Research Report

Exploring Factors Affecting Gender Inequality in the Completion of Higher Education in India: A Survival Model Analysis

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Young Lives

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Acknowledgements

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Summary

This report uses longitudinal data from Young Lives to explore gender differentials in dropout rates before completing higher education among 26-year-old young adults in Andhra Pradesh and Telangana, India. Employing a discrete-time hazard model, it finds that young women have a significantly higher risk of dropping out before completing higher education than young men. The findings further indicate that individual, household and educational factors perpetuate gender inequity in higher education completion, with young adults from disadvantaged social groups and households in the bottom wealth tercile being more likely to drop out than their counterparts. Further, at age 12, early childhood indicators such as engagement in paid work and domestic chores, as well as low Peabody Picture Vocabulary Test (PPVT) and mathematics scores, are positively associated with a higher risk of non-completion, demonstrating the negative affect of early risks on long-term trajectories. As the National Education Policy 2020 targets achieving gender balance in educational opportunities, these findings are an immensely valuable contribution to policy influencing.

1. Background

The higher education sector has been expanding around the globe in the past few decades (Carrieri, Davillas, and Jones 2021; Rong and Deng 2022). While the global population multiplied by 2.1 between 1970 and 2020, student enrolment in higher education multiplied by 7.1 during the same period (Marginson 2016; UIS 2021). According to UIS (2021), the global average gross enrolment ratio (GER) in higher education increased from 13.6 per cent in 1990 to 40.2 per cent in 2020. Most high-income countries and several middle-income countries are close to or have exceeded a GER of 50 per cent in higher education. However, GER across regions in 2020 varied from 86.7 per cent in North America to 25.8 per cent in South Asia. Furthermore, even within the European Union in 2021, although more than 40 per cent of 25–34-year-olds had completed tertiary education, huge gaps remained between countries, with Romania having the lowest enrolments (Eurostat 2021).

Following the global trend, the higher education sector in India has expanded rapidly in terms of the number of institutions and student enrolments since the 1990s. It has become one of the largest higher education systems in the world, with around 41.3 million students enrolled in 1,113 universities, 43,796 colleges and 11,296 standalone institutions (MoE 2023). The impressive growth of higher education sector since the 1990s is largely due to the accompanying fast-expanding private sector participation (Tilak 2018). According to the All India Survey of Higher Education (2023), more than 78.6 per cent of colleges are privately managed, catering to 65.5 per cent of the total students enrolled in higher education. In this context, it is equally important to examine the socioeconomic contours in access, dropout rates, and successful completion of higher education in India. Gender inequality in access to higher education is a major concern often highlighted in studies and policy debates.

1.1. Gender equity

Gender inequalities in education have been a topic of much research (Khajikhan 2021; Kingdon 2005; Iddrisu et al. 2020). Studies have documented that gender is a significant determinant of young adults' likelihood of accessing higher education in Latin America (Stromquist 2001), Peru (Guerrero and Rojas 2020) and several low and middle-income countries (Ilie and Rose 2016; Ilie, Rose, and Vignoles 2021; Jerrim, Chmielewski, and Parker 2015), including Indonesia (Brewis 2019) and Cambodia (Chea 2019). Further, in Italy, young women have been at a disadvantaged position in terms of access to, and completion of, education when taking location, ethnicity and poverty into account (Contini and Salza 2020).

A UNESCO report on gender equality (2022) examined the contribution of 776 higher education institutions around the globe to Sustainable Development Goal 5, 'achieving gender equality and empowering all women and girls'. The report scored institutions across six areas that address how they provide access to women and support their academic progression. While the average SDG 5 score among 26 countries ranged between 25.2 (Japan) to 71.4 (Australia), India's score stood at 39.4. Furthermore, six countries (India, Indonesia, Iran, Pakistan, Uzbekistan and Thailand) have a gender bias in enrolment in STEM education.[1] This gender bias was significant in the case of India, at 25 percentage points.

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[1] STEM education covers science, technology, engineering, and mathematics.

A review of previous studies indicates that both young men and women are influenced by multiple reasons that account for why they leave education (Barbosa-Camargo, García-Sánchez, and Ridao-Carlini 2021; Bennett 2003; Behr et al. 2020; Rankin and Aytac 2006; Rumberger and Lim 2008; Singh and Mukherjee 2017). These include institutional factors, such as the academic course not being their first choice or fees being unaffordable, as well as structural factors, such as prevailing gender stereotypes, patriarchy, betrothal, and parental aspirations, as well as personal and situational factors. For instance, research has found that individuals from vulnerable backgrounds are more likely to drop out at the university level in Italy (Contini and Salza 2020) and Belgium (Arias Ortiz and Dehon 2013).

In India, there has been phenomenal growth in enrolment of young women in higher education, who constituted 48.7 per cent of all enrolments in 2020–21 (MoE 2023). Though the overall gender gap in higher education enrolment has reduced significantly, several studies have found that this gap persists in rural areas, among Scheduled Caste and Scheduled Tribe populations,[2] and among low-middle-income families (e.g. Cassan 2019; Ghosh and Kundu 2021; Kingdon 2005; Tilak and Choudhury 2019). For example, the GER for Scheduled Tribe women is 19.1 per cent, compared to the overall GER among women of 27.9 per cent (MoE 2023).

Rout (2015) found that the socioeconomic settings of students in India influence the probability of completing higher education. Students belonging to low-income households, Scheduled Castes and Other Backward Classes were found to be less likely to complete higher education than their counterparts. Low completion and transition rates from secondary schooling, and low enrolment and retention are the main stumbling blocks to the social, economic and political empowerment of women and girls, leading to gender inequality (British Council 2021). An examination of Indian literature reveals that households prefer to invest more in the education of sons than daughters, and such bias widens in rural areas (Choudhury and Kumar 2022; Datta and Kingdon 2019; Iddrisu et al. 2018). India's conservative socio-cultural setting is also an obstacle for the higher education of young women; for example, when the co-education of a girl child is considered a threat to family honour by the parents (Chanana 2000).

