

# **Educational Attainment of Young Adults in India: Measures, Trends & Determinants**

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## **Abstract**

*Given the fact that education of young adults plays crucial role from both economic and social point of view, the objective of the study is to analyse the pattern of improvements in their education and to identify the factors that explain the rate of increase in educational indicators per year. Educational achievement is captured through literacy rate, percentage of population completed higher education and the average years of schooling. The study finds that significant disparities still prevail across gender, regions and rural-urban areas although the gap is reducing over time. Per capita public expenditure in different levels of education has increased monotonously but there prevails consistent spatial variation in the allocation pattern. The estimated models of the annual increase in those education indicators reveal the fact that social status still plays a crucial role in the society in determining actual progress in educational outcomes. The share of expenditure in higher education is an important factor for achieving greater percentage of population completed higher education. But expenditure on adult education does not have significant impact on literacy rate. Share of GSDP in industry and services, and percentage of registered manufacturing are identified as demand pull factors that encourage more education. Besides, percentage of rural households with irrigation facility is important to have better progress in education sector possibly via its impact on improving rural livelihood.*

**Keywords: Education, Human Capital, Young Adults, Public Expenditure on Education.**

**JEL Code: I21, I22, I28, J24.**

## **Acknowledgements:**

This paper is a part of my Ph.D. thesis. I would like to express my special gratitude to Prof. A. Ganesh Kumar for his guidance, invaluable advice and for sparing his precious time for discussions. The comments and suggestions provided by him were extremely helpful.

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## **1. Introduction**

Education has long been considered as an instrument for economic and social development (Schulz, 1988; Tilak, 2003). Growth theories stated several mechanisms through which education influences economic growth in both short and long run. Mankiw (1992) shows that education increases human capital inherent in the labour force which enhances productivity and promotes growth in the long run. Lucas (1988) and Romer (1990) identified the role of education in innovation and creation of new technologies which leads to higher economic growth; whereas Barro (2001) identified two channels through which education generates higher growth for the economy. First, education as a primary component of human capital facilitates the absorption of superior technologies from leading countries; and second, a country with higher ratio of human capital to physical capital achieves higher growth rate by increasing the quantity of physical capital accordingly. Other studies have shown that investment in education yields more return on growth than investment in physical capital (Tilak, 1987; Blaug et al, 1969).

The success stories in East Asian countries brought out the importance of mass primary and higher education programme pursued by government to facilitate the process of economic development in the long run. Here, Japan, Taiwan and Korea attained higher economic growth in the twentieth century through technological advancement which was possible by expanding education, skills and acquisition of knowledge in the globalised and competitive world (Sarel, 1997). Several empirical studies found significant returns to education on economic development (Gounden, 1965; Psacharopoulos, 1994). But these studies have considered only monetary returns of education. Social, cultural, political, moral returns are not included. Ozturk (2001) shows the role of education to improve labour productivity, trade, health, income distribution and family structure of a country. Moreover, education is critical to strengthen people's capabilities and freedom (Sen, 1989 & 1999) which is considered as one of the human development indicators (Haq, 1995).

Several studies have shown schooling improves the health related behaviour which has direct impact on their health outcomes (Cutler and Lleras-Muney, 2010). In addition, education of adult population has positive impact on health status of children (Mosley and Chen, 1984; Ross and Mirowsky, 1999 & 2011). In this regard, Bhakta and Ganesh-Kumar (2014) have shown multiple channels through which

education of adults affects child mortality rates and their health status in India. They show that education not only has a direct effect on child health status, but it also has an indirect effect by increasing the probability of utilising such health facilities. Thus, it has been a widely accepted fact that education plays a critical role in the process of social and economic development.

The Task Force on Higher Education and Society (2000) was convened by the World Bank and UNESCO to bring forth the importance of higher education to get benefit in the globalised knowledge based economy. India is certainly lagging behind in this aspect. Here 67 per cent of total working age population i.e. 15 to 59 years of ages are literate while merely 11 per cent of them have completed graduation and technical education (Author's calculations based on NSS Consumption Expenditure Survey (CES) data, 2011-12). Thus we need to pay attention to understand the nature of improvements in education and to examine the determinants of such slow progress in educational attainment across states over past decades.

Many studies have examined the determinants of secondary and higher education (Joshi and Rao, 1964; Mason and Khandker, 1995; Case and Deaton, 1999; Rani, 2007). Joshi and Rao (1964) examined the pattern of literacy and level of education in different economic and social groups in 12 villages of Uttar Pradesh in India during 1958-60. The percentage of literacy was significantly higher for both males and females among the higher caste Hindus as compared to other social groups. In addition, literacy rate among Muslim population was higher than the backward and scheduled castes. The percentage of literates increases along with the size of operational land holding. This study has also found out the positive association between the level of higher education with the higher social strata and economic conditions in rural India.

Mason and Khandker (1995) strongly suggest that both demand side and supply side factors are important in Tanzanian. Thus building more secondary schools and improving school budgets may have limited impact. They have pointed out the importance of subsidies in school fees to improve the outcomes of higher education. Case and Deaton (1999) examined the effects of the pupil-teacher ratio and the presence of libraries and laboratories on the educational outcomes after controlling the impact of household income, head teacher's educational attainment and race.

Rani (2007) studied the variation across states in India in terms of several educational indicators such as educational development index and educational performance index for secondary education. These indices are constructed based on several datasets, like the Selected Educational Statistics for 1990-91 and 2003-2004 and the Education in India for 1995-96, 1996-97, 1997-98 and 1998-99. The educational development index uses enrolment, number of institutions and teachers for 1990-91 and 2003-04; whereas the educational performance index includes transition rate, dropout rate, and percentage of appeared students and passed out students in Secondary Board Examination for 1991-92 and 2000-01. In addition, she has compared the performance of each state in terms of enrolment rates,

transition rates, dropout rates and completion rates. The time period of each indicator varies due to the fact that datasets are collected from various sources.

All the above mentioned studies are mostly descriptive examining the data patterns and some simple regressions involving a limited number of explanatory factors due to data limitations. To the best of our knowledge, hardly any study exists both in the international and Indian context that systematically assesses the role of supply and demand side factors, and in particular the role of public spending in determining the level of educational attainment of adults. This paper attempts to fill this gap in the literature for India.

Specifically, the primary objective of the paper is to identify the determining factors of the progress in the educational attainments of young adults. Here, we have examined the role of public policy in education sector, social, economic, demographic and infrastructure variables to find out the significant factors which explain the slow progress in educational outcomes. In particular, the study has analysed the impact of public expenditure in different levels of education on the per year increase in their educational attainments. Although the paper has utilised state level datasets for the analysis, it has considered both supply and demand side factors in a systematic manner. Moreover, we have done an extensive analysis of the pattern in educational improvements across states using panel data during 1999-2012. The use of annual progress in education indicators instead of their levels has given an additional edge to the analysis which provides an explanation of the current slow progress in those indicators.

The household and individual specific information contained in the Consumption Expenditure Survey (CES) data by National Sample Survey Organisation (NSSO) is utilised in the paper. Specifically, the information on the educational attainment of individual member of the household along with other socio-economic characteristics of the household from the CES form the core data used in this paper. We use data from four NSS quinquennial rounds 1999-2000, 2004-05, 2009-10 and 2011-12.

Three separate indicators viz. literacy rate, average years of schooling and percentage of young adults completed higher education are measured to capture the overall nature of educational attainment from different perspectives. We have considered the age group of 18-40 years for women and 18-45 years for men to measure the educational attainments of young adults. This sample population represents about 75 per cent of total working population (Author's calculation based on NSS CES data, 2011-12) and it captures significant percentage of target population for the National Literacy Mission (NLM) undertaken by the central government of India that aims to increase the literacy rate of adult population. They are also important from economic point of view as the returns to education is likely to be high for this particular age group as they are likely to remain in the labour force much longer than older adults. It may also be noted here that according to National Family Health Survey (NFHS) data about 95% parents with a child below 5 years of age belong to this age group (Table 1). Thus,

their education attainment is important for non-economic reasons too in particular for its positive spill overs on health and education of children (Bhakta and Ganesh-Kumar, 2014). Hence, this age-group is considered as the target population for the study.

Data suggests that the literacy rate varies from 98 per cent in Kerala to merely 63 per cent in Rajasthan in 2011-12 (as shown in Figure 1 below). The diversity is present not only in terms of actual literacy rate but also the disparities in the level of improvements over years are quite remarkable. There exists nationwide variation in educational progress across rural and urban areas. Generally, literacy rate is considerably high in urban areas as compared to rural areas, whereas gender wise disparity prevails in favour of male population across all regions. But the level of disparity is reducing over time. We found similar trend in other education outcomes, such as, percentage of higher education and average years of schooling (AYS).

More interestingly the pattern of improvements in each education indicator is different across states. To identify the determining factors of the progress in educational attainments of this age-group, we have included both supply side and demand pull factors in the model. In particular, the study regressed the annual increase in educational indicators on the per capita real public expenditure on different levels of education along with other socio, economic and demographic characteristics. Here fixed effect panel data modelling techniques are employed to find out the factors influencing the nature of improvements in educational indicators.

The results show that public expenditure on adult education does not have a significant impact on the literacy rate of the particular age group whereas percentage of education expenditure on higher education plays key role in determining the per year increase in percentage of population completed higher education. Moreover, per year increase in average years of schooling is determined by the per capita public expenditure on education across states. Other social, economic and demographic attributes are also identified as determinants of the current progress in education of young adult population.

