Journal of Economic Policy and Management Issues

ISSN: 2958-6313 Volume 1, No. 1, 2022, pp. 21-49

Education attainment and household education expenditure in Uganda: An empirical investigation

W. Nabiddo
School of Economics, Makerere University, Uganda
Email: mukisawinnie@yahoo.com

B.L. Yawe
School of Economics, Makerere University, Uganda

F. Wasswa
School of Economics Makerere University, Uganda

Keywords:

- Education attainment
- Household education spending
- Random effects ordered Probit model

Abstract

While Uganda has implemented several education policies and programmes, education attainment remains dismal and below the national development targets. On the other hand, household education spending has been growing. Using the Uganda National Household Survey (UNHS) 2019/20, the study employs an ordered probit model and random effects ordered probit model to examine the effect of household education expenditure on education attainment for both boys and girls in Uganda. The results confirm the positive association for both boys and girls between household education expenditure and attainment of 7 years and 11 years of schooling. Therefore, household resources for education expenditure remain essential for achieving higher years of schooling. In light of the above, the study recommends government to promote household contribution to education since this increases the probability of attaining higher years of schooling.

1. Introduction

There is consensus in the existing literature on the role of education in promoting economic growth and development and ultimately reducing poverty, particularly in developing countries (Schultz, 1961; King and Lillard, 1983; Wolfe and Behrman, 1984). According to human capital theory, education allows individuals to gain better skills and knowledge needed to access jobs, hence enhancing productivity and economic growth, which in turn helps in eradicating extreme poverty and hunger (Schultz, 1961; Mincer, 1970; Bryant, 1990; Becker, 2009).

More importantly, higher education at the post-secondary level or beyond is becoming increasingly important to maintain socio-economic well-being in a world with a growing population and rapid technological advancement (Lemieux, 2006; Carlson and McChesney, 2014). Furthermore, some studies show non-financial advantages of higher education, such as improved health outcomes and more successful marriages (Oreopoulos and Petronijevic, 2013). In addition, policymakers are increasingly focused on improving girls' education, which has additional nonmarket benefits for family welfare through improved child nutrition, decreased fertility, and lower infant mortality rates (Strauss and Thomas, 1995).

The level of a country's education attainment is a major indicator of the quality of human capital stock (UBOS, 2018). Therefore, in general, increasing education levels has been one of the significant goals of development programs. Indeed, education remains prioritized in the Human Capital Development Programme of the Third National Development Plan (NDPIII) as fundamental to the country's industrialization agenda (NPA, 2020a). The NDPIII is the third of six NDPs that will guide the country in achieving the Uganda Vision 2040. The Sustainable Development Goal Target 4.4 proposes substantially increasing the number of youth and adults with relevant technical and vocational skills for increased employment.

The Ugandan government has implemented programs to increase education attainment and participation levels. For example, the government introduced the Universal Primary Education (UPE) program in 1997; the Universal Secondary Education (USE) in 2007 to increase the number of students enrolled in lower secondary schools and improve secondary education quality. Furthermore, the government thirdly implemented the Universal Post O'level Education and Training (UPOLET) program in 2011 to extend free upper secondary education to those who had completed lower secondary education.

Notwithstanding the policy interventions, Uganda's average years of schooling increased from 4.7 in FY2012/13 to 6.1 in FY2019/20 and further to 5.7 in FY2021/22 (UNDP, 2022), below the 11 expected average years of schooling. In Uganda, a child completes seven years of schooling by age 18, compared to 8.1 for their regional counterparts (World Bank, 2019). In addition, the actual years of learning are only 4.5, with 2.5 years considered 'wasted' due to low educational outcomes in literacy and numeracy as a result of poor quality of education. The low educational attainment, however, will leave many young workers with high unemployment rates, chronically low wages, and low wage growth.

On the other hand, education expenditure is one of the most significant educational inputs (Zhou & Zhang, 2015). Therefore, it is crucial for a nation's economic development and the development of its human capital (Kaganovich and Zilcha, 1999; Shi, 2006). For example, household spending on education in Uganda has increased from an average of Shs 104,072 in 2002/3 to Shs 230,105 in 2016/17 and further to Shs 440,000 in 2019/20 (UBOS, 2020). With the growing number of parents spending more on education, evaluating how household educational spending affects educational attainment is vital for researchers and those involved in educational systems.

However, there are differences in boys' and girls' educational attainment due to parental preferences since social factors may influence taste preferences. For example, many societies expect girls to learn housework before marriage. Parents may feel that girls miss out on 'home training' when they spend more time in school (Hill and King, 1995). Therefore, they may hesitate to invest in or send their daughters to school.

In this regard, this study aims to investigate the effect of household education expenditure in explaining education attainment for both boys and girls, considering the targeted 11 years of schooling for Uganda. This includes 7 years of primary education and 4 years of lower secondary education

2. Education Attainment and Household Education Expenditure in Uganda

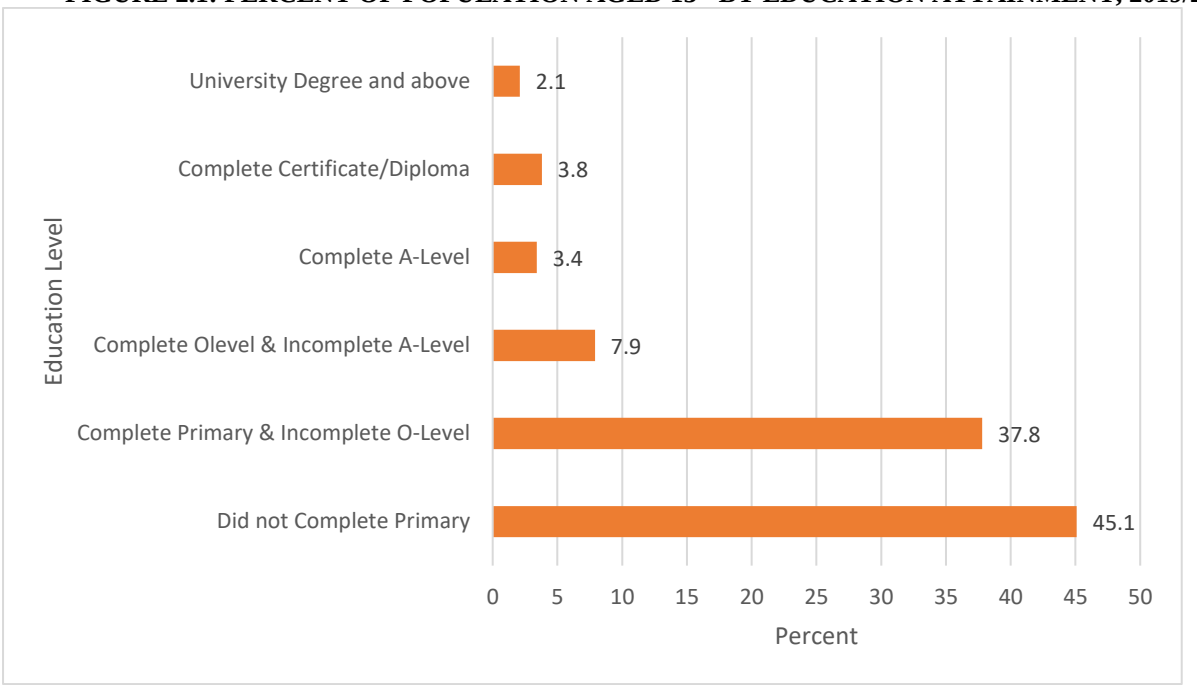
The Ugandan government has implemented programs to increase education attainment and participation levels. The government introduced the Universal Primary Education (UPE) program in 1997, promising to cover the costs of education for four children per family. In 2000, the program was revised to include all children (Bategeka and Okurut, 2006), and parents are still responsible for paying for school supplies, meals, exercise books, uniforms, and physical labour (Mehrotra and Delamonica, 1998; Black et al., 1999).

The UPE Policy had five main goals: 1) to make education accessible to all Ugandans; 2) to ensure that all children completed the primary cycle of education; 3) to make education equitable to eliminate disparities and inequalities; 4) to ensure that education is affordable for most Ugandans; and 5) to reduce poverty by allowing everyone to acquire fundamental skills (NPA, 2018). Introducing free primary education and eliminating school fees have significantly increased the number of children enrolled in primary school. Remarkably, the number of students enrolled rose from 2.6 million in 1995 to 7.2 million in 2005 and 10.8 million in 2019.

