ORIGINAL ARTICLE

Gender differences in students' progress from elementary to secondary education in India: who are performing better?

Deepak Kumar[1] · Bhanu Pratap[2] · Archana Aggarwal[1]

Abstract

This paper analyzes gender differences in the progress of students from elementary to secondary education in India by using India Human Development Survey (2004–05 and 2011–12) panel data. Using a logit model analysis, we have examined how post-enrollment, a child's family background, household educational inputs and process indicators determine his/her elementary and secondary school completion (SSC). Our findings suggest that even after accounting for school accessibility, family socioeconomic status plays an important role in the manifestation of gender inequality in school progression. Secondary school completion has emerged as the major stumbling block for scheduled castes, scheduled tribes and Muslim children, particularly for girls belonging to low-economic-status households. Family educational inputs and student process indicators are also significant influencers of SSC. We find a significant gap in the performance of private and government school children that narrows as family economic status improves.

Keywords Elementary education · Secondary education · Gender · Socioeconomic status · Right to education · Caste

1 Introduction

India has achieved near to universal enrollment in elementary education. However, data on enrollment in elementary education present only half a picture because not all students progress to secondary school after their enrollment in elementary school. Secondary education is important because it serves as a bridge between primary and higher education and is an important part of school education (Choudhury, 2020). Tilak (2007) finds that secondary

✉ Bhanu Pratap
  bhanu92in@gmail.com

  Deepak Kumar
  deepak.yaduvansi123@gmail.com

  Archana Aggarwal
  archagg@jnu.ac.in

[1] Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Delhi, India

[2] Patna Women's College, Patna, Bihar, India

education has a significant impact on income redistribution and plays an important role in reducing poverty as compared to primary education. Hence, it can be said that secondary education has a multiplier effect on overall development of a nation. However, gender differences in progression to secondary education can diminish this multiplier effect. Several research studies, conducted in the last three decades, have highlighted the fact that educating a girl child is the most felicitous way to fight poverty and increase economic growth (Cooray & Potrafke, 2011; Dollar & Gatti, 1999). A World Bank study of one hundred countries showed that if there is an increase in secondary education of girls by 1%, the annual income (per capita) increases by 0.3% (UNICEF, 2014). A study by UNESCO (n.d.) argues that if all the women had received secondary education then twelve million children would have been saved from stunting and malnutrition. Educating females has a trickle-down effect on the health and human capital formation of their children. It is within this context that our research analyzes the factors determining a student's progression from elementary to secondary school with a special focus on gender differentials in progress and completion of secondary school in India.

In India, the government has come up with several educational programs and policies to give a boost to the education of girl children. These initiatives by the government have increased the enrollment of girls in elementary schools (till class 8).[1] However, the data show that a significant number of children, especially girls, do not transit to the secondary level of education after completing elementary school.[2] Fewer girls sign up for secondary schools than boys. Furthermore, looking at those who make the transition and enroll in a secondary school in India, we find that the dropout rate is higher for girls as compared to boys. Data released by the District Information System of Education (2015–16) show that the percentage enrollment for girls in secondary education is around 47% while that for boys stands at 53%. This has a negative, multiplier effect on female enrollment in higher secondary education. It decreases the pool of females who could have enrolled in and completed the higher education if they had not dropped out at the secondary school level.

The Right to Education (RTE) act provides free and compulsory education up to elementary school. Post-elementary school, there is no free education. Costs have to be borne by the individual student. Attending secondary school is expensive relative to primary school (De & Samson, 2020). Tuition fees are higher. In rural areas, the number of secondary schools is substantially less than the number of primary schools (Educational Statistics at a Glance, 2018). Only 38% of the rural households in India have reported about the availability of secondary schools within 1 km distance from their house (National Statistical Office, 2020), consequently increasing the burden of transport costs of the students. Private household expenditures are considerable on school-related items, even by low-socioeconomic-status families (De & Samson, 2020; Tilak, 2002).

The share of public expenditure allocated to secondary education in India is much lower than that allocated to elementary education.[3] Given the low public investment in education, the educational attainment of an individual is largely determined by parental investment, which in turn is highly dependent on the family's economic status. Both the low

---

[1] The gross enrollment ratio for girls in 2014–15 was 99.20 percent (UDISE, 2015–2016).

[2] The annual average drop rate in secondary education in 2013–14 was 17.86 percent (UDISE, 2015–16).

[3] According to the Ministry of Human Resource Development (MHRD), in 2012–13, state governments allocated 54% of their education budget to elementary education and only 33.84% to secondary education. Central government's allocation was even more skewed with 54.37% going to elementary education and only 33.84% to secondary education.

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. In particular, it makes it hard for children, especially girls, from poor and uneducated families to obtain a secondary/higher secondary education. It adversely affects their ability to improve their socioeconomic status and keeps future earnings low (Barro, 2001; Becker, 1964; Hanushek & Woessmann, 2015). Singh and Mukherjee (2015) point out that the problems experienced by families have an inordinate effect on girls. Their study highlighted several factors that affect a girl's enrollment and her progress through secondary school. They found that safety concerns related to school travel and traditional norms place a heavier burden on girl children as compared to their brothers. While both boys and girls are expected to do other work to supplement family income, girls are expected to do household chores. Also, families with limited resources are quick to remove their daughters from school as they view a woman's primary sphere to be her home. This adversely impacts female educational prospects and progress (Singh & Mukherjee, 2015; Bandyopadhyaya & Chugh, 2020).

In our analysis, we use the UNESCO classification of educational indicators. To monitor education, UNESCO has broadly classified educational indicators into (a) input indicators, (b) process indicators and (c) output/outcome indicators (UNESCO, n.d.). In our paper, we have used input and process indicators as explanatory variables for determining outcome variables, i.e., educational attainment. The focus of input indicators is on material, financial and human resources that have been channeled into educational activities. They are used to organize various provisions of educational services to create immediate output (UNESCO, n.d.), e.g., type of school, private tuition and fee/non-fee household expenditure on education. Process indicators reflect how resource inputs have been used to deliver educational services (UNESCO, n.d.). They show what happened during the teaching–learning process in the classroom, such as attendance and repetition while attending school.

Existing research on gender inequality in secondary school education, in India, has mainly focused on the factors affecting the enrollment of children. The literature on the causes of the low completion rate, particularly secondary school completion (SSC), has focused on explaining the importance of the family background of an individual such as poverty, gender, caste and religion, low parental education and lack of financial assistance (Duraisamy, 1998; Filmer & Pritchett, 1998; Borooah, 2001; Sengupta & Guha, 2002; Srinivasan, 2010; Lewin, 2011; Singh & Mukherjee, 2015; Marphatia, 2019). However, there is a dearth of the literature analyzing the combined effect of family background and household educational inputs and process indicators of a child with the attainment of a secondary level of education after a child gets enrolled in school at the elementary level. Existing research has also ignored the differential impact of household socioeconomic status on male and female students. We use India Human Development Survey (IHDS)[4] panel data to examine how a family's socioeconomic status, household educational inputs and process indicators affect the progress of a student from elementary to secondary school and the differential role of gender in this process.

Previous research (Haveman & Wolfe, 1995; Buchmann & Hannum, 2001; Checchi, 2006; Bjorklund & Salvanes, 2011; Nishimura & Yamano, 2013; Ramachandra & Ekbote,

---

[4] IHDS data is a nationally representative multi-topic panel survey that has been conducted in 2004–5 and 2011–12. This panel survey makes the data suitable for tracking the progress of both male and female children over time.

2016; Gouda & Sekher, 2014; Nakajima et al., 2018; Kumar, 2020) indicates that family background, mainly household economic status and parental education, plays an important role in the educational attainment of an individual. Students from a poor socioeconomic background have a higher probability of dropping out of school as compared to their peers who are well-off, both socially and economically (Rumberger, 1983; Alexander et al., 1997; Jordan et al., 1996; Rosenthal, 1998). Several studies, in India, have shown the persistence of a large educational enrollment and attainment gap between rich and poor households (Duraisamy, 1998; Filmer & Pritchett, 1998; Sengupta & Guha, 2002; Srinivasan, 2010). These studies have also found that there exists a direct relationship between educational attainment and socioeconomic status of the families. However, these studies do not provide answers as to how the household economic status affects the different school progression paths of male and female students post-enrollment in school. Using an interactive approach, we will analyze this issue.

Parental education is also a significant determinant of an individual's educational attainment (Nakajima et al., 2018; Siddhu, 2011; Singh & Mukherjee, 2015, 2018; Yi et al., 2015). Several studies have found a strong positive relationship between the educational attainment of parents and their children (Behrman & Rosenzweig, 2002; Cameron & Heckman, 1998; Huang, 2013; Lillard & Willis, 1994; Maitra & Sharma, 2009). Given that educational attainment and socioeconomic status are directly linked (refer to the discussion above), this widens the gap between the well-off and the disadvantaged. Many studies have found that the affiliation of caste and religion of an individual plays an important role in determining educational inequality in India (Borooah, 2001; Lewin, 2011; Sengupta & Guha, 2002; Srinivasan, 2010; UNESCO, 2017).

