

Tracking the Progress of a Child from Enrolment to Completion of Secondary Education in India



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1 Introduction

With the international efforts to achieve universal primary education, the demand for secondary education has increased and emerged as an important challenge in many developing nations. The substantial increase in primary school graduates has put pressure on governments to expand secondary education. It is also argued that providing access to secondary education is essential to ensure that the universal primary education is achieved and continues to be achieved, as the children completing primary education expect to continue secondary education (UNESCO 2013). Also, the growth of secondary education is linked with economic and social development and to the realisation of MDGs, including improvement in wages, the decline in fertility and child mortality, and increase in overall health and nutritional levels of a nation (OECD 2010).

Though elementary education has been emphasised by the Government of India as it was incorporated as Article 21A in the Indian Constitution, secondary education also requires special attention. The NSSO data (71st round) shows that the highest drop-out rate in schools is at the secondary (9th to 10th) level (Business Standard 2018). The high drop-out rates at the secondary level have a multiplier effect on higher secondary education, as they decrease the potential pool of students who could have completed higher secondary level of education if they had not dropped out at the secondary level (i.e. 9th to 10th class). It raises serious concerns for balanced development as the education system plays a crucial role in the nation-building process and is a pivotal component of inclusive development for a developing country like India (Biswal 2011). For maintaining this balance, it is imperative that the children enrolling in schools should complete both primary and secondary education. Thus, secondary education needs more attention to reduce the drop-out rates. It is in this

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context that we analyse and assess the reasons for the high drop-out rates in secondary school.

The spectacular growth in Indian elementary education (both in terms of enrolment and completion),¹ particularly after the Sarva Shiksha Abhiyan (SSA), has put enormous pressure on the secondary level to absorb new entrants. There is fair progress in enrolment rates in secondary schools, particularly after 2010, with the initiation of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). However, retention rates, particularly amongst the students belonging to marginalised sections of society and also amongst first generation learners,² continue to be low.

In India, the Right to Education (RTE) Act provides free and compulsory education up to elementary level, after which an individual has to cover the secondary education expenses personally. Apart from the usual costs associated with education, such as school fees, books, and uniforms, there is often an increase in transportation costs. It is because the numbers of secondary schools are less than primary and middle schools. Household expenditures on these school-related items are considerable even for low socio-economic status families such as Scheduled Caste/tribes and low income families and students attending government schools (Tilak 2002). In addition to educational expenses, families also have to consider the high opportunity cost of children attending secondary school. Children belonging to low-income families are left with two choices viz. either attend school and forego the income which they could have earned or drop out of the school to earn a living. Sometimes, a child's presence at home facilitates the employment of an older member of the household.

In addition to this, the proportion of public expenditure allocated to the secondary education in India is much lower than that allocated to elementary education (Tilak 2003).³ Given the low levels of public investment in education, educational attainment of an individual is mainly determined by parental investment, which is highly dependent on the family's economic status. Both the low level of public expenditure and the higher cost of secondary education intensify the burden on low-income families as the child progresses from elementary to secondary education and make it hard for children from poor and uneducated families to obtain a secondary/higher secondary education. It adversely affects their ability to improve their socio-economic status and keeps future earnings low (Becker 1964; Barro 2001; Hanushek and Woessmann 2015). Therefore, it is quite important to examine the

¹In 2010, an estimated 98.5% of children were enrolled in primary schools as compared to 83.6% a decade earlier. Not only have initial enrolments increased, but the proportion of children who finished primary education has also risen from 71.5% in 2000 to 97.1% in 2009. However, less than two-thirds of Indian children who were eligible to be enrolled in secondary school were actually enrolled by 2010.

²The drop-out rate in Grades I–X continues to as high as 56.7% (56.6% for boys and 57.3% for girls). In other words, only around 43 out of every 100 Grade I cohort survive up to Grade X (Government of India 2008). Moreover, the drop-out rates of 68.4% for SCs and 76.9% for STs in Grades I–X indicate a huge wastage of resources in school education in India' (Biswal 2011, pp. 14).

³The proportional distribution of educational budget on secondary education by State and Central government in India is 33.84% and 13.99%, respectively. The sector-wise proportional distribution of educational budget in India is provided in Table 2 of the Appendix.

factors responsible for the high drop-out rate in secondary education in India. In addition to this, it is also important to analyse the factors that affect the completion of secondary education of an individual after getting enrolled at this level of education. Are students from disadvantaged backgrounds at a disadvantage even when access to education is achieved? Alternatively, are there any other individual or school-related factors that might be associated more or less with the progression of an individual through the secondary level of education?

The existing literature (Haveman and Wolfe 1995; Buchmann and Hannum 2001; Checchi 2006; Björklund and Salvanes 2011) indicates that family background, mainly parental education and household economic resources, plays a crucial role in a child's educational attainment. Several studies in India have shown the persistence of a large educational enrolment and attainment gap between rich and poor households (Duraishamy 1998; Filmer and Pritchett 1999; Sengupta and Guha 2002; Srinivasan 2010). Many studies have found that belonging to 'SC/ST' and 'Muslims' groups play an important role in determining the educational inequality in India (Borooah 2001; Sengupta and Guha 2002; Srinivasan 2010; Lewin 2011). The literature on educational inequality in school education in India (which is limited to secondary education) has mainly focussed on the factors affecting the enrolment of children. Moreover, they have largely focussed on individual and household characteristics, ignoring school-related factors and their interactions with individual and household factors. Our study examines how in addition to family attributes, 'learning activities' and 'access to school resources' affect the progress of a child from enrolment to completion of secondary and higher secondary school in India using India Human Development Survey (IHDS) data. IHDS data is a nationally representative multi-topic panel survey that has been conducted in 2004–05 and 2011–12. This panel survey makes the data suitable for tracking the progress of a selected group of children over time.