The government implemented Universal Secondary Education (USE) in 2007 to increase the number of students enrolled in lower secondary schools and improve secondary education quality. Furthermore, the government thirdly implemented the Universal Post O'level Education and Training (UPOLET) program in 2011 to extend free upper secondary education to those who had completed lower secondary education. The policies include paying learners' capitation grants providing physical infrastructure, instructional materials, training, recruiting, deploying teachers, and enhancing school inspection and management.

In 2019/20, close to four in every ten persons (39 percent) had some primary education, and one in every ten persons completed primary education (13 percent); secondary education (8.6 percent); and post-secondary and above (8.9 percent) respectively (UBOS, 2020).

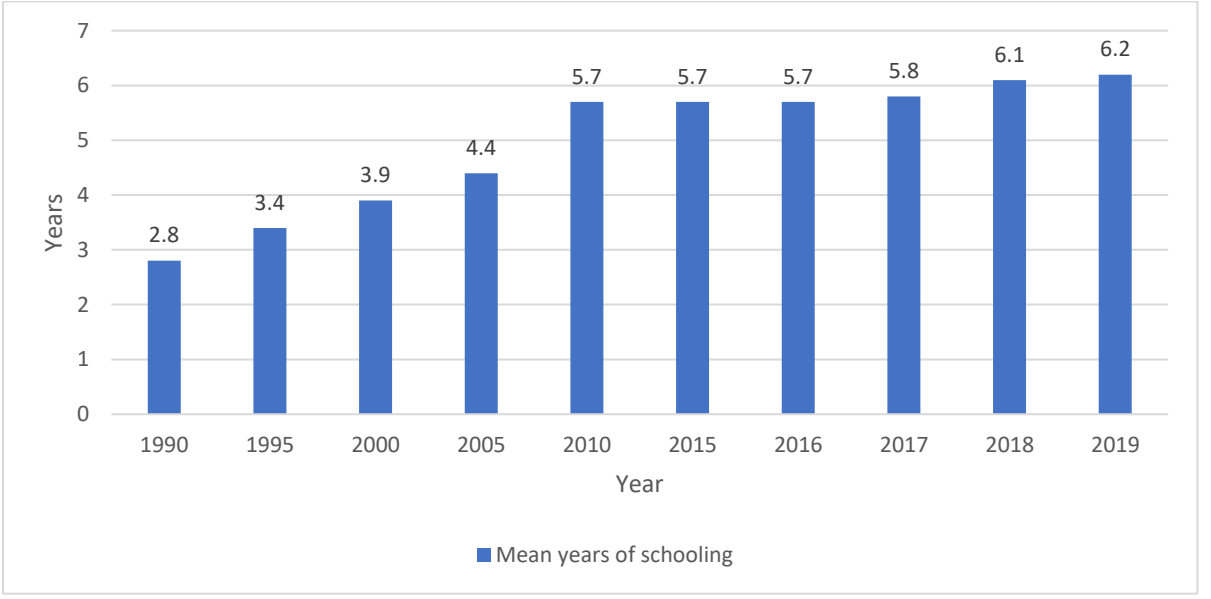
FIGURE 2.1: PERCENT OF POPULATION AGED 13+ BY EDUCATION ATTAINMENT, 2019/20



Source: Uganda Bureau of Statistics (UBOS, 2020)

As shown in figure.2.2, the country is yet to achieve the development goal of attaining the average years of schooling espoused in the NDPII and now in the NDPIII. Specifically, both the NDPII and the NDPIII aim to increase the country's average years of schooling to 11 years – completion of the 7 years of primary education and 4 years of lower secondary education.

FIGURE 2.2 UGANDA'S TIME SERIES DATA FOR MEAN YEARS OF SCHOOLING



Source: Etracted from Uganda Human Development Report, World Bank (2020)

In Uganda, a child completes seven years of schooling by age 18, compared to 8.1 for their regional counterparts (World Bank., 2019). In addition, the actual years of learning are only 4.5, with 2.5 years considered 'wasted' due to low

educational outcomes in literacy and numeracy as a result of poor quality of education. The low educational attainment, however, will leave many young workers with high unemployment rates, chronically low wages, and low wage growth.

The Education Act of 2008 defines the government's and households' responsibilities in education and training. The Education Act of 2008 requires parents to provide their children with food, clothing, shelter, medical care, and transportation. The government is required by Section 5(1)(a) to provide learning materials, structural development, and teacher welfare. The government is the world's largest funder of education, but not in Uganda. In Uganda, households contribute to education. Household education spending accounts for a larger share of GDP than public education spending (Table 2.1). Family education spending has increased since 2010/11, reaching 3.6 percent of GDP in 2013/14. This is due to increased education spending.

TABLE 2.1: HOUSEHOLD EDUCATION EXPENDITURE

	2009/10	2010/11	2011/12	2012/13	2013/14
Household education expenditure (million UGX)	1,564,296	1,557,664	1,971,842	2,178,758	2,441,540
Household education expenditure as % of GDP	3.82%	3.31%	3.32%	3.41%	3.58%
Public education expenditure as % GDP	2%	2%	2%	2%	2%

Source: Extracted from the National Education Accounts Report (NEA), MoES 2016

Primary education accounts for the lion's share of household education spending. From 2010 to 2014, primary, secondary, and higher education received significant household education expenditures (Table 2.2). Primary education accounted for 39 percent of total household education expenditure, lower and upper secondary education for 35 percent and higher education accounted for 20 percent. Pre-education, Teacher Training, and BTVET combined had the lowest proportions of household usage at less than 6 percent. Nonetheless, BTVET spending is increasing. BTVET spending increased by 119 percent, while higher education spending increased by 76 percent. Primary education increased by 60 percent, and secondary education increased by 46 percent. Teacher education increased by 37 percent, upper secondary education increased by 32 percent, and pre-education increased by only 17 percent.

TABLE 2.2: HOUSEHOLD EDUCATION EXPENDITURE BY EDUCATION LEVEL

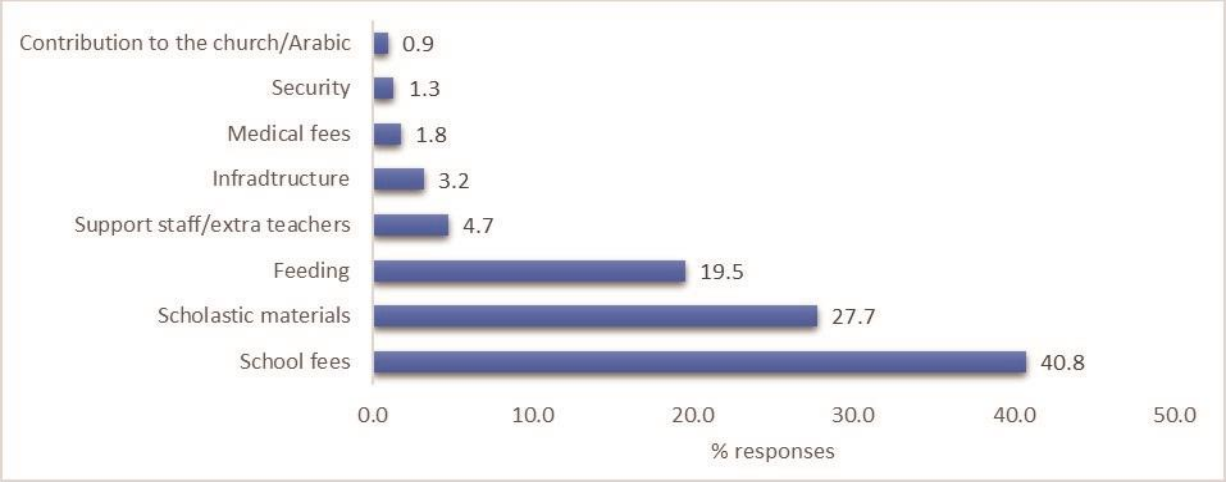
Education Level	2009/10	2010/11	2011/12	2012/13	2013/14
Pre-primary	58,802	25,651	51,522	64,708	66,617
Primary	599,419	587,721	764,480	837,123	960,868
Lower Secondary	450,705	444,878	549,140	628,369	660,222
Upper secondary	113,587	126,542	149,556	166,077	150,109
Teacher Training Education	21,103	22,118	27,143	28,060	28,884
BTVET	16,404	22,363	27,772	36,585	33,759
Higher education	307,276	328,392	402,230	417,837	541,080
Total	1,567,296	1,557,665	1,971,843	2,178,759	2,441,539

Source: Extracted from the National Education Accounts Report (NEA), MoES 2016

Contrary to UPE's free primary education policy, school fees dominate household primary education spending (Figure 2.3). Parents pay for over 50 educational products, with school tuition being the biggest. In FY2009/10-FY2013/14, 41 percent of family education spending goes toward costs. These costs rose from UGX 683,318 in 2010 to UGX 1,070,952 in 2014. (MoES, 2016). Other goods include teaching supplies and school meals (19.5 percent). Development costs, remedial instruction, exam fees, extracurricular activities, PTA money, report books, boarding expenses, board fees, holiday packages, different classes, school trips, utility charges (water and electricity), emptying toilet charges, art and craft training, and P.7 recommendation letters. Parents pay for instructors' health benefits, students' lunches, school transportation, and medical costs. Brooms, toilet paper, building materials, and sanitary pads are also needed. These extra expenditures/requirements increase household education costs, limiting access.

