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POLICY RESEARCH WORKING PAPER 4793

Progress in Participation in Tertiary Education in India from 1983 to 2004

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Abstract

Using nationally representative household surveys, this paper examines the trends in attainment, enrollment, and access to tertiary (higher) education in India from 1983 to 2005. The findings suggest that there has been considerable progress in attainment and participation; however, they remain low. Important gaps exist in enrollment between rich and poor, rural and urban areas, men and women, disadvantaged groups and the general population, and states. Analysis of transition rates from secondary education to tertiary education and regression analysis indicate that inequality in tertiary education between disadvantaged groups and the general population is explained by low completion rates of secondary education. Inequality in tertiary education related to income, gender, rural residence, and between states is explained by: (i) differences in completion rates of secondary education, and (ii) differences in the probability of transitioning from secondary education to tertiary education. In particular, the importance of household income has grown markedly. Equitable expansion of secondary education is therefore critical for improving the equity of tertiary education. There is also a need to help qualified youth from low-income families and rural backgrounds to attend tertiary education, in particular the technical and engineering streams, in which participation is lower.

This paper—a product of the Human Development Department, South Asia Region—is part of a larger effort in the department to analyze progress in education in South Asia to support planned investments in the education sector in the region. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at ablom@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Produced by the Research Support Team

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1. Introduction

This paper examines the attainment and access of tertiary (higher) education in India over the past two decades (1983-2004). There has been an intense effort by the Government of India to expand primary education in this period, and, as a result, the number of children participating in primary education has improved, and the improvements are more visible among children from rural areas, educationally lagging states, girls, and those from socially and economically disadvantaged groups (Shankar, 2007).

Although the goal of universal elementary schooling has not yet been achieved, some attention is shifting to secondary and tertiary education levels to absorb the massive increase in the number of students graduating from primary schools and to meet increased labor market demand for qualified workers. The approach paper for the 11th five-year plan (2007-2012) emphasizes the need for expansion of tertiary education: *"India has a well-developed and comprehensive higher education system which has served well thus far, but is now inadequate. The extent of access it provides is limited. Only about 10% of the relevant age group goes to universities whereas in many developing countries, the figure is between 20 and 25%. There is an overwhelming need to undertake major expansion to increase access to higher education."* (GOI, 2007)

In addition, with increasing integration of the Indian economy with the rest of the world and knowledge becoming a vital factor for economic growth, the importance of tertiary education has increased. The returns to tertiary education in urban India increased by almost 20 percentage points (compared with a below primary educated regular worker, a tertiary educated regular worker was paid 82 percent higher wages in 1993 and 101 percent higher wages in 2004) between 1993 and 2004 (Azam, 2008b). The wage premium for tertiary educated workers compared with secondary educated workers or workers with lower levels of education increased sharply in the late 1990s. Although the increase in the wage premium for tertiary educated workers is mostly driven by demand shifts in favor of workers with a tertiary education, the demand shifts occurred in both the 1980s and 1990s. The increase in relative supply of tertiary workers during 1983-1993 offset the demand shift, limiting the wage premium increase. But during 1993-1999, the growth rate of the relative supply of tertiary workers decelerated, while relative supply was virtually stagnant during 1999-2004. Both of these periods saw an increase in the wage premium as the countervailing supply shift was weak (Azam, 2008a).

So there is a growing need to educate more young people to a higher standard to meet the increasing demand. Furthermore, a degree has become a basic qualification for many skilled jobs. The

quality of knowledge generated in higher education institutions, and its availability to the wider economy, is becoming increasingly critical for national competitiveness (World Bank, 2000).

Tertiary education in India is comprised of diploma courses and undergraduate, graduate, and PhD degrees. Tertiary education consists of technical and general streams (the technical stream consists of agriculture, medicine, engineering, crafts, and some other courses).[1] There are four types of educational institutions that provide tertiary education in India – government institutions, local institutions, private aided institutions, and private unaided institutions.[2] In 2006-07, there were 369 universities and 18,064 colleges. The total number of students was reported to be 11.03 million – 1.43 million (13 percent) in universities and 9.6 million (87 percent) in affiliated colleges (GOI, 2007). In the spheres of technical education, there were about 1,265 engineering and technology colleges, 320 pharmacies, 107 architecture schools, and 40 hotel management institutes, making a total about 1,749 institutions in 2004.

Other than the general available information stated above, the trends in participation in tertiary education in India are not well described in publicly available documents. This limits information-based policymaking, the ability to measure progress and set targets. In particular, trends in attainment, enrollment, and transition rates across population segments are not available in a consistent manner. Nevertheless, there are frequent and heated debates on the inequality in participation in tertiary education across population segments, such as gender, religious affiliation, Schedule Caste (SC), Schedules Tribes (ST), Other Backward Classes (OBCs), and income quintiles.[3] To reach a more equitable tertiary education system with access to all qualified youth regardless of their background, it is crucial to understand the basic trends in attainment and access over time and how these key indicators differ across social groups, religion, geographical areas, income levels, and gender. This need for basic information motivates this paper. The paper does not seek to evaluate the impact of policies or interventions, or test the factors driving the trends. It merely seeks to present the basic trends.

[1] Technical courses offered after higher secondary level are traditionally considered part of higher/tertiary education.

[2] Government institutions include all institutions run by the Central and State Governments, Public Sector Undertakings or Autonomous Organizations, which are predominantly financed by the Government. Institutions run by municipal corporations, municipal committees, notified area committees, zilla parishads, panchayat samitis, cantonment boards, etc. are local body institutions. Private aided institutions are administered by individuals or private organizations and receive maintenance grant from the Government or local body. Institutions that are managed by individuals or a private organization that do not receive maintenance grant either from a Government or a local body, are private unaided institutions.

[3] The Indian state recognized the former untouchables or Scheduled Castes (SCs) and Scheduled Tribes (STs) as disadvantage as far back as in the 1950s. Legal safeguards were provided against discrimination in the Constitution. One of the objective of the government since independence is amelioration of the conditions of these disadvantaged groups. Since 1993, the Other Backward Castes - castes presumed to be slightly better positioned than the SCs/STs in terms of caste hierarchy- is also recognized as a disadvantaged group. India has 22.5 percent of tertiary education seats reserved for the SCs and the STs since 1950.

The findings of the paper are the following:

- Although considerable progress has been made in the Education Attainment Rate (EAR) and Gross Enrollment Ratio (GER), they both remain below 9 percent and 13 percent, respectively. Large gaps in both attainment and enrollment are between: genders, social groups, religious groups, rural and urban areas, income groups, and states.
- While most of the gaps have diminished over time, at least in relative numbers, the gap between income groups has widened.
- Once we condition access to tertiary education on successful completion of higher secondary education, most of the gaps in attainment and enrollment are reduced significantly, with the exception of the gap observed between income groups. The transition rate from completion of higher secondary to tertiary education is 70 percent.
- Economic status, gender, and area of residence are key determinants of the transition to tertiary education after completion of higher secondary education.

Thus, the distortions creating unequal representation in tertiary education lie primarily at the lower rungs of the education ladder and secondarily in access to tertiary education.

The findings of the paper suggest that a more equal tertiary education system requires a sustained effort to improve retention and completion at lower stages of the education system. However, there is also a need to focus attention on the transition from secondary to tertiary education. In particular, youth from low-income families and rural areas are statistically less likely to attend tertiary education, even when they have completed higher secondary education. It is therefore important to step up initiatives that support increased access to tertiary education for students in low-income and rural families. Further understanding of the reasons behind low attendance of female students and rural students is equally necessary to design interventions.

The rest of the paper is organized as follows. Section 2 describes the data and methodology, Section 3 presents the simple empirical findings, Section 4 examines and discusses the determinants of access to tertiary education based on regression analysis, and Section 5 concludes. Annex A contains a primer on the education system in India for readers who are unfamiliar with India's education system, and Annexes I to III present the complete set of indicators and regression results.

2. Data and Methodology

2a. Data Description

This paper draws data from the Employment and Unemployment Schedule, administered by the National Sample Survey Organization (NSSO), Government of India. Data from the 38th, 43rd, 50th, 55th, and 61st rounds – conducted in 1983, 1987-88, 1993-94, 1999-00, and 2004-05, respectively – are used (referred to as 1983, 1987, 1993, 1999, and 2004 in this paper).[4] NSS data provide information about current attendance at different levels of education. In addition, data from the Education Schedule conducted by NSSO in 1995-96 are also used. Each employment survey covers around 120,000 households, and around 600,000 individuals. The samples are based on stratified random sampling and all the analysis in this paper uses survey weights.

In 2000, the states of Jharkhand, Chhattisgarh, and Uttaranchal were carved from Bihar, Madhya Pradesh, and Uttar Pradesh, respectively. For the state level analysis, these states are included with the parent states to maintain comparability across time.[5]

An individual, who has already completed a higher secondary degree, and is attending diploma (such as polytechnic courses) or degree courses, is considered attending tertiary education.[6]

2b. Methodology

Three indicators measure attainment and participation. Each measure is described below.

2b.1. Educational Attainment Rate

Educational Attainment Rate (EAR) measures the percentage of the population that attains a particular educational level. In this paper, EAR for tertiary education is defined as the ratio of number of persons in age group 25-34 years who have completed a tertiary education degree to total population in the same age group.[7] It measures completion of tertiary education prior to the age of 34, regardless of

[4] NSSO conducts thick round survey at five-year intervals (called 'Quinquennial Round'). Data before 1983 is not available.
[5] Information for all states is given in the Annex.
[6] Similar approach is adopted by "Working Group on Higher Education, GOI (2006b)." Before 1993 data do not distinguish between lower secondary and higher secondary. In this case secondary completion is taken as criterion. It may increase the tertiary attendance marginally as some students attending diploma courses at higher secondary level are counted as attending tertiary education.
[7] Approximately 92-94 percent of tertiary attending students (graduate and postgraduate degree) are less than 25 years.

when the education was attained. In addition, it is free from the burden of history that comes through inclusion of higher age groups.[8]

2b.2. Gross Enrollment Ratio

Gross Enrollment Ratio (GER) is the ratio of the number of students currently enrolled in a given level of education regardless of age and the population of the age group that officially corresponds to the given level of education.[9] For tertiary education, the GER is:

$$GER = \frac{\text{Total number of students enrolled in tertiary education}}{\text{Total population in age } 18-28}$$

The Net Enrollment Ratio (NER) is an alternative measure of access. However, part of the student population is outside the expected age cohort of 18-23, in particular in middle and high-income countries. GER is therefore the standard enrollment indicator for tertiary education.[10]

2b.3. Transition Rate

Entry in tertiary education requires completion of higher secondary education first. The characteristics of the student body in tertiary education therefore depends on who and how many graduate from secondary education, and on who and how many of those transition from secondary to tertiary education. To measure the last step, the transition step, we compute the transition rate:

$$\text{Transition Rate} = \frac{(\text{Total population in age group } 18-23 \text{ who either attends or have completed higher education})}{(\text{Total population in age group } 18-23 \text{ who have completed higher secondary education})}$$

3. Findings

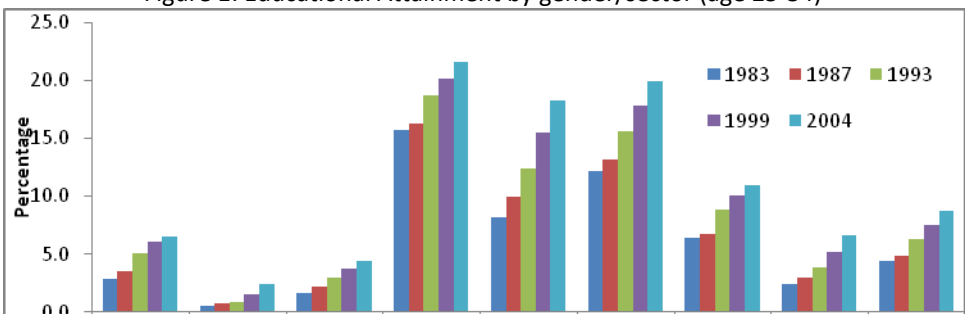
3a. Educational Attainment Rate (EAR)

Figure 1 presents the attainment of tertiary education by gender and sector. There has been considerable progress in attainment during the two decades covered by this study. Yet the attainment rate is low, especially in rural areas. Attainment in rural areas is less than one-fourth of that in urban areas. Attainment by females is only a third of the attainment by males in rural areas. In urban areas, the gap in EAR between the genders has decreased significantly during the past two decades because of

[8] Educational Attainment Rate for age group 15-64 is presented in Annex II.
[9] The NSS data collect information on children's current attendance rather than on enrollment. In this analysis, attendance and enrollment are used interchangeably.
[10] Age-distribution of currently attending students in higher education is given in Annex I Table 1.

significant improvement in female EAR (female EAR increased by 10.1 percentage points while male EAR only increased by 5.8 percentage points during 1983-2004).

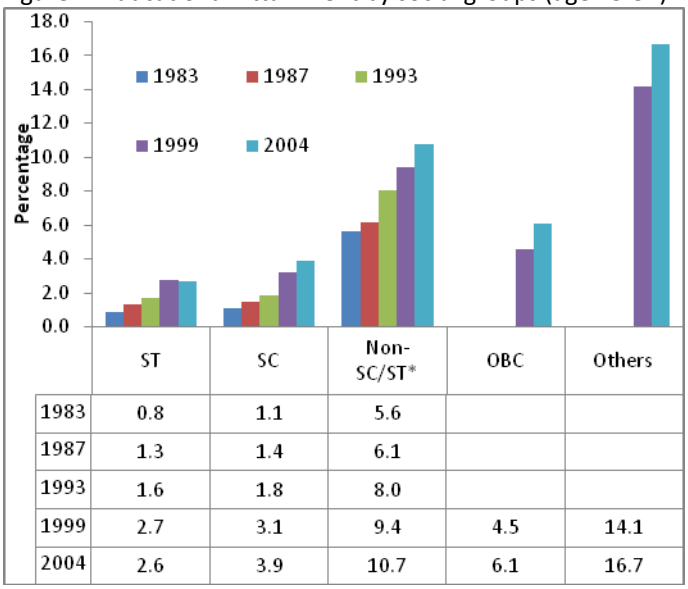
Figure 1: Educational Attainment by gender/sector (age 25-34)



	Rural			Urban			All India		
	Male	Female	All	Male	Female	All	Male	Female	All
1983	2.9	0.5	1.7	15.8	8.2	12.2	6.4	2.4	4.4
1987	3.5	0.8	2.2	16.2	10.0	13.2	6.7	3.0	4.9
1993	5.0	0.9	2.9	18.6	12.4	15.6	8.8	3.8	6.3
1999	6.1	1.6	3.7	20.1	15.5	17.8	10.0	5.2	7.6
2004	6.5	2.4	4.4	21.6	18.3	20.0	11.0	6.6	8.7

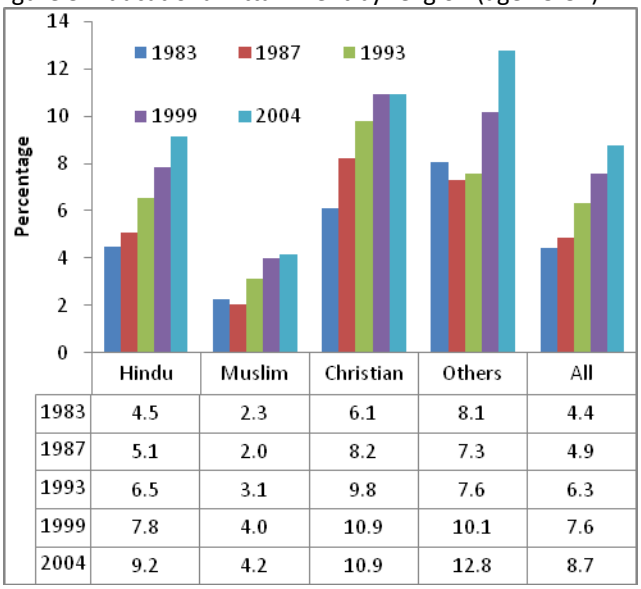
Figure 2 presents the attainment rate for different social groups. The EARs for two disadvantaged groups, the SCs and the STs, were very low in 1983. Although steady progress was made during 1983-2004, the EAR still remains very low. There exists a huge gap in attainment between the "Others (general category)" and the two disadvantaged groups (SCs and STs). The OBCs have higher attainment than the SCs and the STs; however, it is below the average national attainment. Figure 3 presents attainment for different religious groups. Muslims have the lowest attainment, as highlighted by the Sachar Commission Report of 2006 (GOI, 2006d). Importantly, the attainment of the SCs, STs, and Muslims is almost half the national average. Targeted efforts seem to be needed to raise the attainment of these disadvantaged groups.