The paper is organised as follows: Section 2 is the brief review of literature that discusses the studies related to the demand side and school-related factors that affect the educational enrolment and attainment of an individual. Section 3 discusses the data and methodology used in the study, followed by empirical results. The final section summarises the analysis of the study and suggests some policy recommendations.

2 Literature Review

Despite the emphasis given by policy-makers, the literature on the causes behind low completion rate in secondary schools in India is sparse. Researchers have studied the effect of parental education, income and assets on different educational outcomes by incorporating them separately or simultaneously. The research work of Nam and Huang (2009), Huang et al. (2010), Kim and Sherraden (2011) and Huang (2013) has found strong links between household assets and children's educational attainment. Parental endowments and economic resources can facilitate a child's education

directly and indirectly. Borrowing for education is easier with improved financial status. Various studies, conducted in India, have found that children's enrolment in education is positively and significantly associated with the household's economic resources (Duraisamy 1998; Sengupta and Guha 2002; Srinivasan 2010). Using the National Family Health Survey (1992–93) data, Filmer and Pritchett (1999) found a large gap between the enrolment and attainment of children from rich and poor households.

Several studies have found a positive relationship between the educational attainment of parents and their children (Lillard and Willis 1994; Cameron and Heckman 1998; Behrman and Rosenzweig 2002; Maitra and Sharma 2009; Huang 2013). Parents, with higher levels of educational attainment, have better access to financial, social, and human capital as compared to those with lower educational attainment (Conger and Donnellan 2007). Moreover, the highly educated parents can make better choices for their children's education as they are more informed about the benefits and quality of education.

In India, caste and religious affiliation are also important factors that affect the educational attainment of a child (Borooah 2001; Sengupta and Guha 2002; Srinivasan 2010; Lewin 2011). Children belonging to 'SC' and 'ST' families have lower school enrolment rates than children belonging to the upper caste (Filmer and Pritchett 1998). Evidence of religious affiliation and its impact on education is also available. A child's enrolment in school is significantly associated with his or her religion, and the enrolment rate varies by different religious groups (Borooah 2001; Sengupta and Guha 2002; Srinivasan 2010). For example, Borooah (2001) found that the children from Muslim households are less likely to be enrolled and continue their school education as compared to their Hindu and Christian counterparts. Similar results have been found by Sengupta and Guha (2002), and Srinivasan (2010).

There are limited studies on the supply-side intervention of different programs that are initiated for retaining students in secondary schools in India. Higher cost with the progression in schooling is the prime factor for dropping out of poor students as the level of schooling increases. After controlling the factors affecting the enrolment of a student, attending a private school is positively associated with the higher level of student achievement (Kingdon 2007). Moreover, there exists a significant association between the accessibility of educational resources and the socio-economic background of an individual (Duncan and Murnane 2011). Apart from this, the expansion of private schools, with higher school fees, may continue to enlarge these gaps in accessing educational resources and outcomes (Kingdon 2007).

A significant proportion of students takes private tutoring at the secondary education level. NSSO (National Sample Survey Office), in its 2014 survey, reported that 37.8% boys and 34.7% girls were enrolled in private coaching centres at the level of lower and higher secondary schooling (NSSO 2016, p. 98). The literature on private tutoring in India (e.g. Aslam and Atherton 2013; Azam 2014; Majumdar 2014, 2018; Salovaara 2017) finds that private tutoring can compensate for the deficiencies in mainstream education, but it may also contribute to inefficiencies (cited in Bhorkar and Bray 2018, p. 149). A study conducted in Maharashtra region by Bhorkar and Bray (2018) had shown that the high levels of reliance on coaching

classes for Board examinations of Class 10 reflect a belief of significant assistance provided by the coaching classes in exam preparation. Coaching classes are seen as supplementary to school teaching up to Class 10, but after Class 10, they are viewed as more important. By using IHDS data, White et al. (2016), found that the time spent on private tuitions has a strong positive association with the learning of a student while the number of days absent in the school has a small negative association.

Previous research studies, reviewed in the above section, highlight persistent educational inequalities based on gender, socio-economic factors such as caste and religion, income, parental education, private educational expenditure, level of urbanisation, etc. Building on the core concepts and the formal ground set by the above-mentioned literature on school education, we take a leap forward and examine the factors that affect the progress of a child from enrolment to completion of secondary education in India. The socio-economic background of an individual, association of individuals and household characteristics, school-related factors, 'learning activities' and 'access to school resources' are factors considered in our analysis. Given the paucity of research on completion rates among enrolled students, this paper will contribute significantly to secondary education literature in India. The previous literature shows quality and outcome differences across private and government schools in India. Using previous literature on this issue as a reference point, we will also examine if completion rates of secondary and higher secondary students differ across the government and private school students in India.

3 Data and Methodology

3.1 Data and Sample of the Study

This study uses both rounds of India Human Development Survey (IHDS) data, i.e. 2004–05 and 2011–12, for tracking the progress of a child from enrolment to completion of secondary and higher secondary school in India. The IHDS is the first household survey in which multiple topics on health, employment, education, social networks, economic status, fertility, marriage, gender relations and social capital were covered. IHDS (2004–05) is a nationally representative, multi-topic survey of 215,754 individuals and 41,554 households in 1503 villages and 971 urban neighbourhoods located in 33 States and Union Territories across India. In 2011–12, each of these households, including split households,⁴ was re-interviewed using the same questionnaire with a re-contact rate of 84% in IHDS-II. This tracking of cohorts in IHDS-II makes the data suitable for studying the impact of family attributes on educational attainment at different levels of schooling.