India has a complex web of stratification systems, which often give rise to a multiplicity of social categories, making the relative position of women and men within the disadvantaged sections of the Indian society obscure. Women belonging to the disadvantaged sections are doubly disadvantaged as their minority status interacts with India's patriarchal culture and worsens conditions for them (Dunn, 1993). As Sahni (1999) reports, '*one can go no lower in social order than to be lower caste, poor, rural and female.*' In their study based on the relationship between education, social group and gender, Dreze and Kingdon (2001) found that a female child is less likely to attend school than a male child if both belong to the same backward social group. Azam and Bhatt (2012), in their study, found that the scheduled caste (SC) and scheduled tribe (ST) communities have done much better than others in improving inter-generational educational mobility. However, they still lag behind. Lewin (2011) finds that children from ST and SC families have the lowest educational enrollment at secondary school level, particularly girls belonging to ST category. Singh and Mukherjee (2015) find that children from the SC and ST communities are less likely to complete secondary level education. Azam (2016) observed that the relative position of upper castes in educational attainment, vis-à-vis OBCs and SC/ST groups has not changed. The gap between them continues to be significant. Using U-DISE Flash Statistics (2014–2015), Bandyopadhyay and Chugh (2020) have observed that the dropout rates by social groups reflect that girl children from scheduled tribes and Muslim minority groups fall in the most disadvantaged groups. Later in the paper, we analyze how the social group identity, particularly for SCs and STs, has differential effects on the educational outcomes of male and female children. Our research looks at the interactive effect of social group identity and gender on a student's progress through the school system.

Expenditure on a child's education is a crucial element, playing a key role in his/her progression from primary to secondary and then to the post-secondary level of education and further on[5] (Azam & Kingdon, 2011). Several research studies in the past have found evidence of gender bias in educational expenditure in India (Azam & Kingdon, 2013; Kingdon, 2005; Lancaster et al., 2008; Subramanian & Deaton, 1991). The chances of male children going to a private school are higher than those of female children (Tilak & Sudarshan, 2001; Kumar & Choudhary, 2020). The enrollment of girls in private schools is lower than that of boys due to higher costs. Families are willing to spend more from their pockets on educating boys as compared to girls (Azam & Kingdon, 2013). After controlling for the factors affecting the enrollment of a student, attending a private school is positively associated with a higher level of student achievement (Kingdon, 2007). In this context, the lower enrollment of girls in private schools as compared to boys is of special concern, as the government and private schools differ in educational outcomes and quality (Kumar & Choudhary, 2021). Azam and Kingdon (2013) also found a higher level of gender disparities in private educational expenditure in rural areas as compared to urban areas. Kingdon (2007) suggests that the growing number of private schools, with higher school fees, may continue to enlarge gaps in accessing educational resources and learning outcomes. In their study, Stevenson and Barker (1987) observed that parents discriminate between sons and daughters at several levels. Kingdon (2005) found that girls have a lower probability of going to school than boys. They also exhibit higher dropout rates and lower attendance as compared to boys and, make up a larger proportion of out of school children (Bandyopadhyay & Subrahmanian, 2008; Singh & Mukherjee, 2018). Singh and Mukherjee (2018), in their study using data from Andhra Pradesh, found secondary school completion rates were biased in favor of boys. Existing research indicates that private schools offer better educational outcomes as compared to government schools. Our paper examines how this is affected by changes in household economic status. We again use an interactive approach to show how family economic status affects the gender gap in SSC between private and government school children.

Regular attendance is thought to be critical for the high achievement of students irrespective of their background (Epstein & Sheldon, 2002). Several studies across various countries have found significant association between a high rate of absenteeism and lower achievement (Daraganova et al., 2014; Gottfried, 2011; Hancock et al., 2013) Previous studies have also found that factors such as parental education, socioeconomic situation and health of the children are associated with absenteeism (Drèze & Kingdon, 1999; Bandyopadhyay et al., 2011). Prakash et al. (2017) found economic factors (recent girl migration for work), cultural factors (girl child marriage; the value of girl education) and process indicators (harassment at school) to be associated with absenteeism among adolescent girls from the marginalized community in north Karnataka. Grade repetition has also been found to affect dropout rate and educational attainment (García-Pérez et al., 2014; Manacorda, 2012). García-Pérez et al. (2014) in their study argued that grade repetition has a negative impact on educational outcomes for both primary and secondary education. Many factors hinder access to secondary education in India and must be controlled for systematically to understand the role of socioeconomic factors, process inputs and gender on school progression.

---

[5] It includes expenditure on school/college fees, private tuition fees, expenditure on books and other educational articles (Azam & Kingdon 2013). It may also include the cost of conveyance from home to school and vice-versa.

The previous literature has analyzed the determinants of children's school transition in Andhra Pradesh by using Young Lives longitudinal data (Nakajima et al., 2018; Singh & Mukherjee, 2018). Young Lives data have been collected on poor households from Andhra Pradesh. Their findings cannot be generalized to other states or children belonging to the middle-class and rich households.

In contrast, we use all India panel data, from all economic and social classes to examine how post-enrollment gender, family background as well as household educational inputs and process indicators affect the progress of a child from elementary to secondary school. After doing an overall analysis, we have also done an interactive and disaggregated analysis by examining the variation in gender differences for secondary school completion across social groups (caste and religion) and type of school (private and government school students) at different levels of a family's economic status. First, we examine how interaction of gender with a family's economic status and social group determines the secondary school completion of a child, after his/her enrollment in elementary education. This helps in analyzing the importance of social group identity in the manifestation of gender differentials in SSC as family economic status changes. Second, we analyze how the chances of secondary school completion of male and female children change for children attending private and government schools for different levels of household economic status. This analysis will help us comprehend how the SSC gap between private and government school children changes with a change in economic status. The next section discusses the data and methodology used in the study followed by empirical results. The final section summarizes the analysis of the study and suggests some policy recommendations.

2 Data and methodology

2.1 Data

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 enrollment to completion of secondary and higher secondary school in India. The IHDS is the first household survey in which the questionnaire has covered multiple topics on health, employment, education, social networks, economic status, fertility, marriage, gender relations and social capital. IHDS (2004–05) is a nationally representative, a multi-topic survey of 215,754 individuals and 41,554 households in 1503 villages and 971 urban neighborhoods located in 33 states and union territories across India. In IHDS (2011–12), each of these households, including split households,[6] was re-interviewed using the same questionnaire with a re-contact rate of 84% in IHDS (2011–12). This tracking of cohorts in IHDS-II makes the data suitable for studying the impact of family attributes and other factors on educational attainment at different levels of schooling.

---

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

2.2 Sample of the study

We have considered only those children who were enrolled in upper primary school (i.e., 6th, 7th and 8th class) in 2004–05 and who were also included in the 2011–2012 survey.[7] Looking at the 2004–05 IHDS data, a total of 11,568 children aged 9–18 years were enrolled in classes 6th, 7th and 8th. The IHDS (2004–05) was able to track only 7250 (62.7%) of these students in 2011–2012. Given that IHDS-II has a re-contact rate of 84% for households, the tracking rate for students is quite low. One hundred eighteen observations had to be excluded due to the wrong reportage of the outcome variable.[8] It left us with a total of 7132 observations. Some other observations were also excluded due to incomplete reportage of some variables.[9] Our final sample contains a total of 6748 observations of which 60.47% were male and 39.53% were female.[10]

The existing literature suggests that early marriage of girls may lead to their dropping out of school. Rammohan and Robertson (2012), and Rammohan and Vu (2018) have found that patrilocal exogamy marriage norms in which the married couple resides with the husband's family are associated with increased gender inequality in educational attainment. Bhagavatheeswaran et al. (2016) found a strong community conviction that there is little point in continuing education for girls as they will eventually get married and leave their parental home to live with their in-laws. In the context of our data, this suggests an explanation for the low tracking rate of females relative to males due to relatively early marriage of female children in rural areas. Many of these married girl children may have been unavailable for the second round of IHDS (2011–12) as they would have moved to the marital home.

In order to exclude any systematic reasons for the low tracking rate and the shift in the male–female percentages, we checked the distribution of descriptive statistics across different variables for the initially enrolled children (in 2005) sample and finally tracked children sample (in 2012). The results are presented in Table 2 in Appendix. We find that the distribution of both samples across the variables used in our analysis, rural/urban, social group (caste/religion), type of school, the age of a child, household assets, household educational expenditure on school fee and non-fee items, and other educational input and process indicators is similar overall. It suggests that the low tracking rate is due to random factors[11] and is not systematic in nature.

2.3 Model and design of the study

The outcome variable that has been used in our study is the educational attainment of an individual as measured by years of schooling. This outcome variable is divided into two

---

[7] This selection of sample has taken only those students who were aged 9 to 18 years and excluded the outliers that were below or upper to this age category. Also, the majority of students who were enrolled in the 6th, 7th and 8th classes belong to the age group of 9–18 years.

[8] Thus, the sample size becomes 7132, for which we have done the descriptive statistics analysis.

[9] For instance, 46 percent of students enrolled in upper primary school were female in IHDS-I. This proportion fell to 40 percent in our final 'tracked' sample.

[10] The full sample for 2004–05 had 54.5% males and 45.5% females.