Figure 2: Educational Attainment by social groups (age 25-34)



	ST	SC	Non-SC/ST*	OBC	Others
1983	0.8	1.1	5.6		
1987	1.3	1.4	6.1		
1993	1.6	1.8	8.0		
1999	2.7	3.1	9.4	4.5	14.1
2004	2.6	3.9	10.7	6.1	16.7

Figure 3: Educational Attainment by religion (age 25-34)



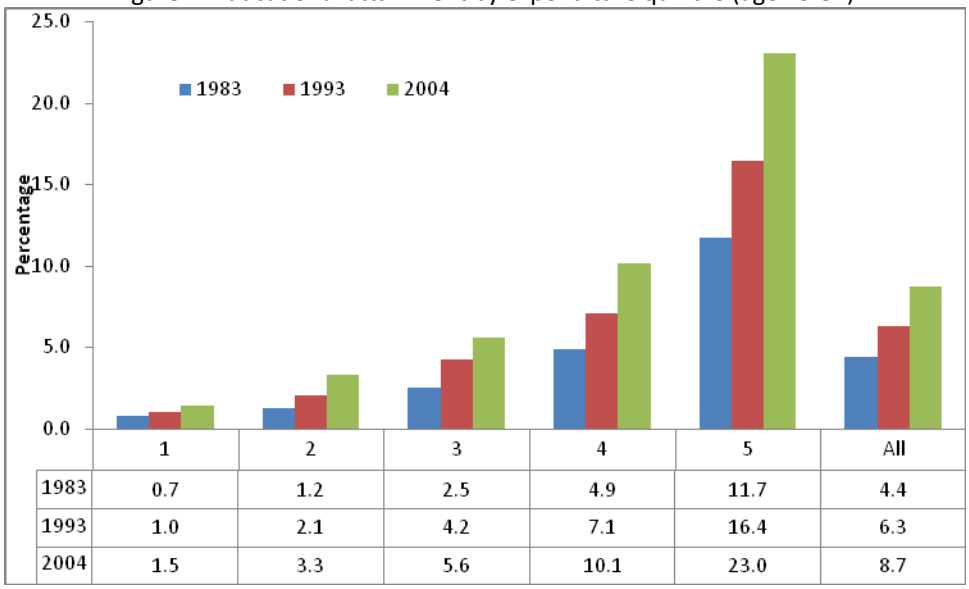
	Hindu	Muslim	Christian	Others	All
1983	4.5	2.3	6.1	8.1	4.4
1987	5.1	2.0	8.2	7.3	4.9
1993	6.5	3.1	9.8	7.6	6.3
1999	7.8	4.0	10.9	10.1	7.6
2004	9.2	4.2	10.9	12.8	8.7

Note: Non-SC/ST combines OBC and Others. OBC was not distinguished before 1999 data.

Figure 4 presents the EAR by expenditure quintile.[11] The attainment increases with the quintile. This is standard for two reasons: (i) attainment of tertiary education generally implies a higher salary, which raises the income of the household, and (ii) already affluent households are more likely to enroll in tertiary education, as shown in the next sub-section, and attainment therefore increases with income. Nevertheless, there is a large gap in the attainment rate of the top 20 percent of the population and the bottom 20 percent of the population. In addition, attainment for the top two quintiles of the population has increased substantially compared with the other quintiles.

[11] NSS data do not have information on income. Per capita monthly consumption expenditure is used as proxy for income. Rural and urban quintiles are generated separately, and combined to get all India quintile. So quintile 1 represents bottom 20 percent of the population irrespective of area.

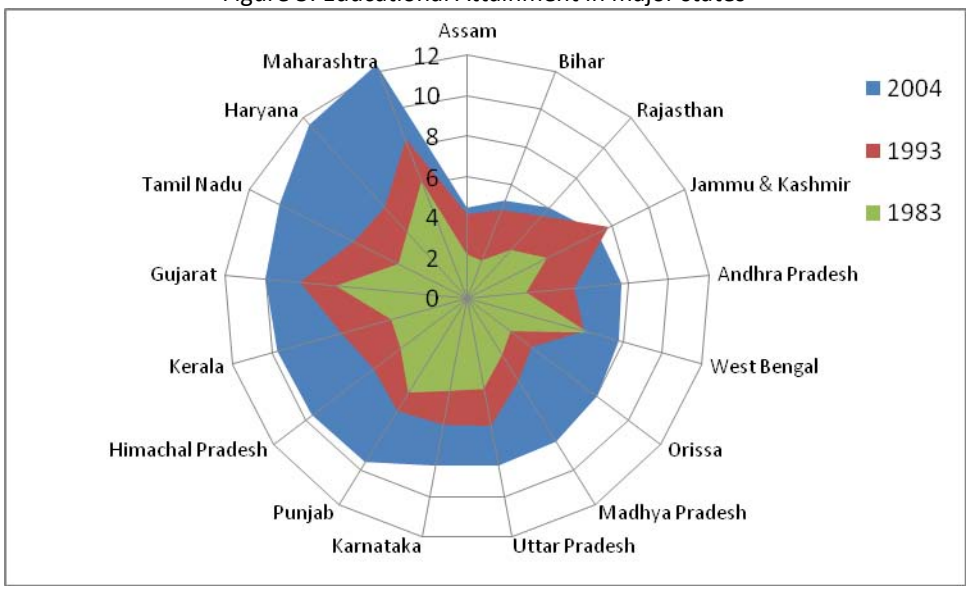
Figure 4: Educational attainment by expenditure quintile (age 25-34)



	1	2	3	4	5	All
1983	0.7	1.2	2.5	4.9	11.7	4.4
1993	1.0	2.1	4.2	7.1	16.4	6.3
2004	1.5	3.3	5.6	10.1	23.0	8.7

Figure 5 presents the EAR for the major states.[12] Attainment has improved in most of the states over time; however, there exist large differences across states. Assam, Bihar and Jammu, and Kashmir not only have low attainment rates, but also, attainment has not improved significantly during the past decade. Most other states experienced a substantial increase in attainment over the past decade.

Figure 5: Educational Attainment in major states



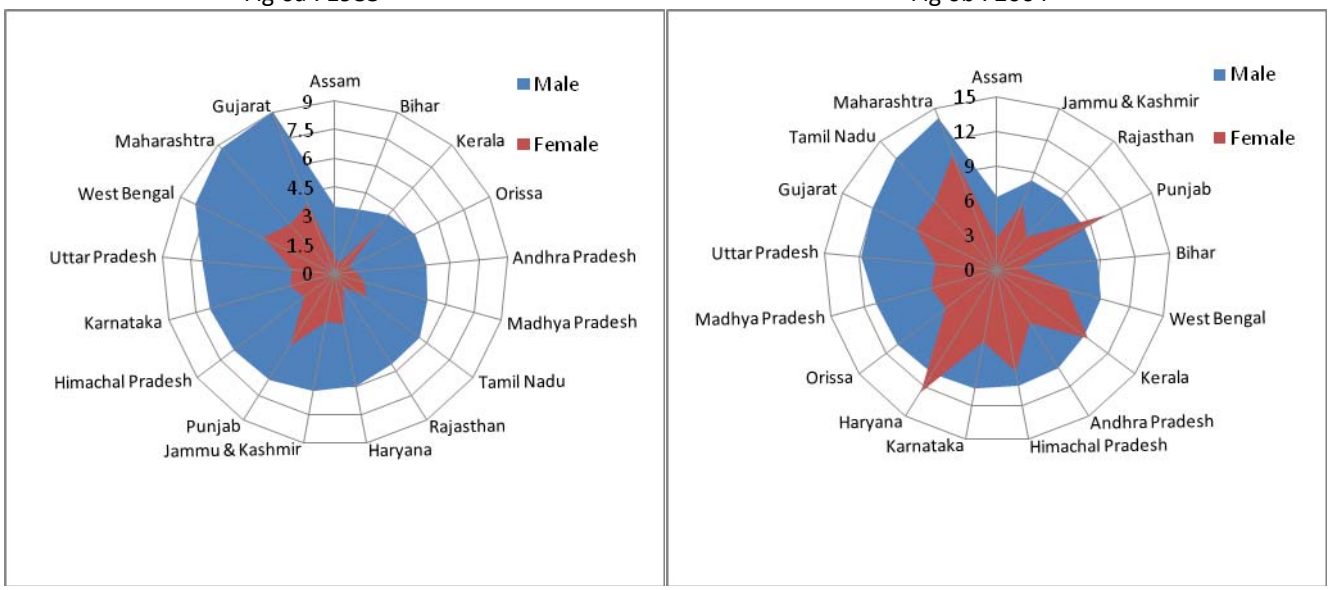
Figures 6a and 6b present the attainment of tertiary education by gender in the major states of India in 1983 and 2004, respectively. In 1983, female attainment was below male attainment for all

[12] The EAR for all states is given in Annex I Table 2.

states. The gender gap was large; male attainment was 167 percent higher than female attainment at the national level. By 2004, female attainment had increased markedly, and the gender gap had been reduced to 67 percent. However, the gender gap in attainment of tertiary education remains significant. Importantly, attainment for females is higher than that of males in a few states, e.g., Kerala, Haryana, and Punjab.

Figure 6: Gender difference in Educational Attainment in major states

Fig 6a : 1983 Fig 6b : 2004

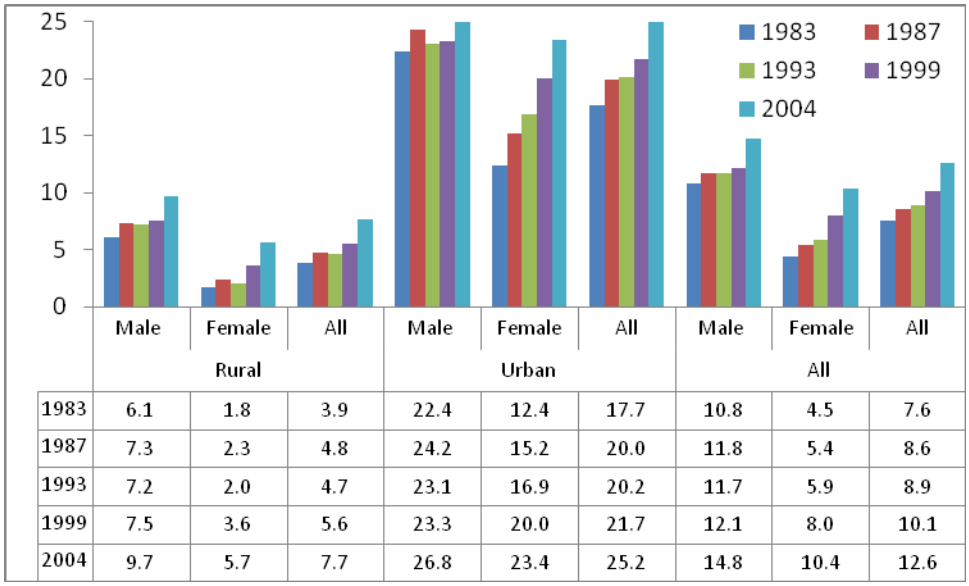


It is expected that the gender gap will continue to decline as female enrollment in tertiary education continues to increase over and above that of males. This will in the future lead to a narrowing of the gender gap in attainment. This and other predictions regarding attainment can be deduced from the past and current enrollment patterns of tertiary education, which the next sub-section will describe.

3b. Gross Enrollment Ratio

Figure 7 presents the GER in tertiary education in India by gender and sector. There has been considerable progress in the GER, especially for females in both urban and rural areas. Female enrollment increased by 131 percent from 1983 to 2004, compared with 37 percent for males. The ratios of GER for different groups (e.g., the ratio of the GER for females to the GER for males) are given in Annex I Table 4. Enrollment in rural areas increased faster than enrollment in urban areas (97 percent compared with 42 percent). Nevertheless, enrollment in rural areas still remains only 30 percent that of enrollment in urban areas. Given that 72 percent of India's population resides in rural areas, a large effort in rural areas is needed to increase the overall GER significantly.

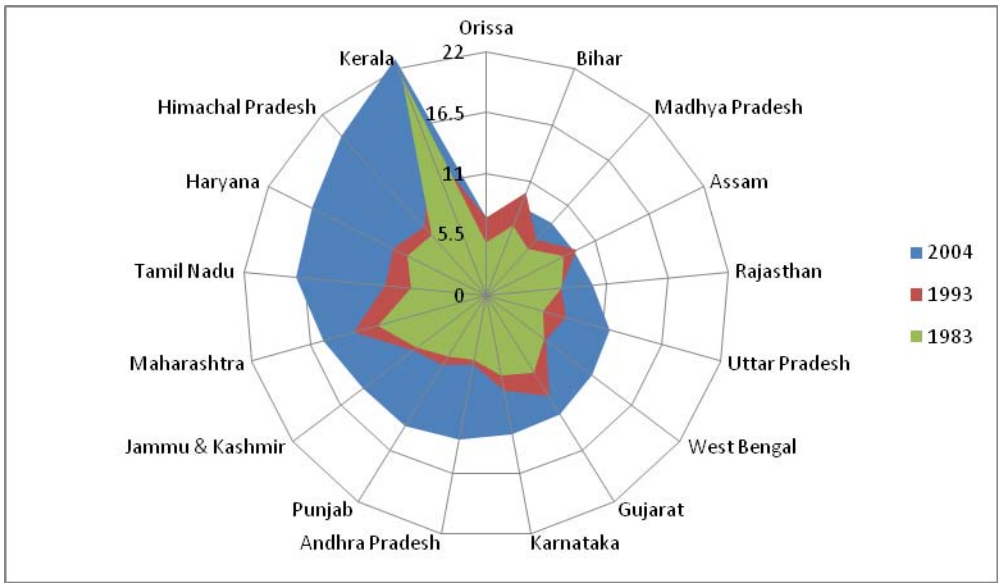
Figure 7: GER by gender and sector



	Rural			Urban			All		
	Male	Female	All	Male	Female	All	Male	Female	All
1983	6.1	1.8	3.9	22.4	12.4	17.7	10.8	4.5	7.6
1987	7.3	2.3	4.8	24.2	15.2	20.0	11.8	5.4	8.6
1993	7.2	2.0	4.7	23.1	16.9	20.2	11.7	5.9	8.9
1999	7.5	3.6	5.6	23.3	20.0	21.7	12.1	8.0	10.1
2004	9.7	5.7	7.7	26.8	23.4	25.2	14.8	10.4	12.6

Figure 8 presents the GER for the major states.[13] Most of the states have seen improvement in enrollment over time; however, the rate of improvement differs significantly across states. As a result, there was a wide variation in enrollment between states in 2004, e.g., GER in Orissa and Bihar was less than half of GER in Kerala.

Figure 8: GER in major states



[13] The GER for all states is given in Annex I Table 3.

Figure 9a presents enrollment in tertiary education in the major states in 1983 by gender, while Figure 9b presents the situation in 2004. In 1983, a considerable gender gap existed in GER in almost all states except Kerala. By 2004, the gender gap in GER had been reduced in most of the states. In a few states, e.g., Kerala and Punjab, female GER exceeded that of males.