⁴Split households are those that got split from the parent household (in 2005) between the two surveys time period and they were staying in different houses in 2011. See IHDS-II User's Guide for more information.

We have considered only those children who were enrolled in secondary school (9th and 10th class) in 2004–05 and who were also included in the 2011–12 survey.⁵ Looking at the 2004–05 IHDS data, a total of 6276 children aged 12–20 years were enrolled in Classes 9 and 10. IHDS was able to track 3421 of these students in 2011–12. Ninety-four observations had to be excluded due to wrong reportage of the outcome variable. It left us with a total of 3327 observations. Some other observations were also excluded due to incomplete reportage⁶ of some variables. Our final sample contains a total of 3143 observations.

The distribution of descriptive statistics across different variables for the initially enrolled children sample and finally tracked children sample is given in Table 3 of the Appendix. This table shows that distribution of both samples across rural/urban, social group (caste/religion), type of school (government/private), the age of a child, household assets, and private educational expenditure, etc. is similar but is different for gender. This similarity in both samples makes the final targeted sample suitable for our analysis.

3.2 Model and Design of the Study

The outcome variable that has been used in this study is the educational attainment of an individual, as measured by completed years of schooling. This outcome variable is divided into two different categories according to the two levels of secondary education: secondary school completion (SSC), i.e. 10th class, and higher secondary school completion (HSSC), i.e. 12th class. Two binary dependent variables have been constructed for this study. For each of these two variables (i.e. Class 10 and 12), the outcome binary variable takes the value ‘1’ if the child has completed that level of schooling in 2011–12, and ‘0’ otherwise. The outcome variable of higher secondary school completion is conditioned on the premise that the child has completed secondary school. Therefore, secondary school completion (SSC) is measured by whether a child completed 10 or more years of schooling, and higher secondary school completion (HSSC) by whether a child completed 12 years of schooling. Due to the binary nature of the outcome variable, this study uses the logit regression model⁷ to examine the association of individual and household characteristics as well as ‘learning activities’ and the ‘access to school resources’ with the probability of secondary and higher secondary school completion. This study contains 6 logit regressions. Equations 1 and 2 consider the analysis of a full sample for both secondary and higher secondary school completion. The logit model has

⁵The majority of students enrolled in Classes 9 and 10 were aged 12–20 years. In order to avoid the outlier problem, we have excluded students younger than 12 years or older than 20 years.

⁶The total number of deleted observations due to missing values is 184, i.e. 5% of the final sample.

⁷Under a logit model: $P(Y_i = 1)/1 - P(Y_i = 1) = e^{(\beta \cdot X_i)} \Rightarrow P(Y_i = 1) = e^{(\beta \cdot X_i)} / 1 + e^{(\beta \cdot X_i)} = F(\beta \cdot X_i)$, where: $X_i \{X_{ij}, j = 1, \dots, J$ represents the vector of observations, for individual ‘i’ on ‘j’ variables, and $\beta = \beta_j, j = 1, \dots, J$ is the associated vector of coefficient estimates (Amemiya 1981; Greene 2003).

also been estimated separately for the government, and private school samples as the literature shows quality and outcome differences across private and government schools. Equations 3 and 4 show the estimates of secondary school completion for government and private school students, respectively. Similarly, Eqs. 5 and 6 give the estimates of higher secondary school completion for government and private school students, respectively.

The estimated coefficients of the independent variables in the 'logit model' help in identifying the direction of the relationship with the dependent variable. These estimates (depicting the directional relationship with the dependent variable) serve as a basis for computing more meaningful statistics. Following Long and Freese (2006), the logit coefficients have been used here to estimate the average marginal effects and the predicted probabilities of SSC/HSSC for different groups. The predicted probabilities of different groups across household assets have been presented in the form of graphs by keeping all other model variables.

For examining the association of individual and household characteristics with the probability of secondary and higher secondary school completion, we used predictors such as gender, age of a child, whether the child belongs to an urban area or a rural area, social group (caste/religion), household assets index as a proxy for long-term economic resources, computer/internet usage by any household member, and parental education of an individual. Economic theory suggests that family attributes affect educational attainment with a lag (Nam and Huang 2009; Huang et al. 2010; Kim and Sherraden 2011; Huang 2013). We have used the explanatory variables (except the variable on 'computer usage') referring to 2004–05 to predict the completion of SSC and HSSC in 2011–12.

To measure parental education, we take years of schooling completed by the highest educated male or female adult (21+) in the household in 2004–05. To facilitate analysis, we constructed a new variable by dividing years of schooling into four categories, based on the different levels of education: illiterate or below primary (i.e. less than four years of completed education), primary or upper primary (i.e. four to nine years of completed education), secondary or higher secondary (i.e. 10–14 years of completed education), graduate and post-graduate (i.e. 15 and more than 15 years of completed education).

The IHDS has given us an asset index⁸ that we use to measure household assets. The index value ranges from 1 to 30. An index value close to 1 indicates the poorest households while 30 indicate the richest households. Research studies indicate that family assets are a better indicator of long-term economic resources of a family as compared to income (Nam and Huang 2009). Assets are more stable and also the income or consumption of a family can change radically when the main income earner of a household loses a job (Nam and Huang 2009).

For examining the disparities among caste and religion of an individual in SSC or HSSC, this study uses the social group of an individual to which he/she belongs.

⁸The data on ownership of resources as household asset index is available in IHDS 2004–05 that contains data on different variables of goods and house owned by the household, and the quality of housing. This index is based on the values of 36 different kinds of household assets like Pakka or Kaccha house, TV, fridge, car, laptop/computer, and AC, etc.