[11] These may include cultural practices and norms regarding marriage, which are not explanatory variables in our study. In addition, the existing literature (Marphatia, 2019; Chugh, 2011) suggests that such practices and norms may impact girl children across socioeconomic categories in similar ways.

different categories according to the different levels of school education: elementary school completion (ESC), i.e., 8th class, and secondary school completion (SSC), i.e., 10th class. Two binary dependent variables have been constructed for this study. For each of these two variables (i.e., class 8th and 10th), 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 SSC is conditioned on the premise that the child has completed elementary school. Therefore, ESC is measured by whether a child completed eight or more years of schooling, and SSC is measured by whether a child completed ten or more years of schooling based on the condition of ESC (8th class).

Due to the binary nature of the outcome variable, we use the logit regression model[12] to examine the association of family background as well as educational input and process indicators with the probability of elementary and secondary school completion. Our study contains six logit regressions. Equations 1 and 2 consider the analysis of a full sample for both elementary and secondary school completion. The logit model has also been estimated separately for the male and female samples. This was done to check for gender disparity in the allocation of resources. Equations 3 and 4 show the estimates of ESC for males and females respectively. Similarly, Eqs. 5 and 6 show the estimates of SSC for males and females, 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. In our paper, the logit coefficients have been used to estimate the average marginal effects and the predicted probabilities of ESC/SSC for different groups.[13] Following Long and Freese (2006), this makes the analysis more meaningful. The predicted probabilities of different groups across household assets have been presented in the form of figures by keeping all other model variables constant.

For examining the association of determinants with the probability of ESC and SSC, we used predictors such as gender, age of a child, location, social group (caste/religion), household asset index as a proxy for long-term economic resources, parental education and 'computer usage by any household member' as well as educational inputs and process indicators of a child. Economic theory suggests that family attributes affect educational attainment with a lag (Huang, 2013; Huang et al., 2010; Kim & Sherraden, 2011; Nam & Huang, 2009). Keeping this in mind, we have used the explanatory variables data from 2004–05 (except computer usage by any household member) to predict the completion of ESC and SSC in 2011–12.

The IHDS has constructed an asset index[14] that we use to measure household assets. The index value ranges from '0' to '30.' An index value close to '0' indicates the poorest households while that near to '30' indicates the richest households. Research studies indicate that family assets are a better indicator of the long-term economic resources of a family as

---

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

[13] It is calculated using the *margins* command in Stata, as suggested by Karaca-Mandic, Norten and Dowd (2012).

[14] The data on ownership of resources as a 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, refrigerator, car, laptop/computer and AC.

compared to income (Nam & Huang, 2009). To measure parental education, we take levels of education completed by the highest educated male or female adult (21 +) in the household. We have used another variable related to family background, i.e., 'computer usage by any household member.' Several research studies have found that academic performance and learning of students improves if they use a computer at home or school (Battle, 1999; Kerawalla & Crook, 2002; Lee et al., 2009). The IHDS does not report individual use of computers. Therefore, we are taking 'computer usage by any household member.' For examining the disparities among caste and religion of an individual in ESC or SSC, we use the social group of an individual to which he/she belongs. Thus, the constructed 'Social Group' variable consists of five categories: 'Upper Caste Hindus and OMR' (all other minority religions such as Christians, Sikhs, Jains and Buddhists except SC and ST of these religions), 'OBC Hindus,' 'SCs,' 'STs' and 'Muslims.'

Next, we come to the educational input indicators of a child, determined by the household. We use 'type of school,' 'whether a child attended private tuition or not' and 'medium of instruction in the school. We also use two measures of household educational expenditure on an individual child, namely 'school fee' expenditure and 'non-fee' expenditure.' The type of school attended by a child is divided into four categories: government schools, government-aided schools, private schools and other types of schools such as convent. The medium of instruction in the school consists of four categories: Hindi language, state language, English language and some other languages. The other household educational expenditure (non-fee) on an individual child includes expenditure on books, uniforms, transport and private tutoring. Adding all the costs of education, the natural log of the 'school fee' and 'non-fee expenditure' has been used in the model. We have used 'whether a child has ever repeated a class or not' (repetition) and 'number of days absent in the last month' (absenteeism) as educational process indicators as these measure post-enrollment experience.

We also attempted to consider the impact of household size and physical access to the school by including 'the distance of the school from home' and 'total number of children in the household.' However, both variables mentioned above are statistically insignificant in every regression equation of our study. It may be that post-enrollment in secondary school the distance effect is offset by other considerations and 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 is provided in Table 3 of appendix.

As mentioned earlier, one of the major, new contributions of our research is our use of interactive and disaggregated analysis to analyze the differential effect of household socioeconomic status and private vs government schools by gender category. To this end, we separated our sample by gender and ran separate regressions for the sample as a whole and the gender segregated subsamples. Post-estimation, we have calculated the predicted probabilities to examine the interaction effect. Our experience was that a judicious combination of both techniques enabled us to gather more insight. The next section presents our findings.

3 Empirical results

Table 1 presents the average marginal effects of the explanatory variables that are associated with the probability of an individual child's ESC and SSC conditional on ESC. The empirical analysis has been done for the full sample as well as separately for males and females at both levels of schooling.

Table 1 Logit model analysis: Average marginal effects (AME) for ESC and SSC

Explanatory Variables	ESC (Full sample)	SSC (Eligible sample)	ESC (Males sample)	ESC (Females sample)	SSC (Eligible males)	SSC (Eligible females)
Female	0.0248***	0.0593***	–	–	–	–
	(0.00638)	(0.00973)				
Age	– 0.0082***	– 0.0168***	– 0.0083***	– 0.0079***	– 0.0200***	– 0.0111**
	(0.00198)	(0.00312)	(0.00268)	(0.00286)	(0.00413)	(0.00476)
Urban	– 0.0171*	– 0.0386***	– 0.0255**	– 0.0072	– 0.0510***	– 0.0162
	(0.00892)	(0.0125)	(0.0125)	(0.0122)	(0.0168)	(0.0187)
Household assets	0.0012	0.0078***	0.0013	0.0010	0.0072***	0.0083***
	(0.000827)	(0.00122)	(0.00114)	(0.00113)	(0.00166)	(0.00177)
Parental education	0.0254***	0.0339***	0.0320***	0.0143***	0.0413***	0.0224***
	(0.00381)	(0.00485)	(0.00545)	(0.00482)	(0.00671)	(0.00681)
Computer usage (ref.—no)	0.0897***	0.242***	0.105***	0.0668***	0.267***	0.208***
	(0.00456)	(0.00865)	(0.00641)	(0.00591)	(0.0123)	(0.0108)
Social group (ref.—others)						
OBC Hindus	– 0.0270***	– 0.0072	– 0.0263**	– 0.0279**	0.0135	– 0.0375**
	(0.00813)	(0.0130)	(0.0112)	(0.0114)	(0.0177)	(0.0183)
SCs	– 0.0366***	– 0.0422***	– 0.0492***	– 0.0162	– 0.0218	– 0.0765***
	(0.00902)	(0.0143)	(0.0127)	(0.0120)	(0.0194)	(0.0210)
STs	– 0.0471***	– 0.0603***	– 0.0550***	– 0.0323*	– 0.0467*	– 0.0862***
	(0.0132)	(0.0206)	(0.0183)	(0.0178)	(0.0277)	(0.0309)
Muslims	– 0.0589***	– 0.0563***	– 0.0696***	– 0.0440**	– 0.0486*	– 0.0694***
	(0.0125)	(0.0190)	(0.0174)	(0.0175)	(0.0264)	(0.0264)
School type (ref.—government)						
Government-aided school	0.0450***	0.0819***	0.0554***	0.0278	0.0641**	0.115***
	(0.0118)	(0.0203)	(0.0160)	(0.0180)	(0.0283)	(0.0268)
Private school	0.0338***	0.0513***	0.0371***	0.0349***	0.0514***	0.0552***
	(0.00820)	(0.0139)	(0.0114)	(0.0107)	(0.0187)	(0.0206)

Table 1 (continued)

Explanatory Variables	ESC (Full sample)	SSC (Eligible sample)	ESC (Males sample)	ESC (Females sample)	SSC (Eligible males)	SSC (Eligible females)
Other types of school	−9.94e−05	0.0305	−0.00849	0.0166	0.0618*	−0.0178
	(0.0187)	(0.0267)	(0.0271)	(0.0225)	(0.0355)	(0.0397)
Private tuition (ref.—no)	0.0504***	0.0423***	0.0475***	0.0533***	0.0577***	0.0118
	(0.00720)	(0.0133)	(0.0108)	(0.00764)	(0.0178)	(0.0203)
Ln (school fee)	−0.0010	−0.0041	−0.0031	0.0016	−0.0059	−0.0005
	(0.00184)	(0.00277)	(0.00259)	(0.00239)	(0.00380)	(0.00396)
Ln (other fee)	0.0024	0.0129***	0.0021	0.0036	0.0108*	0.0184***
	(0.00272)	(0.00444)	(0.00388)	(0.00343)	(0.00595)	(0.00667)
Medium of instruction (ref.—Hindi)						
State language	0.0018	0.0206*	0.0168*	−0.0219**	0.0311**	0.0100
	(0.00720)	(0.0110)	(0.00996)	(0.0100)	(0.0152)	(0.0158)
English language	0.0444***	0.0188	0.0553***	0.0319**	0.0568*	−0.0486
	(0.0131)	(0.0228)	(0.0182)	(0.0160)	(0.0291)	(0.0377)
Other language	−0.0142	−0.0119	−0.0029	−0.0309	0.0153	−0.0450
	(0.0189)	(0.0272)	(0.0263)	(0.0254)	(0.0370)	(0.0401)
Absenteeism	−0.0004	−0.0033***	0.0003	−0.0014**	−0.0043***	−0.0017
	(0.000533)	(0.000820)	(0.000782)	(0.000642)	(0.00115)	(0.00118)
Ever repeated (ref.—no)	−0.0294***	−0.0505***	−0.0409***	−0.0155	−0.0582***	−0.0377
	(0.0105)	(0.0157)	(0.0144)	(0.0152)	(0.0211)	(0.0234)
Log pseudo-likelihood	−1547.292	−2640.631	−1060.0184	−470.726	−1696.78	−924.707
Pseudo—R^2	0.1733	0.2058	0.1677	0.1921	0.1998	0.2133
Observations	6748	6212	4088	2660	3704	2508