The rests of the paper is organised in the following sections. The measurements of the educational indicators and the data source are explained in the next section. It has also elaborated the selection procedure of the target group for the study. Section 3 has described the progress in education of young adults where the spatial pattern of the educational achievement is explained across genders and sectors. Section 4 is dedicated to determine the impact of public expenditure in different levels of educations on the progress of education indicators. This section has elaborated the model specifications and estimation strategy. Then the model results are presented in the following subsections. The conclusions and policy implications are discussed in section 5.

## 2. Education Indicators, Data and Target Group of the Study

Several studies have recognised education as an important variable in influencing economic development as well as human development (Rani, 2007). Notably, UNDP's Human Development Report in 1990 draws the attention towards human development as opposed to economic development. Education is identified as a crucial factor in the Human Development Index (HDI), where the education index consists of a weighted index of literacy rate and mean years of schooling. Since 1995, the means years of schooling has been replaced by gross enrolment ratios of primary, secondary and tertiary enrolment ratios. In Indian context, Tilak (1979) developed a composite educational development index (EDI) using enrolment and educational cost data in 1974-75. Then Tilak (1999) analysed the inter-state variations in stock and flow of human capital in India applying Gender Disparity Index or Sopher's index, index of deprivation and educational development and financing. Rani (2007) has constructed an educational development index using all three aspects, viz. enrolment, total institutions and teachers in secondary education for 1990-91 and 2003-04. Moreover, she developed an educational performance index using transition rate from upper primary to secondary education, cumulative dropout rate from class I to X, percentage of appeared students and percentage of students pass out in the secondary education for the year of 1991-92 and 2000-01.

However, we have taken a different approach and we considered three separate measures to capture the level of educational attainment of adult population, viz. literacy rate, percentage of adults completed higher education and average years of schooling. We did not construct an index. Instead, we have taken literacy rate and percentage of higher education separately to examine the pattern of improvements in education sector. The literacy rate captures the basic educational attainments of each state (Romer, 1990; HDR, 1990; Dreze and Sen, 1995) as basic education is an essential requirement of an individual in the modern society. But, literacy rate does not fully capture the level of skill development in a region. In a globalised economy with an increasing demand for skill and knowledge, India has to revive the existing policies to increase its supply of human capital which promotes higher economic growth through multiple channels and human development in a broader sense. Hence total supply of human capital is measured as a percentage of adult population completed higher education.

Finally, we have calculated the average years of schooling (AYS) to capture the overall educational attainment including primary, secondary and tertiary levels of education for each state over years (Barro and Lee, 1993 & 2010). The AYS is calculated as

$$AYS = \sum_{i=1}^k P_i \times YS_i$$

Here 'i' refers to each level of education which varies from 1 to k.  $P_i$  is the percentage of population who have completed  $i^{\text{th}}$  level of education and  $YS_i$  is the years of schooling to complete the particular



level of education. Thus considering above three indicators we get complete understanding about the educational achievements for adults in India.

We have utilised the micro level Consumption Expenditure Survey (CES) data collected by the NSSO from four quinquennial rounds viz., 55th (1999-2000), 61st (2004-05), 66th (2009-10) and 68th (2011-12) to analyse the trajectory in educational achievements across states. The NSS surveys are conducted through household interviews from a random sample selected through scientific design and cover practically the entire geographical area of the country. The final data set for the analysis contains 26 states viz., Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. As Jharkhand, Chhattisgarh and Uttaranchal were carved out from Bihar, Madhya Pradesh and Uttar Pradesh respectively after 2000; we have combined them with their original states to make them comparable from 1999 to 2011.

The dataset has given educational attainment of each individual in the household under the following categories; not literate, literate without formal schooling, below primary, primary, middle, secondary, higher secondary, graduate, postgraduate and above. To calculate literacy rates across states, we have considered those individuals who have either completed primary education or literate without formal schooling. The percentage of population in higher education is measured as total population completed either graduation in any subject or have any kind of technical education divided by total population in the particular age group. Years of schooling of each level of education are assigned on the basis of total years required to complete the corresponding education level. The AYS for each state is calculated with some caveats. First, the above mentioned categories are reclassified into broader categories, viz. no schooling, below primary & literate without formal schooling, completed primary schooling, middle school, secondary schooling, higher secondary schooling and higher education. Second, to quantify the years of schooling of adults who are literate without formal education, we assigned them 2.5 years of schooling and combined them with those who attended school but could not complete primary education. Third, the adults who attended middle schools are given 7.5 years of schooling and the category “higher education” comprises individuals who are graduate, postgraduate and above; and we combined them and assigned 15 years of schooling.

While measuring the literacy rate of each state we have realised that the target group of population under the adult literacy mission, undertaken by central government of India, is 15-35 years of age. However, it has been observed that many a times people up to age 45 years are also included in this programme. In case of higher education, normal age of completing graduation and other technical education is 22 years which can get extended by few years for many individuals. But, the probability of getting additional education after the age of 45 is relatively low.

In addition, several studies have explained the significance of parental education in improving the child health status. They pointed out how crucial it is to improve basic education of the adult population, who are in the parental age, to accelerate the growth in child health status, especially in developing nations. National Family Health Survey (NFHS) data suggests that about 95% mothers with a child below 5 years of age belong to the age group of 18-40 years whereas 95% fathers are in the age group of 18-45 years. Notably, the distributional pattern has remained stable across different NFHS rounds for the time period 1992-93, 1998-99 and 2005-06 (as given in table 1).

Table 1: Parents' age distribution across NFHS rounds (%)

<b>Mother's Age (Years)</b>	<b>1992-93</b>	<b>1998-99</b>	<b>2005-06</b>
<18	1	3	2
18-21	14	22	20
22-25	31	32	31
26-30	31	27	28
31-35	15	11	12
36-40	5	4	5
>40	2	1	2
<b>Father's Age (Years)</b>	<b>1992-93</b>	<b>1998-99</b>	<b>2005-06</b>
< 18	0	0	0
18-21	1	3	2
22-26	13	18	17
26-30	34	36	34
31-35	27	24	25
36-40	15	13	13
41-45	5	4	5
> 45	3	3	4

Source: Author's calculations based on NFHS data.

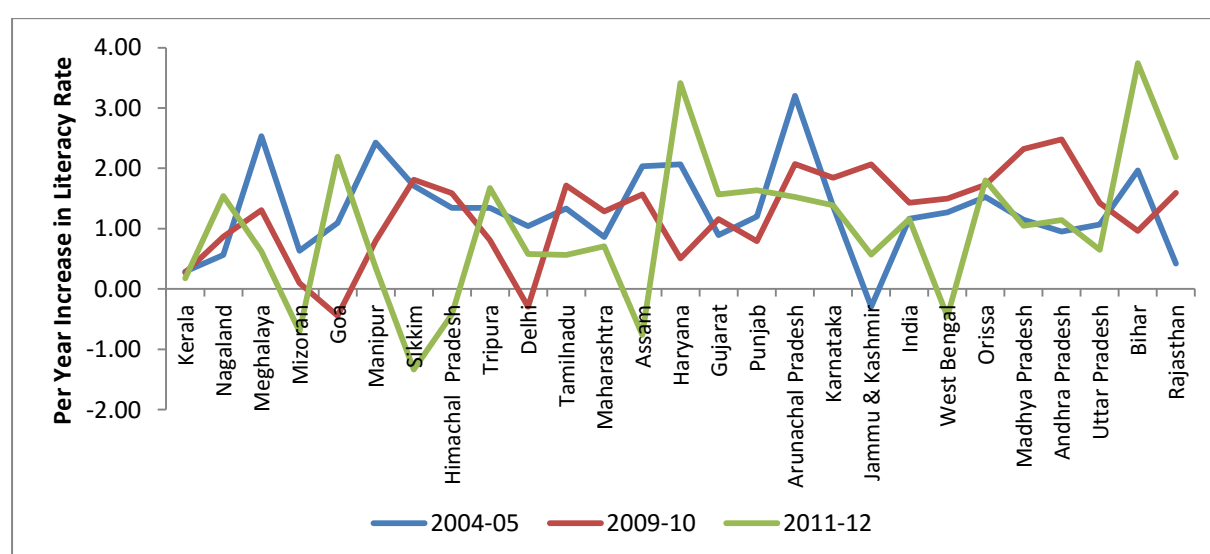
Thus, given the importance of education of young adults from both economic point of view and the significance of education in improving child health status, we have selected the age group of 18-40 years for women and 18-45 years for men for the study. These age groups are referred as young adult population in rest of the study. In this way, we are able to capture more than 75 per cent of total working population (Author's calculation based on NSS CES data, 2011-12). Then, we have calculated the improvement in educational indicators which is measured as per year increase in each educational indicator to analyse the progress in education for the particular time period.

### 3. Overview of the Progress in Education of Young Adults

India is characterised by enormous variations in adult literacy rates spatially. The literacy rate varies from 98 per cent in Kerala to merely 63 per cent in Rajasthan in 2011-12. The diversity is present not only in terms of actual literacy rate but also the disparities in the level of improvements over years which is shown in the figure 1. Here, states are sorted in descending order of their literacy rates in

2011. Although Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh (BIMARU states) are identified with lowest literacy rate i.e. about 66% (in average) in 2011, the following figure suggests that they have experienced a monotonous increase in total literacy rate over the period but their progress has been weakened in subsequent rounds. Surprisingly, around 90% of the target group population are literate in the north eastern states and the average literacy rate was increasing till 2010 then declines as Sikkim, Mizoram, Himachal Pradesh, Assam experienced a drop in literacy rate during 2009-12. Notably, literacy rate has decreased by 1.34 per cent in Sikkim during the same time period. Other states are mostly experiencing positive growth in literacy rate except in certain states viz. Goa, Delhi, Jammu & Kashmir and West Bengal where literacy rate declined in certain years.