Thus, by using caste and religion variables from IHDS, the 'social group' variable has been constructed for analysis of the issue under investigation. The 'social group' variable consists of five categories: 'upper caste Hindus and OMR' (all other minority religions such as Christians, Sikhs, Jains, Buddhists etc. except SC and ST of these religions), 'OBC Hindus', 'SC' (all religion), 'ST' (all religion), and 'Muslims' (upper caste and OBC Muslims).

The 'access to school resources' by a child has been analysed taking into account the 'type of school', i.e. whether the child attended a government, private or another type of school such as convent, etc., and 'private educational expenditure' on a child. The private educational expenditure on a particular child includes school fees, expenditure on books or uniforms, transport expenditure, and private tutoring fee. Adding all the costs of education, the natural log of the total expenditure has been used in the model. Tilak (2002) found that private household expenditures on school-related items, such as books, uniforms and fees, are substantial even for low socio-economic status families, such as Scheduled Castes/Tribes and low income families and those attending government schools. To observe the effects of any assistance provided by the government to the students, we use two more variables such as whether a child has received 'free uniform or books' and 'whether a child has received any scholarship or not'. Both these variables have been included in the regression analysis only for government schools.

The statistical analysis of learning activities includes the 'private tuition hours per week', and 'number of days absent last month'. Several research studies have pointed out that the use of a computer at home or school is positively associated with the academic performance and learning of students at different levels of school education (Battle 1999; Kerawalla and Crook 2002; Lee et al. 2009). Lee et al. (2009), in their study, have stated that even after controlling for a family's socio-economic status computer access at home and its usage is positively associated with the test scores of a child in mathematics and reading. But, the information on computer usage by a child is not available in IHDS data. Therefore, the 'computer/internet usage' by any member of the household has been included in the model.

Other individual specific variables that have been included in the study are the gender of the child, age of the child which ranges from 12 to 20 years, and whether a child has ever repeated a class or not. This study also tried to take into account 'the distance of the school from home' and 'medium of instruction in the school'. However, both the variables mentioned above are statistically insignificant in every regression equation of our study. It may be because post-enrolment in secondary school, the distance effect is offset by other considerations and ceases to make of the school does not make a significant difference in the completion of education. We have, therefore, dropped these variables in the final model. The denotation and definition of all variables are provided in Table 4 of the Appendix.

4 Empirical Results

For exploring the determinants of secondary and higher secondary school completion in India, the marginal effects and predicted probabilities are estimated by using the logit regression model. Table 1 provides the average marginal effects of the explanatory variables that affect the probability of an individual completing secondary schooling (SSC), and higher secondary schooling (HSSC), based on the condition of secondary school completion. Most of the predictors are significantly associated with the probability of completing both levels of education.

Table 1 shows that the likelihood of completion is significantly associated with the gender of an individual at both levels of schooling. The marginal effects show that the probabilities of completion are 6.2% and 9.86% higher for females as compared to males at SSC and HSSC, respectively. This finding is consistent with results obtained by Maitra (2003), who found that the level of grade attained is higher for female children as compared to male children. The probability of completing both SSC and HSSC decreases with increase in the age of a student. It shows that students, whose age is above the standard age of schooling, have lower chances of completing SSC and HSSC. The students residing in rural areas have a higher probability of completing secondary school. However, there is no statistically significant difference between a rural and an urban areas in completing higher secondary school. This finding is not consistent with the previous studies.

In our analysis, children whose parents are 'illiterate or below primary level' have been taken as the base category. For both SSC and HSSC, the results show that the probability of completion increases with the change in the level of parental education from 'illiterate or below primary level' to 'secondary or higher secondary level' and 'graduate or above level'. For instance, the chances of completion are 7.33% and 9.19% higher for SSC and HSSC respectively for those individuals whose parents have attained 'graduate or above' level of education as compared to 'illiterate or below primary'. This finding is consistent with previous research, both at international and national levels, which found that parental education is highly associated with children's educational attainment (Lillard and Willis 1994; Haveman and Wolfe 1995; Buchmann and Hannum 2001; Maitra 2003; Maitra and Sharma 2009; Björklund and Salvanes 2011). However, there is no statistical difference in the chances of completion as the parental education changes from 'illiterate or below primary' to 'primary or upper primary' at both levels of education.

In analysing the effect of the economic status of the family, we found that the economic resources possessed by the family are positively and statistically significantly associated with the completion of SSC and HSSC. The likelihood of completion increases by 0.42% and 0.64% with a one unit increase in the household asset index for SSC and HSSC, respectively. It supports the hypothesis that higher levels of education are more sensitive to household asset levels. Consistent with the Kim and Sherraden (2011) study, this study also found that household assets have a direct positive relationship with the progress of schooling.

Table 1 Logit estimates (Average marginal effects) of secondary and higher secondary school completion (All)

Explanatory variables (average marginal effects)	SSC (Full sample)	HSSC (Eligible sample)
Female (Ref.—male)	0.0620*** (0.0127)	0.0986*** (0.0160)
Age	−0.00853** (0.00390)	−0.0192*** (0.00519)
Urban (Ref.—rural)	−0.0393** (0.0161)	0.0155 (0.0180)
Household Assets Index	0.00424*** (0.00154)	0.00644*** (0.00181)
<i>Social Group (Ref.—UC Hindus & OMR)</i>		
OBC Hindus	−0.0335** (0.0157)	0.0236 (0.0190)
SCs	−0.0389** (0.0177)	−0.00481 (0.0224)
STs	−0.0422 (0.0267)	−0.00903 (0.0360)
Muslims	−0.0656*** (0.0223)	−0.0237 (0.0279)
<i>Parental Education (Ref.—Illiterate)</i>		
Primary or Upper Primary	0.00875 (0.0163)	0.0223 (0.0233)
Secondary or Higher Secondary	0.0439** (0.0173)	0.0404* (0.0242)
Graduate or Above	0.0733*** (0.0241)	0.0919*** (0.0301)
<i>Type of School (Ref.—Govt. & Govt.-Aided)</i>		
Private School	0.0408*** (0.0152)	0.0337* (0.0192)
Other type of school	0.0591** (0.0239)	0.0523* (0.0293)
PTHPW	0.00361*** (0.00139)	0.00144 (0.00150)
DAPM	−0.000973 (0.000987)	0.00181 (0.00145)
ln (PEE)	0.0150*** (0.00505)	0.000374 (0.00826)
Ever repeat (Ref.—No)	−0.0433***	−0.0268