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

Overall, our estimates show that, post-enrollment, at each level of schooling, the probability of ESC and SSC is significantly higher for female students as compared to their male counterparts. Girl children are at a disadvantage in obtaining access to education (Siddhu, 2011; Bandyopadhyay & Subrahmanian, 2008; Marphatia, 2019), but once enrolled, their likelihood of ESC and SSC is higher than that of their male classmates. The Unified District Information System for Education (2014–15) report on school education also reveals that the pass out rate in secondary school exams is higher for girls relative to boys. In Sect. 3.4, we discuss more results (interaction effects) relating to gender differentials and school completion.

3.1 Gender differentiated effect of socioeconomic status on elementary and secondary school completion

We find that, even after enrollment in school, family background and gender are important in determining ESC and SSC. Our results show that a family's economic status (as measured by the household asset index) is positively and significantly associated with SSC, but not with ESC. Elementary education is a fundamental Right in India under Article 21 A of the Indian Constitution making it the state's responsibility to provide free and compulsory education to the children between six and fourteen years of age. This has been strengthened further by the Right of Children to Free and Compulsory Education (RTE) Act, 2009. In contrast, secondary education is not a constitutional right in India. Hence, the entire cost of secondary education, both fee and non-fee expenditure, has to be borne by individual households (De & Samson, 2020; NSSO, 2014). As expected, this has special implications for girl students and students from socioeconomically disadvantaged backgrounds.

We find the marginal effect of household assets on SSC to be larger for girls as compared to boys. We also find that the effect of household economic status becomes stronger with the progression in the level of schooling from elementary to secondary. This effect is more marked for girls relative to boys. Since secondary education is expensive in India owing to high fee and non-fee expenditure incurred upon it by the households (as discussed earlier), genderwise prioritization of household educational expenditure on children becomes more prominent in secondary education. A number of studies have found evidence of gender discrimination in allocation of household resources (Kaul, 2018; Azam & Kingdon, 2013; Kingdon, 2005; Lancaster et al., 2008). The female children have to bear the brunt of this discrimination because dowry (Kaul, 2018; Das Gupta et al., 2003) and patrilocal exogamy marriage norms (Rammohan & Robertson, 2012; Rammohan & Vu, 2018) make the expected returns to educating a girl child much lower than a male child (Das Gupta, 1987; Foster & Rosenzweig, 1999), thus discouraging further investment by a household in educating them. Later in this section, we present estimates of the disaggregated effect of household assets on male and female children for different social groups and school type.

For both ESC and SSC, the results show that the probability of completion increases significantly with an increase in the level of parental education completed. This finding is consistent with previous research at both international and national levels (Lillard & Willis, 1994; Haveman & Wolfe, 1995; Buchmann & Hannum, 2001; Maitra, 2003; Maitra & Sharma, 2009; Bjorklund & Salvanes, 2010). Parents who have low levels of education are more likely to have children who do not enroll in school (Sabates et al., 2013) as compared to well-educated parents. If these children (with poorly educated parents) enroll in school, they tend to dropout in larger numbers (Blick & Sahn, 2000; Sabates et al., 2013). We find

that the marginal effect of parental education is higher for SSC in comparison with ESC. Additionally, we find that the probability of both ESC and SSC is significantly higher for students who live in computer literate households as compared to those who live in homes where members do not use a computer. This marginal effect is larger for SSC as compared to ESC. It is also gender-sensitive. Boys exhibit a larger marginal effect as compared to girls.

In case of social groups, the results for both ESC and SSC show that the chances of completion are significantly lower for the socially disadvantaged groups (SCs, STs and Muslims) as compared to 'Upper Caste Hindus and OMR.' Separating the samples by gender changes the picture. In case of SSC, only 'STs' and 'Muslims' boys have significantly lower chances of completion as compared to 'Upper Caste Hindus and OMR' boys. Girls from all the disadvantaged social groups have significantly lower chances of completion as compared to 'Upper Caste Hindus and OMR' girls. Moreover, the marginal differences in completing secondary school between 'Upper Caste Hindus and OMR' and disadvantaged group girls are higher as compared to boys. This indicates that male students are less affected by social group differences than female students. While previous research has found evidence of lower probabilities of progression to secondary school for girls from disadvantaged groups (Filmer & Pritchett, 1998; Boroch, 2001; Sengupta & Guha, 2002; Srinivasan, 2010), our results show that female students are adversely affected across the board while male students face fewer disadvantages once they enroll in secondary school.

3.2 Differential effect of household educational inputs and process indicators on male and female children in elementary and secondary school completion

In the case of educational input indicators, the 'type of school' variable shows that the students studying in private and government-aided schools have significantly higher chances of both ESC and SSC as compared to government school students. Moreover, the marginal effect increases as students move to secondary school from elementary school. The effect is stronger for female students than for male students. Private schools are more expensive than government schools and children enrolled there are from a higher economic stratum than those enrolled in government schools. It follows that students from well-off households have higher probabilities of SSC than their counterparts from poor households. This effect is also gender-sensitive with females from poor households being the worst hit as we discuss in Sect. 3.3.

We do not find a significant association between the quantum of school fee for a child and ESC or SSC. However, the total household educational expenditure on other non-fee items, such as books, uniforms, travel and private tuition, is positively and significantly associated with SSC. We also find that the marginal effect of this expenditure is higher for girls as compared to boys, suggesting that households that spend more on these items for their daughters are more committed to their children's education and less likely to be resource constrained. It is not significantly associated with ESC. As previously discussed, expenditures on these items improve the probability of completion at the secondary school level. Since educational expenditure by a household plays a pivotal role in the progression of a child from primary to secondary education and further on (Azam & Kingdon, 2011), the expenditures on non-fee items (as an inherent part of household expenditure on education) work as a catalyst in school completion because they provide additional support to the children in their educational endeavors.

Absenteeism as measured by the number of days absent in the last month in the school is negatively and significantly associated with SSC. This is particularly important in the case of boys. Repetition of a class too is negatively and significantly associated with both ESC and SSC. Male students have significantly lower chances of both ESC and SSC if they have ever repeated a class. This variable has no significant impact on the females' sample. The marginal effect of repetition is higher for SSC. These results clearly indicate that educational process indicators have a gender-sensitive impact on both ESC and SSC. The effect is stronger for SSC than ESC. It is consistent with the results in the literature that indicates that student performance in primary school is an important indicator of both ESC and SSC (Singh & Mukherjee, 2015; Singh & Mukherjee, 2018; Marphatia, 2019; Siddhu, 2011). UNESCO Institute for Statistics (2012) suggests that the tendency of grade repetition can be reduced by focusing on developing a range of compensatory opportunities for skill formation and by ensuring transition (in intermediate stages where necessary) to minimize or target the practice of grade repetition.

3.3 Changing effect of household assets on male and female children's secondary school completion: a disaggregation

In this section, we discuss how the probabilities of secondary school completion of male and female children changes across different social groups and school type at different levels of household assets. As we have discussed earlier, the level of household assets is significantly associated with SSC but not with ESC. This is to be expected as elementary school education is free and compulsory for all students, under the law. In order to bring out the gender differentials and their variation across socioeconomic categories, we calculated the predicted probabilities for SSC separately for males and females at different levels of household assets. This interaction effect analysis helps us in assessing how the effect of social group identity on SSC varies across socioeconomic and gender groups. Later in the section, we do a similar analysis for students from private and government schools.

Figure 1 presents the predicted probabilities of boys and girls in ESC and SSC by household assets of an individual child. It shows that the overall probability for girls is higher than boys at both ESC and SSC, and the predicted probabilities of ESC are almost the same across the whole household assets range. The predicted probability curves at SSC show that the marginal effects of increasing household assets are greater for girls as compared to boys as the girls' curve has a steeper slope as compared to the boys' probability curve. Moreover, the gap between the two probability curves becomes wider with an increase in household assets. In other words, the magnitude of household assets becomes significant in SSC, as cost becomes a factor only past age 14 when RTE is no longer applicable and families have to pay for the education of their children. This effect is marked by a strong gender differential. Boys are favored by families in household resource allocation and poor families cut back on their daughters' education before cutting back on their sons' education.