Sánchez and Singh (2018) studied factors which relate to access to higher education using Young Lives longitudinal data across the four study countries, including India. While there are several papers on gender inequalities in access to higher education in India (Srivastava and Sinha 2008; Tilak 2015; Tilak and Choudhury 2019), studies specifically examining *dropouts* before successful completion of higher education are sparse. Though young women's enrolment in higher education is almost at the same level as young men (MoE 2023), we know little about how socioeconomic settings and educational background affect their dropping out before completing higher education. Further, while research evidence exists related to the reasons for progression to higher education, there is very little research examining how these factors interact and affect vulnerable groups based on caste and gender, for instance. Against this backdrop, this paper's specific research question is: 'how do individual, socioeconomic and education-related factors interact with gender to determine dropout rates before higher education completion among young adults in Andhra Pradesh and Telangana, two southern states of India?'

This will answer who are at higher risk of dropping out before graduating and which factors are associated with putting them at higher risk. The paper therefore aims to go some way to addressing the gap in the literature on evidence related to non-completion of graduation in low- and middle-income countries.

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2   Caste is divided into four official categories in India. While Scheduled Castes, Scheduled Tribes and Backward Classes are recognised as historically disadvantaged in the Indian constitution, Other Castes are socially and educationally advantaged castes and are more privileged.

The rest of the paper is structured as follows. Section 2 discusses the data and empirical method used. Sections 3 and 4 examine the gender inequality in dropout rates before completing higher education among young adults in Andhra Pradesh and Telangana, and its association with socioeconomic and educational factors. The concluding section discusses policy implications, limitations, and areas for future work.

2. Data and methodology

2.1. Data

This paper draws upon the quantitative data from Young Lives in India, a longitudinal research study on childhood poverty following 3,000 children in the states of Andhra Pradesh and Telangana.[3] Two cohorts of children, initially aged 8 years (Older Cohort) and 1 year old (Younger Cohort), have been followed in four districts of Andhra Pradesh and three districts[4] of Telangana since 2002. The survey has collected data from six rounds at the child, household and community levels: in 2002 (Round 1), 2005 (Round 2), 2009 (Round 3), 2013 (Round 4), 2016 (Round 5) and 2020–21 (Round 6). Round 6 consisted of five telephone surveys conducted during the COVID-19 pandemic.

The paper uses quantitative data from Rounds 1, 2 and 6 relating only to the Older Cohort, who turned 26 years old in Round 6 – an age by which most of them would have completed at least an undergraduate degree, if they had transitioned successfully to a higher education institution.[5] The initial sample size of the Older Cohort in Round 1 (2002) was 1,008, which reduced to 864 in Round 6, an attrition rate of 14.3 per cent. It is important to mention that the annualised attrition rates in Young Lives are the lowest among longitudinal studies in developing countries (Sánchez and Escobal 2020). While the average annualised attrition rate stood at 1.3 per cent in the literature, it was 0.5 per cent for the Older Cohort in the Young Lives study in India (Sánchez and Escobal 2020). Using the longitudinal data of young adults to examine the determinants of dropout rates provides a better understanding of students' trajectories and childhood factors that have an impact on their decision to drop out before completing higher education.

2.1.1. Dependent variable

Given that this paper explores factors that are associated with the non-completion of higher education, we construct a dependent variable *'dropout'* (whether the student dropped out before completing higher education) and a *'time'* variable (education level at the time of dropping out). This enables us not only to examine *whether* students drop out before completing higher education but also *when* they drop out.

The dependent variable *'dropout'* is a dummy variable based on the response to a question asked to the Older Cohort in Round 6: 'What is the highest education level that you have completed?' Those who reported that they had attained at least an undergraduate degree (coded as '0') were considered to have completed higher education, while those who attained any level of education below graduation (coded as '1') were considered to have dropped out before completing higher education. We do not include individuals who reported having technical or vocational education, which is a post-secondary level diploma or certificate but is not equivalent to a graduate, that is, higher education, degree in India.

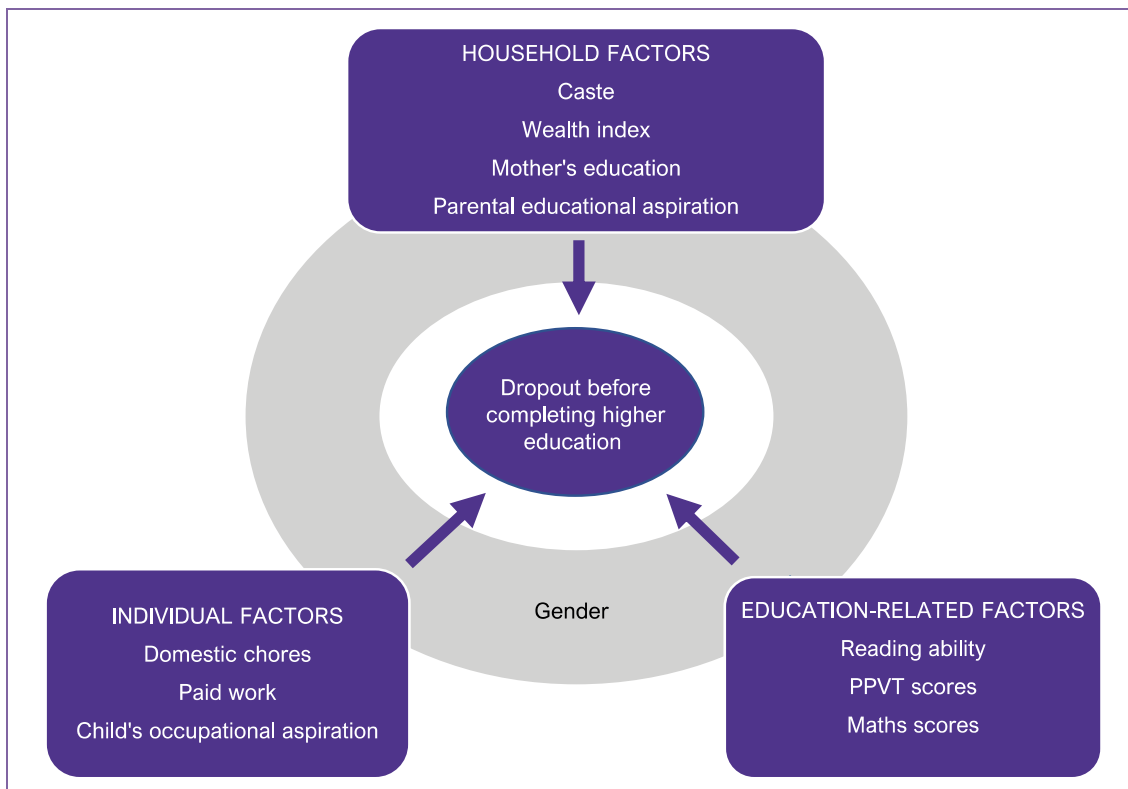3   See Kumra (2008) for details on the Young Lives sampling.