(continued)

Table 1 (continued)

Explanatory variables (average marginal effects)	SSC (Full sample)	HSSC (Eligible sample)
	(0.0160)	(0.0216)
Use computer (Ref.–No)	0.199***	0.229***
	(0.0112)	(0.0165)
Log pseudo-likelihood	–1069.48	–1195.68
Pseudo-R ²	0.21	0.17
Observations	3143	2654

Standard errors in parentheses; Ref. is the reference category of a categorical variable; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Social group analysis is done using ‘upper caste Hindus and OMR’ category as the base category. In case of SSC, we find that the chances of completion are significantly lower for all the socially disadvantaged groups such as ‘OBC Hindus’, ‘SCs’ and ‘Muslims’ as compared to ‘upper caste Hindus and OMR’. We also find that ‘Muslim’ students have the lowest chances of secondary school completion. This finding is consistent with previous research studies, which were based on Indian Sample (Filmer and Pritchett 1999; Borooah 2001; Sengupta and Guha 2002; Srinivasan 2010). Lewin (2011) found that educational attainment is higher for children who belong to Hindus families as compared to those from Muslim families. He also found that within Hindus families, the children from Scheduled Caste and Scheduled Tribe families have the lowest educational attainment.

In the case of HSSC, the estimated results show that there is no statistically significant difference between ‘upper caste Hindus and OMR’ and all other social groups. It means that that being a Muslim and belonging to a backward caste in India acts as a barrier in secondary school completion even after accessing the secondary school. However, once students completed secondary school, caste and religion of an individual did not make a significant difference in higher secondary school completion. It indicates that the major barrier for students from the marginalised sections of society comes up during secondary school. Government policies for marginalised sections of the society should focus on this transition level of education and provide help to these students so that they can complete their secondary education.⁹

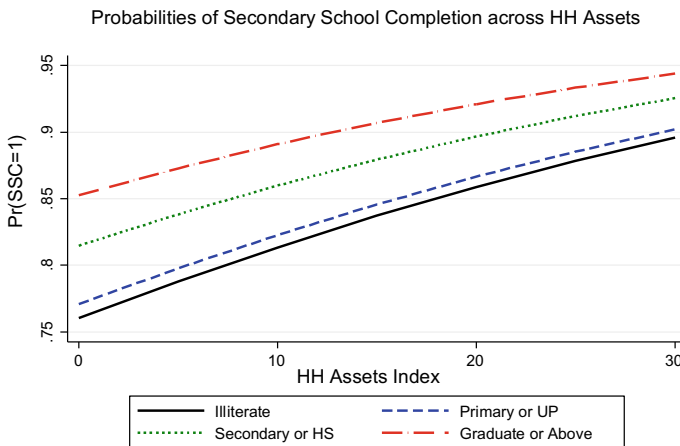
We find that the students studying in private and ‘other types of schools’ have higher chances of completing both (secondary and higher secondary) levels of schooling. For instance, the probability of completion is 4.08% and 3.37% higher for SSC and HSSC respectively for those students who had studied in private schools as compared to government schools. The private educational expenditure variable shows that the likelihood of secondary school completion increases by 1.5% with every one percent increase in the educational expenditure on a child. However, this is not significantly associated with higher secondary school completion.

⁹This might be possible that the 10th class Board exam is the first Board exam that has to be cleared by an individual, where most of the marginalised sections’ students are lagging behind as compared to advantaged groups of the society, if they want to go for higher secondary level of schooling.

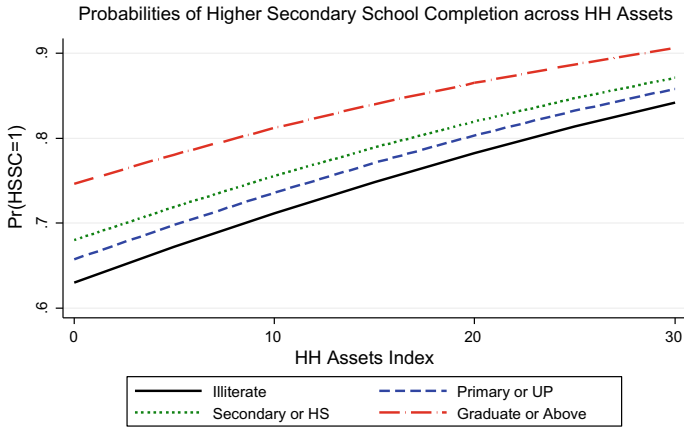
The time spent by a child for private tuition leads to an increase in the probability of secondary school completion by 0.36%, with every one hour increase in the time spent on tuition per week. Again, it is not significantly associated with higher secondary school completion. The ‘number of days absent in last month’ is not significantly associated with secondary and higher secondary school completion. Students, who have repeated a class, have lower chances of secondary school completion, but it does not make a significant difference in higher secondary school completion. Completion probabilities are 19.9% and 22.9% higher for SSC and HSSC, respectively, for students whose any household member uses computers vis-a-vis those who do not use computers. Lee et al. (2009) also found that the use of a computer is positively associated with the academic performance of students in secondary education even after controlling for family’s socio-economic status.