Furthermore, the evaluation reveals that parents also pay for government-funded items. This is due to insufficient government funding to run primary schools effectively. Government schools divide tuition into several components, resulting in multiple payments (see Figure 2.3).

FIGURE 2.3: ITEMS PAID FOR BY HOUSEHOLDS IN PUBLIC PRIMARY SCHOOLS (% RESPONSES)



Source: Extracted from the National Education Accounts Report (NEA), MoES 2016

Due to the UPE policy of subsidized primary education in government schools, the household education cost per pupil in private schools is four times that of public schools at the primary level. This disparity is negligible at the secondary school level (Table 2.3). However, at higher education levels (BTVET, Teacher Training, and others), public expenditure per student in public schools is 44 percent higher than in private schools. This has important implications: households spend more when there is value for money. As a result, they spend more per pupil in private schools at the primary level because the learner outcomes are significantly different and better in private schools. In the case of higher education, however, the opposite is true.

Nonetheless, primary public schooling is subsidized and thus less expensive. There are also disparities in expenditure per pupil between rural and urban schools, as rural schools pay lower fees than urban schools. Rural schools pay higher annual fees than urban schools (Table 2.3).

TABLE 2.3: HOUSEHOLD EXPENDITURE ON EDUCATION PER PUPIL

Education level	Average costs per student		
	Public-private		Public and private
Pre-Primary Education		129,906	129,906
Primary Education	102,509	525,778	92,539
Lower Secondary Education	1,255,313	1,176,895	452,325
Upper secondary education	1,992,875	2,127,016	802,367
Teacher training Education	3,127,347	622,342	1,142,205
BTVET	921,597	622,342	718,228
Higher Education	4,159,513	3,305,980	1,863,621

Source: Extracted from the National Education Accounts Report (NEA), MoES 2016

3. Literature Review

A dearth of literature has examined the effect of household education spending on education attainment. Tansel (2002) found that household education spending positively correlates with school enrolment at the primary, middle, and high school levels as the education outcome variable using an ordered probit model and a well-designed dataset covering 26,256 families in Turkey. Similarly, using Ordinary Least Square (OLS) regression and data from the National Education Longitudinal Survey (NELS), Israel, Beaulieu, and Hartless (2001) discovered a positive relationship between household education expenditure and math test scores, reading test scores, and school attendance Furthermore, Liang (2012) discovered, using data from over 2,000 families in five regions of China, that household education investment has a significant positive effect on the changes in student test scores.

In contrast, Liu and Xie (2015), using data from the 2010 China Family Panel Studies (CFPS) and OLS regression, found that family education expenditures have no impact on the verbal ability of Chinese students. Similarly, Zhang and Zhou (2017) examined the effect of household education expenditure on National College Entrance Exam (NCEE) performance in China and concluded that the average effect of household education expenditure on student NCEE achievement is not statistically significant.

The literature review indicates a scanty of studies examining household education spending and education attainment. Furthermore, the existing studies have only focused on China and Turkey and none on a developing country like Uganda with increasing household expenditure on education. However, despite the limited studies, there are inconclusive results on the effect of household expenditure on education attainment, as some studies find a positive association between household education spending and education attainment. In contrast, others find no significant effect on household education spending.

The gap in knowledge on the effect of household education spending on education attainment in Uganda is evident. In Uganda, studies have examined drivers of student enrolment and school dropouts in Uganda's primary schools (Okumu, *et al*, 2008; Tamusuza, 2011; Musimenta, 2018; Candia *et al* 2018; Namara *et al* 2018). Other studies have focused on traditional inputs regarding teachers, classrooms, and textbooks in the public sector (Kasirye, 2009; Asankha and Takashi, 2011; Muvawala, 2012; Ogawa and Wokadala, 2013; Kan and Klasen, 2018). On the other hand, no study has examined the effect of increasing household education on education attainment. However, because of the low education attainment and increasing household education expenditure in Uganda, it is imperative to examine whether it affects education attainment for both boys and girls. Therefore, this study contributes to the literature by investigating education attainment for both boys and girls and the household education department focusing on years of schooling as a key education policy objective for the country.

4. Materials and Methods

4.1 Empirical model and estimation strategy

The educational attainment, particularly years of education attained, depends on the parents who invest in the child and the child factors that enable one to complete school. Therefore, the decision to invest in education by households is approached following an intrahousehold allocation framework where education is an investment and consumption good (Becker 1962; 1964; Hisarciklilar, 2002; Becker, 2009).

In this framework, the household is assumed to maximize overall lifetime utility, *U*, derived from the weighted sum of utility from present and future consumption, respectively. The household's overall lifetime utility is expressed as shown in Eqn (1)

$$U = G(C_1) + \vartheta F(C_2, W_b, W_g), \quad 0 \leq \vartheta < 1 \tag{1}$$

Where C_1 and C_2 is period 1 and 2 consumption, respectively. Since the education of the boys and girls is an investment, the model, assuming a household with two children, represents the future wealth as a result of the education of the male and female child as W_b and W_g respectively. This is discounted by ϑ. However, assume a difference in the returns and human capital gained from education investment between male and female children.

Therefore, the utility function is expressed as

$$U = G(C_1) + \vartheta F(\beta q_b H_b + \tau r_g L_g, q_b L_b, q_g H_g) \tag{2}$$

Where r_b and r_g denote the rates of return to human capital for the boys and girls, respectively q_b and q_g represent the rates of return to human capital investment for the female and male child, respectively; L_b and L_g denote the human capital as a result of education investment for the male and female child, respectively; β and τ denote rates of transfers per unit of wealth from the boy and girl child; and $C_2 = \beta q_b L_b + \tau q_g L_g$.

As presented in Eqn (3), the household budget is allocated between consumption in period 1 and education

investment for the children of the boy and girls.

$$P_b L_b + P_g H L_g + C_1 = Y$$
$$C_2 = Y_2 + (1 + q_b)P_b L_b + (1 + q_g)P_g L_g \quad (3)$$

Where Y is the income of the household; P_b and P_g represent educational investment prices for the boy and the girl child, respectively. Parents invest in education by maximizing utility expressed in Eqn. 2 subject to budget constraint. Where the education investment for the household is presented in Eqn. 4:

$$\vartheta \frac{\partial F}{\partial C_2}\beta_{qb} + \frac{\partial F}{\partial W_b}q_b = \vartheta \frac{\partial G}{\partial C_2}\tau q_g + \frac{\partial G}{\partial W_g}q_g \quad (4)$$

In light of Eqn.4, parents invest in children's education when the marginal benefit derived from investment in the male child is equal to that of the girl child. On the other hand, is $q_b > q_g$, the parents invest more in the male child than the female child. As such, $L_b > L_g$.

In this regard, from Eq.4, the propensity of schooling for the individual is derived as follows:
Let
$$y_j = \beta' x_j + u_j \quad (5)$$

where y_j is the propensity of schooling for the j^{th}individual, β is a $kx1$ parameter vector, x_j is a $kx1$ vector for the explanatory variables and u_j is the stochastic disturbance term. Within such a framework, the years of schooling will be observed for those with higher propensities:

$$S_j = s \quad if \quad \mu_s \leq y_j \leq \mu_{s+1} \quad for\ s = 0,1,2,3,\dots,11 \quad (6)$$

where S_j shows the final years of schooling the individual has attained and takes values 0, 1, 2, to 11 years of schooling, respectively. The μ's are the threshold values where

$$\mu_0 < \mu_1 < \cdots \mu_{11}, \mu_0 = -\infty \ and\ \mu_{11} = +\infty$$

The conditional probability of attaining a particular year of schooling $S_j = s$ is given by

$$Pr(S_j = s|x_j) = \Phi(\mu_{s+1} - \beta' x_j) - \Phi(\mu_s - \beta' x_j) \quad (7)$$

where Eqn (7) assumes a standard normal distribution error term with zero mean and constant variance represented by $\Phi(\cdot)$.