4   Five districts have been covered in Telangana since the division of Andhra Pradesh.

5   This paper does not consider the Younger Cohort as they were 19 years old at the time of Round 6 and therefore had not reached the age of higher education completion.

2.1.2. Explanatory variables

Several studies have examined the factors affecting the completion of higher education in high-income countries such as Australia (Fieger 2015), the Philippines (Ocenar 2017), the USA (Light and Strayer 2000) and Saudi Arabia (Almenaie 2018). These studies examined how socioeconomic variables, individual and education-related factors determine the successful completion of higher education. We therefore selected explanatory variables based on the literature (Figure 1). We are interested in how these selected factors interact with gender to determine dropping out before successful completion of higher education among young adults in Andhra Pradesh and Telangana. We argue that specific socioeconomic, individual and education-related factors shape girls' education at the college/university level, though some of these constraints do not only pertain to young women.

Figure 1: Factors influencing dropping out before completion of higher education

HOUSEHOLD FACTORS
Caste
Wealth index
Mother's education
Parental educational aspiration

Dropout before completing higher education

Gender

INDIVIDUAL FACTORS
Domestic chores
Paid work
Child's occupational aspiration

EDUCATION-RELATED FACTORS
Reading ability
PPVT scores
Maths scores

Source: Compiled by the authors based on literature.

Individual factors: We include three variables under this category. These include participation in paid work and domestic chores, both at age 12, as several studies have concluded that participation in work negatively affects a child's academic achievement (Ahmed 2011; Ramachandra and Ekbote 2016). This is particularly relevant for low- and middle-income countries like India, where despite legislation to prevent child labour, children continue to work in the informal sector, such as agriculture and home-based enterprises. Round 2 also collected children's occupational aspirations, asking respondents, 'what do you want to be when you grow up?' Several studies have found that occupational aspirations are expected to significantly affect access and completion of higher education (Flouri et al. 2015; Lee, Hill, and Hawkins 2012). Sánchez and Singh (2018) also noted that occupational aspirations, along with paid work and domestic chores, are significant determining factors to access to higher education in India.

Household factors: Four variables are included here. (1) Caste inequalities in higher education in India have been widely studied (Khan 2018; Madan 2020). Studies reveal that the participation of

historically disadvantaged caste groups in higher education has improved over time, but a significant gap still exists. Therefore, we aim to examine the effect of caste on higher education completion. (2) Household economic status is one of the major determinants of an individual's educational attainment as far as investment in human capital is concerned (Tilak and Choudhury 2019). This study uses a household wealth index[6] as the proxy variable for a household's economic status and as an explanatory variable in the regression model. (3) Studies have also found varying effects of parental education on their offspring's education (Demiroglari and Gürler 2020; Minello and Blossfeld 2017; Sánchez and Singh 2018). (4) Similarly, parental educational aspirations are anticipated to have a positive effect on educational attainment of their child (Sarker, Karim, and Suffiun 2017). Therefore, we include four household factors – caste, household wealth index, parental education aspiration and mother's education – in our analysis to examine their effect on dropping out before successful completion of higher education.

Education-related factors: Reading ability and maths test scores at an early age have long-term effects on learning and academic development (Abadzi 2006; Olaya et al. 2020). While examining the factors affecting secondary school completion in India, Singh and Mukherjee (2017) found that the predicted probability of secondary education completion with better reading skills at age 8 was 66 per cent among those with poor reading skills and 81 per cent among those with better reading skills. Similarly, Sánchez and Singh (2018) reported that child scores in Peabody Picture Vocabulary Test (PPVT) and maths test at age 12 are significantly associated with access to higher education in India. Therefore, we include three education-related variables in our analysis: reading ability at age 8, and PPVT and maths test scores captured at age 12 in the longitudinal data.

2.2. Empirical design

Survival analysis is used to answer the research question. Survival analysis is sometimes also called event history analysis, and is suitable for longitudinal data in which the outcome is a binary event (e.g. heart attack, death, completion of higher education). However, survival analysis has two major time methods: discrete time and continuous time (Singer and Willett 2003), which have been used by educational researchers without any clear distinctions (Donaldson and Johnson 2010; Sass et al. 2012). In this context, Kim, Chang and Park (2018) compared two survival methods, the discrete-time hazard model (*discrete*) and Cox proportional hazard model (*continuous*), to provide guidelines for choosing an appropriate survival analysis model. The study suggested using discrete-time survival models for a smaller number of time points and a larger sample size.

Though survival analysis has largely been used in medical studies to estimate the recovery time or death of patients (Klein and Moeschberger 2003), it has recently gained traction in the education field. Scholars have been using this method, for instance, to estimate student dropouts, especially using panel data (Murphy et al. 2010; Plank, DeLuca, and Estacion 2008; Polidano, Tabasso, and Tseng 2015).

This paper uses the discrete-time hazard model (Cox 1972) as this is intended for analysing the probability of an event occurring when the time variable is discretely measured and a larger sample size is available (Kim, Chang, and Park 2018). In the context of dropping out before completing higher education, a discreet-time survival model is suitable to identify factors that are associated with a higher risk of dropping out and to estimate the probability of dropping out at different points in time. Young Lives has the advantage of having gathered data on highest grade completed by age 26 in Round 6 and is therefore able to provide data on dropping out at different levels of education.

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6   The household wealth index indicates the condition of household members in terms of their use of durable goods and access to basic services.

To apply a discreet survival model, a range of variables that can be associated with the risk of dropping out before completing higher education are required. Young Lives longitudinal data provides vital information on demographic characteristics, such as age and gender, socioeconomic status such as caste and wealth index, individual factors like child work and aspirations, and education-related factors such as cognitive achievement skills during early adolescence.

The discreet-time hazard model is better than the logistic regression model used by other studies to examine education completion (Singh et al. 2014; Singh and Mukherjee 2017) as it not only allows us to examine *whether* students drop out before completing higher education but also *when* they drop out, after adjusting for several predictors.