Figure 9: Gender wise difference in GER in Major States

Figure 9a: 1983

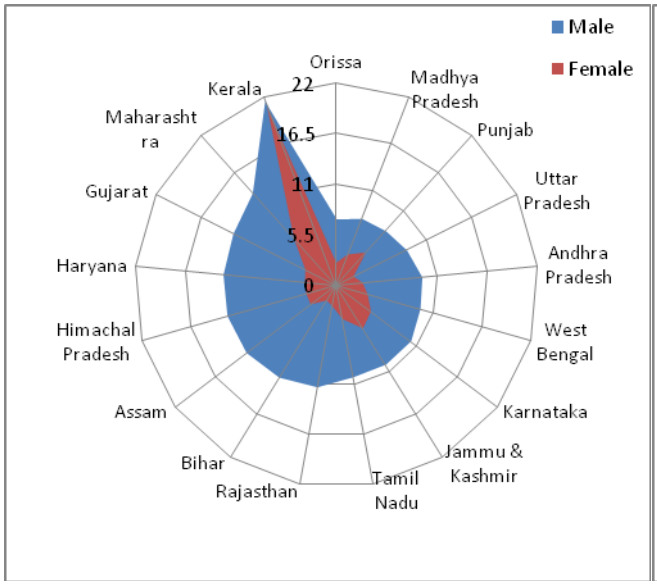
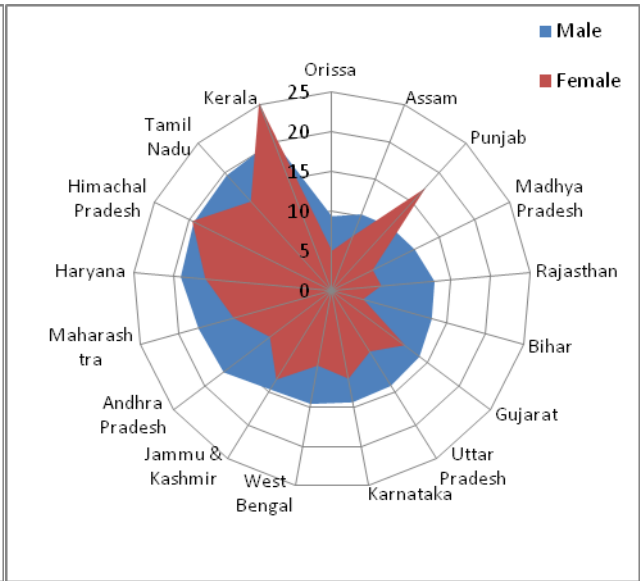
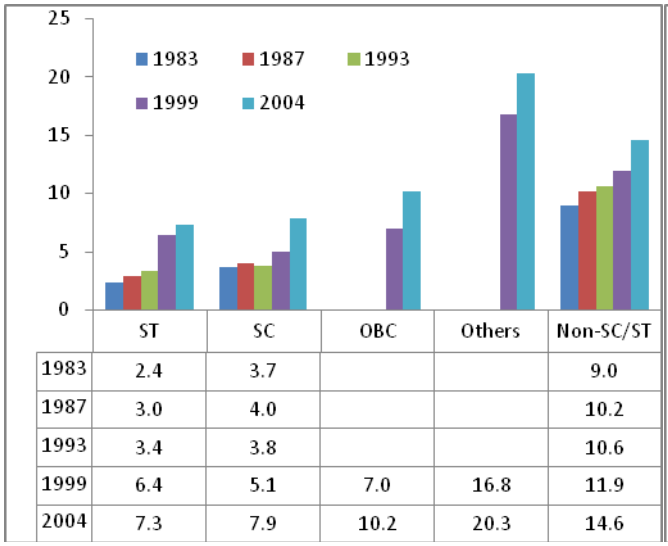


Figure 9b: 2004



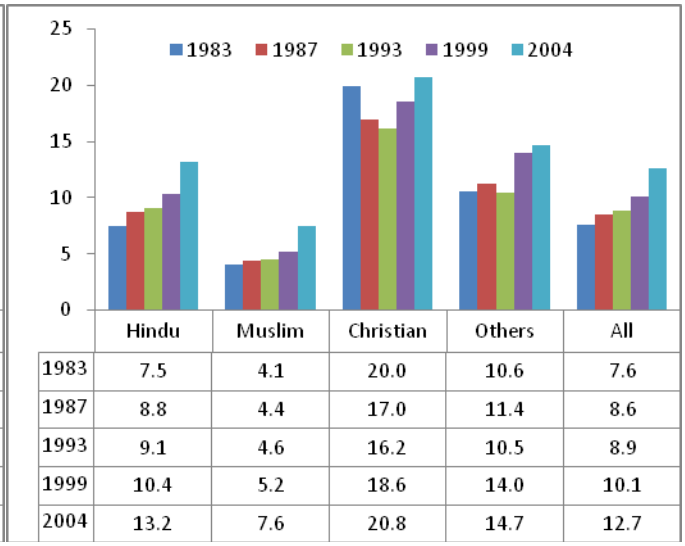
Figures 10 and 11 present the GER for social and religious groups, respectively. The GER for the SCs/STs has improved over time, but still the GER for these two disadvantaged groups is only half the GER for non-SCs/STs. The gap in the GER becomes much larger once we compare SCs/STs to "Others" (mostly higher castes in India). The OBCs have higher enrollment than the SCs/STs, but it is lower than that for "Others." The GER for Muslims is also below the national GER.

Figure 10: GER for different social groups



	ST	SC	OBC	Others	Non-SC/ST
1983	2.4	3.7			9.0
1987	3.0	4.0			10.2
1993	3.4	3.8			10.6
1999	6.4	5.1	7.0	16.8	11.9
2004	7.3	7.9	10.2	20.3	14.6

Figure 11: GER for different Religions

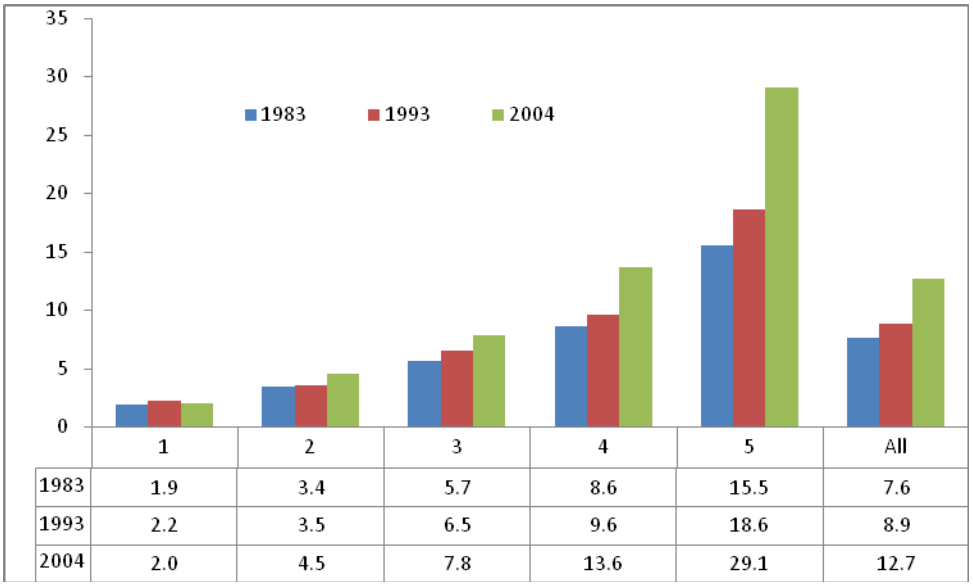


	Hindu	Muslim	Christian	Others	All
1983	7.5	4.1	20.0	10.6	7.6
1987	8.8	4.4	17.0	11.4	8.6
1993	9.1	4.6	16.2	10.5	8.9
1999	10.4	5.2	18.6	14.0	10.1
2004	13.2	7.6	20.8	14.7	12.7

Note: Non-SC/ST combines OBC and Others. OBC was not distinguished before 1999 in the data.

Figure 12 presents the GER by expenditure quintile. The difference in GER between the top and bottom quintiles was 13.6 percentage points in 1983; it increased to 27.1 percentage points in 2004. The GER for the upper two quintiles is increasing over time. However, the GER for the lowest three quintiles only increased marginally during the observed two decades. Two basic factors lie behind this noticeable trend: (i) the income distribution of the pool of graduates for secondary education, and (ii) the transition rate from secondary education to tertiary composition of youth from different income quintiles. To further examine the potential reasons behind the enrollment patterns described in this sub-section, the next sub-section presents the transition rates.

Figure 12: GER by expenditure quintile



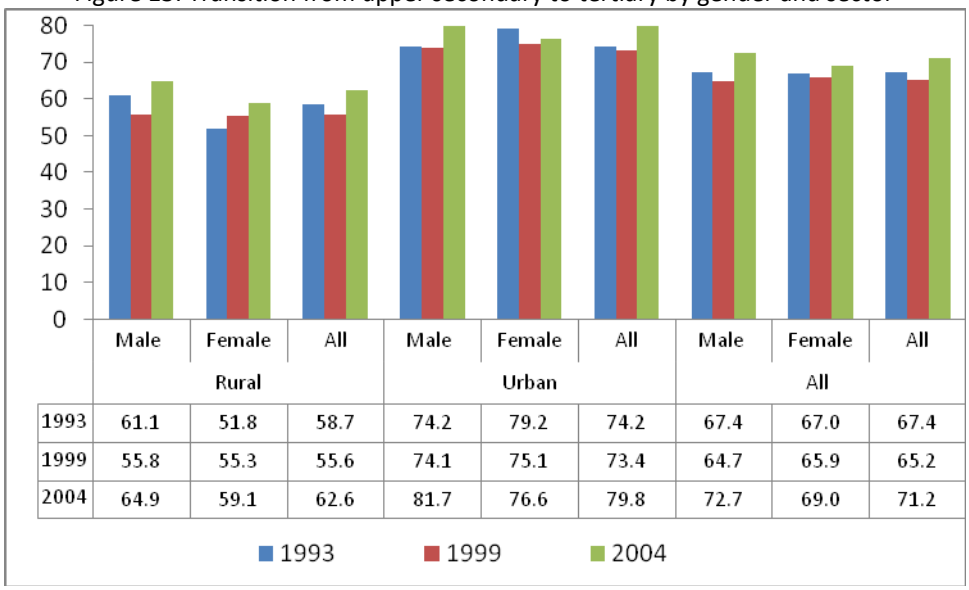
	1	2	3	4	5	All
1983	1.9	3.4	5.7	8.6	15.5	7.6
1993	2.2	3.5	6.5	9.6	18.6	8.9
2004	2.0	4.5	7.8	13.6	29.1	12.7

3c. Transition Rate

The transition rate measures the share of graduates of secondary education that continues to tertiary education for a specific population group. We calculate the transition rate as the share of 18-to-23 year-olds with a complete upper secondary education that either attends or has completed tertiary education. It is hence an indication of whether differences in enrollment at the tertiary education level are primarily caused by shortcomings at the primary and secondary education levels or by shortcomings in the transition between secondary and tertiary education. Note this interpretation is a simplification, since the decision on whether to enroll in tertiary education (transition from secondary education to tertiary education) also depends on the quality and other aspects of primary and secondary education.

Figure 13 presents the transition rates by gender and sector. In 2004, the transition rate from higher secondary to tertiary was 71.2 percent for all India. It was 79.8 percent in urban areas, and 62.6 percent in rural areas. There is not much difference in transition between the two genders.

Figure 13: Transition from upper secondary to tertiary by gender and sector



	Rural			Urban			All		
	Male	Female	All	Male	Female	All	Male	Female	All
1993	61.1	51.8	58.7	74.2	79.2	74.2	67.4	67.0	67.4
1999	55.8	55.3	55.6	74.1	75.1	73.4	64.7	65.9	65.2
2004	64.9	59.1	62.6	81.7	76.6	79.8	72.7	69.0	71.2

Figure 14 presents transition rates in major states.[14] The variation in transition rates between states is much lower than the variations observed in attainment and enrollment. This signals that state variations in enrollment are to a large extent caused by differences in the share of a cohort graduating from higher secondary education. Several states have nevertheless a lower transition rate; notably, Punjab, Rajasthan, Haryana, and Himachal Pradesh have a transition rate below 67 percent. In particular, several North-Eastern states seem to have low transition rates (Arunachal Pradesh, Manipur,

[14] The transition rates for all states are given in Annex I Table 5.

Meghalaya, Tripura, and Assam, see Annex I). These states possess a greater potential to increase tertiary enrollment through focused efforts on increasing the transition from secondary education to tertiary education. Such efforts could include policies to increase the supply of seats through purely public, purely private, and/or public-private partnerships; policies to make available financing for qualified students; and/or targeted programs to raise aspirations among students and families for tertiary education. For other states, efforts to increase the pool of graduates of higher secondary education are more likely to increase enrollment in tertiary education. These are the states/UTs with a high transition rate – notably, Chandigarh, Delhi, West Bengal, Andhra Pradesh, Karnataka, Kerala, and Sikkim – where more than three-fourths of the graduates from secondary education continue to tertiary education.

Figure 15 presents the transition rate by gender in the major states. The difference in transition between the two genders is small in most of the states; the transition rate for girls is higher in a few states, e.g., West Bengal, Karnataka, Himachal Pradesh, and Punjab.

Figure 14: Transition from upper secondary to tertiary in major states

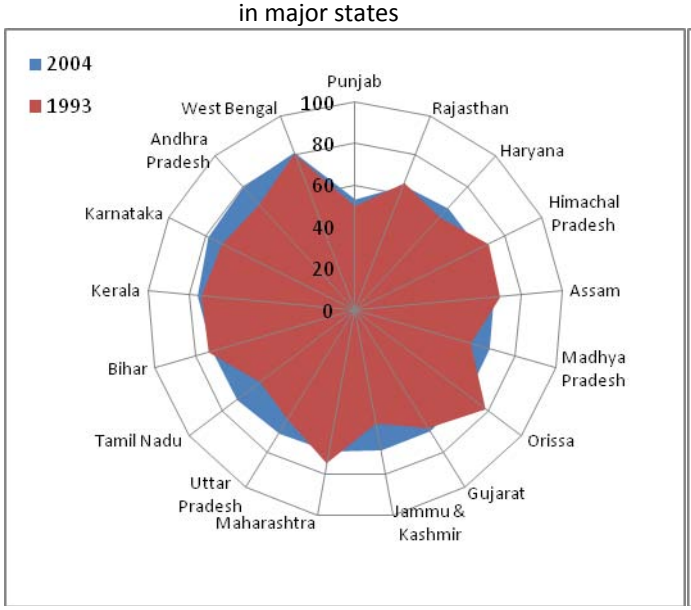
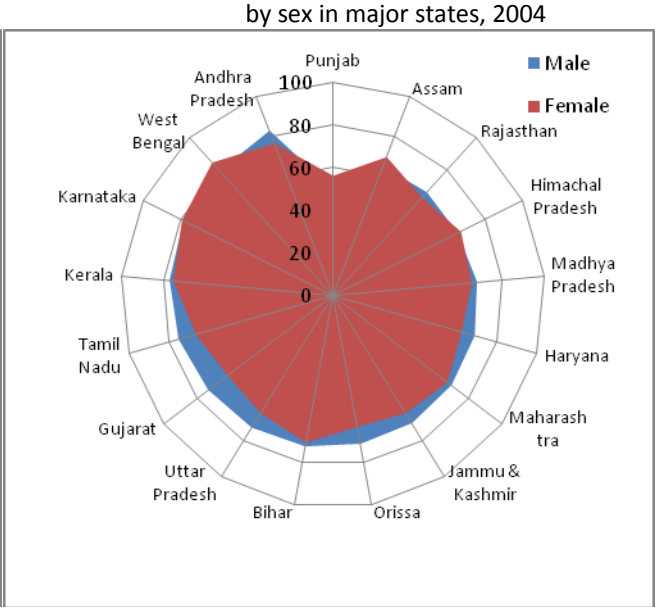


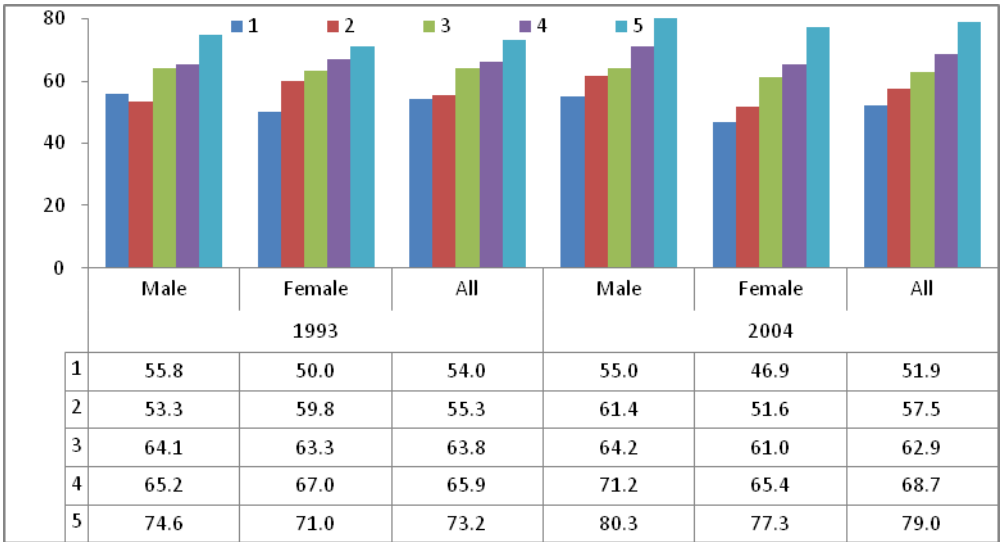
Figure 15: Transition from upper secondary to tertiary by sex in major states, 2004



Youth from households in the top of the income distribution are considerably more likely to transition from secondary education to tertiary education (Figure 16), In 2004, the transition rate for the bottom quintile was only 52 percent; for the top quintile, it was 79 percent. Importantly, the role of income in determining the transition rates of youth appears different than the other factors in two ways: (i) there is a large difference, 27 percentage points, from quintile 1 to quintile 5; and (ii) the difference has increased over time (from 19 to 27 percentage points). Several factors could explain the increased importance of income. First, the quality of primary and secondary education attended by low-income

households now differs more than before from schools attended by high-income families. Second, tertiary education has increasingly become fee based either through increases in the share of students attending self-financed/private colleges, as shown in the next sub-section, or through increased cost-recovery in public institutions. Without sufficient student financial aid, this could make tertiary education unaffordable for low-income families. Third, a larger share of youth from low-income families now graduates from secondary education. A higher proportion of this new and larger share may not aspire to tertiary education or may have less information regarding tertiary education. Therefore, fewer transition from secondary education to tertiary education. It is beyond the scope of this paper to investigate the extent to which these potential explanations drive the increased importance of income for transitioning to tertiary education.