Two main issues arise in the estimation of the above model. Firstly, the censoring problem occurs when the estimation ignores the individuals continuing with their education, resulting in biased estimates and a reduced sample (King and Lillard, 1983; 1987; Hisarciklilar, 2002; Holmes, 2003; Glick & Sahn, 2006;). Therefore, addressing right censoring assumes that the individual will at least complete their current year of schooling[1] (King and Lillard, 1983; 1984; 1987; Lillard and Willis, 1994; Glick and Sahn, 2000). The likelihood of completion of the individuals still in school is provided by:

$$1 - \Phi(\mu_{s+1} - \beta' x_j) \quad (8)$$

where s represents the child's completed year of schooling at the time of the survey.

The second econometric issue arises from ignoring the unobserved household characteristics that result from individuals from the same household (King and Lillard, 1983; Hisarciklilar, 2002; Kilic, 2012). In this regard, a random household-specific component is included in the stochastic term to address standard error distortions.

[1] A similar approach is taken by (King & Lillard, 1987), (Lillard & Willis, 1994), and (Glick & Sahn, 2000). An alternative approach would be to assume that all individuals are likely to drop out before finishing their current grade. In this case the likelihood contribution will be $1 - \Phi(\mu_s - \beta' x_j)$. Comparison of results based on these two assumptions are provided in (Hisarciklilar, 2002)

Therefore, the i^{th} the household's propensity for schooling for the j^{th} child is expressed as follows:

$$y_{ij} = \beta' x_{ij} + \theta_i + \mu_{ij} \tag{9}$$

where $\theta_j \sim N\left(0, \sigma^2_{\theta_i}\right)$, $\mu_{ij} \sim N(0,1)$ and includes the unobserved household characteristics common to all children.

The conditional probabilities for the non-censored observations are expressed as follows:

$$Pr\left(S_{ij}\right) = \Phi\left(\mu_{s+1} - \beta' x_j - \theta_i\right) - \Phi\left(\mu_s - \beta' x_j - \theta_i\right) \tag{10}$$

On the other hand, conditional probabilities for the censored observations are expressed as in Eqn. 11

$$Pr\left(S_{ij}\right) = 1 - \Phi\left(\mu_s - \beta' x_j - \theta_i\right) \tag{11}$$

for the censored observations.

Where the conditional probability for the i^{th} household with n number of children is expressed as a product of all the conditional probabilities for the children in the particular household, expressed in Eqn 13

$$L_i(\theta_i) = \prod_{j=1}^{n} P(S_{ij}) \tag{12}$$

The unconditional probability is derived by integrating the marginal probability over all possible values of θ_i as shown in Eqn.13

$$L_i = \int_{\delta}^{n} \phi(\delta_i) \prod_{j=1}^{n} P\left(S_{ij}\right) d(\delta_i) \tag{13}$$

Where unconditional probability for the non-censored observations is shown in Eqn.14

$$Pr\left(S_{ij}\right) = \Phi\left(\mu_{s+1} - \beta' x_{ij} - \delta_i(\rho/1-\rho)^{1/2}\right) - \Phi\left(\mu_s - \beta' x_{ij} - \delta_i(\rho/1-\rho)^{1/2}\right) \tag{14}$$

While unconditional probability for the non-censored observations is shown in Eqn. 15

$$Pr\left(S_{ij}\right) = 1 - \Phi\left(\mu_s - \beta' x_{ij} - \delta_i(\rho/1-\rho)^{1/2}\right) \tag{15}$$

By taking the natural logarithm of the product of the unconditional likelihood functions of the non-censored observations and censored observations for all the households, the log-likelihood function for the total sample is expressed as follows:

$$In\ L = \sum_{i=1}^{m} \int_{\delta}^{n} \left[ln\phi(\delta_i) \sum_{j=1}^{n} lnPS(S_{ij})\right] d\delta_i \tag{15}$$

where m is the number of households[2].

This study examines the effect of household education expenditure on educational attainment as measured by years of schooling (0 – 11 years). Since these outcomes represent a natural preference ordering, we can use an ordered probit approach (Greene, 2002).

When the dependent variable is years of schooling, OLS is the most commonly used method to model educational attainment (Wolfe and Behrman, 1984; Chernichovsky, 1985; Behrman and Wolfe, 1987;). However, studies employing the OLS estimation method have a significant limitation: they do not account for the data's discreteness. Furthermore, there are generally no observations in the sample for those with no educational qualifications. Similar probability spikes exist in primary and secondary education, where advancement to the next grade level may be delayed due to fees or entrance examinations. Because of these issues, the OLS estimation method may be inappropriate (Holmes, 2003). Therefore, resorting to the preferred ordered probit model, proposed by (King and Lillard, 1983; 1984; 1987) for modelling educational attainment, is more appropriate than the OLS model since it allows for analyzing individuals with

[2] The first derivatives for this integral are calculated making use of the hermite integration suggested by Butler and Moffit (1982). See Frechette (2001) for a discussion.

at different levels of education attainment.

In Uganda, children are legally expected to start primary education at 6, complete at 12, and lower secondary at least 17. In light of this, the sample is separated into groups in this study according to their ranges: 13-17 years and 18-20 years. The reason for forming these groups is that the final school attainment of the children who are still in school at the time of the survey is unknown. This can potentially bias the estimates of school attainment (Goksel, 2008). As (Holmes, 2003) suggests, defining samples that include only those over the approximate age of school completion is one way to avoid censored bias. However, it comes with the caveat of dismissing many observations made by younger people. That is the motivation for calculating the earliest ages of school graduation and forming groups accordingly.

In this regard, the first group includes children who have completed or been through primary education, corresponding to 7 years of primary education. On the other hand, the second group includes children that have either completed or been through primary and lower secondary education, corresponding and having achieved 11 years of schooling or less.

Further, children in the sample are grouped as boys and girls because of the differences in boys' and girls' educational attainment that may be due to parental preferences. Social factors may influence taste preferences. Many societies expect girls to learn housework before marriage. Parents may feel that girls miss out on 'home training' when they spend more time in school (Hill and King, 1995). Therefore, they may hesitate to invest in or send their daughters to school.

Furthermore, different education costs and gross returns can lead to different net returns for boys and girls. While the direct costs of schooling are similar for boys and girls, the opportunity cost may differ. In many societies, girls spend school time caring for younger siblings, doing housework, or farming. These activities will indirectly boost the family budget (Binder, 1998; Chernichovsky, 1985; Hill and King, 1995; Glick and Sahn, 2000). The labour market returns to boys' and girls' educations differ significantly. Gender-based wage discrimination or occupational segregation may discourage parents from investing in their daughters' education.

Traditionally, boys have this responsibility in societies where parents expect children to provide financial support, and differences in educational attainment may be more pronounced. Even if the returns to education for boys and girls are the same, parents may value their sons' education more (Sudha, 1997; Al-Samarrai and Peasgood, 1998; Binder, 1998). In Uganda, girls marry into their husband's families. Many women stop working after getting married or having a child, so their lifetime earnings are lower. Parents may see limited financial returns from investing in their daughter's education. In light of the above, separating boys and girls will highlight the different effects of household expenditure on the educational attainment of boys and girls.

4.2 Data and Variable Definitions

The Uganda National Household Survey (UNHS) 2019/20, which is a national survey that estimates critical variables at the national, rural-urban, regional, and sub-regional levels, was used in the study. First-objective estimates include 13-19-year-olds and 18-20-year-olds, and the sample grouping addresses right censoring (Goksel, 2008; Kilic, 2012).

The individual/child, household/head, and community characteristics are studied characteristics (Gertler and Glewwe, 1990; Glewwe and Jacoby, 1994; Strauss and Thomas, 1995; Kabubo-Mariara and Mwabu, 2007; Kilic, 2012). Given the government's goal of increasing schooling to 11 years, the study used years of schooling as the dependent variable rather than enrollment and the highest level of completed education. Age is one of the individual/child characteristics (boys and girls). When a child begins school, their learning ability is affected by age. Therefore, it forecasts education level (Holmes, 2003). Household head education is one of the most critical elements affecting family members' education (Hisarciklilar, 2002; Tansel, 2002). Other characteristics include household head gender and age.