Discrete-time survival analysis estimates the risk of occurrence (chance) of an event in a time unit. The risk, also referred to as a *hazard*, is defined by the conditional probability that the event will occur to an individual in a time period, assuming that the event has not occurred to that individual up to that time. According to Singer and Willett (2003), the specification of the discrete-time survival model is estimated as:

$$h(t_{ij}) = n\ events_j\ /\ n\ at\ risk_j \quad …(1)$$

where,

$h(t_{ij})$ = risk or hazard

$n\ events_j$ = number of samples with an event occurrence in time period *'j'*

$n\ at\ risk_j$ = the number of samples who have not yet experienced the event occurrence up to the time period *'j'*

A discrete-time survival model also includes *'j'* number of time indicators (dummy variables) such as D1, D2,…, DJ, which represent hazards of respective time periods. It also includes P number of predictors such as X1, X2,…, XP to examine the effect of predictors on the hazard. A discrete-time survival model with time indicators and predictors is specified as (Singer and Willett 2003):

$$h(t_{ij}) = \frac{1}{1+e^{-\left[\{\alpha_1 D_{1ij} + \alpha_2 D_{2ij} + … + \alpha_n D_{nij}\} + \{\beta_1 X_{1ij} + \beta_2 X_{2ij} + … + \beta_n X_{pij}\}\right]}} \quad …(2)$$

where,

α_n = Represents the hazard of respective time periods

β_n = Indicates the effects of respective predictors with controlling for other predictors

A hazard ratio of a predictor greater than unity indicates that the predictor is associated with a higher chance of dropping out before completing higher education.[7]

We estimate three different models to check for the robustness of the results. We start by including only the individual factors (domestic chores, paid work and child's occupation aspiration) in *Model 1*. In the next step, we include household factors (caste, wealth index, parental educational aspiration and mother's education) along with individual factors in *Model 2*. In the final step, we add education-related factors (reading ability, PPVT and maths test scores) alongside individual and household factors in *Model 3*. These models were run for the pooled sample and separately for young men and young women.

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7   Table A1 in the Annex provides the summary statistics of the variables chosen for the model.

3. Bivariate analysis

The panel data reveal that there is a large and significant gender gap in higher education completion rates in Andhra Pradesh and Telangana. Significantly fewer young women (34.5 per cent) have completed higher education[8] than young men (50.9 per cent) (Figure 2), and the result is significant at a 1 per cent significance level. Overall, 43 per cent of young adults aged 26 have completed higher education, whereas 33.5 per cent have completed secondary education, followed by 23 per cent with elementary education qualifications and 0.5 per cent with no formal education.

Figure 2: Education attainment of young adults at age 26
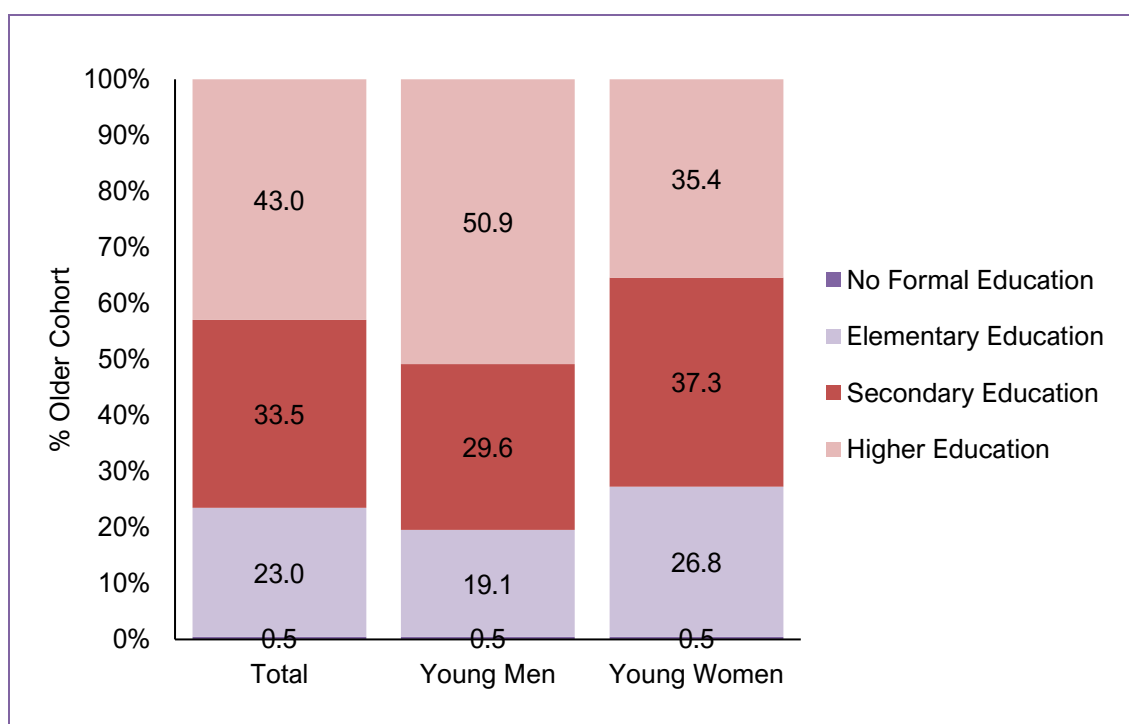
Table 1 shows the dropout rates among young men and women by individual, socioeconomic and education-related factors. There is a positive association between engagement in domestic chores at age 12 and dropout rates among young adults. The dropout rate among those who were doing domestic chores at age 12 (64.7 per cent) is significantly higher than those who were not engaged in domestic chores (39.7 per cent). This effect was higher among young women than young men.

There is a significant relationship between engagement in paid work (at age 12) and dropout rates among young adults. While 79.4 per cent of those doing paid work have dropped out before completing higher education, this is 51.1 per cent among those without such engagements. Though the results hold true irrespective of gender, the effect varies between the two groups. While 70.4 per cent of young men doing paid work at age 12 have dropped out, the corresponding figure for young women was 90.9 per cent. Thus paid work at age 12 has a worse effect on girls' trajectories through higher education.

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8   At least an undergraduate degree.

The dropout rate was significantly lower among those whose occupational aspiration (at age 12) was to secure a professional job (50 per cent) than those whose aspiration was a non-professional job (74.8 per cent).[9] The gender gap in dropout is higher among those aspiring for non-professional jobs (22.2 percentage points) than those who aimed to get a professional job (16.1 percentage points), with the results significant at a 1 per cent significance level.