Figure 1: State wise per year increase in literacy rates across NSS rounds (2004-2012)



Source: Author's calculations based on NSS data and states are ranked in descending order of literacy rates in 2011-12.

For the purpose of assessing the progress in educational attainment, states are grouped in four categories on the basis of their literacy rates as compared to average literacy rate of all states, viz., BIMARU states, other below average states, above average states and north eastern states. The “other below average states” consists of West Bengal, Orissa and Andhra Pradesh which have literacy rates below the average literacy rate of all states (75.7). Then the group “above average states” combines states those are with literacy rate greater than the average and not in the north eastern region. The north eastern states are combined in a separate group.

### 3.1 Gender Gap

Table 2 demonstrates the gender wise discrimination in trends and annual progress in educational indicators. This table shows that gender discrimination in education sector still persists across states over the entire time span. Both literacy rates and percentage of young adults completed higher education are consistently high for male as compared to female. In 2011-12, male literacy rate was 84.2 per cent where only 67 per cent female population were literate. Similar trend is found in higher

education. But literacy rate of female population is growing at the rate of 1.53 per cent annually where male literacy rate is increasing only by 0.77 per cent during 2011-12. Annual increase in higher education was higher for male population till 2009-10. But, the share of higher education of females is increasing by 0.64 annually in 2011-12 which is marginally greater than male population.

Table 2: Gender wise educational indicators of young adults across NSS rounds (1999-2012)

Year	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Gender	Literacy Rate				Per Year Increase in Literacy Rate			
Male	72.7	77.7	82.7	84.2		1.01	0.99	0.77
Female	47.8	54.6	63.9	67.0		1.36	1.87	1.53
Total	60.4	66.3	73.4	75.7		1.17	1.43	1.16
M-F Difference	24.9	23.1	18.7	17.2		-0.4	-0.9	-0.8
	Percentage of Higher Education				Per Year Increase in Percentage of Higher Education			
Male	8.20	10.08	12.20	13.11		0.38	0.42	0.45
Female	4.55	5.83	7.74	9.01		0.26	0.38	0.64
Total	6.41	7.98	10.00	11.10		0.31	0.40	0.55
M-F Difference	3.65	4.25	4.47	4.10		0.12	0.04	-0.18
	Average Years of Schooling				Per Year Increase in Average Years of Schooling			
Male	5.94	6.63	7.37	7.63		0.14	0.15	0.13
Female	3.63	4.38	5.27	5.68		0.15	0.18	0.20
Total	4.81	5.52	6.33	6.67		0.14	0.16	0.17
M-F Difference	2.31	2.24	2.10	1.94		0.01	0.03	0.08

Source: Author's calculations based on NSS data.

The gender gap prevails spatially too. If we observe carefully in table 3, the educational attainments are consistently lower for female population as compared to male population across all regions over the entire time period and the gender gap remains significant across the different levels of education. But these indicators have increased over time in primary, secondary and tertiary education in all regions except the north eastern states. The literacy rate in the north eastern region has decreased during 2009-12 for both female and male population whereas percentage of higher education decreased over 1999-2005 only for female population. Data suggest that literacy rates have decreased over 1 per cent per annum in Assam for female population and Sikkim for male population during 2009-12 (Table 10). In addition, Sikkim has experienced major decline in higher education during 2009-12 (Table 11).

Table 3: Gender wise spatial variation in educational attainment of young adults across NSS rounds (1999-2012)

Gender	Male				Female			
Regions	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
<b>Literacy Rate</b>								
Above Average States	81.94	85.80	89.72	91.17	62.38	69.27	77.02	79.53

BIMARU States	65.52	71.52	76.42	78.12	32.02	38.46	48.55	53.70
Other Below Average	67.15	72.35	79.55	81.24	46.04	53.49	65.22	66.25
North Eastern States	78.81	87.94	92.60	92.30	63.71	75.16	84.87	83.91
<b>Percentage of Population Completed Higher Education</b>								
Above Average States	9.34	12.33	15.10	16.55	6.41	8.58	11.35	12.96
BIMARU States	7.53	8.76	10.21	10.73	3.34	4.09	5.57	6.69
Other Below Average	7.60	9.03	11.52	12.23	3.44	4.47	5.81	6.82
North Eastern States	5.85	6.10	6.79	7.06	3.09	2.73	3.71	4.60
<b>Average Years of Schooling</b>								
Above Average States	6.91	7.67	8.41	8.71	4.99	5.96	6.87	7.26
BIMARU States	5.37	5.97	6.68	6.88	2.41	2.99	3.86	4.38
Other Below Average	5.14	5.86	6.68	6.99	3.18	3.90	4.84	5.14
North Eastern States	5.88	6.94	7.50	7.60	4.27	5.21	6.06	6.18

Source: Author's calculations based on NSS data.  
Detailed tables are given in appendix

## 3.2 Rural-Urban Disparity

Table 4 shows the nationwide variation in educational progress across rural and urban areas. Rural-urban disparity prevails in favour of urban areas, as both literacy rate and the indicator of human capital are considerably high in urban areas as compared to rural areas. But the difference between rural and urban areas in terms of literacy rate is reducing during 1999-2012. Moreover the rural-urban disparity in higher education was increasing till 2009-10 then it declines in 2009-12 because rural areas are growing at faster rate than urban areas.

Table 4: Rural-urban variation in educational indicators of young adults across NSS rounds (1999-2012)

Year	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Sector	Literacy Rate				Per Year Increase in Literacy Rate			
Rural	53.04	59.63	67.88	70.49		1.32	1.65	1.30
Urban	80.09	83.49	86.72	87.47		0.68	0.65	0.38
Total	60.45	66.27	73.43	75.74		1.17	1.43	1.16
U-R Difference	27.06	23.86	18.84	16.99		0.64	1.00	0.93
Percentage of Higher Education				Per Year Increase in Percentage of Higher Education				
Rural	2.92	3.98	4.87	5.88		0.21	0.18	0.50
Urban	15.64	18.35	22.29	22.76		0.54	0.79	0.24
Total	6.41	7.98	10.00	11.10		0.31	0.40	0.55
U-R Difference	12.71	14.37	17.41	16.88		-0.33	-0.61	0.27
Average Years of Schooling				Per Year Increase in Average Years of Schooling				
Rural	3.80	4.53	5.30	5.66		0.15	0.15	0.18
Urban	7.47	8.08	8.82	8.92		0.12	0.15	0.05
Total	4.81	5.52	6.33	6.67		0.14	0.16	0.17
U-R Difference	3.67	3.55	3.53	3.26		0.02	0.00	0.13

Source: Author's calculations based on NSS data.

In addition, the rural-urban disparity prevails across all regions throughout the time period. Merely 62.1% young adults of the rural areas are literate in the BIMARU states whereas about 80.5% are literate in urban areas. Although, certain states in the north-east region have experienced negative growth in education sector during few time periods but the literacy rates are remarkably high in these states as compared to the BIMARU states and below average states (table 5). If we concern about the supply of skilled labour in India, only 24% have completed higher education in urban areas and 7.9% for rural areas. The situation is worse in north-eastern states and below average states where less than 5% young adults completed their higher education in rural areas (Table 14).

Table 5: Rural-Urban spatial variation in educational attainment of young adults across NSS rounds (1999-2012)

<b>Sector</b>	<b>Rural</b>				<b>Urban</b>			
<b>Regions</b>	<b>1999-00</b>	<b>2004-05</b>	<b>2009-10</b>	<b>2011-12</b>	<b>1999-00</b>	<b>2004-05</b>	<b>2009-10</b>	<b>2011-12</b>
<b>Literacy Rate</b>								
Above Average States	64.99	71.22	78.76	81.16	85.35	87.97	90.19	91.23
BIMARU States	43.10	49.71	57.95	62.10	72.00	76.37	80.16	80.49
Other Below Average	49.92	57.15	67.82	68.59	77.15	80.80	85.89	86.62
North Eastern States	68.70	80.23	87.74	87.19	89.18	91.10	94.84	94.11
<b>Percentage of Population Completed Higher Education</b>								
Above Average States	3.55	5.29	6.50	7.90	15.63	18.85	22.88	23.99
BIMARU States	2.74	3.35	4.26	5.16	15.91	18.43	21.36	21.48
Other Below Average	2.34	3.48	4.10	4.77	15.15	16.84	22.17	21.48
North Eastern States	2.66	2.76	2.97	3.67	15.99	15.89	18.81	18.23
<b>Average Years of Schooling</b>								
Above Average States	4.86	5.74	6.52	6.94	7.94	8.58	9.27	9.42
BIMARU States	3.15	3.74	4.51	4.95	6.86	7.42	8.14	8.16
Other Below Average	3.21	4.01	4.84	5.06	7.03	7.54	8.48	8.59
North Eastern States	4.60	5.68	6.34	6.46	8.23	8.87	9.44	9.43

Source: Author's calculations based on NSS data.  
Detailed tables are given in appendix

Thus we have observed gradual increase in education outcomes in primary, secondary and tertiary levels, but the magnitude of improvements widely varied across states over years. Public policies, socio-economic and demographic characteristics may have significant role in determining the inter-state disparities in the progress of education.

## 4. Determinants of Educational Attainment

### 4.1 Econometric Models

To understand the determinants of education attainment we have specified the following equations that relate the annual progress in the three educational indicators to public expenditure in different levels of education, economic, social characteristics, demographic and infrastructure variables.