Household size is the number of individuals who live together. Money and credit limits affect educational investment decisions. Families with little credit may be unable to invest in their children's education. Since impoverished families may perceive boys as prospective breadwinners, the effect may be more significant for girls (Hisarciklilar, 2002). The study includes the dummy urban for community characteristics to see if living in a rural location reduces educational achievement. Rural areas have fewer schools, fewer experienced teachers, and higher opportunity costs for children due to farm employment opportunities or child labour needs at home (Goksel, 2008).

To obtain unbiased estimation results, the study considers econometric issues while investigating educational attainment in light of the variables. These include the censoring of enrolled children's final attainment, endogeneity, intrafamily correlation among siblings, and selection bias related to children living in the household.

5. Discussion of the Results

The descriptive statistics of the continuous variables and percentage distributions for the categorical variables in the

study are presented in the appendix in Table A4.1. The results are presented separately for boys and girls at the seven years of primary and eleven years of lower secondary education.

The results show that boys and girls complete the 7 years of primary education with an average age of 14. This is an indication of school dropouts and delayed school progression. On the other hand, boys and girls complete 11 years of primary education with an average age of 18 years. Furthermore, most children abode in the household head age group between 40 – 49 years, and fewer children abode in the age group between 20 – 20 years. Similarly, the majority are in male-headed households. Finally, the percentage distributions of the regions show that the highest proportions of children live in the Eastern part (nearly 28 percent). In comparison, the lowest children ratios live in the Central region for both samples (almost 21 percent).

The study tested for the exogeneity of household education expenditure. The results indicate no evidence of endogeneity because the null hypothesis of exogeneity is not rejected at five and one percent levels of significance with the p-value at 0.0818. Therefore, the study proceeds without running the IV corresponding models. The results of estimated the ordered probit and random effects of ordered probit models are presented in this section by gender.

The Results of the Ordered Probit Analysis for the Education attainment - 7 -Years of Primary Education

Table A4.2 in the appendix presents the coefficients for the ordered probit models for both boys and girls. The model chi-square is 798.15 with 2 d.f. This is highly significant and tells us that the explanatory variables significantly affect the years of schooling. The study also uses the likelihood ratio test to determine whether the model conforms to the parallel regression assumption. The likelihood ratio chi-square value of 139.92 for boys and 124.76 for girls is not significant at 5 percent significance, indicating non-violation of the proportional odds assumption.

However, interpreting the coefficients from an ordered probit model is complex. More specifically, it is necessary to calculate marginal effects to ascertain the impact of a specific explanatory variable on intermediate educational outcomes. Because the average marginal effects depend on the levels of all variables, Table 4.1 and Table.4.2 present the average marginal effects for each of the alternatives of years of schooling calculated at the sample means of the covariates.

In addition to the marginal effects, Table A4.2 reports the results of the coefficients. However, emphasize the interpretation of results for the marginal effects for the 7^{th} year of schooling as the major alternative since the completion of this year is a step to transiting to lower secondary education. One important thing to keep in mind is that a positive coefficient for a given variable in the model means that the variable raises the likelihood of the best possible educational outcome while lowering the likelihood of the worst possible educational outcome.

The household education expenditure coefficient log is positive and highly significant for both genders. The coefficient estimate of the household education expenditure is larger for girls than for boys, implying that increased education spending contributes more to the probability of schooling achievement of girls at 23 percent than boys at 17 percent. The positive coefficient indicates that schooling is a normal good and that the growth in education spending will increase schooling achievement (Tansel, 2002). The positive connection between household spending on education and years of schooling of children is confirmed in several studies (Birdsall and Mundial, 1982; Behrman and Wolfe, 1987; Parish & Willis, 1993; Behrman *et al* 1997; Alderman and King, 1998; Tansel, 2002).

The average marginal effects present relevant results, for instance, attaining the 7^{th} year of schooling. As indicated in Tables 4.1 and 4.2, for every additional increase in household educational expenditure, the probability of attaining the 7^{th} year of schooling increases by 2.3 percent for boys and 3.6 percent for girls. While the results show that increases in household income increase the probability of attaining the different years of schooling for boys, the results are contrary for girls for achieving the 1^{st} to the 5^{th} year of schooling in that additional increase in household expenditure decreases the probability of girls attaining the above years of schooling. Another difference is that the marginal effects relating to the household education spending variable, particularly for the 7^{th} year of schooling, have increased in the random effects ordered probit model compared to the ordered probit models.

TABLE 4.1: MARGINAL EFFECTS FOR THE ORDERED PROBIT MODEL FOR BOYS – EDUCATIONAL ATTAINMENT - 7 YEARS OF PRIMARY EDUCATION

	BOYS							
Variables	0	1	2	3	4	5	6	7
Age of the Child	-0.014***	-0.008***	-0.022***	-0.034***	-0.021***	0.019***	0.041***	0.037***
Household Head Age group								
Head aged 20-29	0.017	0.009	0.025	0.036	0.018	-0.024	-0.044	-0.036
Head aged 30-39	0.004	0.002	0.006	0.01	0.006	-0.005	-0.012	-0.011
Head aged 50-59	0.005	0.003***	0.008***	0.012***	0.008***	-0.006***	-0.015***	-0.013***
Head aged 60 &above	0.005	0.003	0.008	0.013	0.008	-0.007	-0.016	-0.014
Household Head Education								
Some primary	-0.014***	-0.006***	-0.017***	-0.022***	-0.007***	0.019***	0.027***	0.019***
Completed Primary	-0.03***	-0.015***	-0.043***	-0.064***	-0.036***	0.039***	0.079***	0.069***
Some secondary	-0.032***	-0.016***	-0.047***	-0.071***	-0.042***	0.041***	0.087***	0.08***
Completed Secondary	-0.035***	-0.018***	-0.053***	-0.085***	-0.056***	0.041***	0.103***	0.103***
Post-Secondary Plus	-0.002***	-0.017***	-0.05***	-0.125***	-0.125***	-0.004***	0.152***	0.172***
Female Household Head	-0.001***	-0.005***	-0.013***	-0.028***	-0.02***	0.01***	0.033***	0.024***
Household Educ expenditure (Log)	-0.001***	-0.005***	-0.013***	-0.029***	-0.021***	0.01***	0.034***	0.024***
Household Size	0.000*	0.000*	0.001*	0.003*	0.002*	-0.001*	-0.003*	-0.002*
Urban	-0.001***	-0.006***	-0.017***	-0.039***	-0.032***	0.01***	0.047***	0.037***
Region								
Eastern	0.000***	0.003***	0.008***	0.018***	0.015***	-0.005***	-0.022***	-0.018***
Northern	0.001***	0.01***	0.024***	0.051***	0.035***	-0.02***	-0.06***	-0.041***
Western	0.000	0.002	0.005	0.011	0.009	-0.002	-0.013	-0.011

Source: Author's Computation

TABLE 4.2: MARGINAL EFFECTS OF THE ORDERED PROBIT MODEL FOR GIRLS' EDUCATIONAL ATTAINMENT - 7 YEARS OF PRIMARY EDUCATION

	Girls							
Variables	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Age of the Child	-0.001***	-0.004***	-0.02***	-0.049***	-0.052***	0.003	0.07***	0.054***
Household Head Age group								
Head aged 20-29	0.001	0.004	0.016	0.034	0.031*	-0.009	-0.047	-0.03*
Head aged 30-39	0	0.001	0.004	0.009	0.009	-0.001	-0.013	-0.009
Head aged 50-59	0	-0.001	-0.004	-0.009	-0.011	0	0.014	0.011
Head aged 60 &above	0	-0.001	-0.003	-0.006	-0.007	0	0.009	0.007
Household Head Education								
Some primary	0	-0.001	-0.003	-0.006	-0.005	0.002	0.009	0.005
Completed Primary	0.000*	-0.003***	-0.014***	-0.032***	-0.031***	0.006***	0.044***	0.03***
Some secondary	-0.001***	-0.005***	-0.024***	-0.058***	-0.064	0***	0.083***	0.069******
Completed Secondary	-0.001***	-0.005***	-0.024***	-0.058***	-0.06	0***	0.082***	0.068***
Post-Secondary	-0.001***	-0.007***	-0.033***	-0.09***	-0.117***	-0.031***	0.129***	0.149***
Female Household Head	0	-0.002***	-0.008***	-0.019***	-0.02***	0.001	0.027***	0.021***
Household Educ expenditure (Log)	0.000***	-0.003***	-0.014***	-0.033***	-0.035***	0.002***	0.047***	0.036***
Household Size	0	0***	0.001***	0.003***	0.003***	0***	-0.005***	-0.003***
Urban	0***	-0.003***	-0.014***	-0.035***	-0.042***	-0.004***	0.051***	0.046***
Region								
Eastern	0*	0.002***	0.009***	0.026***	0.037***	0.011***	-0.039***	-0.045***
Northern	0.002***	0.011***	0.047***	0.105***	0.103***	-0.013***	-0.144***	-0.112***
Western	0***	0.003***	0.014***	0.039***	0.052***	0.012***	-0.059***	-0.062***

Source: Author’s Computation

This increase is more significant in the girls' sample, confirming the potential presence of bias when unobserved household characteristics are ignored. This finding is similar to the results of (Kilic, 2012).