Table 1: Dropout rates before completing higher education by age 26

	Total	Young men	Young women	Gender gap
Domestic chores (R2)###				
No domestic chores	39.7	37.4	44.9	7.4
1 or more hours	64.7	58.3	69.0	10.7***
Child work (R2)###				
Not engaged	51.1	42.4	58.8	16.4***
Engaged	79.4	70.4	90.9	20.5***
Child's occupational aspiration (R2)###				
Non-professional job	74.8	65.2	87.4	22.2***
Professional job	50.0	41.2	57.4	16.1***
Caste (R1###				
Scheduled Caste	64.6	58.5	71.3	12.8*
Scheduled Tribe	62.0	53.9	67.9	14.1
Backward Classes	61.5	48.7	74.4	25.6***
Other Caste	36.6	37.0	36.2	-0.9
Wealth index (R1)###				
Bottom	73.9	63.6	83.0	19.4***
Middle	59.2	52.8	65.5	12.7**
Top	38.1	31.9	44.3	12.4**
Parental education aspiration (R2)###				
Up to higher secondary	80.8	75.5	83.8	8.4*
Higher education	41.7	37.5	47.1	9.6**
Mother's education (R2)###				
No formal education	67.6	58.7	76.4	17.7***
Up to elementary	42.7	33.7	51.7	18.0**
Above elementary	37.5	35.1	39.7	4.6
Reading ability (R1)###				
None	73.1	67.2	77.6	10.4**
Able to read sentence	42.1	35.2	50.0	14.8***
PPVT score (R2)###				
Below median	73.8	67.6	78.8	11.2***
Above median	38.4	30.6	46.9	16.3***
Maths score (R2)###				
Below median	71.2	65.3	76.2	10.9**
Above median	41.4	33.8	49.7	15.9***
Overall	**57.0**	**49.1**	**64.6**	**15.4***

Notes: R = Young Lives survey rounds. T-test significant at: *** p<0.01, ** p<0.05, * p<0.1.
Chi-square test of association significant at: ### p<0.01, ## p<0.05, # p<0.1.

9   A professional job requires specific advanced training and education. These jobs include doctor, teacher, lawyer, artist, author, and scientist. Non-professional jobs can be started with little training or education. These jobs include cashier, salesperson, electrician, and customer care worker.

An examination across castes reveals that the gender gap (favouring young men) in dropout rate is highest among those belonging to Backward Classes (25.6 percentage points), followed by Scheduled Castes (12.8 percentage points). While the gender gap is statistically significant in the case of Scheduled Castes and Backward Classes, it is insignificant in the case of Scheduled Tribes and Other Castes. In contrast, the dropout rate is slightly less among Other Caste young women (36.2 per cent) than Other Caste young men (37 per cent).

A substantial gap in dropout rate is seen among young adults based on the household wealth index. Around three-quarters of the people in the bottom wealth tercile[10] have dropped out before completing higher education, whereas only 38.1 per cent of people in the top tercile (Table 1) have done so. There is also a significant negative relationship between the wealth index and gender gap in dropout rate. The gender gap (favouring men) is 19.4 percentage points among those in the bottom tercile and 12.4 percentage points among those in the top tercile, and this result is statistically significant.

The dropout rate among those whose parents' aspiration was that their child should attain higher education (41.7 per cent) is almost half that of those whose parents aspire that their child attain an education level below graduation (80.8 per cent) (Table 1). The gender gap in dropout rate (favouring men), which is found to be statistically significant, is greater among those whose parents aspire that they complete higher education (9.6 percentage points) than those whose parents aspire that they attain education up to secondary level (8.4 percentage points).

The findings also reveal that mother's education is negatively associated with the dropout rate of young adults. Individuals whose mothers have completed above elementary-level education have a significantly lower dropout rate of 37.5 per cent, compared to 67.6 per cent of those whose mothers did not receive any formal education (Table 1). Further, the gender gap in dropout rate was 17.7 percentage points (statistically significant) among those whose mothers did not receive formal education, and 4.6 percentage points among those whose mothers attained above elementary-level education. This is in line with the view that the significance of higher education is better appreciated among better-educated parents, who might also be less gender biased when making educational decisions related to their children. Further, better-educated parents have higher educational aspirations for their children and spend more on education (Kuvat and Kizilgöl 2020; Yan et al. 2021).

Education-related factors also affect a child's higher education attainment. For instance, the dropout rate among those who could read sentences at age 8 (42.1 per cent) is significantly lower than those without good reading skills (73.1 per cent). This effect is more significant in the case of young men than young women. The dropout rate among young men with age-appropriate reading skills (35.2 per cent) is less than that of young women with these skills (50 per cent).

There is a significant negative association between dropping out before completion of higher education and PPVT and mathematics test scores at age 12.[11] The dropout rate is considerably lower among those securing above-median scores compared to those securing below-median scores in PPVT and mathematics. The dropout rates ranged from 38.4 per cent to 73.8 per cent for above and below-median PPVT scorers, and from 41.4 per cent to 71.2 per cent for maths test scorers (Table 1).

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10 The wealth index is categorised into three quintiles: lower, middle, and upper class.

11 The percentage of marks secured by respondents in these tests are divided into two groups, below and above median scores.

4. Multivariate analysis

We estimate three different models to examine the effect of selected explanatory factors on dropout rates – Model 1 with individual factors, Model 2 with individual and household factors, and Model 3 with individual, household and education-related factors. These models were run for the pooled sample and separately for young men and young women, with the results presented in terms of ratios which show dropout risk before completing higher education. As shown in Figure 3, the probability of dropping out increases with years of education and becomes highest after 15 years of education: undergraduate degree level. The probability of dropping out among young adults is 0.025 at Grade 5, which increases to 0.07 at Grade 10 and becomes much greater at 0.16 at 15 years of education (university level) (Figure 3).