To analyze the existence of a class effect within a social group, we have calculated the predicted probabilities of girls and boys in SSC across social groups at different levels of household assets, as shown in Figs. 2 and 3, respectively. In the case of boys, it is lowest for 'Muslims' and 'STs' as shown in Fig. 3. However, in the case of girls, the results shown in Fig. 2 depict that the predicted probabilities curve, at all levels of household assets, is highest for 'Upper Caste Hindus and OMR' girls, and it is lowest for 'STs' followed by
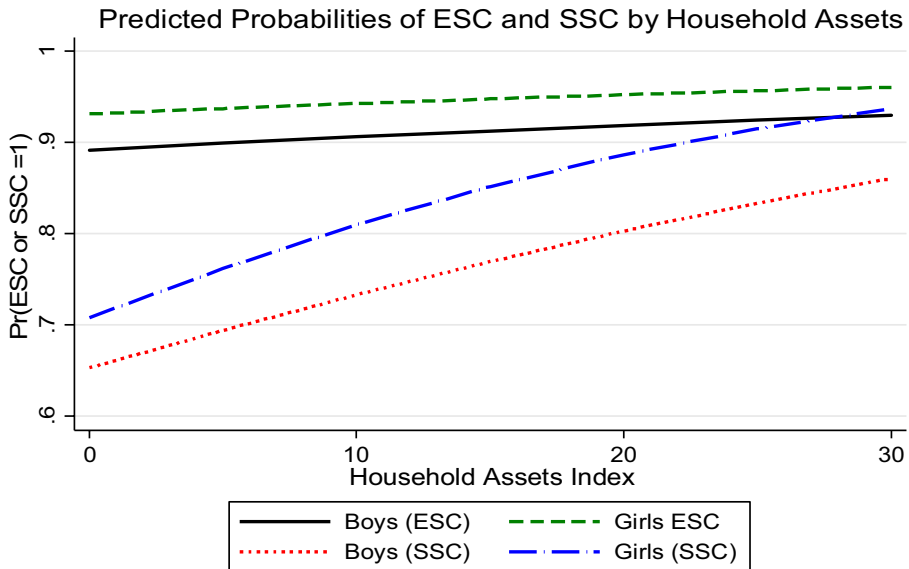
Predicted Probabilities of ESC and SSC by Household Assets

Fig. 1 Predicted probabilities of ESC and SSC for boys and girls by household assets

'SCs' and 'Muslims.' Moreover, the probability gaps between 'Upper Caste Hindus and OMR' and other disadvantaged social groups are wider in the case of girls as compared to boys, particularly at lower levels of household assets.

The probabilities of SSC for each social group increase with an increase in the level of household assets for both boys and girls, and the gaps between the probability curves narrow down at higher levels of household assets. We find that the class effect on educational inequality is stronger than the caste effect. The effect is gender-sensitive and stronger for girls (as evidenced by the narrower spaces between the curves) than for boys.

To analyze the gender differences in predicted probabilities of SSC between government and private school students, we calculated the predicted probabilities after estimating four different regression equations for boys (government and private schools) and girls (government and private schools). Figure 4 presents the predicted probabilities of boys and girls in SSC differentiated by government and private school students at different levels of household assets. We find that the probability of SSC is higher for private school students as compared to government school students. However, as household assets increase the improvement in predicted probability of SSC, for both boys and girls, is greater for government school students as compared to private school students. This suggests that while government school students lag behind private school students, the size of the gap declines as household asset index increases. One reason for this is that some households may be experiencing a temporary reduction in income (as during the 2008 recession) and are able to provide better support (books, tuition, less time spent doing chores, better nutrition, etc.) for the student even if they have to move him/her to a government school. Secondly, in such cases the student is often better prepared at the elementary level and as discussed earlier; better preparation early on means better performance in secondary school. Further, some government schools are better than others. While this information should be free to all, relatively
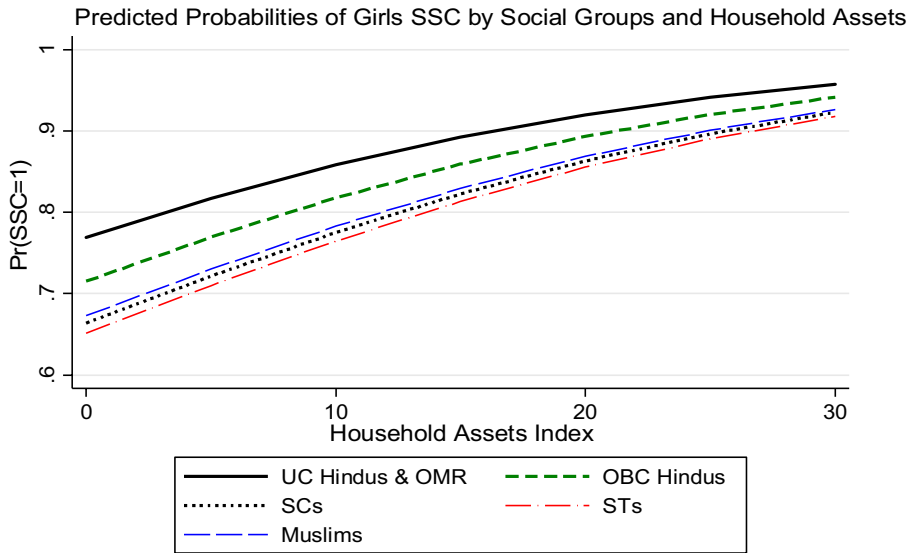
Predicted Probabilities of Girls SSC by Social Groups and Household Assets

Fig. 2 Predicted probabilities of girls' SSC by social group and household assets

well-off families often have better access to information and can take advantage of this asymmetry. Unfortunately, we do not have information on 'within private and government school quality' and cannot explicitly analyze its effect on a child's progression from elementary to secondary education. Improved data collection will facilitate further research to understand it better.

4 Conclusion

Gender differentials in education have a multiplier effect with negative repercussions for women in the form of fewer labor market opportunities, less voice in decision-making at all levels and even less control over reproductive health and choices (UN Women 2013; Singh & Mukherjee, 2018). This in turn adversely impacts a nation's economic growth and women development. Gender disparity in education is a major concern in many parts of the world. In particular, Africa, the Middle East and South Asia (Gender and Education, n.d.) are developing areas of special concern. The persistence of gender disparity in education is troubling as it prevents nations from achieving their full potential and exacerbates the incidence of poverty and inequalities in society. Our study uses data from India to analyze this issue. The findings of our study along with their policy implications will help in understanding the determinants of gender differentials in school education and policies needed to address the inequities therein.

Given the low public investment in education in India, the educational attainment of an individual is largely determined by parental investment. This in turn depends on the family's socioeconomic status. In India, despite near universal enrollment in primary school, completion rates are low and decrease sharply at each stage of transition—primary to upper primary, upper primary to lower secondary and lower secondary to higher secondary. The dropout rates are largest for children from disadvantaged socioeconomic groups
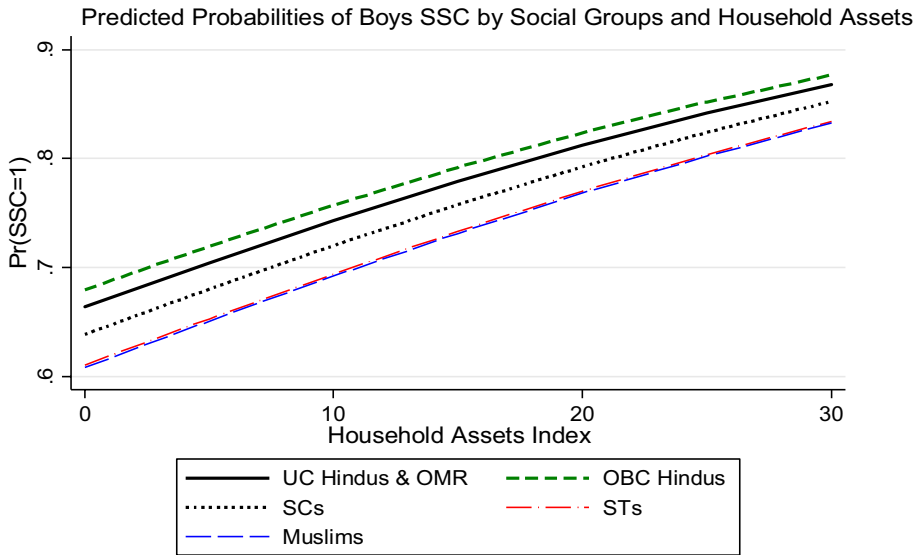
Fig. 3 Predicted probabilities of boys' SSC by social group and household assets

and girls. Children from SC, ST and Muslim families have the poorest access to schools and low completion rates post-enrollment. Given that there is a gender bias in how families treat daughters' education vis-à-vis sons' education, given that many families face a resource crunch, given that there is a quality gap between private and government schools, it becomes imperative to consider the joint impact of these variables rather than analyzing them individually.

Our research raises the question whether low socioeconomic status still acts as a barrier for children's school progression even after a child gets enrolled in school at elementary level, and does its effect vary for male and female children. It is within this context that we have examined how post-enrollment, family background as well as household educational inputs and process indicators affects the progress of male and female child from elementary to secondary education. In particular, we analyze how the effect of social group identity of male and female children on their SSC changes with the change in family's economic status or class. Also, does the secondary school completion probability gap between private and government school children decrease with the increase in the economic status of a household or not?

Our findings suggest that, even after controlling for school accessibility, a family's socioeconomic status plays an important role in determining children's school progression. In addition, this affects male and female children differently. The effect of household economic status becomes stronger with the progression in the level of schooling from elementary to secondary, especially for girls. Secondary school completion has emerged as the major stumbling block for the children belonging to SCs, STs and Muslims social groups, particularly for girls.