Given the above, household resources for education expenditure remain essential for higher schooling. For example, (Glick and Sahn, 2000) and (Kabubo-Mariara and Mwabu, 2007) found that household resources are directed towards girls relative to boys. In Uganda, the results are consistent with those (Nishimura *et al*, 2008). They find that socio-economic factors like household expenditure still significantly influence overall education attainment in primary education even when the tuition is accessible under the UPE policy. Even when public schools are free, educational attainment necessitates out-of-pocket expenses such as learning materials, school contributions, school uniforms, and travel expenses. These expenses may differ between girls and boys for various reasons. For example, parents may be more hesitant to send their daughters to school without proper school uniforms, raising the cost of girls' educational attainment (Hill and King, 1995).

The other important factor includes the education level of the household head (Mincer, 1970; Kilic, 2012). In this context, the results indicate that household head education is associated with higher years of schooling for both genders, except for household heads with some primary education that the study finds to be insignificant in influencing education attainment. However, the effect is more prominent as the household head attains higher levels of education. For example, the probability of attaining the 7 years of primary education for both boys and girls is 58 percent and 43 percent for a household head with completed secondary education compared with 30 percent and 18 percent for the household head that has completed primary education. The results indicate that for all levels of education attained by the household head, the probability of achieving higher years of schooling is more for boys than girls. The marginal effects, however, indicate that household heads having completed beyond post-primary education is a relevant determinant of attaining the 7 years of schooling. This finding is consistent with (Al-Samarrai and Peasgood, 1998) who finds that one of the strongest predictors of educational attainment is whether or not parents have attended secondary school, suggesting the critical impact of parental education upon that of their children.

Tables 4.1 and 4.2, for example, suggest that if a household head has completed secondary education, this increases the likelihood of attaining the 7 years of schooling by 9.1 percent for boys and 6.1 percent for girls. However, the children in households with the household head having post-secondary and above are likely to attain the 7 years of schooling by 17.3 percent for boys and 14.9 percent for girls. The results further reveal that the increase in a household affects girls' education attainment more than boys. The household size reduces the probability of attaining the 7 years of schooling by 0.4 percent for girls while that of boys increases by 0.2 percent. This is because girls' resources are further reduced due to the large family size and cultural preferences, which limits their ability to pursue higher education (Raza *et al*, 2022). For community characteristics, the probability of attaining 7 years of schooling is higher for those residing in urban areas than rural residents. (Simkins, 2001) also finds a similar result

The Results of the Random Effects Ordered Probit Analysis

Tables 4.3 and 4.4 present the marginal effects of the random effects ordered probit models for both boys and girls to address the common unobserved household characteristics. The results support the possibility of bias due to higher marginal effects in the random effects ordered probit model. However, both models produce results with similar variables' signs and statistical significance levels.

The increase in marginal effects is most noticeable for household heads with primary education or higher. As a result, the importance of primary education attainment is highlighted. Finally, the variance in the dependent variable explained by the random error component is 71 percent for boys and 96 percent for girls, resulting from similar unobserved household characteristics. As a result, the random effects ordered probit model outperforms the ordered probit model.

The Results of the Random Effects Ordered Probit Analysis - 11 Years of Schooling

Tables 4.3 and 4.4 separately present the marginal effects of the random effects ordered probit model of boys and girls. While Table 4.4 presents the coefficients of estimating the random effects ordered probit model for the 11 years of schooling for both boys and girls. Compared to the results for the ordered probit model, the random effects ordered probit model results are different in terms of more significant marginal effects. Similar to the 7 years of schooling model, this increase is most apparent in the marginal effects representing household head education, households headed by a female, and household education expenditure.

Finally, the results of the random effects ordered probit model indicate that ρ is highly statistically significant. Its magnitude shows that 26 percent of the total variance in the educational attainment of boys and 48 percent in the

educational attainment of girls, who belong to the same household, are explained by unobserved family and household characteristics. Similar to the primary school educational attainment model, this finding has provided further evidence for the importance of accounting for unobserved family characteristics for children from the same household in the analysis. This is consistent with the findings of Kilic (2012), who also considers unobserved family characteristics for children from the same household in examining determinants of educational attainment in Turkey.

TABLE 4.3: MARGINAL EFFECTS FOR THE RANDOM EFFECTS ORDERED PROBIT MODEL FOR BOYS (11 YEARS OF PRIMARY EDUCATION)

	BOYS											
Variables	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Age of the Child	-0.004*	0.000	-0.001*	-0.002*	-0.003*	-0.005*	-0.003*	0	0.001*	0.003*	0.005*	0.009*
Household Head Age group												
Head aged 20-29	0.019***	0.001	0.005***	0.009***	0.013***	0.02***	0.013***	0.000	-0.005**	-0.015***	-0.023***	-0.036***
Head aged 30-39	0.009	0.001	0.002	0.005	0.007	0.011	0.007	0.001	-0.002	-0.007	-0.012	-0.02
Head aged 50-59	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0010
Head aged 60 &above	0.0110*	0.0010	0.0030*	0.0050*	0.0080*	0.0130*	0.0090*	0.0010	-0.0030*	-0.0090*	-0.0140*	-0.0240*
Household Head Education												
Some primary	-0.0360**	-0.0020***	-0.0070***	-0.0140***	-0.0180***	-0.0230***	-0.0080***	0.0080***	0.0110***	0.0240***	0.0290***	0.0350***
Completed Primary	-0.0640***	-0.0030***	-0.0150***	-0.0280***	-0.0390***	-0.0570***	-0.0330***	0.0050***	0.0180***	0.0470***	0.0670***	0.1020***
Some secondary	-0.0680***	-0.0040***	-0.0160***	-0.0310***	-0.0440***	-0.0650***	-0.0410***	0.0020***	0.0180***	0.0510***	0.0760***	0.1220***
Completed Secondary	-0.0750***	-0.0040***	-0.0180***	-0.0350***	-0.0510***	-0.0790***	-0.0550***	-0.0060	0.0170***	0.0550***	0.0900***	0.1600***
Post-Secondary	-0.0850***	-0.0050***	-0.0220***	-0.0440***	-0.0670***	-0.1170***	-0.1040***	-0.042***	0.000	0.048***	0.117***	0.322***
Female Household Head	-0.0180***	-0.0010***	-0.0050***	-0.0090***	-0.0130***	-0.0210***	-0.0140***	-0.001	0.005***	0.015***	0.023***	0.038***
Household Educ expenditure (Log)	-0.0320***	-0.0020***	-0.0080***	-0.0160***	-0.0240***	-0.0380***	-0.0260***	-0.002	0.009***	0.027***	0.043***	0.069***
Household Size	-0.0020***	0.0000*	-0.0010**	-0.0010**	-0.0010**	-0.0020**	-0.002**	0.0000	0.001	0.002**	0.003**	0.004**
Urban	-0.0100**	-0.0010*	-0.0030**	-0.0050**	-0.0080**	-0.0120	-0.009**	-0.001**	0.003**	0.008**	0.014**	0.023**
Region												
Eastern	0.0020	0.0000	0.0000	0.0010	0.0010	0.0020	0.0020	0	0	-0.001	-0.002	-0.005
Northern	0.0210***	0.0010**	0.0050***	0.0110***	0.0150***	0.024***	0.016***	0.001	-0.006***	-0.018***	-0.027***	-0.044***
Western	0.0130**	0.0010*	0.0040**	0.0070**	0.01**	0.017**	0.012**	0.002	-0.003**	-0.011**	-0.019**	-0.032**