Figure 3: Hazard probability for dropping out before completing higher education
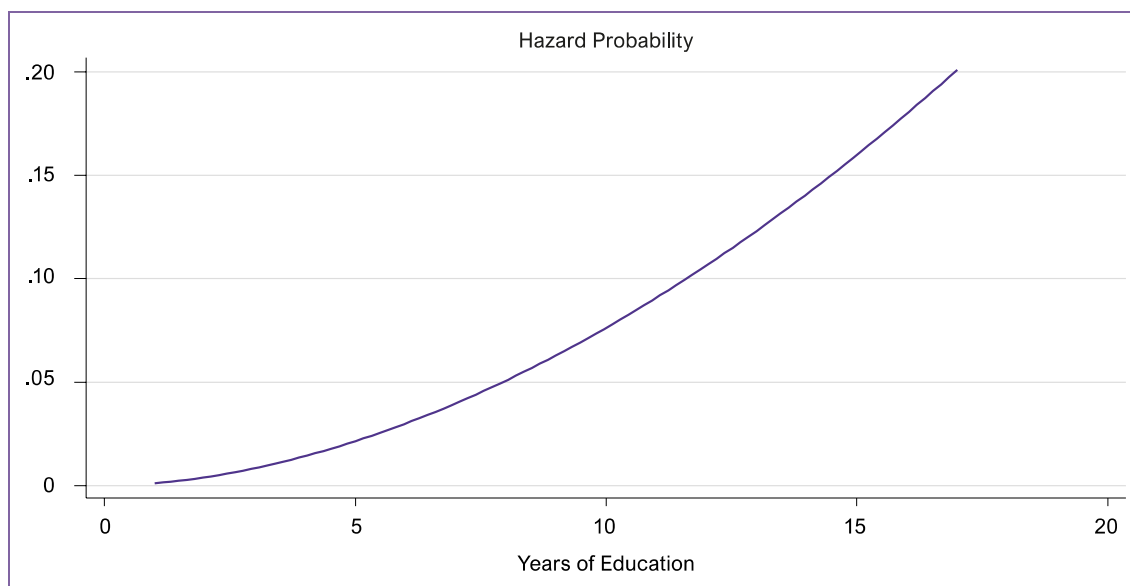

Table 2 presents the hazard ratios of dropping out before completing higher education among young adults aged 26 in Andhra Pradesh and Telangana, after adjusting for the explanatory variables. The findings reveal that the dropout risk among young women is higher than among young men. Young women are 1.7 times more likely to drop out than young men at the university level, after controlling for individual factors. The gender gap is highly significant and holds true even after controlling for household and education-related factors. Specifically, the probability of dropping out for young women is 1.6 times higher when controlled for individual and household factors; and 1.4 times higher when controlled for individual, household and education-related factors.

The hazard probability graph (Figure 4) shows that while the probability of dropping out is positively associated with years of education for both young men and women, the steeper curve for young women indicates greater dropouts. For instance, the probability of dropping out among young women and young men is 0.03 and 0.02 at Grade 5, respectively, and increases to 0.09 and 0.07 at Grade 10. Singh and Mukherjee (2017) reported similar findings on the completion of secondary education among Young Lives children in India. They found that the predicted probabilities of completion rate of secondary education were higher for boys (80 per cent) than girls (72 per cent) – a difference of 8 percentage points positively biased towards boys (Singh and Mukherjee 2017, 9).

Figure 4: Hazard probability for dropping out before completing higher education, by gender
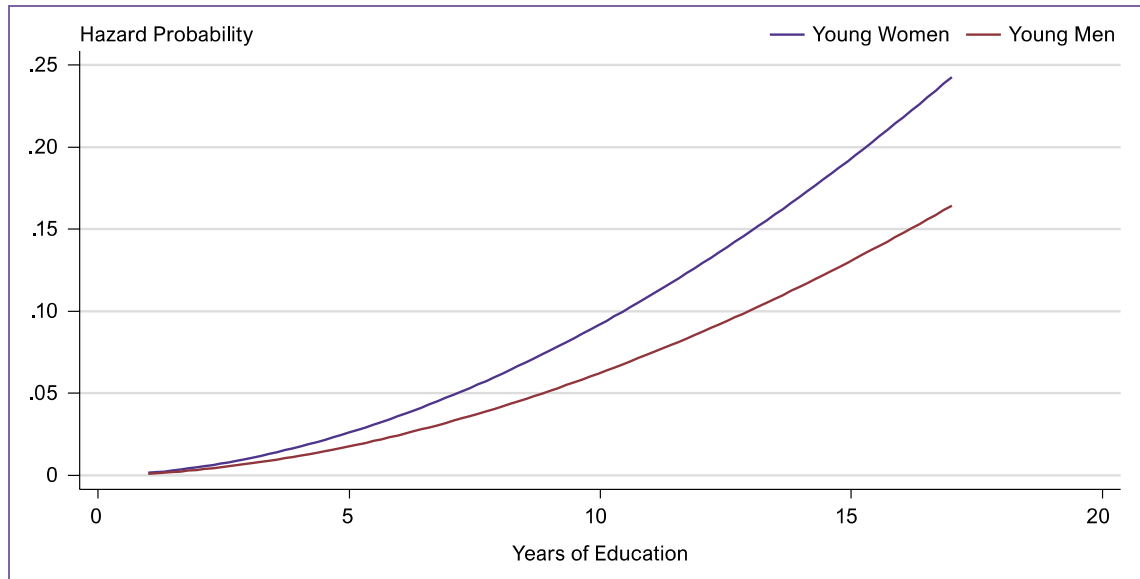
Model 1 further reveals that young adults who were engaged in domestic chores and paid work at age 12 are at significantly higher risk of dropping out than those who were not engaged in these activities at the same age. The dropout risk of those who were engaged in domestic chores is 1.7 times that of those who were not engaged (Table 2). In Model 2 and 3, the likeliness of dropping out is around 1.4 times among those who were engaged in domestic chores. Similarly, those who were engaged in paid work are 2.4 times more likely to drop out than those without such engagements in Model 1, which becomes 1.7 times and 1.6 times when controlled for household and education-related factors in Model 2 and 3, respectively.

Those whose occupational aspiration at age 12 was to secure a non-professional job are 2.5 times more likely to drop out than those who aspired to secure a professional job. This risk is 2.3 and 2.1 times, respectively, when controlled for household factors in Model 2 and household and education-related factors in Model 3, in addition to the individual factors.