Figure 16: Transition from upper secondary to tertiary by expenditure quintile

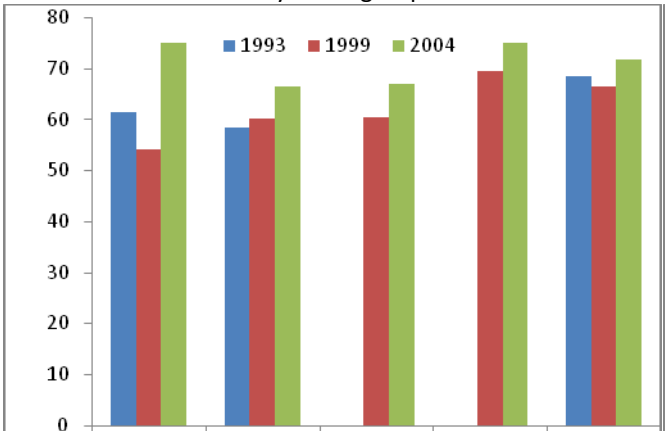


	1993			2004		
	Male	Female	All	Male	Female	All
1	55.8	50.0	54.0	55.0	46.9	51.9
2	53.3	59.8	55.3	61.4	51.6	57.5
3	64.1	63.3	63.8	64.2	61.0	62.9
4	65.2	67.0	65.9	71.2	65.4	68.7
5	74.6	71.0	73.2	80.3	77.3	79.0

Figures 17 and 18 present transition rates for different social groups and religions, respectively. Compared with the attainment and enrollment rates, the difference in transition rates among social and religious groups is less pronounced. Notably, transition rates for disadvantaged groups – such as ST, SC, and OBC students – have increased more rapidly than the national average. The rates for disadvantaged groups were relatively close to the national average in 2004. Actually, the transition rate for youth from an ST background is above the national average (75 percent compared with 71.1 percent). This is an important fact to take into account when considering options to increase the enrollment of disadvantaged groups. The numbers suggest that the predominant reason for low enrollment in tertiary education of SC, ST, OBC, and Muslim youth is a lower propensity to complete secondary education. This will be further examined in section 4, where a regression analysis will examine the probability of transitioning to

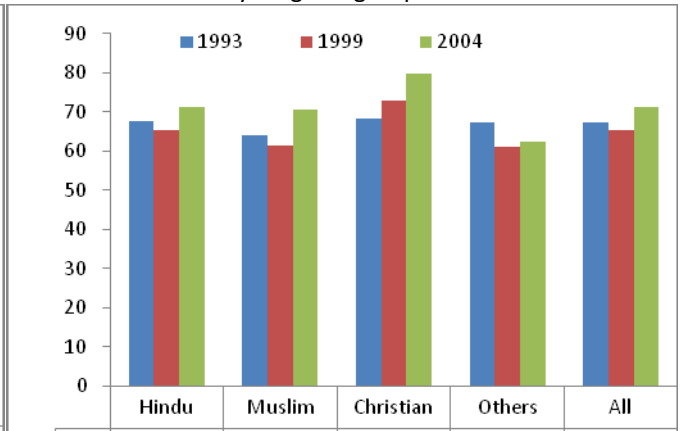
tertiary education. The next subsection will focus on the kind of tertiary education institution and stream of tertiary education in which students enroll.

Figure 17: Transition from upper secondary to tertiary by social groups



	ST	SC	OBC	Others	Non-SC/ST
1993	61.4	58.5			68.4
1999	54.0	60.2	60.5	69.3	66.5
2004	75.0	66.3	66.9	74.9	71.6

Figure 18: Transition from upper secondary to tertiary by religious groups



	Hindu	Muslim	Christian	Others	All
1993	67.7	63.9	68.3	67.4	67.4
1999	65.4	61.3	72.9	61.2	65.2
2004	71.3	70.7	79.8	62.5	71.1

Note: Non-SC/ST combines OBC and Others. OBC was not distinguished in 1993 data.

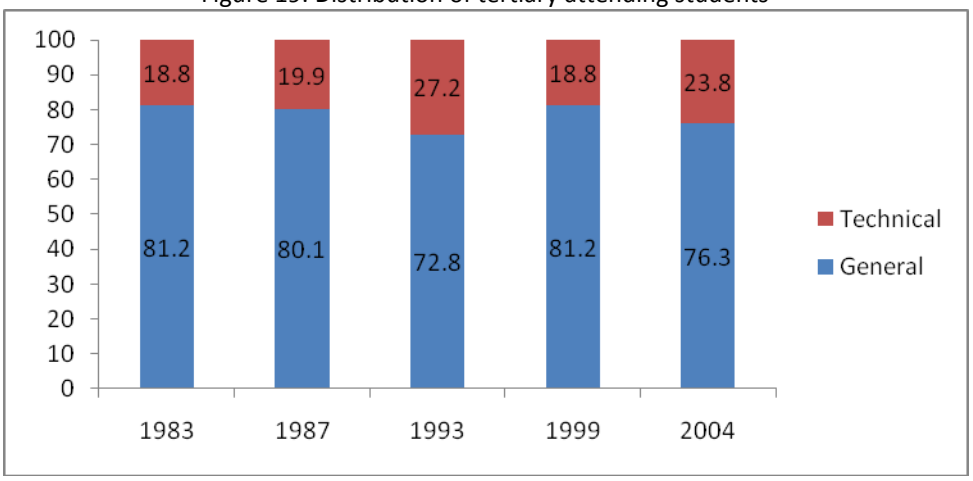
3d. Participation in Tertiary Education by Stream of Tertiary Education

To understand the basic trends in participation in tertiary education, it is not only important to know who participates, but also where they participate. The two following sub-sections briefly examine this second part of participation. This sub-section looks at participation by stream of tertiary education. Tertiary education consists of the General and Technical streams. Engineering is part of the Technical stream.

Approximately less than a quarter of tertiary education students attended technical courses, while more than three-quarters attended general courses in 2004 (Figure 19). The share of technical streams among tertiary attending students increased between 1999 and 2004 (Figure 19). Not only the number of students attending technical and engineering courses has shown a steady increase over time, but also the share of engineering courses in the technical stream is increasing over time (Figure 20).[15] It should be noted that the sample size of students in technical and engineering education is smaller than the general stream. Therefore, the margin of error of the estimates for these groups of students is larger.

[15] The sudden jump in 1993 could statistical error (data noise) and therefore may not reflect an actual increase. Therefore, a linear trend was added to the figures to show that the share of students attending technical (including engineering) stream seems to have steadily increased.

Figure 19: Distribution of tertiary attending students



Note: Tertiary education consists of the General and Technical streams. Engineering is part of the Technical stream.

Figure 20: Number of students attending Engineering courses

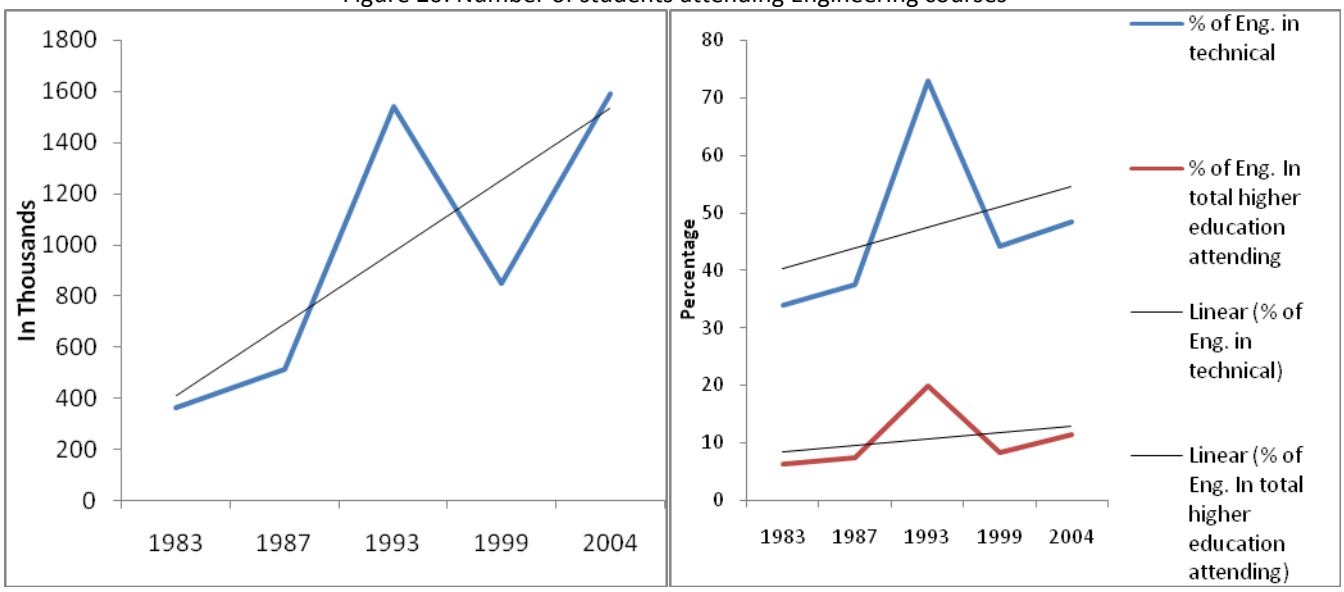
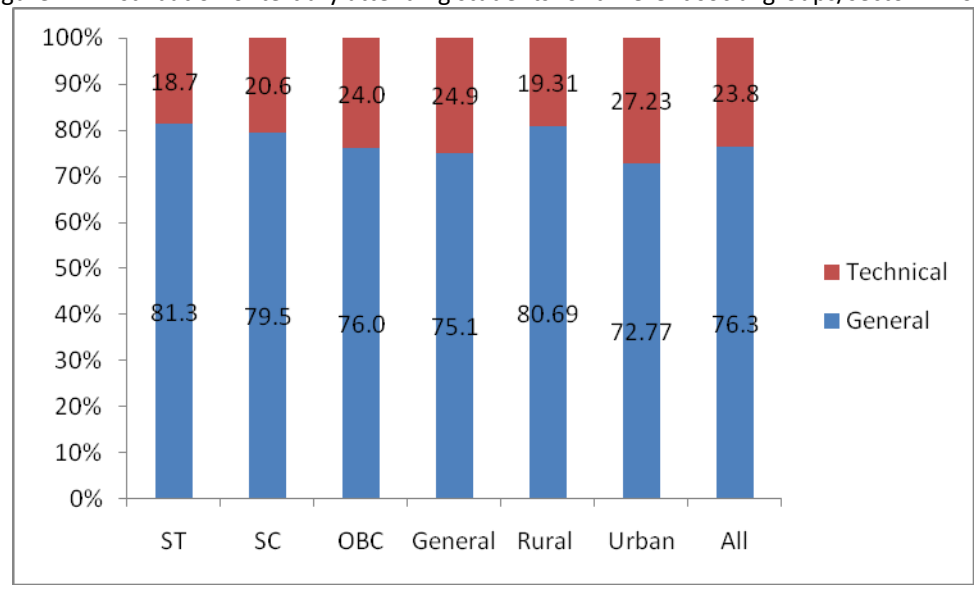


Figure 21 presents the shares of different streams among tertiary attending students by social group and sector. The percentage of students attending the technical stream is higher for the general category compared with the SCs/STs; however, the difference in percentage attending the technical stream is not large between OBCs and the general category.

Figure 21: Distribution of tertiary attending students for different social groups/sector in 2004



Note: Population share refers to percentage of 18-23 age group individuals belonging to different quintiles. As quintiles divide the entire population into five groups based on the consumption expenditure and the demographic profile (e.g., age-distribution) of each quintiles differs, individuals with age between 18 and 23 are not equally distributed across quintiles. The bottom 20 percent of the population has less number of members in 18-23 age group, while top 20 percent of the population has largest number of members In age group 18-23.

Figure 22 presents the breakdown of students enrolled in different streams of tertiary education according to students' economic status. As the demographic profile of each quintile varies (e.g., poor families may have more members below 14 years of age), the number of persons belonging to age group 18-23 also varies across quintiles. Only 16 percent of individuals in age group 18-23 belong to the bottom 20 percent of the country, while 24 percent of individuals in age group 18-23 belong to the top 20 percent of the country. Although the top expenditure quintile has a larger share in the 18-23 age group population (24 percent), the share of students from the top quintile is even larger (55 percent). The share of students from the top quintile is particularly dominant in the engineering programs (73 percent). The lowest quintile has a marginal share in the total student body (2.4 percent) and especially in the technical and engineering streams (1.9 percent and 0.8 percent). This pattern could be explained by several factors: (i) engineering (and technical) education is considered prestigious and attractive because of high returns. Therefore, competition for entry is stronger, which could result in a higher share coming from affluent families; (ii) a higher share of engineering (and technical) education is self-financed, as shown later in this section. Therefore, less well-off families could have difficulties paying the tuition fees. Further, the self-financed colleges are predominantly located in Southern states and in urban areas, where income is higher. In addition, the self-financed and private aided colleges are not necessarily subject to the same regulations regarding reservations for SC and ST students.

Figure 22: Break-up of tertiary attending students, 2004

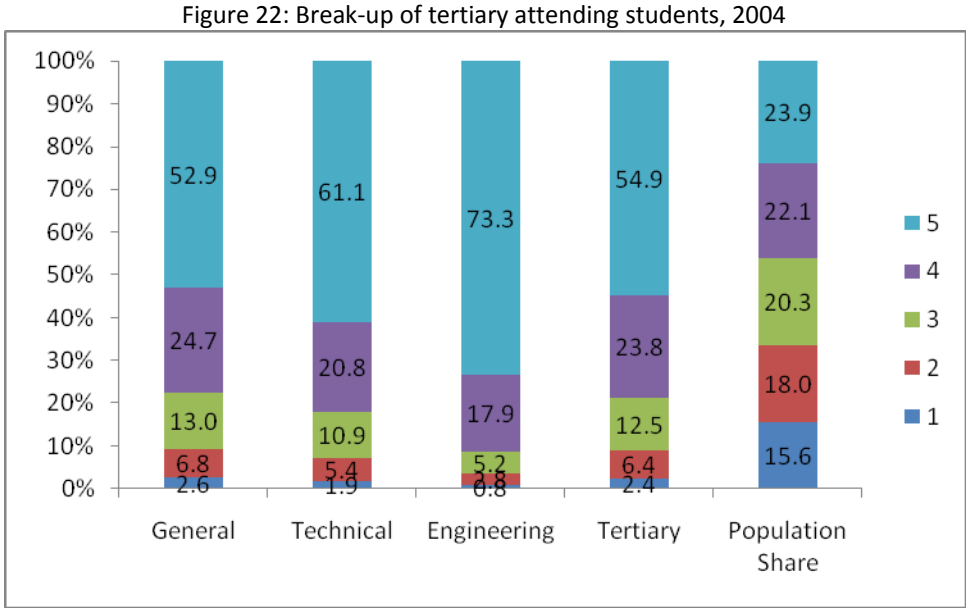
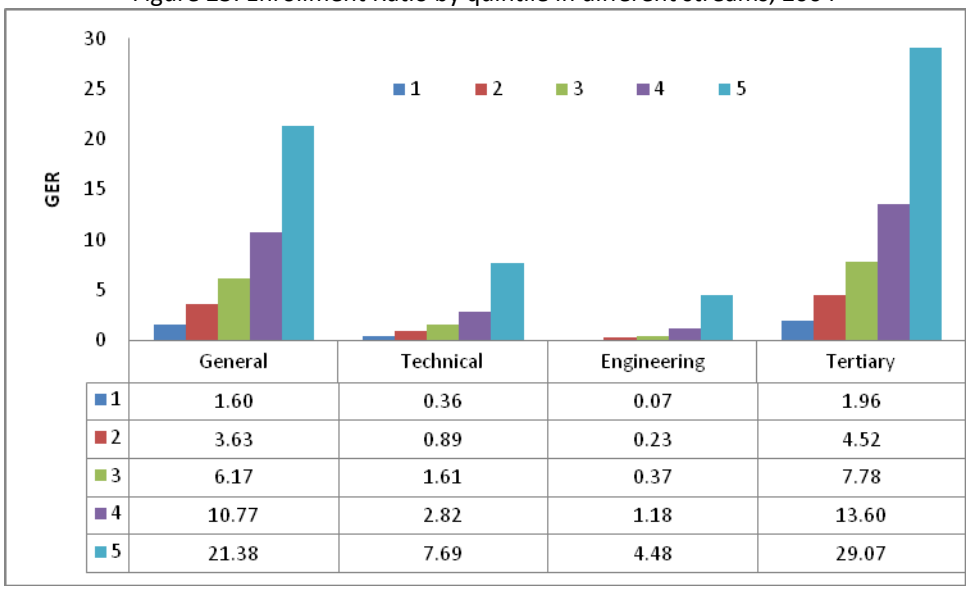


Figure 23 presents the enrollment ratio by expenditure quintile and tertiary education stream. As expected, there is wide variation in the enrollment ratio across expenditure quintiles, and the variation is larger in technical/engineering courses. Access to technical/engineering courses is very low for students belonging to lower expenditure quintiles.