The equation for per year increase in literacy rate (*PYILR*) is given as;

$$PYILR_{ij} = \alpha_{1ij} + \beta_{11}PubExp_{ij} + \beta_{12}EcoCharP_{ij} + \beta_{13}SocChar_{ij} + \beta_{14}Demo_{ij} + \beta_{15}Infras_{ij} + \varepsilon_{1ij} \quad \dots\dots\dots (1)$$

The equation for per year increase in the percentage of population completed higher education (*PYIHE*) is given as;

$$PYIHE_{ij} = \alpha_{2ij} + \beta_{21}PubExp_{ij} + \beta_{22}EcoCharP_{ij} + \beta_{23}SocChar_{ij} + \beta_{24}Demo_{ij} + \beta_{25}Infras_{ij} + \varepsilon_{2ij} \quad \dots\dots\dots (2)$$

The equation for per year increase in average years of schooling (*PYIAYS*) is given as;

$$PYIAYS_{ij} = \alpha_{3ij} + \beta_{31}PubExp_{ij} + \beta_{32}EcoCharP_{ij} + \beta_{33}SocChar_{ij} + \beta_{34}Demo_{ij} + \beta_{35}Infras_{ij} + \varepsilon_{3ij} \quad \dots\dots\dots (3)$$

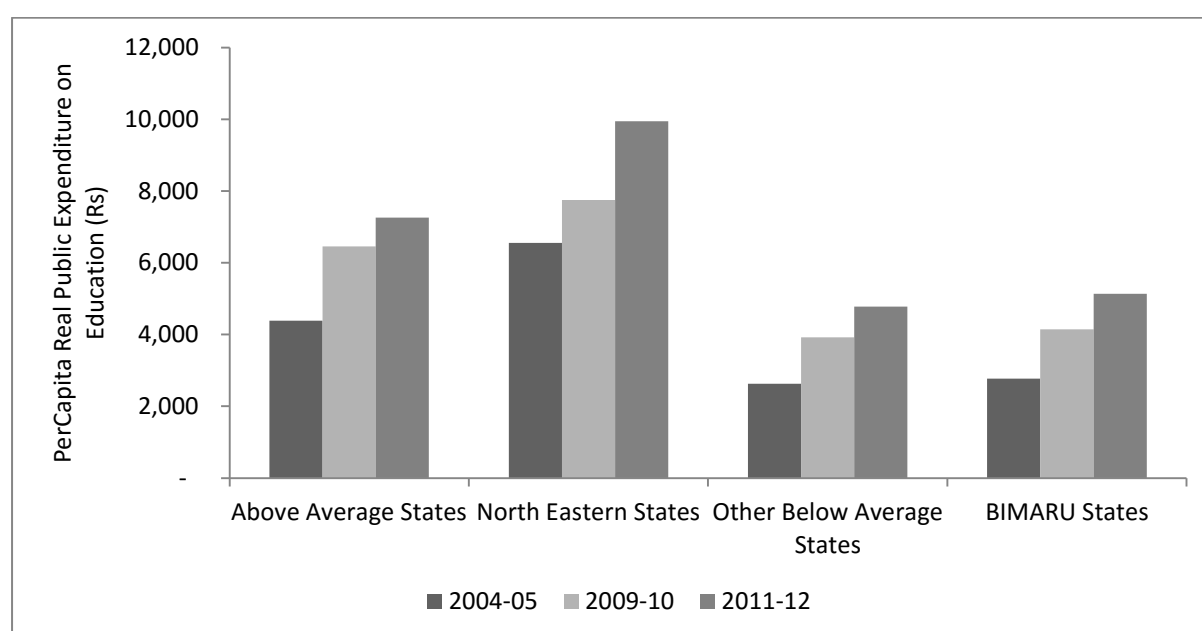
The explanatory variables in each equation can be categorised in five broad dimensions; public expenditure in education (*PubExp*), economics characteristics (*EcoChar*), social characteristics (*SocChar*), demographics (*Demo*) and infrastructure (*Infras*). These categories of explanatory variables are discussed in detail below.

#### **Public Expenditure in education**

The data on total public expenditure on education is collected from the Planning Commission of India whereas the percentages of total educational expenditure on higher and adult education are calculated from the data source “Analysis of Budgeted Expenditure on Education”. Here the educational budget can be categorised in five broad segments; viz., primary, secondary, higher education, adult education and others. Several policy initiatives have been undertaken by the central government to improve the progress in education sector. Though contribution of higher education in development is widely accepted, India has not paid adequate attention to the enhancement in higher education (Tilak, 2010). India tends to focus on the elementary education and greater percentage of public spending is allocated towards elementary education. Special attention is given to elementary education through Sarva Siksha Abhiyan (SSA) in order to attain universal primary education for children. But elementary education cannot be expanded fully without the expansion of secondary and higher education. The central government has initiated Adult Literacy Mission (ALM) under the Right to Education Act (RTE), 2009 to increase adult literacy rates to 85 per cent. Moreover the Rashtriya Madhyamik Shiksha Abhiyan (RMSA) was established in 11<sup>th</sup> Five Year Plan and the allocation for higher education was enhanced to improve the completion rate of higher education. The budgetary allocation and expenditure on higher education has increased by more than three times between 2007-08 and 2011-12 (Mukherjee and Sikdar, 2012).

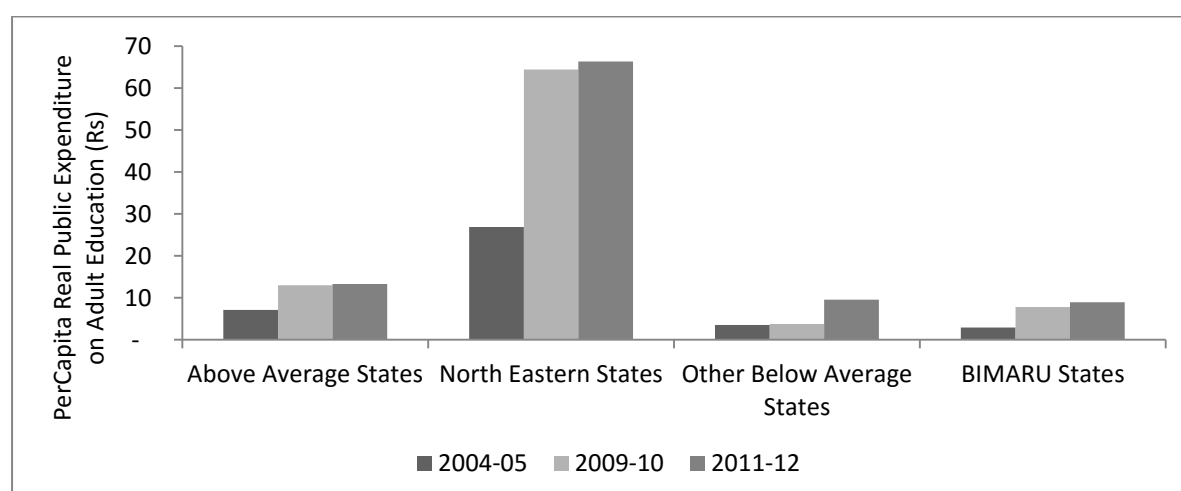
Figure 2 demonstrates the pattern of per capita real public expenditure in education sector which is quite consistent with the nature of educational attainment across states. The ‘above average states’ spend more as compared to other states besides north eastern states in terms of real educational expenditure per capita which may be a major factor determining the existing pattern of educational indicators. The literacy rate in the north eastern states is about 82% where per capita public expenditure in education is significantly high over the period. Moreover, these states are spending relatively more in adult education as compared to other states which may have direct and significant impact on literacy rate of young adults (Figure 3). Notably, BIMARU and ‘other below average states’ are spending quite less in every levels of education throughout the period (Figure 2, 3 & 4).

Figure 2: Per capita real public expenditure on education (2004-12)



Source: Author's calculations based on NSS data.

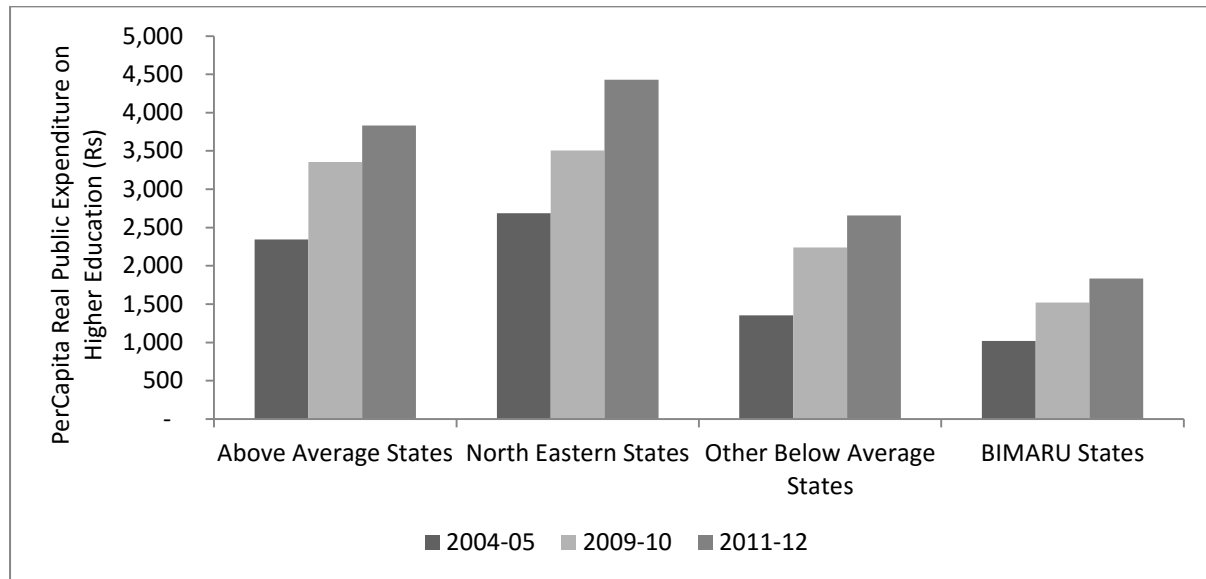
Figure 3: Per capita real public expenditure on adult education (2004-12)





Source: Author's calculations based on NSS data.