The interaction of the gender of a child with his/her household economic status and social group shows interesting results. We find that the probability of SSC, for each social group, increases with an increase in the level of household assets for both males and females, and the probability gaps between social groups narrow down at higher levels
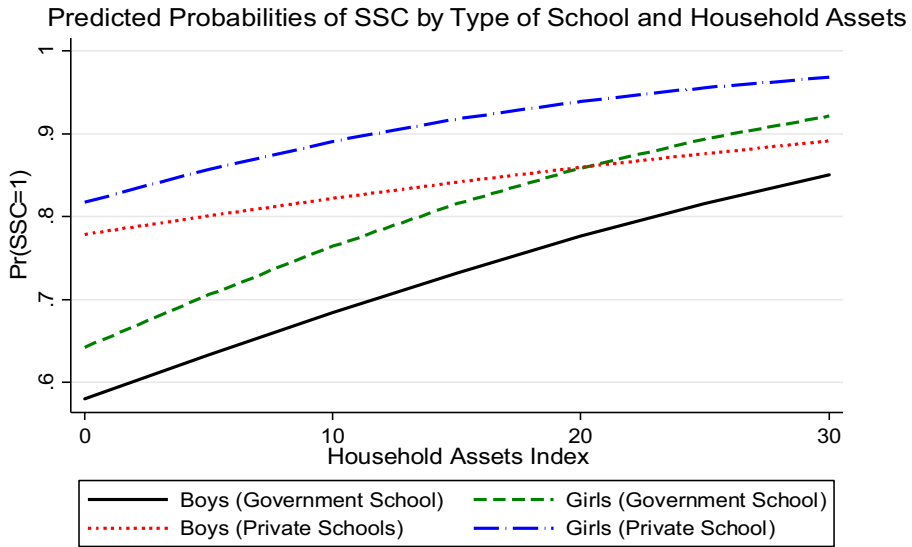
Predicted Probabilities of SSC by Type of School and Household Assets

Fig. 4 Predicted probabilities of SSC for girls and boys by type of school and household assets

of household assets, particularly for girls. Moreover, in the case of low-economic-status households, the SSC probability gap between different social group children is higher among female children relative to their male counterparts. It shows that while caste/religion acts as a barrier for SSC, female students belonging to low-economic-status households are the worst affected. Overall, the effect is stronger for girls relative to boys. The effect of caste/religion acting as a barrier to secondary school completion for children from disadvantaged social groups such as 'SCs,' 'ST' and 'Muslims' can be minimized by augmenting their access to financial resources. One way to achieve this is by providing opportunities for augmenting household income. Scholarships/stipends can also be provided to children from the disadvantaged groups.

We also find that household educational inputs are significantly associated with progress in schooling. The probability of completing secondary education is higher for private school students as compared to government school students for both males and females, and there is not much gender difference in the effect of private school. However, an increase in household assets benefits government school students more than private school students. The probability gap for SSC between private and government school children decreases significantly with an increase in household assets, and it is lowest at the highest level of household's assets. The effect is almost similar for male and female children. We also find that the household's expenditure on non-fee items for a child and taking private tuition is positively and significantly associated with SSC. We again find that the marginal effect of this expenditure is higher for girls as compared to boys. These findings indicate that girls are more vulnerable to a resource crunch in households. Our findings suggest that the process indicators for a child are also significantly associated with SSC. Absenteeism has a substantial, negative effect on SSC. This effect is stronger for boys. Boys are also more likely to be negatively affected if they have ever repeated a class. It indicates that the process indicators have a higher significance for boy's secondary school completion.

Several schemes launched by the Government of India to promote the education of the girl child at secondary and higher secondary level suffer from shortsightedness. For instance, the *National Schemes of Incentive to Girls for Secondary Education* aims to provide monetary help to girl students who pass the 8th class. Not only is the quantum of aid (Rs.3000 plus interest which can be withdrawn when they attain the age of 18 years) too little, but it is mistimed. The student is unable to access the funds during the years she is most likely to be in secondary and higher secondary school. Similarly, through 'Balika Samriddhi Yojana' the girl child can avail a fixed annual allowance of Rs. 800 in class 8th and Rs. 1000 in Class 9 and 10. Such a small sum is not sufficient to cover the annual fee and non-fee expenditure on education. Apart from this, only one girl child from a family can avail this scheme. Hence, there is a need to address the issues related to educational inputs and problems at a societal level which discourage disadvantaged children, especially girls, from accessing or completing secondary education. Attempts should also be made to create awareness among parents about the societal benefits of girls' education.

However, we also find that, post-enrollment, girls have a higher probability of completing both elementary and secondary education as compared to boys. It suggests that the negative impact of caste, religion and gender on educational attainment at the secondary level can be minimized by augmenting access to financial resources. It may be achieved by augmenting household incomes or by providing scholarships and free education to these groups. In our opinion, government policies for the marginalized sections of society should also focus on children in secondary schools, especially girls. Programs to improve financial resources available to these children and their families together with programs to provide remedial/coaching classes to the children will improve their chances of SSC[15],[16]. The *National Commission to Review the Working of the Constitution* in 2002 suggested incorporating the right to free education (as a part of article 21A) for girls and students from SC and ST community until they attain the age of 18 years. The Central Advisory Board of Secondary Education (2005) also suggested that secondary education should be made universal (Report of the Central Advisory Board of Secondary Education, 2005 as cited in Tilak, 2020). Both of these recommendations have not been implemented till now. However, some states have taken the initiative to address the issue of free education for girls at secondary level and thereafter.[17]

Our study has provided new insights into the determinants of ESC and SSC within the context of gender differentials in school education. However, as mentioned earlier, we do not have information on 'within private and government school quality' and cannot analyze its effect on the probability of ESC, SSC or the transition of a student from elementary to secondary education. Improved data collection is needed to fill this gap and facilitate

---

[15] One reason for this emerging as a choke point may be that the class 10 board exam is the first board exam that has to clear by a student. In other words, this is the first 'public' test of a student's abilities, and the shortcomings in the learning outcomes for the students from the marginalized sections come to the fore, preventing them from continuing to higher secondary school.

[16] Recent data for Delhi schools showed that government schools (passing rate of 90 percent) are performing better than private schools in class 12th results. However, the data also show that more than 40 percent of the government school students dropped out before completing class 9 or 10. Source: https://www.newslaundry.com/2018/06/09/delhi-government-schools-print-filtering-students-aam-aadmi-party.

[17] E.g. Karnataka government has promised to provide free education to those female students studying in the government run educational institutions of the state till the post-graduation level (The New Indian Express, 2018). Punjab has also promised to provide free education for girls from nursery up to doctoral studies (India Today, 2017).

further research. Finally, our study does not differentiate between the quantity and quality of elementary and secondary education attained by the students. Further research is needed to explore the determinants of gender differences in the quality of secondary education attained.

Appendix

See Tables 2, 3.

Table 2 Comparison of descriptive statistics for both 'final study sample (in 2012)' and 'total enrolled children full sample (in 2004–05)'

Explanatory Variables	Description of the Variables	Full sample (In 2005) (In %)	Study sample (In 2012) (In %)	Females (In 2005) (In %)	Females (In 2012) (In %)
Gender	Male	54.5	60.47	–	–
	Female	45.5	39.53	–	–
Location	Rural	66.77	67.2	66.41	66.09
	Urban	33.23	32.8	33.59	33.91
Social Groups	UC Hindus and OMR	26.71	26.44	27.02	28.71
	OBC	34.4	34.41	33.82	33.63
	SC	20.44	21.17	20.84	20.38
	ST	7.57	7.01	7.13	6.15
	Muslim	10.87	10.96	11.19	11.14
Type of school	Government school	65.18	64.79	67.93	65.43
	Government-aided	6.13	6.21	6.12	6.25
	Private school	24.61	25.13	21.81	23.93
	Other types of school	4.08	3.87	4.14	4.39
Medium of Instruction	Hindi language	43.36	43.38	42.51	43.44
	State language	41.04	42.13	42.40	41.12
	English language	12.24	10.75	11.60	11.26
	Other language	3.36	3.73	3.50	4.19
		Mean	Mean	Mean	Mean
Age	Age of the student	12.80	12.72	12.70	12.48
Household assets	Household Assets Index	12.87	12.94	13.03	13.49
Parental education	Highest adult (21 +) education	2.46	2.44	2.53	2.60
Private tuition	Private tuition or not	0.20	0.20	0.19	0.20
Absenteeism	Days absent in last month	2.62	2.62	2.52	2.55
Ever repeated	Ever repeated a class or not	0.11	0.10	0.10	0.09
School fee	Ln (school fee)	4.79	4.76	4.65	4.70
Non-fee	Ln (other fees)	6.50	6.50	6.85	6.89
Total observations		11,568	7132	5263	2846