Source: Author's Computation

TABLE 4.4: MARGINAL EFFECTS FOR THE RANDOM EFFECTS ORDERED PROBIT MODEL FOR GIRLS (11 YEARS OF PRIMARY EDUCATION)

	Girls											
Variables	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Age of the Child	-0.004*	0.000	-0.001*	-0.002*	-0.003*	-0.004*	-0.004*	0.000	0.001*	0.003*	0.005*	0.008*
Household Head Age group												
Head aged 20-29	0.042***	0.003***	0.01***	0.02***	0.03***	0.047***	0.038***	0.001	-0.01***	-0.033***	-0.058***	-0.089***
Head aged 30-39	0.022***	0.001***	0.005***	0.011***	0.018***	0.03***	0.027***	0.005**	-0.004***	-0.018***	-0.036***	-0.061***
Head aged 50-59	0.008*	0.001	0.002*	0.004*	0.007*	0.013*	0.013*	0.004*	-0.001	-0.007*	-0.015*	-0.029*
Head aged 60 &above	0.004	0	0.001	0.002	0.003	0.006	0.006	0.002	0	-0.003	-0.007	-0.014
Household Head Education												
Some primary	-0.062***	-0.003***	-0.011***	-0.021***	-0.028***	-0.033***	-0.01***	0.02***	0.017***	0.037***	0.047***	0.048***
Completed Primary	-0.084***	-0.005***	-0.016***	-0.032***	-0.044***	-0.058***	-0.03***	0.019***	0.022***	0.054***	0.078***	0.095***
Some secondary	-0.091***	-0.005***	-0.018***	-0.036***	-0.051***	-0.069***	-0.042***	0.015***	0.023***	0.06***	0.092***	0.122***
Completed Secondary	-0.099***	-0.006***	-0.02***	-0.041***	-0.06***	-0.087***	-0.063***	0.006	0.022***	0.066***	0.111***	0.17***
Post-Secondary	-0.096***	-0.006***	-0.019***	-0.039***	-0.056***	-0.079***	-0.054***	0.01*	0.022***	0.064***	0.103***	0.148***
Female Household Head	-0.021***	-0.001***	-0.005***	-0.01***	-0.016***	-0.025***	-0.021***	-0.001*	0.005***	0.018***	0.031***	0.048***
Household Educ expenditure (Log)	-0.018***	-0.001***	-0.004***	-0.009***	-0.014***	-0.022***	-0.018***	-0.001*	0.004***	0.015***	0.027***	0.041***

Household Size	-0.001	0	0	0	-0.001	-0.001	-0.001	0	0	0.001	0.001	0.002
Urban	-0.01***	-0.001***	-0.002**	-0.005***	-0.008***	-0.012***	-0.011***	-0.001	0.002**	0.008**	0.015**	0.024**
Region												
Eastern	0.002	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0	-0.001	-0.003	-0.006
Northern	0.057***	0.003***	0.012***	0.025***	0.037***	0.053***	0.038***	-0.005*	-0.015***	-0.042***	-0.068***	-0.095***
Western	0.009**	0.001**	0.002**	0.005**	0.008**	0.014**	0.014**	0.003*	-0.002*	-0.008**	-0.017**	-0.03**

Source Author's Computations

6. Conclusion and Recommendations

In this context, this study aimed to investigate the determinants of the educational attainment of boys and girls using the UNHS 2019/20 to shed new light on the factors behind the educational attainment process and gender inequality in schooling. With this aim, the ordered probit model and random effects ordered probit model are estimated for separate 7-years of schooling and 11 years of schooling models because the factors related to attaining the 7 years of schooling may differ from those related to attaining the 11 years of schooling.

Similar to gender variations in educational attainment, academic performance may factor in gender gaps. Parents may consider their children's grades when allocating home resources and obligations. This variable is likewise missing from the data set, but Glick and Sahn (2002) argue that household-level variables may implicitly capture these processes. This chapter confirms a link between household education spending and boys' and girls' attainment of 7 and 11 years of schooling. This remains a substantial supplement to public and household education expenditures in enhancing educational achievement from 6.1 to 11 years. The findings support the premise that educational attainment and gender gap determinants vary with the level of education.

In light of the above, the study provides the following recommendations. Firstly, the government should encourage household contribution to education, increasing the likelihood of higher schooling. Therefore, household resources for education expenditure remain essential for achieving higher years of schooling. Further, the study recommends increasing access to lower secondary education given that children residing in households whose heads have lower secondary education have a higher probability of attaining 7 and 11 years of schooling. Thirdly, expand education provision in rural, northern, and eastern regions since amenities similar to those in urban areas promote and favour learning compared to rural areas.

References

Alderman, H., & King, E. M. (1998). Gender Differences in Parental Investment in Education. . *Structural Change and Economic Dynamics*(9(4)), 453-468.

Al-Samarrai, S., & Peasgood, T. (1998). Educational attainments and household characteristics in Tanzania. *Economics of Education Review*(17(4)), 395-417.

Al-Samarrai, S., & Reilly, B. (2000). Urban and rural differences in primary school attendance: an empirical study for Tanzania. *Journal of African Economies*(9(4), 430-474.

Asankha, P., & Takashi, Y. (2011). Impacts of universal secondary education policy on secondary school enrollments in Uganda. *Journal of Accounting, 1*, 16-30.

Aydemir, A., Chen, W.-H., & Corak, M. (2008). Intergenerational Education Mobility Among the Children of Canadian Immigrants. *Statistics Canada Catalogue no. 11F0019M*.

Badr, M., Morrissey, O., & Appleton, S. (2012). Determinants of Educational Attainment in MENA. *CREDIT Research Paper*.(12/03).

Barros, R. P., & Lam, D. (1993). Income inequality, inequality in education, and children's schooling attainment in Brazil.

Bategeka, L., & Okurut, N. (2006). *Universal Primary Education, Uganda, Policy Brief 10.* . London: UK: Overseas Development Institute.

Becker, G. S. (1962). Investment in Human Capital: A Theoretical Analysis. *Journal of political economy*(70), 9-49.

Becker, G. S. (1964). Human Capital Theory. *Columbia, New York*.

Becker, G. S. (1964). Human Capital: Theoretical and Empirical Analysis: With Special Reference to Education. *National Bureau of Economics Research, New York*.

Becker, G. S. (2009). Human Capital: A Theoretical and Empirical Analysis, With Special Reference to Education. *University of Chicago press*.

Behrman, J. R., & Knowles, J. C. (1999). Household income and child schooling in Vietnam. *The World Bank Economic Review*(13(2), 211-256.

Behrman, J. R., & Wolfe, B. L. (1987). Investments in schooling in two generations in pre-revolutionary Nicaragua: the roles of family background and school supply.,. *Journal of Development Economics*(27(1-2)), 395-419.

Behrman, J. R., Khan, S., Ross, D., & Sabot, R. (1997). School quality and cognitive achievement production: A case study for rural Pakistan. . *Economics of Education Review*(16(2)), 127-142.

Binder, M. (1998). Family Background, Gender and Schooling in Mexico. *The Journal of Development Studies*(35(2)), 54-71.

Birdsall, N., & Mundial, B. (1982). *Child schooling and the measurement of living standards (No. 14)*. Washington, SC: World Bank.

Blau, F. D., & Grossberg, A. J. (1990). Maternal Labor Supply and Children's Cognitive Development. *National Bureau of Economic Research*(w3536).

Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure.* . John Wiley & Sons Inc.

Boudon, R. (1974). Education, opportunity, and social inequality: Changing prospects in western society, Publisher Wiley, New York,

Bryant, W. K. (1990). The Economic Organization of the Household. . *Cambridge University Press*.

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.

Candia, D. A., Ashaba, C., Mukoki, J., Jehopio, P. J., & Kyasiimire, B. (2018). Non-School Factors Associated with School Dropouts in Uganda. ,. *International Journal of Social Sciences*(4(1)).

Card, D., DiNardo, J., & Estes, E. (2000). *The more things change: Immigrants and the children of immigrants in the 1940s, the 1970s, and the 1990s.‖ Issues in the Economics of Immigration. G.J. Borjas (ed.).* . Chicago: Chicago University Press.

Chernichovsky, D. (1985). Socio-economic and demographic aspects of school enrollment and attendance in rural Botswana. *Economic development and cultural change*(33(2)), 319-332.