Figure 23: Enrollment Ratio by quintile in different streams, 2004

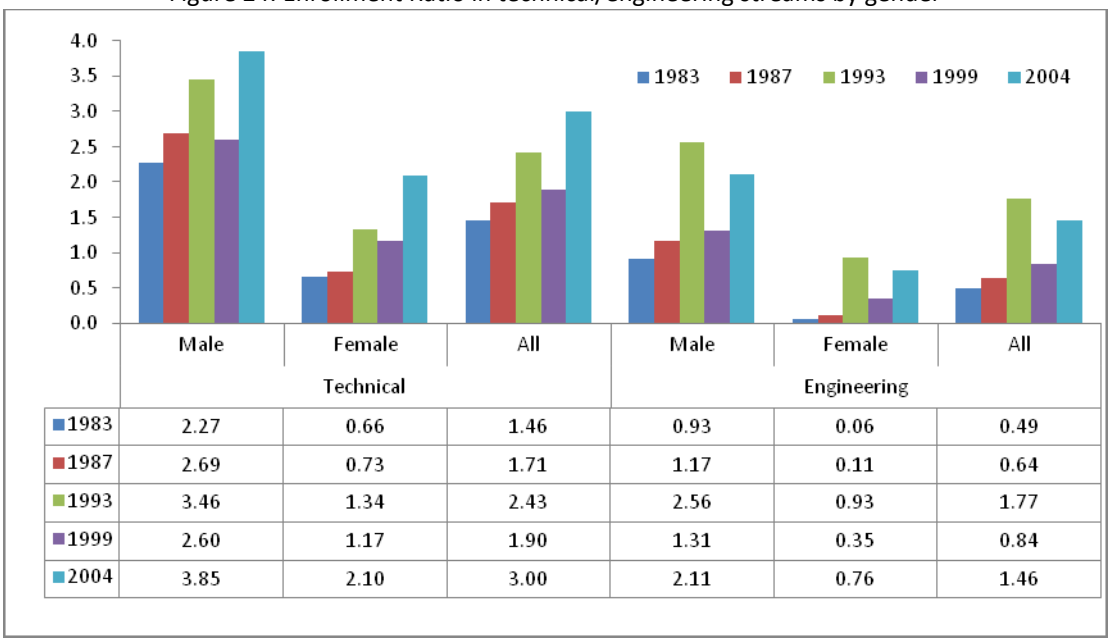


	General	Technical	Engineering	Tertiary
1	1.60	0.36	0.07	1.96
2	3.63	0.89	0.23	4.52
3	6.17	1.61	0.37	7.78
4	10.77	2.82	1.18	13.60
5	21.38	7.69	4.48	29.07

Given the increasing importance of technical education in tertiary education, we now explore how equitable the access to technical or engineering education is. Figure 24 presents the enrollment ratio

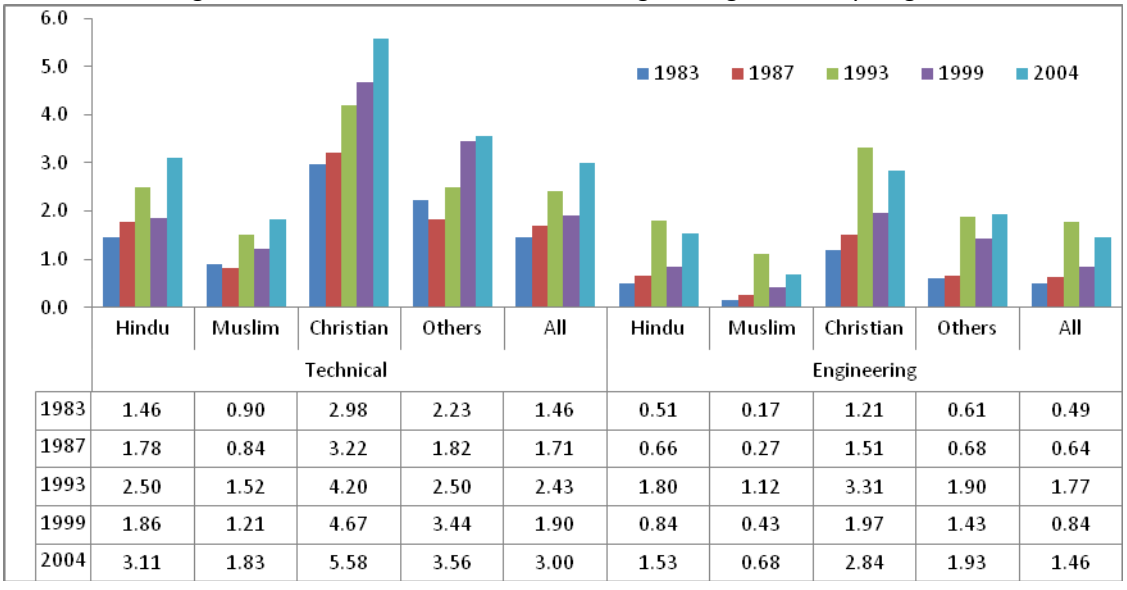
in technical and engineering courses by gender. Although the enrollment ratio has improved for both genders, female enrollment is lagging far behind male enrollment. As was the case with tertiary education enrollment, in the technical/engineering stream, female enrollment is lower than male enrollment. However, it is worth noting that the female enrollment ratio in technical education and engineering seemingly increased dramatically from 1983 to 2004, around 4 times for technical education and 10 times for engineering education. Some contributing factors, among others, could be: (i) the general increase in participation among women, and (ii) the advent of "softer" engineering programs, in particular IT-programs.

Figure 24: Enrollment Ratio in technical/engineering streams by gender



	Technical			Engineering		
	Male	Female	All	Male	Female	All
1983	2.27	0.66	1.46	0.93	0.06	0.49
1987	2.69	0.73	1.71	1.17	0.11	0.64
1993	3.46	1.34	2.43	2.56	0.93	1.77
1999	2.60	1.17	1.90	1.31	0.35	0.84
2004	3.85	2.10	3.00	2.11	0.76	1.46

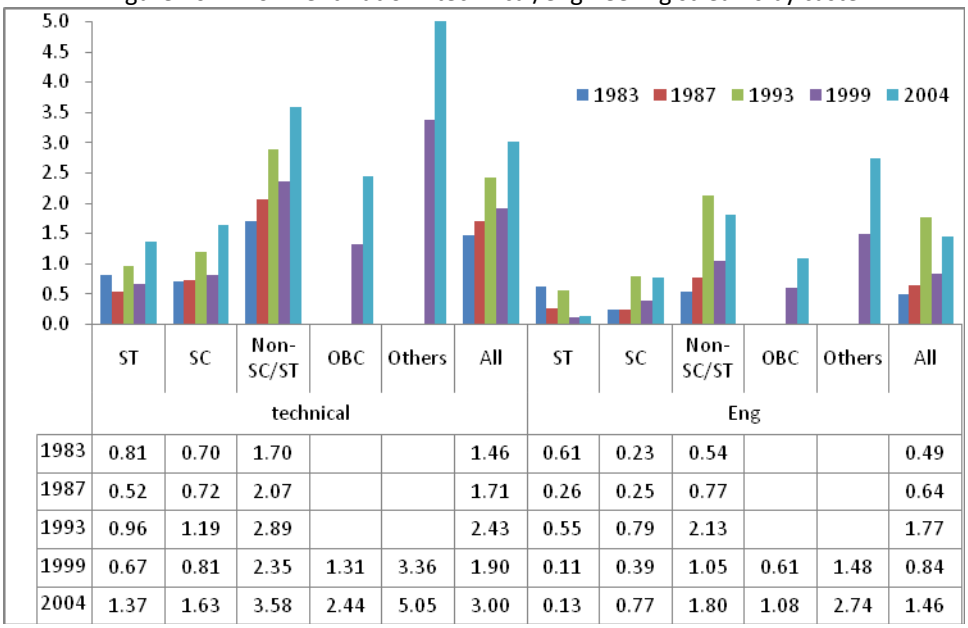
Figure 25: Enrollment Ratio in technical/engineering streams by religion



	Technical					Engineering				
	Hindu	Muslim	Christian	Others	All	Hindu	Muslim	Christian	Others	All
1983	1.46	0.90	2.98	2.23	1.46	0.51	0.17	1.21	0.61	0.49
1987	1.78	0.84	3.22	1.82	1.71	0.66	0.27	1.51	0.68	0.64
1993	2.50	1.52	4.20	2.50	2.43	1.80	1.12	3.31	1.90	1.77
1999	1.86	1.21	4.67	3.44	1.90	0.84	0.43	1.97	1.43	0.84
2004	3.11	1.83	5.58	3.56	3.00	1.53	0.68	2.84	1.93	1.46

Figures 25 and 26 present the enrollment ratio in technical and engineering courses by religion and caste, respectively. Enrollment in technical and engineering courses among Muslims, SCs, STs, and OBCs is below that of the general population. This seems particularly to be the case for ST students, where the enrollment ratio in engineering education is estimated to be 0.13 (compared with 1.46 for all India). There is a need to confirm the low participation with estimates from other data sources. Further, the reasons behind this low participation should be investigated with an eye to design programs to increase the participation of SC, ST, and other disadvantaged groups in technical education, including engineering education. All financial, social, and educational reasons should be considered in such a study.

Figure 26: Enrollment Ratio in technical/engineering streams by caste



	technical						Eng					
	ST	SC	Non-SC/ST	OBC	Others	All	ST	SC	Non-SC/ST	OBC	Others	All
1983	0.81	0.70	1.70			1.46	0.61	0.23	0.54			0.49
1987	0.52	0.72	2.07			1.71	0.26	0.25	0.77			0.64
1993	0.96	1.19	2.89			2.43	0.55	0.79	2.13			1.77
1999	0.67	0.81	2.35	1.31	3.36	1.90	0.11	0.39	1.05	0.61	1.48	0.84
2004	1.37	1.63	3.58	2.44	5.05	3.00	0.13	0.77	1.80	1.08	2.74	1.46

Note: Non-SC/ST combines OBC and Others. OBC was not distinguished before 1999 data.

3e. Participation by Type of Institution

This subsection looks at another aspect of participation across types of tertiary education. There are four types of educational institutions that provide tertiary education in India: government institutions, local institutions, private aided institutions, and private unaided institutions.

Figure 27 presents the distribution of tertiary education students across types of institutions. More than half of tertiary-attending students attended government institutes and a quarter attended private aided institutes in 2004. The share of private unaided institutions increased between 1995 and 2004, while the share of private aided institutions declined. The proportion of students in government institutions remained more or less stable. The increasing role of self-financed/private tertiary education

is a global trend. This trend is seemingly driven by: (i) the inability of governments to increase public investment in tertiary education sufficiently to meet demand, (ii) a rapid increase in demand for tertiary education, making more students and families willing to pay for tertiary education, and (iii) greater political and regulatory acceptance of private tertiary education (World Bank, 2002). These drivers could equally explain the rise in private unaided institutions in India.

Figure 28 presents the distribution of students across different types of institutes by expenditure quintile. Unsurprisingly, the proportion of students attending private unaided institutes is larger in the higher quintiles, while the proportion of students attending government institutes is larger in lower quintiles. Among other factors, this pattern is likely to be the combined result of the inability of low-income families to finance high fees in private unaided institutions and the reservations in public institutions. Further, government institutions are likely to be more present in rural and low-income areas of India, thus increasing their enrollment among low-income students.

Fig 27: Distribution of tertiary attending by institutes types

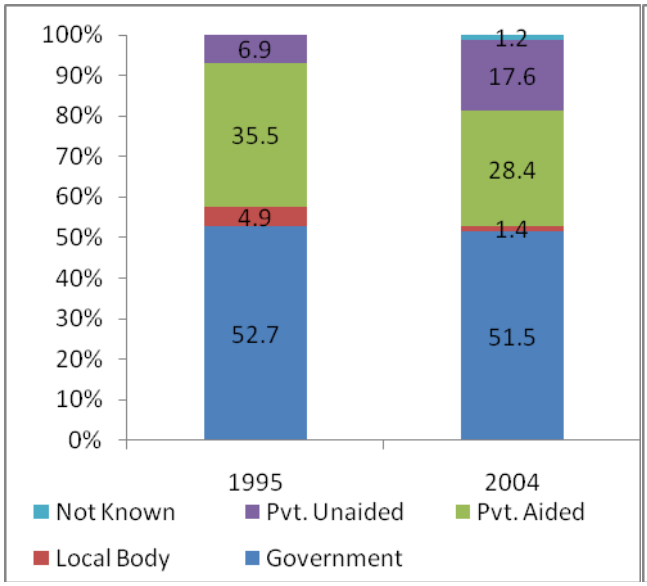


Figure 28: Distribution of tertiary attending students by type of institute across expenditure quintile in 2004

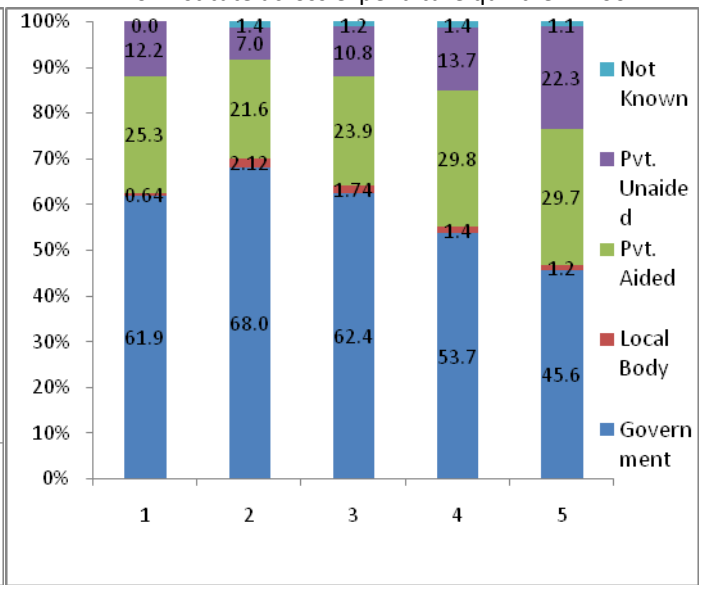
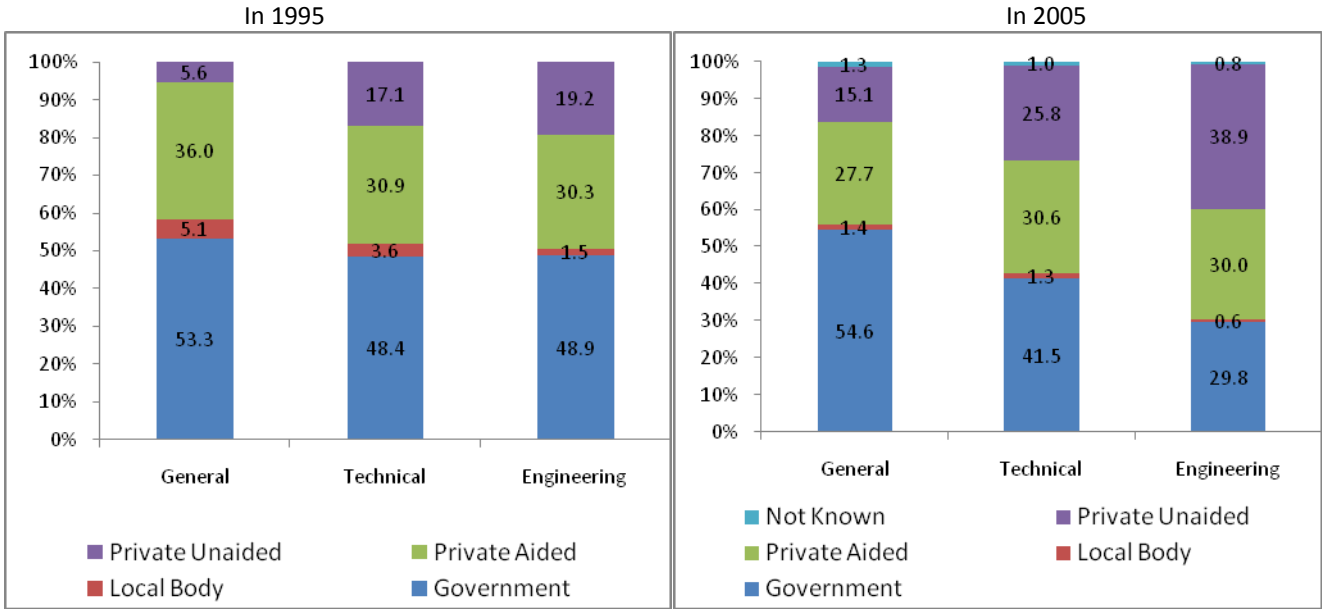


Figure 29 presents the type of institutions attended by students in different streams in tertiary education. Government institutions have the largest share in general and technical courses. While the share of government institutions remained similar for general courses between 1995 and 2004, it declined for technical courses (especially for engineering courses). The share of private unaided institutes increased between 1995 and 2004 in all streams. In 2004, the government educated less than a third of the students in engineering programs. Hence, it is no longer the majority provider, but rather a

minority provider. This implies that the central and state government should increasingly be strategic as to which kind of minority provider it should be. In particular, the government could consider where in the system its limited public investment in engineering education should be oriented. Public investment could be oriented toward critical objectives that private institutions are not currently covering sufficiently. In other developing countries, such objectives have been: (i) equity in terms of disadvantaged groups, low-income students, and under-served geographical regions, (ii) research and development, including strategic masters and PhD programs, and (iii) disciplines considered a national priority, but with low labor market returns for the individual.