Table 3 Notation and definition of variables

Name of variables	Description	Definition of variables
Level of education Completed	ESC or SSC	1, if an Individual has completed Elementary education or Secondary (10th class) education
		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
	Rural	0, if an individual resides in a rural area
Age of student	Age	Age of the student
Highest adult (21+) *Education (HH)*	Parental education	Highest Level of education completed by an adult in HH
HH Assets Index	Household assets	This index is made from 33different household assets
Computer usage	Yes	1, if any household member uses a computer
	No	0, otherwise
Social group	UC Hindus and OMR	1, if an Individual is upper caste Hindu or other minority religion such as Christian, Sikh and Jain except SC and 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	1, if an individual has studied in government schools
	Government-aided	2, if an individual has studied government-aided schools
	Private	3, if an individual has studied in private schools
	Others	4, if an individual has studied in other type of schools
Private tuition	Yes	1, if an individual has taken private tuition
	No	0, otherwise
School fee expenditure	Ln (school fee)	School fees on the education of a child in last year
Non-fee expenditure	Ln (other fees)	Expenditure on Books/Bus/Uniform/Private Tuition
Medium of instruction in school	MI	1, if the instruction of medium is Hindi Language
		2, if the instruction of medium is State Language
		3, if the instruction of medium is English Language
		4, otherwise
Ever repeated	Yes	1, if an individual has ever repeated a class
	No	0, otherwise
Absenteeism	DAPM	Number of days absent in the last month

ESC elementary school completion, *SSC* secondary school completion, *UC* upper caste, *OBC* other backward caste; *SCs* schedule castes, *STs* schedule tribes

Survey-II (IHDS-II), 2011–12. ICPSR36151-v6.*Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 31.*

References

Al-Ayed, I. H. (2010). Mothers' knowledge of child health matters: Are we doing enough? *Journal of Family and Community Medicine, 17*(1), 22.

Alexander, K. L., Entwisle, D. R., & Horsey, C. S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, 87–107.

Amemiya, T. (1981). Qualitative response models: A survey. *Journal of Economic Literature, 19*(4), 1483–1536.

Azam, M. (2014). Private tutoring: Evidence from India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2526594

Azam, M., & Bhatt, V. (2012). Like father, like son? Intergenerational education mobility in India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2050742

Azam, M., & Kingdon, G. G. (2013). Are girls the fairer sex in India? Revisiting intra-household allocation of education expenditure. *World Development, 42*, 143–164.

Azam, M. (2016). Intergenerational educational persistence among daughters: evidence from India. *The BE Journal of Economic Analysis & Policy*, 16(4).

Bandyopadhyay, M., & Chugh, S. (2020). Status of secondary education in India: A review of status, challenges and policy issues. In J. B. G. Tilak (Ed.), *Universal secondary education in India* (pp. 17–49). Singapore: Springer.

Bandyopadhyay, M. and R. Subrahmanian. (2008). *Gender equity in education: A study of trends and factors.* Research monograph no. 18. New Delhi: National University of Education and Planning. July 2016. http://sro.sussex.ac.uk/1866/1/PTA_18.pdf.

Bandyopadhyay, M., Das, D. & Zeitlyn, B. (2011). Absenteeism, repetition and silent exclusion in India. CREATE India policy brief 3.

Barro, R. J. (2001). Human capital and growth. *The American Economic Review, 91*(2), 12–17.

Becker, G. S. (1964). Human Capital: A theoretical and empirical analysis, with special reference to education. *National Bureau of Economic Research*.

Behrman, J. R., & Rosenzweig, M. R. (2002). Does increasing women's schooling raise the schooling of the next generation? *American Economic Review, 91*(1), 323–334.

Berberoğlu, G., & Tansel, A. (2014). Does private tutoring increase students' academic performance? Evidence from Turkey. *International Review of Education, 60*(5), 683–701.

Bhagavatheeswaran, L., Nair, S., Stone, H., Isac, S., Hiremath, T., Raghavendra, T., & Watts, C. (2016). The barriers and enablers to education among scheduled caste and scheduled tribe adolescent girls in northern Karnataka, South India: A qualitative study. *International Journal of Educational Development, 49*, 262–270.

Bhorkar, S., & Bray, M. (2018). The expansion and roles of private tutoring in India: From supplementation to supplantation. *International Journal of Educational Development, 62*, 148–156. https://doi.org/10.1016/j.ijedudev.2018.03.003

Björklund, A., & Salvanes, K. G. (2011). Education and family background: Mechanisms and policies. *Handbook of the Economics of Education, 3*(3), 201–247.

Blick, P., & Sahn, D. E. (2000). Schooling of girls and boys in a West African country: The effects of parental education, income, and household structure. *Economics of Education Review, 19*, 63–87.

Borooah, V. K. (2001). Do children in India benefit from having mothers who are literate? New Delhi: National Council of Applied Economic Research (No. 77).

Buchmann, C., & Hannum, E. (2001). Education and stratification in developing countries: A review of theories and research. *Annual Review of Sociology, 27*(1), 77–102.

Cameron, S. V., & Heckman, J. J. (1998). Life cycle schooling and dynamic selection bias: Models and evidence for five cohorts of American males. *Journal of Political Economy, 106*(2), 262–333.

Central Advisory Board of Secondary Education. (2005). Universalisation of secondary education: Report of the central advisory board of secondary education. New Delhi: Government of India.

Checchi, D. (2006). *The economics of education: Human capital, family background and inequality*. Cambridge University Press.

Chhapial, H. (2013). Line is blurring between schools, coaching classes. Times of India. Retrieved from:https://timesofindia.indiatimes.com/city/mumbai/Line-is-blurring-between-schools-coaching-classes/articleshow/18897715.cms. Accessed February 21, 2020.

Choudhury, P. K. (2020). Expanding education market and parental choice for secondary schools in India: Evidence from IHDS data. In J. B. G. Tilak (Ed.), *Universal Secondary Education in India (pp. 113–135).* Singapore: Springer.

Chugh, S. (2011). *Dropout in secondary education: A study of children living in slums of Delhi*. National University of Educational Planning and Administration.

Cooray, A., & Potrafke, N. (2011). Gender inequality in education: Political institutions or culture and religion? *European Journal of Political Economy, 27*(2), 268–280.

Daraganova, G., Mullan, K. & Edwards, B. (2014). Attendance in primary school: Factors and consequences (Canberra, Australian Government Department of Social Services).

Das Gupta, M. (1987). Selective discrimination against female children in rural Punjab, India. *Population and Development Review, 13*(1), 77–100.

Das Gupta, M., Zhenghua, J., Bohua, L., Zhenming, X., Chung, W., & Hwa-Ok, B. (2003). Why is son preference so persistent in East and South Asia? A cross country study of China, India and the Republic of Korea. *The Journal of Development Studies, 40*(2), 153–187.

De, A., & Samson, M. (2020). Secondary education in Maharashtra: Issues of concern. In J. B. G. Tilak (Ed.), *Universal secondary education in India* (pp. 71–98). Singapore: Springer.

Dollar, D., & Gatti, R. (1999). *Gender inequality, income, and growth: are good times good for women?* (Vol. 1). Washington, DC: Development Research Group, the World Bank.

Drèze, J., & Kingdon, G. G. (1999). School Participation in Rural India. *Review of Development Economics, 5*(1), 1–24.

Drèze, J., & Kingdon, G. (2001). School participation in rural India. *Review of Development Economics, 5*(1), 1–24.

Dunn, D. (1993). Gender inequality in education and employment in the scheduled castes and tribes of India. *Population Research and Policy Review., 12*(1), 53–70.

Duraisamy, P. (1998). Morbidity in Tamil Nadu: Levels, differentials and determinants. *Economic and Political Weekly*, 982–990.

Educational Statistics at a glance. (2018). Department of School Education and Literacy. Ministry of Human Resource Development. Government of India.

Epstein, J. L., & Sheldon, S. B. (2002). Present and accounted for: Improving student attendance through family and community involvement. *The Journal of Educational Research, 95*, 301–318.

Filmer, D., & Pritchett, L. (1998). *Educational enrolment and attainment in India: Household wealth, gender, village, and state effects*. World Bank.

García-Pérez, J. I., Hidalgo-Hidalgo, M., & Robles-Zurita, J. A. (2014). Does grade retention affect students' achievement? Some evidence from Spain. *Applied Economics, 46*, 1373–1392.

Gender and Education. (2020). UNICEF. Retrieved from: https://data.unicef.org/topic/gender/gender-disparities-in-education/. Accessed June 13, 2021.

Gottfried, M. A. (2011). The detrimental effects of missing school: Evidence from urban siblings. *American Journal of Education, 117*(2), 147–182.

Gouda, S., & Sekher, T. V. (2014). Factors leading to school dropouts in India: An analysis of national family health survey-3 data. *IOSR Journal of Research & Method in Education, 4*(6), 75–83.

Greene, W. H. (2003). *Econometric analysis*. Prentice Hall.

Hancock, K. J., Shepherd, C. C. J., Lawrence, D. &Zubrick, S. R. (2013). Student attendance and educational outcomes: Every day counts (Canberra, Australian Government Department of Education).

Hanushek, E. A., & Woessmann, L. (2015). *The knowledge capital of nations: Education and the economics of growth*. Cambridge: MIT Press.

Haveman, R., & Wolfe, B. (1995). The determinants of children's attainments: A review of methods and findings. *Journal of Economic Literature, 33*(4), 1829–1878.

Huang, J. (2013). Intergenerational transmission of educational attainment: The role of household assets. *Economics of Education Review, 33*, 112–123.

Huang, J., Guo, B., Kim, Y., & Sherraden, M. (2010). Parental income, assets, borrowing constraints and children's post-secondary education. *Children and Youth Services Review, 32*(4), 585–594.

