in Appendix)
7. Education and National Development (1964-66): Report of the Education Commission (1964-66): Vol. 4: Planning, Administration, Finance, p.961.

REFERENCES

1. Adewuyi, J. O. & Okemakinde, T. (2012), Analysis of Factors Influencing Public Expenditure on Primary Education in Oyo and Lagos States, Nigeria (1990-2004), *European Journal of Humanities and Social Sciences*, Vol. 12, No. 1.
2. Al-Yousif, Y. K. (2008), Education expenditure and economic growth: Some empirical evidence from the GCC countries, *The Journal of Developing Areas*, Vol. 42, No. 1, pp. 69-80.
3. Chakrabarti, A. & Joglekar, R. (2006), Determinants of Expenditure on Education: An Empirical Analysis Using State Level Data, *Economic and Political Weekly*, Vol. 41, No. 15, pp. 1465-1472.
4. Fernandez, R. & Rogerson, R. (2001), The Determinants of Public Education Expenditures: Longer-Run Evidence from the States, *Journal of Education Finance*, Vol. 27, No. 1, pp. 567-583.
5. India. Education Commission, & Kothari, D. S. (1966), *Report of the Education Commission, 1964-66: Education and National Development*, Government of India Press.
6. Joshi, S. (2006), Impact of Economic Reforms on Social Sector Expenditure in India, *Economic and Political Weekly*, Vol. 41, No. 4, pp. 358-365.
7. Ministry of Human Resource Development, *All India Survey on Higher Education* (2010-11), New Delhi: Government of India, Department of Higher Education.
8. Ministry of Human Resource Development, *Analysis of Budgeted Expenditure on Education* (various years), New Delhi: Government of India, Department of Education.
9. Ministry of Human Resource Development, *Budgetary Resources on Education* (1951-52 to 1993-94), New Delhi: Government of India, Department of Education.
10. Ministry of Human Resource Development, *Education in India, Vol.1* (various years), New Delhi: Government of India, Department of Education.
11. Ministry of Human Resource Development, *Selected Educational Statistics* (various years), New Delhi: Government of India, Department of Education.
12. Ministry of Human Resource Development, *Statistics of Higher and Technical Education* (various years), New Delhi: Government of India, Bureau of Planning, Monitoring and Statistics.
13. Ministry of Human Resource Development, *Statistics of School Education* (various years), New Delhi: Government of India, Bureau of Planning, Monitoring and Statistics.
14. Ranis, G., Stewart, F. & Ramirez, A. (2000), Economic growth and human development, *World development*, Vol. 28, No. 2, pp. 197-219.
15. Shariff, A. & Ghosh, P. K. (2000), Indian Education Scene and the Public Gap, *Economic and Political Weekly*, Vol. 35, No. 16, pp. 1396-1406.

16. Tilak, J. B. G. (1993), Financing Higher Education in India: Principles, Practice, and Policy Issues, *Higher Education*, Vol. 26, No. 1, pp. 43-67.
17. Tilak, J. B. G. (1993), Investment in education in East Asia, *ASEAN Economic Bulletin*, Vol. 9, No. 3, pp. 301-322.
18. Tilak, J. B. G. (2007), The Kothari Commission and Financing of Education, *Economic and Political Weekly*, Vol. 42, No. 10, pp. 874-882.