Figure 29: Share of type of institutes in different courses



4. Determinants of Access

In the previous sections, we have seen that there exist large gaps in attainment, enrollment, and transition rates between rural-urban areas, genders, expenditure quintiles, social groups, religions, and states. However, several of the characteristics are overlapping. For example, a higher share of the disadvantaged groups, such as SCs and STs, are poor and live in rural areas. Therefore, it is difficult to know which overlapping factor is dominant. To disentangle these effects, we estimate a probit model.

The explanatory variables considered are caste, religion, expenditure quintile, sector, gender, and state of residence.[16] The results are given in Table 1.[17] In column (1) the dependent variable is an indicator for persons (in age group 18-23) attending tertiary education or who have already completed a

[16] OBCs are not included as a separate social group since OBCs were not distinguished in 1993 data.
[17] Full model is given in Annex III Table 1.

tertiary degree. In column (2), the sample is restricted to persons (in age group 18-23) who already have completed the higher secondary level, and the dependent variable is an indicator for attending tertiary education or having already completed a tertiary degree. In column (3), the dependent variable is an indicator for having completed the higher secondary level or above (in age group 18-23). So column (1) explains participation in tertiary education, column (2) explains participation conditional on completion of a higher secondary degree, and column (3) explains completion of at least the higher secondary level.

Table 1: Determinants of tertiary education access for age group 18-23

	(1)		(2)		(3)	
	Attending or completed tertiary		Attending or completed tertiary conditional on completed higher secondary		At least completed higher secondary	
	2004	**1993**	**2004**	**1993**	**2004**	**1993**
sc*	-0.205***	-0.403***	0.052	-0.103	-0.248***	-0.413***
st*	0.008	-0.371***	0.407***	-0.089	-0.151**	-0.391***
muslim*	-0.364***	-0.533***	-0.033	-0.157*	-0.406***	-0.548***
female*	0.057	-0.019	-0.138*	0.016	0.110***	-0.029
rural*	-0.780***	-0.755***	-0.593***	-0.420***	-0.650***	-0.686***
female*Rural*	-0.328***	-0.547***	-0.089	-0.331***	-0.346***	-0.517***
quintile 2*	0.332***	0.227***	0.177	0.005	0.294***	0.232***
quintile 3*	0.644***	0.530***	0.346***	0.221**	0.585***	0.485***
quintile 4*	0.955***	0.759***	0.518***	0.278***	0.860***	0.716***
quintile 5*	1.565***	1.214***	0.957***	0.572***	1.394***	1.128***
Number of Observations	68,894	65,722	14,956	11,699	68,894	65,722

Notes: (1) * p<0.05; ** p<0.01; *** p<0.001
(2) The coefficients are marginal effects.
(3) * denote dummy variable and marginal impact is for discrete change of dummy variable from 0 to 1.
. (4) Non-SC/ST is the social group of reference.
(5) The model also includes state dummies (full results in Annex III)

Most of the explanatory variables considered are statistically significant at the 1 percent level. In general, the results confirm the descriptive statistics from the previous section. The estimations suggest that:

- Income seems to be a decisive factor for participation in tertiary education. There is a strong positive association between expenditure quintile and participation in tertiary education. Income is strongly and statistically significantly associated with both completion of secondary education, and

transitioning from secondary to tertiary education. Further, both coefficients increased from 1993 to 2004.[18]

- Rural youth is statistically associated with a strong negative impact on the probability of attending tertiary education. This is as a result of both a negative impact from lower completion rates of secondary education and a lower probability of transitioning from secondary school to a tertiary education institution. This effect did not decreased from 1993 to 2004.
- An urban female was not statistically significantly less likely to attend tertiary education in 2004 compared with a male with the same characteristics. This seems to be a combination of a higher likelihood of completing secondary education, but a lower tendency to transition to tertiary education.
- Rural females are associated with a significantly lower propensity to attend tertiary education, but this decreased between 1993 and 2004. The lower probability of completing secondary education compared with their urban peers seems to account for the difference. Rural women appeared to be as likely to transition to tertiary education from secondary school in 2004 (this was not the case in 1993).
- The under-participation of Scheduled Castes is seemingly mostly driven by a lower completion rate of secondary education among SCs (and other overlapping factors, such as poverty). There is no statistically significant lower transition rate for SCs. Importantly, this may (or may not) be a result of the positive discrimination from the reservation policies.
- The under-participation of Scheduled Tribes is equally driven by the smaller share of graduates of secondary education (and other overlapping factors, such as poverty). In fact, compared with the general population, an ST student is statistically 41 percent more likely to enroll in tertiary education than a peer with the same observable characteristics. This effect was not present in 1993. Again, this may (or may not) be a result of the positive discrimination from the reservation policies.
- The under-participation of Muslims also appears to be caused by lower completion rates of secondary education (and other overlapping factors, such as poverty). There was no statistically significant effect in 2004 on the probability of transition to tertiary education (a small effect was statistically significant in 1993).

The results in Table 1 suggest that the marginal impact of economic status seems most important in determining participation in tertiary education and its importance has increased during the past decade.

[18] The findings remain unaffected when we use per capita expenditure in place of quintiles (see Annex III Table 3).

The importance of social group, religion, and gender has decreased during the same period. The expansion of primary and secondary education to these groups is highly likely to have contributed substantially to the decline in importance. However, there are still important gaps in participation for these groups. The results indicate that the primary distortions continuing the unequal representation in tertiary education lie mostly at the lower rungs of the education ladder. Therefore, the continued inequality of completion of primary and secondary education is perpetuated in much lower and more unequal access to tertiary education. Equitable expansion of secondary education is therefore a cornerstone in a policy to increase equal access to tertiary education.

Table 2 presents the determinants of access to technical/engineering courses conditional on completion of higher secondary education and attending tertiary education.[19] Again, the regression results confirm the descriptive statistics from Section 3. The general, but rough, interpretation is that once a student is attending tertiary education, the demographic factors do not matter for choice of stream. However, there are four caveats to this result: (i) students belonging to the top quintile have a higher probability of taking technical/engineering courses, and this tendency has increased over time; (ii) female students are less likely to attend technical/engineering courses; (iii) youth in rural areas are less likely, and strongly so, to enroll in technical/engineering courses, an effect that intensified between 1993 and 2004; and (iv) ST students have statistically significantly lower probability to attend engineering courses.

[19] Annex III, Table 2 presents the complete model.

Table 2: Determinants of technical/engineering access for age group 18-23

	Attending or completed Technical education conditional on				Attending or completed Engineering conditional on			
	completed higher secondary		attending or completed tertiary		completed higher secondary		attending or completed tertiary	
	2004	**1993**	**2004**	**1993**	**2004**	**1993**	**2004**	**1993**
sc*	0.037	0.161*	0.015	0.218*	0.044	0.102	0.023	0.138
st*	0.116	0.169	0.013	0.211	-0.490***	0.038	-0.591***	0.044
muslim*	0.013	0.087	0.028	0.159	-0.041	0.101	-0.027	0.173
female	-0.295***	-0.385***	-0.285***	-0.437***	-0.482***	-0.411***	-0.477***	-0.462***
Rural	-0.458***	-0.371***	-0.317***	-0.264***	-0.689***	-0.360***	-0.579***	-0.261***
female*rural	-0.066	0.071	-0.067	0.183	-0.127	0.079	-0.152	0.192
quintile 2*	-0.051	0.114	-0.138	0.156	-0.109	0.013	-0.194	0.037
quintile 3*	0.18	0.099	0.056	0.044	0.023	0.077	-0.103	0.023
quintile 4*	0.158	0.157	-0.035	0.093	0.267	0.085	0.093	0.018
quintile 5*	0.561***	0.388***	0.293*	0.248*	0.794***	0.279**	0.583**	0.133
Number of Observations	14,953	11,699	10,274	8,018	14,785	11,699	10,177	8,018

Notes: (1) * p<0.05; ** p<0.01; *** p<0.001
(2) The coefficients are marginal effects.
(3) * denote dummy variable and marginal impact is for discrete change of dummy variable from 0 to 1.
(4) Non-SC/ST is the social group of reference.
(5) The model also includes state dummies (full results in Annex III).

5. Conclusion

This paper has reviewed participation in tertiary education in India from 1983 to 2004 by computing the attainment, enrollment, and transition rates from secondary education by population groups. It is motivated by a need to establish a consensus on the basic trends in participation and contribute to more fact-driven and targeted policy-making for tertiary education.

The findings show that Indian tertiary education progressed significantly between 1983 and 2004. Attainment of tertiary education in the age group 25-34 doubled from 4.4 percent in 1983 to 8.8 percent in 2004. Enrollment increased by 5 percentage points, from 7.6 to 12.6 percent (a 60 percent increase).

Nevertheless, there exist large gaps in enrollment between:

- Rich and poor households. In 2004, a young person from the top expenditure quintile was 14.5 times more likely to enroll in tertiary education than a young person from the bottom quintile. This is a considerable increase from 8 times in 1983.

- Rural and urban areas. Rural youth were 3.2 times less likely to attend tertiary education compared with their urban peers. This gap had been narrowing over time (from 4.5 times in 1983).
- Disadvantaged groups (SCs, STs, OBCs, and Muslims) and the general population. For example, the non-SC/ST population is 1.9 times more likely to attend tertiary than an ST student. The gap halved from 3.8 times in 1983.
- Women and men. In 2004, males were 1.4 times more likely to enroll than females. This gap has been reduced from 2.4 times in 1983.
- Between states. For instance, a youngster from Maharashtra is 1.7 times more likely attend tertiary education than a peer from Madhya Pradesh.

Overall, the (relative) gaps in enrollment remain sizable, but they have diminished over time, with the notable exception of the gap between rich and poor, which has widened substantially.

To start narrowing down on the specific bottlenecks, the paper analyzed transition rates from secondary education to tertiary education and estimated regressions explaining who enrolls in tertiary education. The results suggest the following:

- The enrollment gap between rich and poor stems both from a lower probability of completing secondary education, and from a substantially lower chance of transition from secondary education to tertiary education. Further, the importance of income in this transition seems to have strengthened over time. The transition rate among young people from the poorest expenditure quintile was 52 percent in 2004 (compared with 54 percent in 1983), while the transition rate in the richest quintile was 79 percent (compared with 71 percent in 1983). The regression results confirm the importance of household income as a key factor for entry in tertiary education, even after controlling for completion of secondary education.
- Rural youth have both a lower chance of completing secondary education and a lower chance of transitioning from secondary education to tertiary education. This is even more pronounced for rural females.
- The gaps in transition rate between genders, between social groups, and between religious communities are much smaller than compared with the gaps observed in enrollment. This indicates that completion of secondary education remains the main barrier to tertiary education for these groups.
- The primary distortions creating unequal representation in tertiary education for SC, ST, OBC, and Muslim youth seemingly lie mostly at the lower rungs of the education ladder.

Only economic status, gender, and rural residence remain statistically significant for the transition from secondary school to tertiary education. Hence, for SCs, STs, OBCs, and Muslims, the gaps in enrollment in tertiary education are statistically explained by the difference in completion rates of higher secondary education.

- Transition rates differ less between states than enrollment rates. This indicates that completion of secondary education is a fundamental factor behind the state differences in enrollment in tertiary education. In certain states/UTs, notably Chandigarh, Delhi, West Bengal, and Andhra Pradesh, the transition rate exceeds 80 percent, indicating that expansion of tertiary education will predominantly require expansion in the share of the cohort that completes higher secondary education. In contrast, the transition rate in the states of Arunachal Pradesh, Manipur, Meghalaya, and Mizoram is below 60 percent, signifying that a large proportion of seemingly qualified youngsters exit the education system in the transition from secondary to tertiary education.

Lastly, we examined whether participation in the technical education stream and in particular engineering courses differed from general participation in tertiary education. The enrollment inequalities between income groups, rural-urban residence, and gender are larger in the technical stream, and especially so for the engineering courses. We speculate that this may be a result of fierce competition to enter the engineering field and the higher share of private, self-financed education in engineering. Government institutions educated around 30 percent of the student body in 2004, compared with 49 percent in 1995. Importantly, the gender gap in the engineering field has been narrowing. The female enrollment ratio in engineering courses increased ten-fold from 1983 to 2004.

The policy challenge for India is to expand tertiary education, while at the same time making it more inclusive. This is not likely to happen by itself; it will require targeted and focused polices to help disadvantaged youth qualify for, enroll in, and complete tertiary education.

An equitable expansion of secondary education is necessary for fundamental improvement in equity in tertiary education; in particular for low-income families, girls, Muslims, disadvantaged groups (SCs, STs, and OBCs), and rural areas.

There is a clear need to improve the transition to tertiary education for students belonging to low and middle-income families, and thus bring more low and middle-income students to universities and colleges. The inequality of participation in tertiary education risks jeopardizing a more

inclusive Indian society. There is a need to better understand why and how family income translates to unequal access. Such an analysis should encompass consideration of financial, social, academic, and information obstacles to tertiary education. A major reason is expected to be lack of financing to sustain another four years of investment in education in terms of foregone income, living costs, and education costs. The policy implication of such a finding would be to scale up financial assistance to low and middle-income families through education loan programs, and perhaps a highly targeted scholarship program exclusively for poor families.

Lack of information regarding tertiary education, low expectations of attending tertiary education, and inadequate preparation are equally expected to be behind the unequal access to tertiary education. This could be a barrier for young women, in particular those from rural and disadvantaged communities. Therefore, compensatory programs could assist poor families and young women in overcoming these barriers.

In addition, the gap in enrollment and transition into tertiary education for rural youth requires special attention and initiatives. Again, more analysis is called for. A key driver could be a shortage of seats in rural areas, which is likely to require smart expansion of public, private, or public-private partnerships. Alternative policy implications could be greater relevance of tertiary education for the rural labor market and industry, and probably also increased quality of primary and secondary education in rural schools.

India has tremendous potential to make tertiary education an engine for equal social and economic progress, but it requires concerted and targeted efforts based on facts.

References

Azam, M. (2008a), "India's Rising Skill Premium: Role of Demand and Supply," *Southern Methodist University Working Paper.*

Azam, M. (2008b), "Changes in Wage Structure in Urban India 1983-2004: A Quantile Regression Decomposition," *Southern Methodist University Working Paper.*

Government of India (2006a), "Implementation of Reservation for OBCs," AICTE.

Government of India (2006b), "Draft Report of Working Group On Higher Education-11th Five Year Plan," Planning Commission of India.

Government of India (2006c), "Towards Faster and More Inclusive Growth - An Approach to the 11th Five Year Plan (2007-2012)," Planning Commission of India.

Government. of India (2006d), "Social, Economic and Educational Status of the Muslim Community of India."

Government of India (2006e), "Report of the Oversight of Implementation of the new reservation policy in Higher education."

Government of India (2007), "Selected Educational Statistics 2004-05," MHRD.

Government of India (2008), "Economic Survey, 2007-08."

Hasan, Rana. and Mehta, Aashish (2006), "Under-representation of Disadvantaged Classes in Colleges, What do the data tell us?," Economic and political weekly, September 2.

Sankar, Deepa (2007), "What is the progress in elementary education participation in India during the last two decades? An Analysis using NSS Education rounds," World Bank Mimeo.

Thorat (2006), "Higher Education in India: Emerging Issues Related to Access, Inclusiveness and Quality," Nehru Memorial Lecture.

World Bank (2000), "Higher Education in Developing Countries- Peril and Promise."

World Bank (2002), "Constructing Knowledge Societies: New Challenges for Tertiary Education", Washington D.C.

World Bank (2003), "Secondary Education in India." Washington D.C.

World Bank (forthcoming) "Secondary Education policy report." Washington D.C.

Annex-A

This Annex provides a brief primer on the education system in India.

The education structure of India is presented in Figure A1. The education system is divided broadly into primary (I-V), middle/upper primary (VI-VIII), secondary (IX-XII), and tertiary (higher education).