Results reveal that household factors are also significant in determining dropout before completing higher education. The risk of dropping out among Scheduled Caste and Backward Class young adults is around 1.6 times higher than for their Other Caste counterparts. After education-related factors are controlled for, the dropout risk among Backward Class young adults is 1.4 times. Similarly, the dropout risk increases with a downward shift in the household wealth tercile, and the result is statistically significant. Young adults from bottom-tercile households are 1.7 times more likely to drop out than their counterparts from top-tercile households. When controlled for education-related factors in Model 3, the direction of the effect of household wealth on dropping out remains the same, but the magnitude is slightly reduced. Those from bottom-tercile households are 1.5 times more likely to drop out than those from top-tercile households.

Individuals whose parents expected them to attain up to higher secondary education are 2.3 times more likely to drop out than those whose parents expected them to complete higher education. Further, those whose mothers have not received any formal education are 1.4 times more likely to drop out than those whose mothers have attained above elementary-level education. The direction of the effect of mother's education on dropping out remains the same and the magnitude is almost equal, when controlled for education-related factors in Model 3.

Factors relating to educational background (Model 3) are also found to significantly affect the risk of dropouts. Those without age-appropriate reading skills (at age 8) are 1.7 times more likely to drop out than those with age-appropriate reading skills. Similarly, those performing poorly in PPVT and maths tests at age 12 are 1.6 times and 1.3 times, respectively, more likely to drop out than above-median performers.

Table 2: Hazard ratio for dropping out before completing higher education (Models 1 to 3)

	Model 1			Model 2			Model 3		
	Overall Eqn. 1	Young women Eqn. 2	Young men Eqn. 3	Overall Eqn. 4	Young women Eqn. 5	Young men Eqn. 6	Overall Eqn. 7	Young women Eqn. 8	Young men Eqn. 9
Individual factors									
Gender									
Young men[Ref]									
Young women	1.725*** (.172)	---	---	1.565*** (.167)	---	---	1.393*** (.151)	---	---
Domestic chores at age 12									
No[Ref]									
Yes	1.668*** (.198)	1.686*** (.311)	1.675*** (.262)	1.355** (.173)	1.385* (.275)	1.344* (.232)	1.350** (.178)	1.367 (.274)	1.378* (.248)
Paid work at age 12									
Not engaged[Ref]									
Engaged	2.380*** (.254)	2.733*** (.400)	2.060*** (.319)	1.741*** (.201)	1.806*** (.296)	1.751*** (.296)	1.617*** (.194)	1.722*** (.294)	1.630*** (.295)
Child's occupational aspiration at age 12									
Professional job[Ref]									
Non-professional job	2.513*** (.248)	2.905*** (.390)	2.133*** (.307)	2.291*** (.243)	2.540*** (.376)	2.027*** (.313)	2.106*** (.228)	2.007*** (.309)	2.257*** (.362)
Household factors									
Caste									
Other Caste[Ref]									
Scheduled Caste	---	---	---	1.623*** (.286)	1.748** (.422)	1.397 (.364)	1.349 (.249)	1.600* (.395)	.962 (.272)
Scheduled Tribe	---	---	---	1.269 (.262)	1.240 (.351)	1.429 (.447)	1.301 (.281)	1.317 (.384)	1.148 (.390)
Backward Class	---	---	---	1.564*** (.245)	1.887*** (.410)	1.208 (.281)	1.426** (.234)	1.776*** (.394)	1.023 (.260)
Wealth index tercile at age 8									
Top[Ref]									
Middle	---	---	---	1.303* (.178)	1.355* (.240)	1.226 (.269)	1.103 (.155)	1.084 (.198)	1.102 (.249)
Bottom	---	---	---	1.721*** (.242)	2.013*** (.368)	1.445 (.331)	1.501*** (.215)	1.697*** (.310)	1.228 (.295)
Parental educational aspiration at age 12									
Higher education[Ref]									
Up to higher secondary	---	---	---	2.319*** (.248)	2.033*** (.296)	2.653*** (.425)	2.255*** (.244)	2.116*** (.312)	2.491*** (.417)
Mother's education									
Above elementary[Ref]									
Up to elementary	---	---	---	1.061 (.189)	1.400 (.328)	.711 (.200)	1.026 (.189)	1.357 (.325)	.650 (.193)
No formal education	---	---	---	1.449*** (.226)	1.632** (.342)	1.205 (.283)	1.328* (.209)	1.439* (.303)	1.171 (.285)
Education-related factors									
Reading ability at age 8									
Able to read sentences[Ref]									
None	---	---	---	---	---	---	1.705*** (.188)	1.517*** (.219)	2.116*** (.373)
PPVT score at age 12									
Above median[Ref]									
Below median	---	---	---	---	---	---	1.588*** (.192)	1.525*** (.247)	1.679*** (.312)
Maths test score at age12									
Above median[Ref]									
Below median	---	---	---	---	---	---	1.309** (.155)	1.400** (.219)	1.193 (.232)
Constant	.000*** (.000)	.001*** (.000)	.001*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)
Prob > Chi²	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NOB	822	425	397	764	392	372	738	381	357

Notes: R = Young Lives survey rounds. [Ref]: Reference category.
Dependent variable: hazard for dropping out before higher education, '1' Yes, '0' No.
Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

An examination of the dropout risk before completing higher education was also undertaken separately for young men and young women. When controlling for individual factors, the effect of domestic chores (at age 12) on dropping out before completing a higher education degree was significant for both young women and men. Young women and men who were engaged in domestic chores were both about 1.7 times more likely to drop out than those who were not engaged.

After controlling for household and individual factors, young women and men who were engaged in domestic chores, were 1.4 and 1.3 times respectively more likely to drop out than their counterparts.[12]

Similarly, young women and men who were engaged in paid work (at age 12) are 2.7 times and 2.1 times, respectively, more likely to drop out than those without such engagements (Table 2).[13] When controlled for household factors in Model 2, and household and education-related factors in Model 3, the direction of the effect of paid work on dropouts remains the same, but the magnitude differs slightly. However, the effect of paid work on dropout risk remains higher for young women than young men.

Young women and young men whose occupational aspiration (at age 12) was to secure a non-professional job are 2.9 times and 2.1 times, respectively, more likely to drop out than their peers with ambitions of attaining a professional job when they grow up.[14] The direction of the effect of occupational aspiration on dropouts remains the same after controlling for household and education-related factors but the magnitude varies slightly. In Model 3, young women and men in the former group are 2.0 times and 2.2 times more likely to drop out than their peers aspiring for a professional job.