4.1 Predicted Probabilities of Secondary and Higher Secondary School Completion

Graphs 1 and 2 present the predicted probabilities of secondary and higher secondary school completion, respectively, by a child’s parental educational levels at different levels of household assets of an individual, keeping all other variables constant. The predicted probabilities have been calculated after estimating the logit coefficients. Both these graphs of predicted probabilities show that the students, whose parental education is ‘graduate or above’, have the highest chances of completing both levels of education, across the complete range of household assets, followed by those whose parents have ‘secondary or higher secondary’ level of education. Both the graphs also show that the probabilities of completion increase with the increase in the level



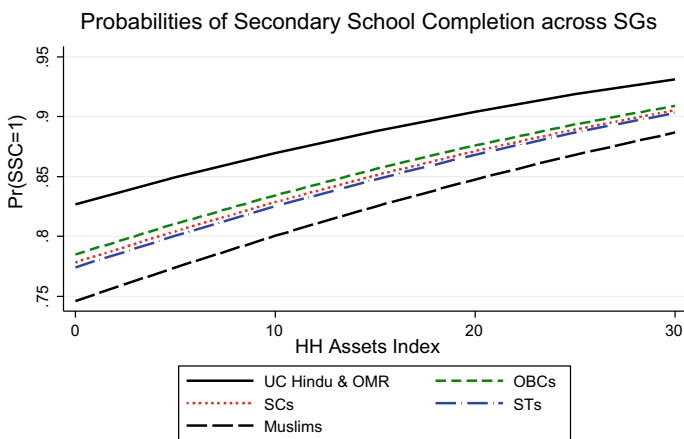
Graph 1 Predicted probabilities of SSC (10th) by parental education and household assets



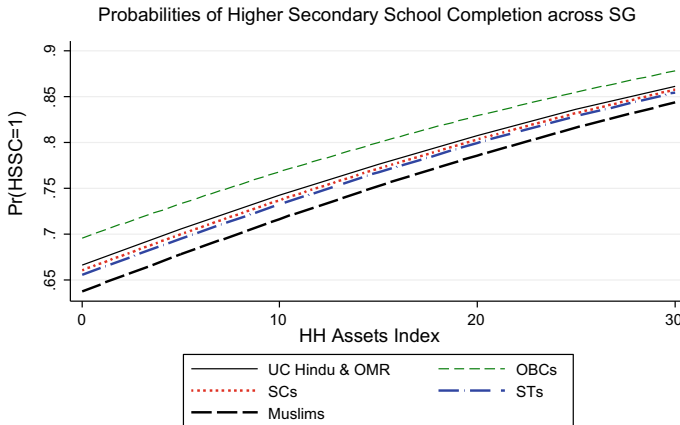
Graph 2 Predicted probabilities of HSSC (12th) by parental education and household assets

of household assets. Moreover, the gap between the predicted probability curves, depicting parental education level, is decreasing with the increase in the value of household assets index from 1 to 30, and this is lowest at the highest level of household assets. Clearly, parental education and household assets act as substitutes in some ranges.

To analyse the existence of a class effect within a particular caste/religion, we have calculated the predicted probabilities of different social groups at different levels of household assets as shown in Graphs 3 and 4. From the results shown in Graph 3, it may be noticed that the predicted probabilities curve for ‘upper caste Hindus and OMR’ children is the highest and the lowest is for Muslims. Moreover, the gap between ‘upper caste Hindus and OMR’ children’s curve and those of other



Graph 3 Predicted probabilities of SSC (10th) by social groups and household assets



Graph 4 Predicted probabilities of HSSC (12th) by social groups and household assets

social groups is huge. It shows that ‘upper caste Hindus and OMR’ children have the highest chances of secondary school completion. However, for higher secondary school completion there is not much difference in the predicted probabilities curves of different social groups as shown in Graph 4. These graphs also show that the gap between the predicted probabilities curves by different social groups decreases with an increase in the value of household assets. These results indicate that caste/religion barrier to secondary educational attainment for disadvantaged groups, such as ‘SC/ST and Muslims’, is linked to their economic status, and reducing poverty will improve their chances of higher educational attainment. In short, lack of economic resources is the major factor preventing students from completing SSC and HSSC.

4.2 Results for SSC and HSSC Completion in the Government and Private Schools

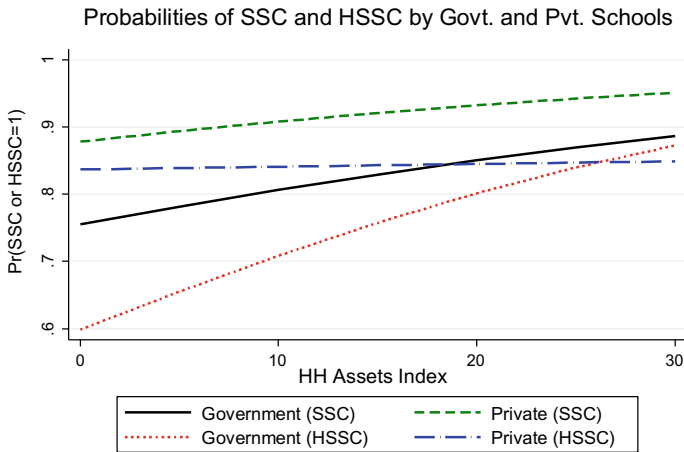
Table 5 in the Appendix gives the marginal effects of the explanatory variables that are associated with the probability of a student completing secondary and higher secondary schooling for government and private schools students separately. The estimated results show that the probability of completing secondary and higher secondary level of education is higher for females as compared to males in both private and government schools. In addition to this, the magnitude of the marginal effect of being a female is higher in government schools relatively to private schools at both levels of schooling.