Figure A1:

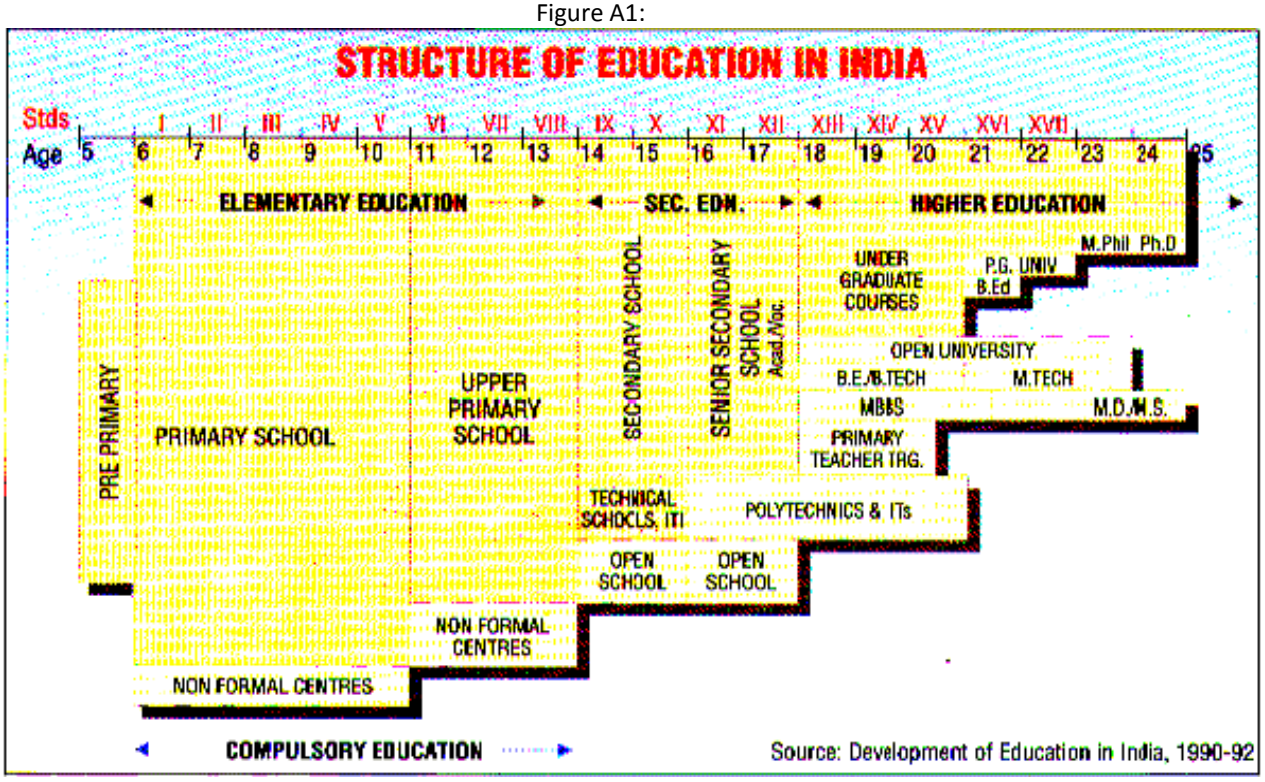


Table A1 presents the GER for different levels of education in India.[20] The universal enrollment at the primary stage is achieved in 2004; however, the GER for tertiary education remains low compared to lower levels of education.

Table A1: GER in different levels of education in India

Year	Primary	Middle	Secondary	Tertiary
1983	49.2	50.6	34.4	7.6
1987	53.0	56.8	38.4	8.6
1993	69.0	71.6	50.6	8.9
1999	75.1	77.9	50.2	10.1
2004	101.5	85.4	60.0	12.6

[20] Age group 6-10, 11-13, and 14-17 respectively is used as denominator to calculate GER for primary, secondary, and tertiary.

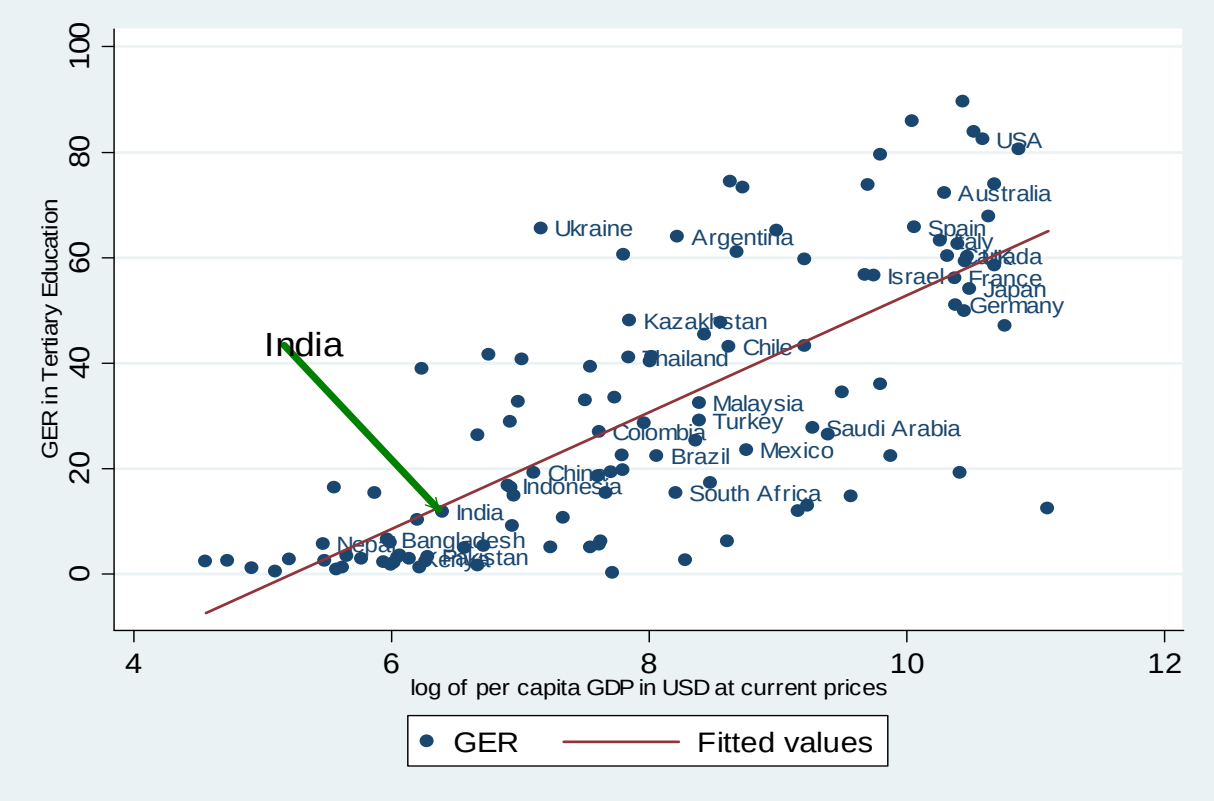
Table A2 presents the EAR in age group 25-34. The tertiary attainment is much lower.

Table A2: Educational attainment rate in India for age group 25-34

year	Primary	Middle	Secondary	Tertiary
1983	38.6	25.3	14.0	4.4
1987	39.0	25.6	14.9	4.9
1993	43.6	31.5	19.0	6.3
1999	49.5	38.5	23.8	7.6
2004	56.7	43.6	26.9	8.7

Figure A2 presents GER for different countries with respect to their per capita GDP. While India does well compare to Bangladesh and Pakistan, it lags behind countries like China, Brazil, Thailand, and Malaysia. Also, the GER in tertiary education in India far behind the GER in developed countries.

Figure A2: GER in Tertiary Education in different countries, 2004



Source: World Bank's Educational Statistics for GER and International Monetary Fund for per capita GDP.

Annex I

Annex I Table 1: Age-distribution of students currently attending higher education

	1993		1999		2004	
Age	% of attending	cumulative %	% of attending	cumulative %	% of attending	cumulative %
less than 18	7.76	7.76	5.66	5.66	7.56	7.56
18	17.27	25.02	16.46	22.12	17.46	25.02
19	14.57	39.59	14.37	36.49	16.9	41.92
20	18.29	57.88	20.13	56.62	20.34	62.25
21	11.5	69.38	12.02	68.64	11.9	74.15
22	12.15	81.53	11.53	80.17	10.25	84.41
23	6.12	87.65	5.85	86.03	5.27	89.67
24	3.71	91.36	5.22	91.25	4.07	93.74
25	3.68	95.04	3.87	95.12	2.68	96.43
More than 25	4.96	100	4.88	100	3.57	100

Annex I Table 2: Educational attainment in different states

	1983			1993			2004		
state	Male	Female	All	Male	Female	All	Male	Female	All
Andhra Pradesh	4.8	1.1	3.0	8.0	2.8	5.3	10.1	5.5	7.7
Arunachal Pradesh	19.7	4.0	12.7	3.8	2.0	2.9	9.0	3.5	6.1
Assam	3.5	0.8	2.2	5.9	2.4	4.1	6.3	2.8	4.4
Bihar	3.6	0.5	2.0	8.1	1.4	4.6	8.7	2.0	5.1
							(7.9)	(1.2)	(4.2)
Jharkhand	NA	NA	NA	NA	NA	NA	10.7	4.7	7.7
Goa				10.2	9.9	10.1	13.8	18.8	16.4
Gujarat	9.0	3.9	6.5	11.7	4.8	8.3	12.0	7.8	10.0
Haryana	5.9	2.7	4.4	8.5	3.4	5.9	10.6	12.6	11.6
Himachal Pradesh	6.6	2.0	4.1	7.6	4.4	5.8	10.3	9.0	9.6
Jammu & Kashmir	6.2	2.6	4.4	8.6	7.2	7.8	8.3	6.2	7.2
Karnataka	6.8	2.5	4.7	9.0	3.9	6.4	10.5	6.4	8.5
Kerala	4.1	3.7	3.9	8.6	4.7	6.5	9.5	9.9	9.7
Madhya Pradesh	5.0	1.6	3.3	6.4	3.2	4.8	10.9	6.0	8.4
							(10.9)	(6.4)	(8.6)
Chhattisgarh	NA	NA	NA	NA	NA	NA	11.0	4.7	7.7
Maharashtra	8.8	3.5	6.2	11.2	5.6	8.4	14.1	10.7	12.4
Manipur	4.4	1.3	2.8	15.6	10.4	12.9	13.3	8.8	10.8
Meghalaya	3.8	3.9	3.9	2.9	3.1	3.0	4.6	8.1	6.5
Mizoram	3.0	0.9	2.0	4.5	2.4	3.4	7.9	3.9	5.8
Nagaland	7.5	3.5	6.3	10.6	4.4	7.4	16.6	8.7	12.3
Orissa	4.6	0.8	2.7	5.8	2.3	4.0	10.8	5.6	8.1
Punjab	6.5	4.5	5.5	6.8	6.3	6.6	8.4	10.7	9.6
Rajasthan	5.5	0.8	3.2	8.3	2.7	5.5	8.3	3.8	6.0
Sikkim	4.2	2.5	3.3	6.2	1.9	4.4	5.8	4.5	5.1
Tamil Nadu	5.5	2.0	3.8	8.6	3.9	6.3	13.0	8.0	10.3
Tripura	11.0	2.1	6.7	9.9	4.1	6.9	6.9	4.8	5.8
Uttar Pradesh	7.0	2.2	4.6	9.3	3.7	6.4	11.8	5.3	8.5
							(11.6)	(4.9)	(8.1)
Uttaranchal	NA	NA	NA	NA	NA	NA	17.2	13.0	15.0
West Bengal	8.1	4.2	6.2	8.3	3.8	6.0	9.4	6.3	7.8
Chandigarh	28.2	23.7	26.1	24.5	23.8	24.2	23.5	26.8	25.2
Delhi	22.0	19.4	20.9	21.7	24.5	22.9	24.5	21.8	23.3
INDIA	**6.4**	**2.4**	**4.4**	**8.8**	**3.8**	**6.3**	**11.0**	**6.6**	**8.7**

Note: The entry in parenthesis refers to new boundary (carved out state is excluded from parental state). The states of Jharkhand, Chhattisgarh, and Uttaranchal were carved out from Bihar, Madhya Pradesh, and Uttar Pradesh, respectively in 2000.

Annex I Table 3: GER in different states

	1983			1993			2004		
	Male	Female	All	Male	Female	All	Male	Female	All
Andhra Pradesh	9.3	2.9	6.0	9.4	3.6	6.5	17.0	9.8	13.3
Arunachal Pradesh	16.2	0.0	9.2	6.4	3.4	4.8	4.1	3.5	3.8
Assam	12.3	3.5	7.9	11.1	6.6	9.1	10.3	7.4	8.9
Bihar	11.8	2.0	6.8	15.3	4.1	9.9	13.0	4.1	8.6
							(13.4)	(2.8)	(8.2)
Jharkhand	NA	NA	NA	NA	NA	NA	12.0	7.4	9.7
Goa				18.2	17.9	18.1	17.7	15.3	16.4
Gujarat	12.5	3.8	8.3	12.4	8.7	10.7	13.8	11.5	12.7
Haryana	12.3	3.4	8.0	12.9	5.2	9.4	19.0	16.0	17.6
Himachal Pradesh	12.3	3.4	7.3	9.8	6.8	8.3	19.3	19.6	19.5
Jammu & Kashmir	10.2	5.6	7.9	9.9	6.8	8.4	14.6	13.3	14.0
Karnataka	10.1	4.8	7.4	12.7	4.7	8.9	14.2	11.3	12.8
Kerala	21.5	20.9	21.2	15.1	13.3	14.2	20.3	25.3	22.9
Madhya Pradesh	7.7	3.6	5.7	9.6	3.7	6.7	11.6	5.7	8.8
							(11.3)	(5.3)	(8.4)
Chhattisgarh	NA	NA	NA	NA	NA	NA	12.5	7.1	10.0
Maharashtra	13.5	6.9	10.2	16.2	8.5	12.5	17.4	12.8	15.3
Manipur	7.9	4.1	6.0	30.7	15.9	23.1	18.3	10.9	14.6
Meghalaya	5.7	1.9	3.6	4.7	2.8	3.6	4.4	5.4	4.9
Mizoram	5.3	2.6	3.9	9.0	5.9	7.5	9.7	8.4	9.1
Nagaland	12.7	0.0	7.5	16.0	12.9	14.7	27.6	16.7	22.0
Orissa	7.2	2.5	4.7	9.9	4.2	7.0	9.4	5.0	7.0
Punjab	8.0	4.8	6.5	6.8	8.4	7.5	10.9	17.5	14.0
Rajasthan	11.3	2.3	6.9	9.1	4.2	6.8	12.9	6.2	9.7
Sikkim	0.4	1.3	0.8	5.4	3.1	4.3	6.1	7.1	6.5
Tamil Nadu	10.2	3.8	6.9	11.8	6.8	9.2	19.6	15.1	17.3
Tripura	13.8	3.3	8.5	9.4	5.3	7.4	6.5	4.6	5.5
Uttar Pradesh	8.5	2.1	5.4	10.0	4.7	7.5	14.0	9.1	11.7
							(13.9)	(8.5)	(11.3)
Uttaranchal	NA	NA	NA	NA	NA	NA	16.1	19.5	17.8
West Bengal	9.5	3.6	6.6	9.3	4.0	6.7	14.4	9.7	12.0
Chandigarh	46.3	21.8	37.1	47.0	47.3	47.1	54.3	44.3	49.8
Delhi	24.8	25.9	25.3	20.5	22.8	21.5	24.4	36.6	29.0
INDIA	**10.8**	**4.5**	**7.6**	**11.7**	**5.9**	**8.9**	**14.8**	**10.4**	**12.6**

Note: The entry in parenthesis refers to new boundary (carved out state is excluded from parental state). The states of Jharkhand, Chhattisgarh, and Uttaranchal were carved out from Bihar, Madhya Pradesh, and Uttar Pradesh, respectively in 2000.