Figure 4: Per capita real public expenditure on higher education (2004-12)



Source: Author's calculations based on NSS data.

Public expenditure in different levels of education is included in each model according to the relevance in the particular model. For PYILR (equation 1), public expenditure on adult education is included as other components of educational expenditure should not have any impact on the progress of literacy rates of the target age group. Then public expenditure on higher and technical education is considered while explaining the annual increase in the percentage of population with higher education (equation 2), whereas per capita public expenditure on overall education is included in the third equation to explain the overall progress in educational attainment (equation 3). These variables are, in general, expressed in real terms by dividing with Gross State Domestic Product (GSDP) deflator.

### Economic Characteristics

Several economic factors (*EcoChar*) are considered in each of the above models. To capture economic condition of a state, per capita GSDP (PCGSDP) at constant prices and poverty head count ratio (the proportion of population below the poverty line) of rural and urban areas are considered. The percentages of population below poverty line (BPL) of both rural and urban sectors are taken from the Planning Commission database. These statistics are based on the methodology suggested by Tendulkar Committee and are estimated using NSSO data.

Real PCGSDP is taken as a proxy for average income of each state to capture affordability of the people of each state on education which leads to higher educational attainment. In addition, poverty head count ratio measures the level of economic deprivation of a state. States with high poverty ratio

are expected to experience negative effect on educational attainment (Suryadarma and Suryahadi, 2010; Jayachandran, 2002) as poor people cannot afford both direct and opportunity cost of education (Rani, 2007).

Sectoral distribution of total GSDP is included in the model to explain the demand pull effect on the education sector. An economy with greater share of secondary and tertiary sector generate demand for semi-skilled and skilled labour which in turn is likely to have positive influence on demand of education. The study also gives a special emphasis to the rural agricultural sector. Here percentage of rural households with own-land is taken to capture the wealth effects on the capability of attaining basic education as compared to landless labourers. Further, the percentage of cultivated land and irrigated land in rural areas are also considered in the model to capture the wealth effects of those households who are engaged in agriculture sector. The share of registered manufacturing in total manufacturing is included in the model to capture the demand side factor which may have a positive impact on the educational outcome as the demand for literacy and skilled workers is relatively higher in registered manufacturing firms as compared to unregistered firms. The data on the sectoral distribution of gross state domestic products across different sectors and the share of registered manufacturing are collected from the Planning Commission of India.

### *Social Characteristics*

Among social factors (*SocChar*), the distributional pattern of total population in different social status viz., scheduled castes (SC), scheduled tribes (ST), other backward castes (OBC) and upper castes are included as explanatory variable for educational attainment. The SCs and STs are historically deprived and under-privileged which may explain lack of opportunities and backwardness as compared to others in the society. Historically, they were not allowed to get education and they were treated as untouchables by the upper castes. Although this kind of extremity has been removed by law, discrimination still remains in every region of India. Thus, states with larger share of population from SC and ST are expected to experience lesser increase in educational indicators (Joshi and Rao, 1964). In addition, population distribution across different religion is also considered as an important determining factor in these models (Suryadarma, 2009).

We have utilised the CES data undertaken by NSSO for four quinquennial rounds during 1999-12 to construct these variables related to social characteristics and demographic variables and certain infrastructure and economic variables across states. Percentages of rural households with own land, cultivated land and irrigated land are estimated from the NSS data.

### *Demographics*

Demographics (*Demo*) are considered as important determinants of the progress in education (Jayachandran, 2002). The sex-ratio, calculated as female-male ratio, is included as a proxy of women

empowerment for each state. In a state where women are more empowered, greater percentage of women are expecting to get education which will have a positive impact on the overall educational attainment. In contrast, increase in dependency ratio and average household size raises total liability of a household, and households will have less income per capita available for education after essential consumption expenditure, which will have negative impact on educational attainment. Age distribution of the underlying population is considered as an important demographic feature of the state while analysing the education level of youth adults. If the age distribution of population is skewed towards 30 years then the probability of getting higher education is negligible. In contrast if population is mostly in the age group of 18-30 then they are more probable of getting higher education or adult education. These variables are calculated from the NSS data.

### **Infrastructure**

Infrastructure (*Infras*) comprises electricity, urbanisation, road density and availability of public education institutions in each state (Jayachandran, 2002). Electricity is a basic requirement for education, and per area road density captures available transportation and communication of the state which should have positive effect on educational attainment (Sánchez and Sbrana, 2009). Then total number of primary, secondary, higher secondary and colleges per area are included to explain availability and accessibility of educational facilities in each state. Urbanisation explains economic progress which is expecting to have a positive impact on the educational attainment.

State-wise road length in relation to area and population in India are available in the department of Ministry of Road Transport and Highways. State-wise total number of primary, high/post basic schools, higher secondary schools, intermediate, pre-degree, junior colleges in India are collected from the website of Ministry of Human Resource Development in India. Then the level of urbanisation in each state is calculated from the NSS data.

Here poor socio-economic condition, demographic characteristics, direct and opportunity cost of education, quality of schooling are demand side determinants for higher as well as primary education. Moreover, inadequate provision of physical infrastructure (schooling, roads and transport) is a supply side factor which constrains to achieve education (Rani, 2007). Public policies in education sector can influence supply side as well as demand side factors. Per capita public spending on education can increase not only the availability of public schools but it can improve the accessibility and quality of schooling as well. The above equations are estimated to measure the impact of public expenditure in education and other socio-economic variables.

Here we applied panel data modelling techniques and Hausman test is done to choose between fixed effect and random effect models. Both state level effects and time effects are included to control the effects of unobservable factors. In case of fixed effects model, we applied ordinary least squares

(OLS) technique with time and state level dummy variables. For random effects model, a composite error term is formed with an additional time invariant error term and estimated through Generalised Least Square (GLS) techniques. Then final models are chosen applying Hausman test.

## 4.2 Descriptive Statistics

Table 6 presents the descriptive statistics of both outcome and explanatory variables. India experiences 1.27 per cent annual increase in literacy rate during 1999-2012. The percentage of population completed higher education increases by 0.45 per cent and AYS increases by 0.17 years during the period.

Table 6: Descriptive Statistics (1999-2012)

Variable	N	Mean	Std. Dev.	Minimum	Maximum
<b>Outcome Variable</b>					
PYI in Literacy Rate	78	1.27	1.21	-3.29	3.83
PYI in Percentage of Population Completed Higher Education	78	0.45	0.66	-2.31	3.05
PYI in Average Years of Schooling	78	0.17	0.13	-0.34	0.72
<b>Explanatory Variables</b>					
<b>Public Expenditure on Education</b>					
PYI in Per Capita Educational Expenditure	77	214.73	462.10	-883.90	3460.44
PYI in Percentage of Educational Expenditure in Higher Education	76	0.20	3.96	-20.66	20.78
PYI in Percentage Expenditure in Adult Education	76	-0.01	0.15	-1.00	0.77
<b>Economic Characteristics</b>					
PYI in Per Capita GSDP Constant (Rs.)	77	2438.37	2539.85	197.92	19440.00
PYI in Percentage of GSDP in Primary Sector	78	-0.25	1.10	-2.29	4.68
PYI in Percentage of GSDP in Secondary Sector	78	0.23	1.53	-3.41	7.44
PYI in Percentage of GSDP in Tertiary Sector	78	0.22	1.43	-3.78	7.04
PYI in Percentage of GSDP in Industry	78	0.94	3.94	-7.68	20.30
PYI in Percentage of GSDP in Industry and Services	78	0.96	3.33	-5.49	19.32
PYI in Percentage of Rural HHs with Own Land	78	0.15	1.51	-6.54	7.92
PYI in Percentage of Rural HHs with Cultivated Land	78	-0.16	2.33	-8.34	7.03
PYI in Percentage of Rural HHs with Irrigated Land	78	0.22	2.52	-6.17	8.02
Registered Manufacturing as a Percentage of Total Manufacturing	78	59.34	24.89	0.00	98.02
Percentage of BPL Population	78	24.03	12.18	5.10	57.20
Percentage of BPL Population Rural	78	26.46	13.19	6.80	60.80
Percentage of BPL Population Urban	78	18.45	9.68	3.70	46.40
<b>Social Characteristics</b>					
PYI in Percentage of Hindu Population	78	-0.08	0.91	-3.49	1.89
PYI in Percentage of Muslim Population	78	0.10	0.67	-1.32	3.44
PYI in Percentage of ST Population	78	0.14	1.22	-6.85	3.73
PYI in Percentage of SC Population	78	-0.10	0.80	-3.74	1.42
PYI in Average Household Size	78	-0.04	0.06	-0.22	0.16
<b>Demographics</b>					
PYI in Dependency Ratio	78	-0.45	0.47	-1.99	1.11
PYI in Sex Ratio	78	0.79	15.32	-45.83	83.24

PYI in % of Population in 30-45 Years of Age Group	78	0.33	1.04	-1.42	5.75
<b>Infrastructure</b>					
PYI in Urbanisation	78	0.56	1.57	-2.68	10.45
PYI in Percentage of HHs with Electricity	78	1.56	1.77	-1.09	9.07
PYI in Road Density per square Km. Area	77	0.03	0.04	-0.08	0.17
PYI in Number of Schools per Area	78	0.02	0.04	-0.12	0.22
PYI in No. of Higher/Secondary Schools and Colleges Per Area	78	0.003	0.01	-0.02	0.04

Source: Author's calculations based on NSS data. Note: PYI refers to "Per Year Increase".