Apart from this, the separate analysis of government and private school students shows that the household assets are significantly associated with completion of both secondary and higher secondary levels of education by government school students while they do not make a significant difference in the case of private school students.

Moreover, we can also infer that there is a significant association between social groups and private tuition hours in government schools only at the level of secondary school completion. In all other cases, they do not make a significant difference. A student, who uses the computer for learning, has higher chances of completion of (secondary and higher secondary education) in both government and private schools but the magnitude of the marginal effect (of using a computer) is relatively higher for a student of a government school than the student of a private school at both levels of schooling.

In addition to these factors, this study has also taken into account two more factors in the government school sample: whether a child received ‘free books or uniform’ and a ‘scholarship’. We find that the ‘free books or uniform’ received by a child are not significantly associated with either level of completion. However, if a child receives a scholarship, the probability of completion increases.

Graph 5 presents the predicted probabilities of secondary and higher secondary school completion by government and private school students across household assets of an individual, keeping all other variables constant. We see that private school students have higher probabilities of completion as compared to government school students for both levels of education. The predicted probability curves at both levels of education show that the marginal effects of increasing household assets are greater for government school students, particularly for higher secondary completion, as compared to private school students. It is because the probability curve of government school students has a higher slope than that of their private counterparts.



Graph 5 Predicted probabilities of SSC and HSSC by the government and private school children across household assets

5 Conclusion and Policy Recommendations

In the presence of a low public investment in education, educational attainment of an individual is mainly determined by parental investment which is highly dependent on the family's economic status. In the Indian case, the proportion of public expenditure allocated to secondary education is much lower than that allocated to elementary education, making the burden on the poor and uneducated families high.

We have focussed on the factors associated with secondary and higher secondary education completion after the accessibility of secondary education by a child. In particular, we have examined the impact of factors like 'learning activities' and 'access to school resources' on the progress of a child from enrolment to completion of secondary and higher secondary schools in India. We have also conducted separate analysis for government and private schools students in secondary and higher secondary schools.

The biggest factors influencing completion of secondary and higher secondary school by a student are household assets and parental educational attainment. The chances of completing both levels of schooling (secondary and higher secondary) increase with the increase in the level of household assets and the level of parental education. The association of both household assets and parental education becomes greater with the progress in the level of schooling from secondary to higher secondary. We also found that parental education and household assets act as substitutes for each other within a fairly broad band. The marginal impact of both the factors, particularly household assets, is higher for girls as compared to boys.

An interesting result, relating to the association of caste/religion of an individual with their educational attainment, has been found in this study. We find that the major hurdle for the marginalised sections of the society such as 'SC/ST and Muslims' crops up at the secondary school stage, particularly in government schools. Once this hurdle is cleared, there is no significant effect of caste/religion of an individual in completing the higher secondary level of schooling. We also found that the class effect is more important than the caste effect in determining educational inequality among the children. Therefore, the government policies for marginalised sections of the society should focus on secondary or below secondary schools because most of the children from marginalised sections are not able to complete their secondary school education.¹⁰ The National Commission to review the working of the Constitution (NCRWC 2002), suggested incorporating the right to free education (as a part of Article 21A) for members of SC and ST community until they attain the age of 18 years. But this provision has also not been implemented till now.

The results of this study also reflect that male students, enrolled in private schools, have significantly higher chances, compared to their counterparts in government

¹⁰Most recent debate in case of Delhi government schools analysed that public schools are performing better than private schools in Class 12 results with passing rate of 90%. However, the Delhi government schools' data also shows that more than 40% of the students dropped out before completing 9th or 10th class. Source: <https://www.newslandry.com/2018/06/09/delhi-gov-ernment-schools-print-filtering-students-aam-aadmi-party>

Table 2 Sector-wise public expenditure on education of the Education Department (Revenue Account) for the year 2012–13 (actual)

Different sectors of education	States & UTs (%)	Centre (%)
Elementary education	50.00	54.37
Secondary education	33.84	13.99
Adult education	0.21	0.71
University & higher education	11.25	17.32
Technical education	2.87	12.88
Others	1.83	0.77

Source Analysis of Budget Expenditure on Education 2012–13 to 2014–15 (MHRD)

schools, for both levels of secondary and higher secondary school completion. However, no significant statistical difference was found regarding completion of secondary education for females, whether they studied in private or government schools. Apart from this, we found that easing of financial constraints, by increasing private educational spending (for private school students or by the provision of scholarships to students in government schools), improves chances of completion of higher secondary school. Aid in the form of free books or uniforms does not have this effect. It suggests that the State should focus on monetary aid rather than aid in kind.

We also found that girls have higher chances of completing secondary education as compared to boys once both get enrolled/reach the secondary education. It suggests that government policies and programs should target girl children during the transition from middle to secondary school, specifically to reduce gender inequality in education.

Appendix

See Tables [2](#), [3](#), [4](#) and [5](#).