Annex I Table 4: Ratio of GER

	Female/Male			Rural/ Urban	SC/Non-SC & ST	ST/Non-SC & ST	Muslim/ Hindu	quintile1/ quintile5	quintile2/ quintile5
	Rural	Urban	All India						
1983	0.29	0.55	0.41	0.36	0.41	0.27	0.54	0.12	0.22
1987	0.32	0.63	0.46	0.41	0.39	0.29	0.50		
1993	0.28	0.73	0.50	0.40	0.36	0.32	0.50	0.12	0.19
1999	0.48	0.86	0.66	0.46	0.43	0.54	0.50		
2004	0.59	0.87	0.70	0.52	0.55	0.50	0.57	0.07	0.16

Annex I Table 5: Transition rate in different states

	1993			1999			2004		
	Male	Female	All	Male	Female	All	Male	Female	All
Andhra Pradesh	69.8	66.9	68.8	69.1	71.9	70.3	82.8	76.7	80.3
Arunachal Pradesh	44.8	54.4	49.2	40.3	17.6	34.1	17.2	25.3	20.5
Assam	66.0	79.1	70.0	72.4	61.6	67.6	64.9	69.9	66.9
Bihar	74.0	70.5	73.3	61.2	62.0	61.4	72.2	70.1	71.7
							(73.4)	(68.2)	(72.4)
Jharkhand	NA	NA	NA	NA	NA	NA	68.2	72.3	69.8
Goa	84.5	64.6	74.2	68.4	73.4	71.2	59.9	63.0	61.7
Gujarat	67.1	65.1	66.2	57.8	69.4	63.1	73.8	62.3	68.2
Haryana	60.2	61.9	60.7	53.5	65.2	58.5	69.3	62.8	66.4
Himachal Pradesh	67.8	78.9	71.8	56.4	61.6	59.0	65.4	67.3	66.4
Jammu & Kashmir	55.6	54.7	55.2	60.2	66.8	62.7	70.5	64.9	68.2
Karnataka	74.2	66.4	71.6	58.0	58.5	58.2	78.7	79.6	79.2
Kerala	79.7	69.8	74.2	71.5	77.3	75.1	77.3	75.7	76.3
Madhya Pradesh	55.8	62.9	57.9	51.0	72.8	60.4	68.0	65.7	67.1
							(70.5)	(63.7)	(67.9)
Chhattisgarh	NA	NA	NA	NA	NA	NA	61.3	72.3	64.9
Maharashtra	74.8	74.6	74.7	71.3	65.8	69.1	69.9	67.4	68.9
Manipur	72.4	68.9	70.9	39.1	52.1	44.9	60.9	53.8	57.8
Meghalaya	89.5	51.2	70.4	72.7	84.5	78.2	41.3	47.0	44.3
Mizoram	82.0	87.1	84.1	56.8	59.4	58.1	65.5	43.6	54.1
Nagaland	34.2	65.0	43.6	61.1	57.6	59.4	78.8	59.8	70.0
Orissa	78.6	78.8	78.7	73.0	65.4	70.1	70.9	62.5	67.5
Punjab	40.9	59.8	50.3	49.3	57.1	53.2	49.5	56.4	53.5
Rajasthan	62.2	74.5	65.8	63.0	70.4	65.8	65.4	62.3	64.4
Sikkim	60.3	48.2	54.3	89.1	53.1	75.9	76.4	81.5	78.7
Tamil Nadu	60.2	53.3	57.2	67.0	55.8	61.4	75.7	67.2	71.3
Tripura	67.5	68.3	67.8	57.2	42.4	49.7	64.6	67.0	65.6
Uttar Pradesh	61.4	61.8	61.5	71.8	61.0	67.3	73.0	64.9	69.6
							(73.1)	(64.7)	(69.6)
Uttaranchal	NA	NA	NA	NA	NA	NA	72.1	67.2	69.5
West Bengal	83.3	76.9	80.9	66.7	71.6	68.4	79.1	84.7	81.5
Chandigarh	41.9	62.0	52.5	67.4	71.7	69.4	90.2	80.6	85.8
Delhi	66.2	73.9	70.5	55.9	77.7	65.7	86.1	79.9	83.3
INDIA	**67.4**	**67.0**	**67.4**	**64.7**	**65.9**	**65.2**	**72.7**	**69.0**	**71.2**

Note: The entry in parenthesis refers to new boundary (carved out state is excluded from parental state). The states of Jharkhand, Chhattisgarh, and Uttaranchal were carved out from Bihar, Madhya Pradesh, and Uttar Pradesh, respectively in 2000.

Annex II (Educational attainment for age group 15-64)

Annex II Table 1: Education Attainment Rate by Sector/Gender (15-64)

	Rural			Urban			All India		
	Male	Female	All	Male	Female	All	Male	Female	All
1983	1.6	0.4	1.0	9.7	4.8	7.4	3.7	1.4	2.6
1987	2.1	0.5	1.3	11.2	6.3	8.9	4.3	1.8	3.1
1993	2.8	0.6	1.7	13.7	8.3	11.2	5.7	2.5	4.2
1999	3.5	1.0	2.3	16.0	10.7	13.5	7.0	3.6	5.3
	4.0	1.4	2.7	16.4	12.2	14.4	7.5	4.2	5.9

Annex II Table 2: Education Attainment Rate by Social Group (15-64)

	ST	SC	Non-SC/ST*	OBC	Others	All
1983	0.55	0.60	3.27			2.60
1987	0.86	0.85	3.91			3.12
1993	0.98	1.11	5.29			4.18
1999	1.91	1.97	6.63	2.96	10.20	5.32
2004	1.94	2.38	7.29	3.83	11.67	5.91

Note: Non-SC/ST combines OBC and Others. OBC was not distinguished before 1999 data.

Annex II Table 3: Education Attainment Rate by Religion (15-64)

	Hindu	Muslim	Christian	Others	All
1983	2.6	1.4	3.9	4.4	2.6
1987	3.2	1.3	5.1	4.5	3.1
1993	4.3	2.0	6.1	5.7	4.2
1999	5.5	2.6	7.9	7.3	5.3
2004	6.2	3.0	7.7	8.8	5.9

Annex II Table 4: Education Attainment Rate by consumption quintile (15-64)

	1	2	3	4	5	All
1983	0.47	0.80	1.47	2.75	6.58	2.59
1993	0.64	1.21	2.38	4.32	10.74	4.17
2004	0.89	1.91	3.37	6.16	14.63	5.91

Annex II Table 5: Education Attainment Rate in major states (15-64)

	1983	1987	1993	1999	2004
Andhra Pradesh	1.8	2.1	3.1	5.1	5.0
Assam	1.4	3.0	2.6	3.5	3.2
Bihar	1.4	2.0	3.2	4.0	3.7
Delhi	15.0	17.6	21.4	21.5	20.9
Gujarat	3.6	3.3	4.7	5.4	6.4
Haryana	2.4	3.4	4.6	5.1	7.5
Himachal Pradesh	2.4	1.9	3.5	4.5	5.8
Jammu & Kashmir	2.6	3.3	4.6	4.5	4.5
Karnataka	2.5	2.5	4.1	5.2	5.6
Kerala	2.5	3.7	4.4	5.4	6.3
Madhya Pradesh	2.3	3.0	3.2	4.2	5.4
Maharashtra	3.3	3.9	5.5	6.7	7.7
Orissa	1.4	1.8	2.4	3.3	4.5
Punjab	3.1	3.8	4.6	5.4	6.9
Rajasthan	1.9	2.6	3.5	4.4	4.7
Tamil Nadu	2.1	2.8	3.9	5.6	6.9
Tripura	3.7	3.9	3.8	3.7	4.0
Uttar Pradesh	2.7	3.2	4.2	5.3	5.7
West Bengal	3.5	3.8	4.9	5.6	6.0
All India	**2.6**	**3.1**	**4.2**	**5.3**	**5.9**

Annex III

Annex III Table 1: Determinants of higher education access for age group 18-23, 2004

	(1)		(2)		(3)	
	Attending or completed tertiary		Attending or completed tertiary conditional on completed higher secondary		At least completed higher secondary	
	2004	1993	2004	1993	2004	1993
sc*	-0.205***	-0.403***	0.052	-0.103	-0.248***	-0.413***
st*	0.008	-0.371***	0.407***	-0.089	-0.151**	-0.391***
muslim*	-0.364***	-0.533***	-0.033	-0.157*	-0.406***	-0.548***
female*	0.057	-0.019	-0.138*	0.016	0.110***	-0.029
rural*	-0.780***	-0.755***	-0.593***	-0.420***	-0.650***	-0.686***
fem_rural*	-0.328***	-0.547***	-0.089	-0.331***	-0.346***	-0.517***
Quintile 2*	0.332***	0.227***	0.177	0.005	0.294***	0.232***
Quintile 3*	0.644***	0.530***	0.346***	0.221**	0.585***	0.485***
Quintile 4*	0.955***	0.759***	0.518***	0.278***	0.860***	0.716***
Quintile 5*	1.565***	1.214***	0.957***	0.572***	1.394***	1.128***
Arunachal Pradesh*	-0.792***	-0.353**	-1.818***	-0.486*	-0.224	0.335
Assam *	-0.091	0.416***	-0.335**	0.319**	-0.305	0.946***
Bihar *	0.006	0.522***	-0.135	0.339***	-0.294	1.014***
Goa *	-0.038	0.142	-0.537*	0.271	-0.113	0.684**
Gujarat*	-0.218**	0.194**	-0.443***	-0.026	-0.399	0.804***
Haryana*	-0.121	-0.021	-0.502***	-0.247	-0.248	0.624**
Himachal Pradesh*	0.107	0.159*	-0.380**	0.17	-0.049	0.679**
Jammu & Kashmir*	-0.08	-0.051	-0.350**	-0.415**	-0.268	0.683**
Karnataka*	-0.005	0.159**	-0.026	0.091	-0.315	0.706**
Kerala*	0.226***	0.412***	-0.02	0.293**	-0.036	0.942***
Madhya Pradesh*	-0.057	0.097*	-0.331***	-0.278***	-0.267	0.773***
Maharashtra*	-0.068	0.172***	-0.389***	0.109	-0.212	0.724**
Manipur*	-0.188*	0.489***	-0.604***	0.225	-0.279	1.013***
Meghalaya*	-1.159***	-0.173	-1.542***	0.052	-1.056***	0.341
Mizoram*	-0.846***	-0.078	-1.364***	0.445*	-0.764***	0.344
Nagaland*	-0.273**	0.252*	-0.850***	-0.627***	-0.299	1.185***
Orissa*	0.154*	0.386***	-0.13	0.498***	-0.109	0.837***
Punjab *	-0.293***	-0.184***	-0.860***	-0.546***	-0.247	0.604**
Rajasthan*	-0.278***	-0.071	-0.480***	-0.105	-0.459*	0.506*
Sikkim *	-0.634***	-0.097	-0.264	-0.184	-0.933***	0.510*
Tamil Nadu*	0.052	0.07	-0.266**	-0.284**	-0.126	0.796***

Tripura*	-0.176	0.044	-0.29	0.057	-0.405	0.572*
Uttar Pradesh*	0.09	0.213***	-0.169	-0.093	-0.157	0.850***
West Bengal*	-0.015	0.137**	-0.004	0.381***	-0.358	0.590**
Delhi *	-0.141	0.051	-0.307*	-0.297*	-0.36	0.748**
Constant	-1.371***	-1.506***	0.577***	0.360***	-0.840***	-1.790***
N	68894	65722	14956	11699	68894	65722

Notes: (1) * p<0.05; ** p<0.01; *** p<0.001

(2) The coefficients are marginal effects.

(3) * denote dummy variable and marginal impact is for discrete change of dummy variable from 0 to 1.

. (4) Non-SC/ST is excluded social group.

(5) The model also includes state dummies

Annex III Table 2: Determinants of access to technical/engineering courses for age group 18-23, 2004

	Attending or completed Technical education conditional on				Attending or completed Engineering conditional on			
	completed higher secondary		attending or completed tertiary		completed higher secondary		attending or completed tertiary	
	2004	1993	2004	1993	2004	1993	2004	1993
sc*	0.037	0.161*	0.015	0.218*	0.044	0.102	0.023	0.138
st*	0.116	0.169	0.013	0.211	-0.490***	0.038	-0.591***	0.044
muslim*	0.013	0.087	0.028	0.159	-0.041	0.101	-0.027	0.173
female*	-0.295***	-0.385***	-0.285***	-0.437***	-0.482***	-0.411***	-0.477***	-0.462***
rural*	-0.458***	-0.371***	-0.317***	-0.264***	-0.689***	-0.360***	-0.579***	-0.261***
fem_rural*	-0.066	0.071	-0.067	0.183	-0.127	0.079	-0.152	0.192
Quintile 2*	-0.051	0.114	-0.138	0.156	-0.109	0.013	-0.194	0.037
Quintile 3*	0.18	0.099	0.056	0.044	0.023	0.077	-0.103	0.023
Quintile 4*	0.158	0.157	-0.035	0.093	0.267	0.085	0.093	0.018
Quintile 5*	0.561***	0.388***	0.293*	0.248*	0.794***	0.279**	0.583**	0.133
Arunachal Pradesh*	-0.425	0.249	0.535	0.556	-0.837*	-0.026	-0.277	0.182
Assam *	-0.217	0.055	-0.167	-0.012	-1.591***	-0.172	-1.630***	-0.25
Bihar *	-0.509***	0.289**	-0.539***	0.215*	-1.102***	-0.137	-1.134***	-0.252*
Goa *	0.329	-0.24	0.595*	-0.34	0.553*	-0.118	0.814**	-0.202
Gujarat*	-0.256*	-0.304*	-0.154	-0.312*	-0.177	-0.355**	-0.076	-0.365*
Haryana*	-0.381*	-0.208	-0.299	-0.144	-0.216	-0.664***	-0.148	-0.647**
Himachal Pradesh*	-0.379**	0.191	-0.318*	0.177	-0.814***	0.211	-0.774***	0.204
Jammu & Kashmir*	-0.222	0.01	-0.156	0.216	-0.624***	-0.371	-0.607**	-0.264
Karnataka*	0.186	0.048	0.219	0.036	0.093	-0.022	0.117	-0.041
Kerala*	0.119	0.077	0.129	0.004	0.298*	0.054	0.323*	-0.015
Madhya Pradesh*	-0.235	0.083	-0.181	0.226*	-0.252	0.033	-0.212	0.161
Maharashtra*	-0.033	0.011	0.064	-0.003	-0.085	-0.026	-0.017	-0.038
Manipur*	-0.086	0.577***	0.092	0.604***	-0.769**	0.569***	-0.714**	0.589***
Meghalaya*	-0.653*	-0.929***	-0.224	-1.018***		-0.727**		-0.793**
Mizoram*	-0.823**	0.677**	-0.543	0.651**	-0.319	0.513*	-0.093	0.486
Nagaland*	-0.424	-0.015	-0.247	0.417	-0.251	-0.804**	-0.113	-0.583
Orissa*	-0.062	0.167	-0.044	0.045	0.05	0.041	0.067	-0.079
Punjab *	-0.550***	-0.234*	-0.350**	-0.008	-0.786***	-0.270*	-0.657***	-0.058
Rajasthan*	-0.079	0.188	0.041	0.270*	-0.508**	0.187	-0.458*	0.267*
Sikkim *	-1.386**	0.896**	-1.380**	1.359***		0.133		0.258

Tamil Nadu*	0.202	-0.186	0.299**	-0.095	0.362**	-0.148	0.439***	-0.051
Tripura*	0.05	0.528**	0.13	0.613**	-0.235	0.077	-0.208	0.1
Uttar Pradesh*	-0.195	-0.043	-0.184	-0.009	-0.522***	-0.071	-0.522***	-0.042
West Bengal*	-0.108	0.008	-0.116	-0.08	-0.266	0.011	-0.267	-0.069
Delhi *	-0.536**	0.174	-0.491**	0.321*	-0.593***	0.241	-0.557**	0.394**
Constant	-0.929***	-1.125***	-0.625***	-0.848***	-1.278***	-1.144***	-1.023***	-0.873***
N	14953	11699	10274	8018	14785	11699	10177	8018

Notes: (1) * p<0.05; ** p<0.01; *** p<0.001
(2) The coefficients are marginal effects.
(3) * denote dummy variable and marginal impact is for discrete change of dummy variable from 0 to 1.
. (4) Non-SC/ST is excluded social group.

Annex III Table 3: Determinants of tertiary education access for age group 18-23

	(1)		(2)		(3)	
	Attending or completed tertiary		Attending or completed tertiary conditional on completed higher secondary		At least completed higher secondary	
	2004	**1993**	**2004**	**1993**	**2004**	**1993**
sc*	-0.174***	-0.407***	0.064	-0.099	-0.220***	-0.416***
st*	0.018	-0.376***	0.413***	-0.094	-0.140**	-0.397***
muslim*	-0.331***	-0.541***	-0.018	-0.160*	-0.375***	-0.554***
female*	0.068*	-0.021	-0.133*	0.013	0.124***	-0.03
rural*	-0.154***	-0.397***	-0.207***	-0.233***	-0.084**	-0.354***
female*Rural*	-0.337***	-0.544***	-0.088	-0.322***	-0.358***	-0.513***
log per capita expenditure	1.057***	0.771***	0.650***	0.410***	0.980***	0.730***
Number of Observations	**68,894**	**65,719**	**14,956**	**11,699**	**65,719**	**65,719**

Notes: (1) * p<0.05; ** p<0.01; *** p<0.001
(2) The coefficients are marginal effects.
(3) * denote dummy variable and marginal impact is for discrete change of dummy variable from 0 to 1.
(4) Non-SC/ST is the social group of reference.
(5) The model also includes state dummies (not shown in this table).