Here, per capita real educational expenditure and the percentage of educational expenditure in higher education increase over the period; but the share of educational expenditure in adult education decreases. Among other explanatory variables, per capita GSDP in constant term is increasing over time where the share of primary sector in total GSDP is shrinking as industry and service sectors are growing at a faster rate. Percentage of households with owns land has a positive growth in the rural areas. Although percentage of cultivated land is declining over years but additional lands are facilitated with irrigation facilities. In terms of roads, schools, urbanisation and electrification, India experiences a considerable and consistent progress in infrastructure over the period.

In average, India experienced increasing trend in sex ratio whereas dependency ratio decreases. The data suggests considerable changes in the composition of total population in terms of social characteristics which are captured by the population distribution among social groups, religion and household size. In addition, there prevail inter-state disparities in terms of educational attainments, socio-economic and demographic characteristics.

### 4.3 Results

The study used 69 observations comprising three NSS rounds viz. 2004-05, 2009-10 and 2011-12; as the time period 1999-2000 is dropped off to calculate the per year increase in subsequent round. Hausman test suggests fixed effect panel data modelling technique to estimate per year increase in educational indicators.

Table 7 presents the estimated results of two separate models for per year increase in literacy rates. While concerning the effectiveness of public policy in adult literacy, model 1 explicitly proved that percentage of total educational expenditure in adult education does not have a significant impact on the state wise literacy rate. It may be due to the fact that government is spending merely around one per cent of total education expenditure in adult education. Thus government has to enhance total coverage to significant percentage of illiterate people through such literacy mission and they have to implement this programme more effectively to get a significant impact on literacy rate.

We have estimated a separate model (Model 2) without the public expenditure on adult education as it is insignificant in model 1. The result shows that the per year increase in percentage of population in

backward castes (SC and ST) have negative impact on the improvements in literacy rates per year. Thus social status still plays a significant role in India. Evidence suggests that students from SC and ST community are being neglected in schools and other social platforms which have negative impact on their enrolment and completion of education.

Here demographic pattern is important to determine actual increase in literacy rate. States with a greater proportion of population from older age group has lower progress in literacy rate. Then percentage of rural households with own land is identified as a supply side factor to determine the literacy rate of the state. In rural India, households without land are mostly in economically and socially vulnerable state with credits and other liabilities. Thus, the proportion of rural households with land can indirectly capture the economic ability of their residents to afford the basic education level from formal schooling.

Moreover, the percentage of registered manufacturing in total manufacturing is identified as a demand pull factor which motivates them to attain atleast minimum level of education. The literacy rate is increasing annually at a diminishing rate which is captured by the year dummies with the coefficients 1.16 and 1.67 in 2009-10 and 2011-12 respectively.

**Table 7: Per year increase in literacy rate (% of population completed primary education or informal education), 2004-2012**

Variable	Model 1	Model 2
Per Year Increase in Percentage Expenditure in Adult Education	0.0001	
Per Year Increase in Percentage of ST Population	-0.3788***	-0.3580***
Per Year Increase in Percentage of SC Population	-0.25143*	-0.2588*
Per Year Increase in % of Population in 30-45 Years of Age Group	-0.25697**	-0.2237**
Registered Manufacturing as a Percentage of Total Manufacturing	0.01097**	0.0103**
Percentage of Rural HHs with Own Land	0.0197***	0.0174***
Year 2009-10	-1.3586***	-1.1071***
Year 2011-12	-1.8860***	-1.6482***
State Dummies	Yes	Yes
No. of observations	69	69
Root MSE	0.938	0.951
R-Square	0.748	0.734
Adjusted R-Square	0.715	0.704
F Value	22.48***	24.18***

Source: Author's estimates of equation-1 based on NSS data.

The estimated results for per year increase in percentage of population completed higher education is given in table 8. Here public policy is found to be effective in increasing skilled labour force. The proportion of educational expenditure in higher education has significant impact on the annual

increase in the percentage of population completed higher education. Thus the results support the argument that states which are spending a greater proportion in higher education are experiencing more increase in skilled labour force.

The result also suggests that states with higher growth in Hindu population experiences lower increase in percentage of population completed higher education annually. Similarly, social status plays a critical role here as per year increase in percentage of ST population has negative impact on higher education.

Here sex ratio is taken as a proxy for women empowerment of a state and we found an increase in sex ratio has positive impact on educational progress. The preliminary analysis shows that female education is growing at a higher rate than the male population which may result positive effect on the overall progress in education in a state where the sex ratio is increasing as compared to others.

We find a negative significant coefficient for the dependency ratio which captures the economic burden of the society and deteriorates the growth rate of higher education. Percentage of GSDP in industry and services is included in the model to capture the demand pool effects on education. Here one unit increase in annual growth in the percentage of GSDP in industry and services has positive impact on the completion rate of higher education. Although Indian states are experiencing steady growth across different time period as year dummies are not significant in the model.

**Table 8: Per year increase in percentage of population completed higher education, 2004-2012**

Variable	Model
Percentage of Educational Expenditure in Higher Education	0.0032*
Per Year Increase in Percentage of Hindu Population	-0.1348*
Per Year Increase in Percentage of ST Population	-0.2251***
Per Year Increase in Sex Ratio	0.0086*
Per Year Increase in Dependency Ratio	-0.3348***
Per Year Increase in Percentage of GSDP in Industry and Services	0.0593***
State Dummies	Yes
No. of observations	69
Root MSE	0.528
R-Square	0.613
Adjusted R-Square	0.562
F Value	12.12***

Source: Author's estimates of equation-2 based on NSS data.

Table 9 gives the estimated results for per year increase in average years of schooling. Here per year increase in per capita real expenditure on education is significant at 1 percentage level. Thus public education policy is effective in improving overall educational outcome across states.

**Table 9: Per year increase in average years of schooling, 2004-2012**

Variable	Model
Per Year Increase In Per Capita Educational Expenditure	0.0001***
Per Year Increase In Percentage of ST Population	-0.0314***
Per Year Increase In % of HHs with Irrigated Land in Rural Areas	0.0127***
Per Year Increase In Dependency Ratio	-0.0846***
Per Year Increase in No. of Higher/Secondary Schools and Colleges Per Area	3.9581*
Percentage of GSDP in Industry and Services	0.0019***
Year 2009-10	-0.0523*
Year 2011-12	-0.0793**
State Dummies	Yes
No. of observations	69
Root MSE	0.096
R-Square	0.828
Adjusted R- Square	0.802
F Value	32.21***

Source: Author's estimates of equation-3 based on NSS data.

Again, percentage of ST population is important in determining annual progress in AYS. Result suggests that states with greater percentage of ST population have slow progress in AYS. Then the share of GSDP in industry and services has positive impact on the overall educational progress which can be explained as a demand side impact on education. Greater share of GSDP in industry and services increase the demand for skilled labour which has a significant impact on the educational attainment in India. Additionally, annual increase in percentage of households with irrigated land in rural areas has positive impact on educational improvements as the increase in the share of irrigated land captures the economic development of those households who are engaged in agriculture sector. Such development improves income of those households and offers them an opportunity to afford educational services. Moreover, increase in total number of higher/secondary schools and colleges per area has positive impact on educational improvements. This may be due to the fact that increase in the number of schools and colleges improves the accessibility of the education facilities in each place which improves total enrolment and completion in those places and people are more willing to send their children to school if it is closer to their homes.

## 5. Conclusions and Policy Implications

Education is considered as a necessary means of life to attain freedom and to achieve inherent capabilities of a person. Moreover, education has several linkages which promote higher growth of the economy. Literature suggests the importance of education in attaining better health behaviour which leads to better health of their children. But India is lacking in terms of both basic and higher education as there has been slow progress in educational outcomes over last two decades. Thus, the basic objective of the study is to identify the determining factors of the slow progress in educational



attainment per year. We have included social, economic, demographic, infrastructure and public spending in education sector to examine both supply and demand side factors in the model. In particular, the role of public expenditure in different levels of education is examined in this paper. The use of annual progress in educational indicators instead of their levels offers an additional edge to the analysis to identify the driving forces of improving the rate of progress in those outcomes.

The study starts with an overview of the pattern of improvements in education of working population in India at their early age of adulthood. We have considered three separate indicators to measure the level of progress in the educational status, viz., literacy rate, percentage of population completed higher education and average years of schooling. The CES data collected by NSS is utilised to estimate state-wise annual progress in educational attainments for four quinquennial rounds viz., 55<sup>th</sup> (1999-2000), 61<sup>st</sup> (2004-05), 66<sup>th</sup> (2009-10) and 68<sup>th</sup> (2011-12). The study reveals that gender gap still prevails in India in favour of male population and rural-urban disparities exist across all states. But the differences are declining over time as the backward groups are growing at a faster rate. Notably, literacy rates in north eastern states are remarkably higher than below average and BIMARU states but the education indicators in certain north eastern states, Sikkim and Assam in particular, have declined in 2011-12. The study has also elaborated the pattern of per capita expenditure in education across states over time and it shows that education outcomes are generally higher in a state which spends more on education.

Second, we have regressed the per year increase of each educational outcome on public expenditure in different levels of education after controlling the impact of economic, social, demographic and infrastructure variables across states for the time period to determine the driving forces of the slow progress in educational attainment. The estimated results show that the public expenditure on education has significant impact on the progress in average years of schooling whereas the annual increase in the supply of human capital depends on the educational expenditure in higher education. In particular, the percentage of public spending in higher education determines the level of improvements in higher educational outcome. But the public spending on adult education does not have significant impact on the progress of literacy rate across states. The preliminary analysis pointed out that the share of total public spending on adult education is less than one per cent of total educational spending. This may be responsible for its insignificant impact on the literacy rate. Thus Government has to increase the level of per capita real expenditure on adult education to get substantial impact on the literacy rate.