Table 3 Comparison of descriptive statistics for both the ‘final study sample’ and ‘total enrolled children in secondary schools (9th and 10th class) in 2004–05’

Categorical variables	Description	Study sample (In %)	Total (In %)
Gender	Male	66.25	54.7
	Female	33.75	45.3
Location	Rural	60.41	61.65
	Urban	39.59	38.35
Social group	UC Hindus & OMR	29.89	30.48
	OBC	33.26	33.99
	SC	20.2	18.16
	ST	5.51	6.87
	Muslim	11.14	10.5
Type of school	Government	68.23	68.71
	Private	26.03	25.3
	Others (Convent etc.)	5.74	5.99
Highest adult (21+)	Illiterate or BP	18.85	18.42
Education	Primary or UP	33.66	34
	Secondary or HS	33.15	32.3
	Graduate	14.34	15.28
Total observations		3327	6276
Other variables	Description	Mean	Mean
Household assets index	Assets	14.15	14.16
Age of student	Age	15.18	15.24
Private tuition hours	PTHPW	2.95	2.89
Days absent in a month	DAPM	2.52	2.57
ln (PEE)	PEE	7.47	7.45

Table 4 Notation and definition of variables

Name of variables	Description	Definition of variables
Level of education	‘SSC’ or	1, if an Individual has completed Secondary (10th Class)
Completed	‘HSSC’	or Higher Secondary (12th Class) level of Schooling
		0, otherwise
Gender	Male	0, if an individual is male
	Female	1, if an individual is female
Location	Urban	1, if an individual resides in an urban area

(continued)

Table 4 (continued)

Name of variables	Description	Definition of variables
	Rural	0, if an individual resides in a rural area
Social group	UC Hindus	1, if an Individual is upper caste Hindu or other minority
	& OMR	Religion such as Christian, Sikh, Jain, etc. except SC & ST
	OBCs	2, if an Individual is OBC Hindu
	SCs	3, if an Individual is SC
	STs	4, if an Individual is ST
	Muslims	5, if an Individual is Muslim
Type of School	Government or Government-Aided	1, if an individual has studied in government or government-aided school
	Private	2, if an individual has studied in private school
	Others	3, if an individual has studied in another type of school
Highest Adult (21+)	Illiterate or BP	1, if the HH is illiterate or below the primary
Education (HH)	Primary or UP	2, if the HH has completed primary or upper primary
	Secondary or HS	3, if the HH has completed secondary or Higher secondary level of education
	Graduate	4, if the HH is graduate or above graduate
HH assets index	Assets	This index is made from 33 different household assets
Uses computer	Yes	1, if an individual hh member uses a computer
	No	0, otherwise
Ever repeated	Yes	1, if an individual has ever repeated a class
	No	0, otherwise
Age of student	Age	Age of the student
Private tuition	PTHPW	Time spending at private tuition (total hours/week)
Absenteeism	DAPM	No. of days absent in last month (Days/month)
Private educational Expenditure (PEE)	ln (PEE)	Household expenditure on the education of a child (School fee or private tuition fee or Books/Bus/Uniform)

Note SSC secondary school completion; HSSC higher secondary school completion; UC upper caste; OBC Other backward caste; SC schedule caste; ST schedule tribe; PTHPW private tuition hours per week (In last week); DAPM days absent per month (In last month); ln (PEE) is natural log of private educational expenditure on a child

Table 5 Logit Estimates (Average marginal effects) of SSC and HSSC by the government and private school samples

Variables (marginal effects)	SSC government	SSC private	HSSC government	HSSC private
Female (Ref.—male)	0.0762*** (0.0168)	0.0390** (0.0193)	0.103*** (0.0213)	0.0632** (0.0260)
Age	-0.0110** (0.00544)	-0.00464 (0.00525)	-0.0172** (0.00701)	-0.0305*** (0.00829)
Urban (Ref.—rural)	-0.0339 (0.0217)	-0.0557** (0.0238)	0.0562** (0.0238)	-0.0219 (0.0289)
Household Assets index	0.00346 (0.00214)	0.00243 (0.00214)	0.00945*** (0.00249)	0.000402 (0.00283)
OBC (UC Hindus & OMR)	-0.0424** (0.0205)	-0.0347 (0.0251)	-0.00735 (0.0253)	0.0582** (0.0290)
SC	-0.0749*** (0.0242)	0.0341 (0.0254)	-0.0163 (0.0296)	-0.0248 (0.0393)
ST	-0.0716** (0.0357)	0.0311 (0.0355)	-0.0564 (0.0473)	0.0567 (0.0500)
Muslims	-0.117*** (0.0309)	0.0275 (0.0274)	-0.00105 (0.0383)	-0.0582 (0.0410)
Primary or UP (Ref.—illiterate)	0.00944 (0.0210)	0.0272 (0.0306)	0.0220 (0.0286)	0.0659 (0.0498)
Secondary or HS	0.0407* (0.0226)	0.0679** (0.0312)	0.0116 (0.0306)	0.117** (0.0499)
Graduate	0.0919*** (0.0324)	0.0653* (0.0371)	0.0899** (0.0406)	0.123** (0.0561)
PTHPW	0.00457** (0.00181)	0.00288 (0.00213)	0.00246 (0.00207)	-0.000466 (0.00200)
DAPM	-0.00140 (0.00135)	1.93e-05 (0.00137)	0.00116 (0.00190)	0.00118 (0.00284)
ln (PEE)	0.0210*** (0.00736)	0.0125*** (0.00469)	-0.00478 (0.0105)	0.0212** (0.00908)
Ever Repeat a Grade (Ref.—No)	-0.0417** (0.0209)	-0.0738** (0.0306)	-0.0246 (0.0273)	-0.0358 (0.0392)
Use Computer (Ref.—No)	0.224*** (0.0142)	0.141*** (0.0218)	0.249*** (0.0206)	0.173*** (0.0310)
Free Books or Uniform (Ref.—No)	0.0254 (0.0182)	- -	0.00570 (0.0233)	- -

(continued)

Table 5 (continued)

Variables (marginal effects)	SSC government	SSC private	HSSC government	HSSC private
Scholarship (Ref.—No)	−0.0239 (0.0229)	–	0.0577** (0.0284)	–
Log pseudo-likelihood	−816.84	−166.41	−826.51	−264.66
Pseudo-R ²	0.19	0.29	0.16	0.19
Observations	2078	820	1688	752

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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