Caste identity plays a significant role in dropouts among young women, although the results for young men are statistically insignificant. Young women from Scheduled Caste and Backward Class communities are 1.7 times and 1.9 times, respectively, more likely to drop out than Other Caste women. After controlling for education-related factors, these figures are 1.6 times and 1.8 times. Similarly, the effect of household wealth index on dropout risk is found to be statistically significant among young women and not statistically significant for young men. Young women from bottom-tercile households are 2.0 times more likely to drop out than young women from top-tercile households, with the risk decreasing to 1.7 times when controlling for education-related factors.

The effect of parental educational aspiration on dropouts was relatively lower among young women than young men. Young women and men whose parents expect them to complete up to higher secondary education are 2.0 times and 2.6 times more likely to drop out than those whose parents expect them to attain higher education. When controlling for education-related factors in Model 3, the direction of this effect remains the same, and the magnitude is almost equal.

Education-related factors also had differential effects on the dropout risk among young women and men. For instance, young women and men without age-appropriate reading skills (at age 8) are 1.5 times and 2.1 times, respectively, more likely to drop out than their counterparts with age-appropriate reading skills. Furthermore, young women and men with below-median PPVT scores at age 12 are 1.5 times and 1.7 times, respectively, more likely to drop out than their above-median counterparts. Similarly, young women with below-median maths test scores at age 12 are 1.4 times more likely to not complete higher education than their above-median counterparts.

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12   While 82.5 per cent of 12-year-old girls were engaged in domestic chores, this was 55.7 per cent for 12-year-old boys.

13   Around 19.1 per cent of girls were engaged in paid work at age 12; this was slightly higher (23.7 per cent) for 12-year-old boys.

14   While 24.7 per cent of 12-year-old girls aspired to secure a non-professional job when they grow up, this was 33.3 per cent for 12-year-old boys.

5. Conclusion

This paper explored the gender differentials in dropout rates before completing higher education among young adults in the states of Andhra Pradesh and Telangana in India. The findings from the discreet hazard model estimates indicate that in the final model, after adjusting for effects of individual, household and education-related factors, young women are, at 1.4 times, at significantly higher risk of dropping out before completing higher education than young men. In addition, girls who were engaged in paid work at age 12 are, at 1.7 times, significantly more likely to drop out before completing higher education, compared to those who were not engaged in paid work. The occupational aspiration of girls is also found to be a significant predictor of higher education completion. For example, those whose occupation aspiration at a younger age was to secure a non-professional job are twice as likely to drop out as those who aspired to secure a professional job.

Girls from Backward Class households are, at 1.8 times, significantly more likely to drop out compared to Other Caste (upper-caste) households, while those from bottom-tercile households are 1.7 times more likely to drop out before completing graduation. Poor cognitive skills at early ages are also found to have significant detrimental effects on higher education completion. For instance, girls without age-appropriate reading skills are 1.5 times more likely to drop out than those who had such skills. Similarly, girls who achieved below-median PPVT and mathematics scores at age 12 are 1.5 and 1.4 times, respectively, more likely to drop out compared to girls who scored better in these tests. The discrete-time survival model findings further indicate that individual, household and educational factors perpetuate gender inequity in higher education completion.

Individual factors like child's aspiration, domestic chores and paid work at an early age are not only significantly linked with dropouts before completing higher education, but also influence gender differentials in dropouts. Shifting social norms around child labour is critical and will require working with communities in order to change patriarchal beliefs and customs. Girls from the most socially and economically disadvantaged households seem to be doubly disadvantaged in transitioning successfully through higher education. This is similar to evidence from a recent qualitative study from Andhra Pradesh (British Council 2021) that showed that increased expenditure related to higher education in terms of enhanced fees and transportation costs are likely to cause young people from poor households to drop out, with financial constraints having more of an impact on girls. This gender inequality is largely because of long-held son preferences that lead parents to spend more on the education of their sons, while girls are made to do the bulk of the domestic chores from an early age.

The recently adopted National Education Policy 2020 (Ministry of Human Resource Development 2020) which is aligned to the 2030 Sustainable Development Goals considers gender as a cross-cutting theme and aims to achieve gender equality in education in partnership with states and local community organisations (British Council 2021). The policy aims to increase the GER in higher education to 50 per cent by 2035, from its current level of 27.3 per cent. Equitable participation of men and women in higher education is the cornerstone for the growth and prosperity of a country. Low gender parity in higher education completion is likely to have a negative impact on economic growth, since education is an important measure towards women's empowerment and participation. India will not be able to harness the 'demographic dividend' of a large youth population unless we attain gender parity in all spheres, including higher education.

Addressing parental preference for providing better quality education to sons (Himaz 2009; Saha 2013) is important to achieve gender equality in education. Therefore, sensitisation of communities is required, particularly through media and families, to address gender inequalities and familial gender stereotypes such as gendered roles. To mitigate the gender gap in higher education completion, this paper provides a rationale for intervention at the institutional level, particularly focused on socially economically disadvantaged students. This could be in the form of enhanced scholarships and hostel facilities specifically targeting girls to support their access to, and completion of, higher education.

It is important to underscore that higher education in India is not homogenous: it is highly stratified and uses diverse business models with a great deal of difference in fees and quality (Patel 2022; Hegde 2022). For instance, tuition fees in professional disciplines such as engineering, medicine and management are relatively higher than in general disciplines such as social sciences and humanities (Choudhury and Kumar 2022). Therefore, future research could examine the magnitude of gender inequalities reproduced by costly professional courses through a higher education survey that examines both institutional and personal factors.

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Annex

Table A1: Summary statistics of the variables used in the regression analysis

Variable	NOB	Mean	SD	Min	Max
Completed higher education (R6)	838	0.4296	0.4953	0	1
Gender (R1)	864	0.4838	0.5000	0	1
Caste (R1)	864	1.8275	1.2118	0	3
Reading ability (R1)	856	0.5105	0.5002	0	1
PPVT score (R2)	846	1.4905	0.5002	1	2
Maths score (R2)	852	1.4859	0.5001	1	2
Wealth index tercile (R1)	864	1.9965	0.8148	1	3
Parental education aspiration (R2)	837	0.6225	0.4851	0	1
Paid work (R2)	864	0.2130	0.4096	0	1
Child occupation ambition (R2)	864	0.7118	0.4532	0	1
Mother's education (R2)	826	1.5969	0.7868	1	3

Notes: SD = Standard Deviation. R = Young Lives survey rounds.

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