Besides, the social indicators still play significant role in India in determining the progress of all education outcomes per year. Specially, states with more population from scheduled castes and scheduled tribes have slow progress in the education outcomes. The result also suggests that states with higher growth in Hindu population experiences lower increase in higher education whereas

women empowerment of a state, captured by female-male ratio, has positive impact on the overall educational progress.

The economic variables are invariably important to determine the progress in education of adults in India. Here, percentage of GSDP in non-agricultural sector is included in the model to capture the demand pull effect on education. Greater share of industry and services in GSDP has positive impact on the overall educational progress, whereas dependency ratio captures the economic burden of the society significantly slows down the growth rate of higher education. Moreover, the percentage of rural households with own land is identified as an important economic factor to determine the literacy rate of the state. It captures economic ability of their residents to afford the basic education level. In addition, percentage of registered manufacturing in total manufacturing is identified as another demand pull factor affecting the progress in literacy rate by encouraging people to attain a minimum level of education.. Additionally, annual increase in percentage of households with irrigated land in rural areas has positive impact on educational improvements. It is well known that irrigation enables farm households to diversify into commercial agriculture thereby raising their income levels, and also brings greater stability to agricultural incomes, both of which seems to matter for improvements in educational attainment in rural areas.

Further, the composition of the target population of the study plays significant role in determining the progress in education indicators. States with more population in the older age group has negative impact on the progress of literacy rate. Among all infrastructure variables included in the model, the area-wise total number of higher/secondary schools and colleges is coming out as significant to increase the annual growth in overall education level.

While discussing the policy implication of these results we should keep in mind the following limitation of the study. We did not consider the quality aspect of the educational outcomes. The educational outcomes are measured purely on the basis of years of schooling completed of young adults but actual level of education should depend on their cognitive skills which enhance productivity and efficiency of labour. Nevertheless this study measured education from multiple dimensions to understand the trends in educational outcomes and identified several factors to explain the recent progress in India. As India is experiencing a remarkable demographic transition where majority of the population is below the age of 25, education is going to play a major role in India for acquiring the demographic dividend over the next decades. In such a situation, India has to increase public expenditure in different levels of education to gain maximum return in recent future. The results also find evidences to suggest a significant increase in per capita real expenditure in education sector to increase the educational outcomes. India should not focus only on elementary education, as elementary education cannot be expanded fully without the expansion of secondary and higher education. Moreover, in this globalised skill and knowledge based society, the contribution of higher education in development is widely accepted (Tilak, 2003). This study found that proportion of public spending in higher education has positive impact on the progress in higher educational outcome. Thus

India has to focus on both elementary and higher education to achieve better economic and human development. Government has to provide scholarship to more students from economically deprived families which would offer them equal opportunities to pursue higher education (Sparrow, 2007; Cameron, 2009). Total allocation of education spending has to increase towards adult education also to overcome from the intergenerational vicious cycle of low education. These policy initiatives would certainly accelerate the rate of current progress in educational outcomes.

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## Appendix

Table 10: Gender wise spatial variation in educational attainment of young adults across NSS rounds (1999-2012)

Gender	Male				Female			
States	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Andhra Pradesh	61.04	65.48	76.15	78.72	39.16	44.59	58.55	60.38
Arunachal Pradesh	61.02	76.38	83.85	86.20	41.32	57.90	70.72	74.89
Assam	77.40	86.97	91.89	90.99	61.10	72.56	83.38	80.80
Bihar	58.55	69.13	70.76	76.34	25.94	35.88	42.47	51.95
Delhi	93.07	94.66	93.57	94.27	72.89	82.21	78.95	82.26
Goa	93.04	95.45	93.42	98.07	81.80	90.66	88.63	92.46
Gujarat	80.71	82.95	88.06	90.37	54.73	61.68	68.20	71.67
Haryana	76.38	84.73	85.14	89.42	47.01	59.47	64.73	73.84
Himachal Pradesh	86.82	90.49	95.70	94.57	68.13	77.55	87.94	87.09
Jammu & Kashmir	81.60	76.92	84.80	85.90	50.68	51.69	64.59	66.17
Karnataka	72.07	78.27	85.04	87.59	50.57	58.16	69.70	72.57
Kerala	97.08	97.39	98.63	98.66	93.66	96.09	97.54	98.16
Madhya Pradesh	67.70	72.67	81.05	82.03	36.24	42.97	58.14	61.30
Maharashtra	84.95	87.75	91.81	92.73	64.05	70.35	79.02	81.01
Manipur	83.66	94.57	96.77	96.39	69.87	83.40	89.14	91.00
Meghalaya	80.19	91.32	96.81	99.03	75.13	89.21	96.79	97.10
Mizoram	95.84	98.59	99.66	98.64	94.75	98.34	98.28	96.55
Nagaland	94.60	93.91	96.39	98.30	80.70	87.95	93.75	98.01
Orissa	69.26	74.13	81.56	85.37	43.63	53.90	64.11	67.26
Punjab	73.98	79.63	81.47	85.16	61.63	67.87	74.46	77.32
Rajasthan	68.70	71.15	76.62	80.11	27.83	30.23	40.79	45.53
Sikkim	85.64	92.19	98.20	94.16	66.11	76.98	89.89	88.21
Tamilnadu	81.46	87.35	92.27	92.40	62.49	70.06	82.09	84.11
Tripura	83.27	88.19	91.55	93.90	68.49	77.34	82.28	86.66
Uttar Pradesh	67.50	72.36	77.45	76.58	34.85	40.55	50.21	53.76
West Bengal	72.28	77.78	82.18	81.99	54.50	61.93	72.76	71.38

Source: Author's calculations based on NSS data.

Table 11: Gender wise spatial variation in percentage of young adults completed higher education across NSS rounds (1999-2012)

Gender	Male				Female			
	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
States	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Andhra Pradesh	8.46	9.67	14.83	17.06	3.44	4.00	6.56	8.80
Arunachal Pradesh	7.62	7.41	11.08	12.41	1.16	3.11	4.91	5.10
Assam	5.35	5.37	5.46	5.14	2.63	1.87	2.66	3.41
Bihar	7.03	7.89	7.17	8.61	1.98	2.21	2.61	3.00
Delhi	25.51	24.16	24.13	25.64	24.41	22.02	21.38	25.76
Goa	13.27	17.43	9.47	19.80	12.15	12.74	12.62	14.95
Gujarat	8.04	10.81	12.12	10.96	5.56	6.99	9.70	8.94
Haryana	7.86	11.10	14.57	17.38	5.37	7.57	10.50	14.34
Himachal Pradesh	8.30	9.70	13.44	15.34	4.65	6.22	9.74	12.03
Jammu & Kashmir	6.44	7.95	11.48	11.79	2.40	4.67	7.70	10.47
Karnataka	9.44	10.84	13.65	17.34	4.38	5.42	7.51	10.92
Kerala	8.13	13.14	15.41	17.15	7.10	14.04	17.92	17.96
Madhya Pradesh	6.76	8.19	10.31	10.13	3.32	4.35	5.36	6.31
Maharashtra	9.79	12.65	16.98	17.62	6.52	7.70	11.54	12.04
Manipur	12.34	12.86	17.50	22.18	8.34	9.25	9.36	12.63
Meghalaya	3.97	5.54	6.01	8.43	3.37	4.03	4.99	7.51
Mizoran	5.61	7.35	10.19	8.73	2.65	2.60	4.80	7.22
Nagaland	10.69	16.04	16.93	18.34	6.30	7.50	9.17	8.61
Orissa	6.31	9.76	10.05	7.91	2.45	4.28	4.49	4.46
Punjab	5.78	7.89	8.07	8.83	6.24	9.41	11.28	10.91
Rajasthan	7.45	8.95	10.24	11.98	3.01	3.37	5.26	7.33
Sikkim	6.30	6.20	11.00	8.01	3.52	4.10	10.33	4.41
Tamilnadu	8.15	13.99	17.31	20.25	5.28	8.64	11.64	15.24
Tripura	5.56	5.42	5.73	7.57	3.11	3.00	4.00	4.10
Uttar Pradesh	8.27	9.48	12.03	12.01	4.28	5.35	7.58	9.03
West Bengal	7.34	8.13	8.76	9.29	3.92	5.02	5.62	5.94

Source: Author's calculations based on NSS data.