India Today. (2017). This state will provide free education for girls from Nursery to PhD. Retrieved from: https://www.indiatoday.in/education-today/news/story/free-education-girls-983907-2017-06-21. Accessed March 17, 2020.

Jordan, W. J., Lara, J., & McPartland, J. M. (1996). Exploring the causes of early dropout among race-ethnic and gender groups. *Youth & Society, 28*(1), 62–94.

Karaca-Mandic, P., Norton, E. C., & Dowd, B. (2012). Interaction terms in nonlinear models. *Health Services Research, 47*(1 pt 1), 255–274.

Kim, Y., & Sherraden, M. (2011). Do parental assets matter for children's educational attainment? Evidence from mediation tests. *Children and Youth Services Review, 33*(6), 969–979.

Kingdon, G. G. (2005). Where has all the bias gone? Detecting gender bias in the intrahousehold allocation of educational expenditure. *Economic Development and Cultural Change., 53*, 409–451.

Kingdon, G. G. (2007). The progress of school education in India. *Oxford Review of Economic Policy, 23*(2), 168–195.

Kumar, D., & Choudhury, P. K. (2021). Do private schools really produce more learning than public schools in India? Accounting for student's school absenteeism and the time spent on homework. *International Journal of Educational Development, 83*, 102395.

Kumar, D. (2020). Tracking the progress of a child from enrolment to completion of secondary education in India. In J. B. G. Tilak (Ed.), *Universal secondary education in India* (pp. 221–243). Singapore: Springer.

Kumar, D., & Choudhury, P. K. (2020). Determinants of private school choice in India: All about the Family Backgrounds? *Journal of School Choice*, 1–27.

Lancaster, G., Maitra, P., & Ray, R. (2008). Household expenditure patterns and gender bias: Evidence from selected Indian states. *Oxford Development Studies., 36*(2), 133–157.

Lee, S., Brescia, W., & Kissinger, D. (2009). Computer use and academic development in secondary schools. *Computers in the Schools, 26*(3), 224–235.

Lewin, K. M. (2011). Expanding access to secondary education: Can India catch up? *International Journal of Educational Development, 31*(4), 382–393.

Lillard, L. A., & Willis, R. J. (1994). Intergenerational educational mobility: Effects of family and state in Malaysia. *Journal of Human Resources*, 1126–1166.

Long, J., & Freese, J. (2006). *Regression models for categorical dependent variables using stata* (2nd ed.). Stata Press.

Maitra, P. (2003). Schooling and educational attainment: Evidence from Bangladesh. *Education Economics, 11*(2), 129–153.

Maitra, P., & Sharma, A. (2009). Parents and children: Education across generations in India. In *5th annual conference on economic growth and development*. Delhi: ISI Delhi.

Majumdar, M. (2014). *The shadow school system and new class divisions in India*. Working Paper Series, TRG Poverty & Education. Max Weber Stiftung, London.

Manacorda, M. (2012). The cost of grade retention. *Review of Economics and Statistics, 94*, 596–606.

Marphatia, A. A., Reid, A. M., & Yajnik, C. S. (2019). Developmental origins of secondary school dropout in rural India and its differential consequences by sex: A biosocial life-course analysis. *International Journal of Educational Development, 66*, 8–23. https://doi.org/10.1016/j.ijedudev.2018.12.001

NSSO. (2014). India: Social consumption—education survey 2014, National sample survey 71st round. New Delhi: Ministry of Statistics and Programme Implementation. Government of India (2014).

Nakajima, M., Kijima, Y., & Otsuka, K. (2018). Is the learning crisis responsible for school dropout? A longitudinal study of Andhra Pradesh, India. *International Journal of Educational Development, 62*, 245–253.

Nam, Y., & Huang, J. (2009). Equal opportunity for all? Parental economic resources and children's educational attainment. *Children and Youth Services Review, 31*(6), 625–634.

National Statistical Office. (2020). Household social consumption on education in India. NSS 75th round. Ministry of Statistics and Programme Implementation. Government of India. Retrieved from: http://mospi.nic.in/sites/default/files/publication_reports/Report_585_75th_round_Education_final_1507_0.pdf. Accessed June 17, 2021.

National Sample Survey Office. Education in India. 71st Round. January-June 2014. Ministry of Statistics and Programme Implementation. Government of India. Retrieved from: http://mospi.nic.in/sites/default/files/publication_reports/nss_rep_575.pdf. Accessed February 17, 2020.

Nishimura, M., & Yamano, T. (2013). Emerging private education in Africa: Determinants of school choice in rural Kenya. *World Development, 43*, 266–275.

Prakash, R., Beattie, T., Javalkar, P., Bhattacharjee, P., Ramanaik, S., Thalinja, R., Murthy, S., Davey, C., Blanchard, J., Watts, C., et al. (2017). Correlates of school dropout and absenteeism among

adolescent girls from marginalized community in north Karnataka, south India. *Journal of Adolescence., 61*, 64–76.

Ramachandra, S., & Ekbote, E. R. (2016). Factors responsible for school dropout: A systemic approach. *Universe of Knowledge: Research Analysis, 1*(2), 92–105.

Rammohan, A., & Robertson, P. E. (2012). Do kinship norms influence female education? Evidence from Indonesia. *Oxford Development Studies, 40*(3), 283–304.

Rammohan, A., & Vu, P. (2018). Gender inequality in education and kinship norms in India. *Feminist Economics, 24*(1), 142–167.

Rumberger, R. W. (1983). Dropping out of high school: The influence of race, sex, and family background. *American Educational Research Journal, 20*(2), 199–220.

Sabates, R., Hossain, A., & Lewin, K. M. (2013). School drop out in Bangladesh: Insights using panel data. *International Journal of Educational Development, 33*(3), 225–232.

Sahni, U. (1999). Postcards from India. *Journal of Adolescent & Adult Literacy, 43*(2), 134–141.

Salovaara, I. M. (2017). The work of tuitions: Moral infrastructure in a Delhi neighbourhood. *Asian Anthropology., 16*(4), 243–260.

Schady, N. (2011). Parents' education, mothers' vocabulary, and cognitive development in early childhood: Longitudinal evidence from Ecuador. *American Journal of Public Health, 101*(12), 2299–2307.

Sengupta, P., &Guha, J. (2002). Enrolment, dropout and grade completion of girl children in West Bengal. *Economic and Political Weekly*, 1621–1637.

Siddhu, G. (2011). Who makes it to secondary school? Determinants of transition to secondary schools in rural India. *International Journal of Educational Development, 31*, 394–401.

Singh, R., & Mukherjee, P. (2018). Whatever she may study, she can't escape from washing dishes': Gender inequity in secondary education–evidence from a longitudinal study in India. *Compare: A Journal of Comparative and International Education, 48*(2), 262–280.

Singh, R., & Mukherjee, P. (2015). Determinants of successful completion of secondary education: Evidence from young lives, Andhra Pradesh.

Srinivasan, J. (2010). *Demand for education in India: Sub regional study*. Well Publication.

Stevenson, D. L., & Baker, D. P. (1987). The family-school relation and the child's school performance. *Child development*, 1348–1357.

Subramanian, S., & Deaton, A. (1991). Gender effects in Indian consumption patterns. *Sarvekshana., 14*, 1–12.

The New Indian Express. (2018). Free education for Karnataka girls up to post graduation. Retrieved from: http://www.newindianexpress.com/states/karnataka/2018/feb/16/free-education-for-karnataka-girls-up-to-post-graduation-1774401.html. Accessed February 11, 2020.

Tilak, J. B. (2002). *Determinants of household expenditure on education in rural India*. New Delhi: National Council of Applied Economic Research.

Tilak, J. B. (2020). Universal secondary education in India: An introductory overview of issues, challenges and prospects. In J. B. G. Tilak (Ed.), *Universal secondary education in India, pp 1–14.* Singapore: Springer.

UNESCO. (2017). Global education monitoring report 2017/18. Accountability in education. Meeting our commitments. UNESCO, Paris: France. Retrieved from: https://www.unesco-vlaanderen.be/src/Frontend/Files/Media/Files/GEMR2017-8.pdf. Accessed April 4, 2020.

UNESCO (n.d.). Systematic Monitoring of Education for all. Retrieved from: http://www5.unescobkk.org/education/efatraining/module-a3/3-types-of-indicators/. Accessed March 12, 2020.

UNESCO Institute for Statistics. (2012). Opportunities lost: the impact of grade repetition and early school leaving. Global Education Digest 2012.

UNESCO (n.d.). *Sustainable development begins with education*. Retrieved from: https://en.unesco.org/news/unesco-sustainable-development-begins-education. Accessed August 14, 2020.

UNICEF. (2014). Accelerating secondary education for girls: Focusing on access and retention. Retrieved from: http://www.ungei.org/resources/files/2014-04-GPE-UNGEI-Accelerating-Secondary-Education-Girls.pdf. Accessed August 14, 2020.

World Bank. (2011). *World development report 2012: Gender equality and development*. World Bank Publications.

Yi, H., Zhang, L., Yao, Y., Wang, A., Ma, Y., Shi, Y., & Rozelle, S. (2015). Exploring the dropout rates and causes of dropout in upper-secondary technical and vocational education and training (TVET) schools in China. *International Journal of Educational Development, 42*, 115–123.