Table 12: Gender wise spatial variation in average years of schooling of young adults across NSS rounds (1999-2012)

Gender	Male				Female				
States	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12	
Andhra Pradesh		5.03	5.68	6.99	7.58	2.85	3.40	4.76	5.13
Arunachal Pradesh		4.83	6.64	7.65	7.91	2.79	4.43	5.79	6.04
Assam		5.77	6.82	7.38	7.32	4.07	4.93	5.75	5.70
Bihar		4.73	5.74	5.96	6.62	1.82	2.55	3.12	3.74
Delhi		9.50	9.66	9.99	9.65	7.83	8.25	8.36	8.92
Goa		8.55	9.29	8.88	10.65	7.19	8.36	8.18	9.49
Gujarat		6.39	7.15	7.74	7.63	4.18	5.22	5.74	5.85
Haryana		6.60	7.52	8.02	9.00	3.83	5.11	6.02	6.97
Himachal Pradesh		7.41	8.08	9.23	9.53	5.40	6.46	7.91	8.23
Jammu & Kashmir		6.95	7.13	8.04	8.06	3.89	4.61	5.80	6.09
Karnataka		6.17	6.92	7.88	8.32	3.96	4.91	5.92	6.48
Kerala		8.04	8.69	9.32	9.54	7.69	8.71	9.45	9.60
Madhya Pradesh		5.15	5.70	6.78	6.97	2.53	3.16	4.30	4.69
Maharashtra		7.35	8.03	8.88	9.23	5.09	6.00	7.12	7.34
Manipur		7.79	9.13	10.28	10.45	6.04	7.24	8.54	8.76
Meghalaya		4.91	6.15	7.18	8.14	4.49	5.60	6.93	7.68
Mizoran		7.44	8.41	8.38	8.46	7.03	7.58	7.79	8.09
Nagaland		7.88	9.28	9.66	10.55	6.11	7.73	8.71	9.31
Orissa		5.09	6.02	6.68	6.82	2.89	3.94	4.74	4.87
Punjab		6.17	7.00	7.39	7.83	5.08	6.16	6.95	7.32
Rajasthan		5.53	5.86	6.48	6.91	2.05	2.31	3.18	3.73
Sikkim		6.04	6.45	7.64	7.08	4.45	5.29	6.77	5.87
Tamilnadu		6.43	7.52	8.45	8.86	4.68	5.65	6.97	7.63
Tripura		5.62	6.48	6.21	6.71	4.00	4.99	5.07	5.57
Uttar Pradesh		5.83	6.27	7.15	6.98	2.81	3.40	4.33	4.86
West Bengal		5.27	5.95	6.37	6.48	3.68	4.36	4.98	5.27

Source: Author's calculations based on NSS data.



Table 13: Rural-urban disparities in literacy rates of young adults across NSS rounds (1999-2012)

Sector	Rural				Urban			
States	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Andhra Pradesh	40.08	47.29	60.78	61.49	73.55	75.05	82.70	85.03
Arunachal Pradesh	47.47	63.44	73.94	77.43	86.99	90.65	89.87	91.96
Assam	67.34	78.85	86.83	85.47	87.34	89.00	94.46	91.68
Bihar	37.95	48.27	53.66	61.70	69.77	78.86	77.56	82.51
Delhi	81.14	81.65	80.81	94.13	85.02	89.66	88.01	88.35
Goa	86.70	93.98	89.84	94.82	88.68	91.65	93.81	95.77
Gujarat	59.70	63.76	71.65	74.74	85.04	88.03	88.32	90.49
Haryana	58.11	68.85	73.35	78.07	73.59	83.75	80.27	91.45
Himachal Pradesh	75.25	82.44	91.66	90.07	92.08	93.72	90.99	95.76
Jammu & Kashmir	62.95	60.13	72.12	73.80	77.66	77.15	83.41	83.40
Karnataka	52.52	60.23	70.25	74.21	82.31	85.00	89.52	90.19
Kerala	94.26	96.17	97.66	98.27	97.93	98.34	99.12	98.70
Madhya Pradesh	45.13	52.05	64.29	66.99	76.56	79.44	87.97	86.48
Maharashtra	66.19	72.15	79.94	82.70	86.87	88.36	92.81	91.63
Manipur	71.56	88.23	91.76	92.62	92.52	91.01	96.15	96.45
Meghalaya	74.25	89.09	96.63	97.89	92.95	97.10	97.61	98.57
Mizoran	91.84	97.61	98.25	95.80	99.86	99.78	99.81	99.50
Nagaland	84.62	88.35	94.10	97.58	94.21	95.71	97.72	99.18
Orissa	52.00	60.81	70.01	74.33	76.60	81.89	86.86	86.08
Punjab	62.53	68.57	74.01	77.63	79.03	84.66	85.16	87.54
Rajasthan	40.35	43.69	52.10	57.21	74.22	71.98	77.51	80.43
Sikkim	74.76	83.29	93.82	89.85	88.91	95.45	94.70	96.86
Tamilnadu	63.49	72.05	83.52	84.32	86.16	88.02	91.07	92.76
Tripura	74.45	81.57	86.06	89.79	85.94	90.54	91.03	92.66
Uttar Pradesh	46.30	51.42	59.68	61.57	69.56	75.60	78.08	76.60
West Bengal	58.05	64.31	73.54	72.00	82.09	86.18	89.61	88.68

Source: Author's calculations based on NSS data.

Table 14: Rural-urban disparities in percentage of young adults completed higher education across NSS rounds (1999-2012)

Sector	Rural				Urban			
States	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Andhra Pradesh	1.91	3.10	5.00	6.65	15.37	16.56	24.05	24.94
Arunachal Pradesh	3.66	4.17	5.65	6.44	11.39	12.24	16.67	17.26
Assam	2.50	2.32	2.08	2.87	15.81	15.56	19.92	15.97
Bihar	2.60	2.84	3.08	3.83	16.57	19.85	16.64	19.37
Delhi	12.20	16.00	11.53	25.94	30.13	23.72	23.62	25.67
Goa	8.99	13.06	7.44	7.42	16.62	18.93	20.92	27.10
Gujarat	2.99	3.58	3.95	4.96	14.47	18.26	21.10	16.57
Haryana	3.52	6.23	8.13	8.11	14.35	17.94	22.85	33.05
Himachal Pradesh	4.38	6.54	9.76	11.56	24.46	18.87	28.06	28.97
Jammu & Kashmir	2.20	3.42	6.41	8.16	12.48	14.49	19.21	20.55
Karnataka	2.90	3.18	3.16	5.68	16.39	18.47	23.03	28.18
Kerala	6.23	11.60	14.41	15.11	11.22	20.05	23.45	24.26
Madhya Pradesh	1.71	2.43	3.18	4.09	16.07	19.51	23.05	20.34
Maharashtra	3.54	4.87	5.99	6.80	14.66	17.17	24.90	23.47
Manipur	5.86	8.59	10.44	13.77	23.86	18.41	21.60	27.09
Meghalaya	0.95	1.75	2.58	2.15	16.18	22.53	19.56	27.21
Mizoran	1.42	2.31	3.93	3.51	7.67	9.09	11.63	12.86
Nagaland	4.98	7.60	10.67	11.14	15.47	19.61	19.54	16.88
Orissa	2.91	5.32	4.65	4.07	11.16	16.54	21.16	17.11
Punjab	2.28	3.93	4.17	4.29	13.25	17.46	19.01	18.94
Rajasthan	1.87	3.39	3.56	5.06	15.74	14.48	19.59	23.25
Sikkim	4.04	3.59	9.20	4.44	12.32	15.62	18.32	13.37
Tamilnadu	2.74	5.10	7.72	10.59	13.52	20.39	22.03	26.17
Tripura	2.49	2.58	2.72	3.29	15.46	14.08	15.26	18.88
Uttar Pradesh	3.62	4.15	5.86	6.73	15.63	18.89	22.90	22.21
West Bengal	2.45	2.86	2.96	3.46	16.30	17.19	20.10	18.40

Source: Author's calculations based on NSS data.

Table 15: Rural-urban disparities in average years of schooling of young adults across NSS rounds (1999-2012)

Sector States	Rural				Urban			
	1999-00	2004-05	2009-10	2011-12	1999-00	2004-05	2009-10	2011-12
Andhra Pradesh	2.66	3.50	4.71	5.02	6.93	7.21	8.59	8.92
Arunachal Pradesh	3.42	5.07	6.13	6.29	7.64	8.45	8.90	9.50
Assam	4.56	5.57	6.21	6.24	8.01	8.69	9.52	9.00
Bihar	2.74	3.56	4.07	4.72	6.67	7.92	7.70	8.49
Delhi	7.71	7.63	8.50	10.22	9.15	9.13	9.37	9.24
Goa	7.47	8.67	8.14	9.29	8.34	9.16	9.50	10.85
Gujarat	4.12	4.86	5.33	5.47	7.71	8.56	8.85	8.52
Haryana	4.60	5.70	6.49	7.09	6.99	8.21	8.38	10.19
Himachal Pradesh	5.97	6.97	8.36	8.63	9.74	9.32	10.21	10.59
Jammu & Kashmir	4.86	5.18	6.34	6.54	7.44	7.91	8.76	8.80
Karnataka	3.83	4.69	5.47	6.05	7.99	8.47	9.33	9.66
Kerala	7.57	8.45	9.14	9.30	8.64	9.51	10.09	10.29
Madhya Pradesh	2.90	3.52	4.53	4.97	7.10	7.67	8.94	8.47
Maharashtra	5.00	5.90	6.67	7.12	8.00	8.50	9.75	9.57
Manipur	5.99	7.75	9.02	9.15	9.71	9.44	10.47	10.80
Meghalaya	3.84	5.21	6.48	7.13	8.63	9.75	9.80	10.50
Mizoran	6.15	7.21	7.01	7.12	8.66	9.20	9.34	9.53
Nagaland	6.17	7.71	8.81	9.57	8.67	10.01	10.22	10.49
Orissa	3.43	4.49	5.18	5.40	6.53	7.71	8.43	8.10
Punjab	4.81	5.64	6.27	6.79	7.32	8.44	8.75	8.90
Rajasthan	2.79	3.24	3.85	4.41	7.01	6.64	7.59	8.11
Sikkim	5.00	5.53	6.87	5.87	7.56	8.26	8.92	8.91
Tamilnadu	4.34	5.34	6.57	7.18	7.61	8.39	8.97	9.49
Tripura	4.39	5.34	5.17	5.69	7.48	8.17	7.89	8.44
Uttar Pradesh	3.66	4.13	5.04	5.29	6.75	7.42	8.11	7.89
West Bengal	3.62	4.23	4.80	4.93	7.35	7.82	8.36	8.30

Source: Author's calculations based on NSS data.