Coelli, M. B. (2005). Leading determinants of education attainment. *Doctoral dissertation, University of British Columbia*.

Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. . *Educational administration quarterly*(52(2)), 221-258.

Dayioğlu, M., Kirdar, M. G., & Tansel, A. (2009). (2009). Impact of sibship size, birth order and sex composition on school enrolment in urban Turkey. *Oxford Bulletin of Economics and Statistics*(71(3)), 399-426.

De Tray, D. (1978). Child Schooling and Family Size: An Economic Analysis.

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

Dutta, V., & Sahney, S. (2016). School leadership and its impact on student achievement. *International Journal of Educational Management*. (30(6)) 941-958

Frenette, M. (2006). Too far to go on? Distance to school and university participation. *Education Economics*(14(1)), 31-58.

Gertler, P., & Glewwe, P. (1990). The willingness to pay for education in developing countries: Evidence from rural Peru. . *Journal of public Economics*(42(3)), 251-275.

Gertler, P., & Glewwe, P. (1992). The willingness to pay for education for daughters in contrast to sons: Evidence from rural Peru. *The World Bank Economic Review*(6(1)), 171-188.

Glewwe, P., & Jacoby, H. (1994). Student achievement and schooling choice in low-income countries: Evidence from Ghana. *Journal of Human Resources*,28(3) 843-864.

Glewwe, P., & Muralidharan, K. (2016). *Improving Education Outcomes in Developing Countries: Evidence, knowledge gaps, and policy implications. In Handbook of the Economics of Education* (Vol. V). Elsevier.

Glick, 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(1)), 63-87.

Glick, P., & Sahn, D. E. (2006). The demand for primary schooling in Madagascar: Price, quality, and the choice between public and private providers. *Journal of development economics*, 79(1). 118-145.

Goksel, I. (2008). Determinants of school attainment in Turkey and the impact of the extension of compulsory education. . *In Seminar on child labour, education and youth employment: A challenge for growth, 1112*.

Greene, W. H. (2002). *Econometric Analysis. 5th ed.* . London: London Prentice Hall.

Handa, S. (1996). Maternal education and child attainment in Jamaica: Testing the bargaining power hypothesis. *Oxford Bulletin of Economics and Statistics*(58(1)), 119-137.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of economic literature*(24(3), 1141-1177.

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.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). An exchange: Part I: Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational researcher*(23(3)), 5-14.

Hill, M. A., & King, E. (1995). Women's education and economic well-being. *Feminist Economics*(1(2)), 21-46.

Hisarciklilar, M. (2002). A censored regression model for the educational attainment of boys and girls in Turkey.

Hisarcıklılar, M., McKay, A., & Wright, P. (2010). Gender-based differences in educational achievement in Turkey: What has changed over time. *In the Annual Conference of the MEEA*, 3-6.

Holmes, J. (2003). Measuring the determinants of school completion in Pakistan: analysis of censoring and selection bias. *Economics of Education Review*(22(3)), 249-264.

Jensen, P., & Nielsen, H. S. (1997). Child labour or school attendance? Evidence from Zambia. *Journal of population economics*(10(4)), 407-424.

Kabubo-Mariara, J., & Mwabu, D. K. (2007). Determinants of School Enrolment and Education Attainment: Empirical Evidence from Kenya. *South African Journal of Economics*(75(3)), 572-593.

Kalmijn, M. (1994). Mother's occupational status and children's schooling. *American Sociological Review*, Vol. (59(2), 257-275.

Kan, S., & Klasen, S. (2018). Evaluating UPE in Uganda: School fee abolition and educational outcomes, Discussion Papers, No. 245

Kasirye, I. (2009). Determinants of learning achievement in Uganda. *Economic Policy Research Centre Uganda*.

Keng, C. (2004). Household Determinants of Schooling Progression among Rural Children in Cambodia. *International Education Journal*(5(4)), 552-561.

Kilic, D. (2012). Empirical Analysis of Health and Educational Attainment in Turkey (Doctoral dissertation, University of Sheffield. The *University of Sheffield*.

King, E. M., & Lillard, L. A. (1983). Determinants of Schooling Attainment and Enrollment Rates in the Philippines.

King, E. M., & Lillard, L. A. (1987). Education policy and schooling attainment in Malaysia and the Philippines. *Economics of education review*(6(2)), 167-181.

Lazear, E. (1977). Education: consumption or production?. . *Journal of Political Economy*(85(3),), 569-597.

Lehrer, E. L. (1999). Religion as a determinant of educational attainment: An economic perspective. *Social Science Research*(28(4)), 358-379.

Leibowitz, A. (1974). Home investments in children. *Journal of Political Economy*(82(2)), S111-S131.

Lillard, L. A., & King, E. M. (1984). Methods for analyzing schooling choice with household survey data. 6(2) *Rand*.

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

Lincove, J. A. (2012). The influence of price on school enrollment under Uganda's policy of free primary education. . *Economics of Education Review*, *31*(5), 799– 811.

Lloyd, C. B., & Blanc, A. K. (1996). Population and development review. *Children's schooling in sub-Saharan Africa: The role of fathers, mothers, and others*, 265-298.

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

Manski, C. F., Wise, D. A., & Wise, D. A. (1983). College choice in America. *Harvard University Press*.

Mare, R. D. (1980). Social background and school continuation decisions. *Journal of the American statistical association*(75(370)), 295-305.

Marginson, S. (2019). Limitations of human capital theory. Studies in Higher Education. (44(2)), 287-301.

Mincer, J. (1970). The distribution of labour incomes: a survey with particular reference to the human capital approach. ,. *Journal of economic literature*(8(1)), 1-26.

MoES. (2016). National Education Accounts Report (NEA). Ministry of Education and Sports Kampala, Uganda.

MoES. (2017). Ministry of Education and Sports Statistics Abstract.

Mulindwa, R., & Marshall, J. (2013). Problematics Areas and Teacher Effectiveness. *National Assessment*. Retrieved from http. books. google. co. in/books2isbn, 8218601.

Musimenta, B. M. (2018). Determinants of School Dropout in Uganda (Doctoral dissertation, Makerere university).

Muvawala, J. (2012). Determinants of learning outcomes for primary education: A case of Uganda. *The African Statistical Journal*(15(1)), 42-54.

Namara, S., Hisali, E., & Baale, E. (2018). Determinants of Primary School Child Progression in Uganda. Retrieved from SSRN 3219462.

Nannyonjo, H. (2007). Education inputs in Uganda: An analysis of factors influencing learning achievement in grade six. The World Bank.

Nishimura, M., Yamano, T., & Sasaoka, Y. (2008). Impacts of the universal primary education policy on educational attainment and private costs in rural Uganda. *International Journal of Educational Development*(28(2)), 161-175.

NPA. (2010). Uganda Vision 2040. *National Planning Authority*.

NPA. (2018a). *Education Modelling and Forecasting, Comprehensive Evaluation of the Universal Primary Education (UPE) Policy, Thematic Report 5*. Kampala: National Planning Authority.

NPA. (2018b). *Financing and Costing of UPE, Thematic Report 5.* Kampala: National Planning Authority.

NPA. (2020a). *The Third National Development Plan (2020/21 – 2024/25).* Kampala: National Planning Authority.

NPA. (2020b). *The National Human Resource Development Plan (2020 -2025)* . Kampala: National Planning Authority.

Ochwo, P. (2013). Pupil, teacher, and school factors that influence student achievement on the Primary Leaving Examination in Uganda: Measure development and multilevel modeling (Doctoral dissertation, Kent State University).

Ogawa, K., & Wokadala, J. (2013). Analysis on Equity Issues in Lower Secondary Education in East Uganda. . *Hiroshima University CICE Series, 2013,* , 111-140.

Okumu, I. M., Nakajjo, A., & Isoke, D. (2008). Socio-economic determinants of primary school dropout: the logistic model analysis. *Research Series 93855, Economic Policy Research Centre (EPRC).*

Omoeva, C., & Gale, C. (2016). Universal, but not free: Household schooling costs and equity effects of Uganda's Universal Secondary Education policy. *International Journal of Educational Development, 50*, 41-50.

Oxaal, Z. (1997). Education and poverty: A gender analysis. *Sussex: Institute of Development Studies at the University of Sussex., 53*.

Pal, S. (2004). How much of the gender difference in child school enrolment can be explained? Evidence from rural India. . *Bulletin of Economic Research*(56(2)), 133-158.

Parish, W. L., & Willis, R. J. (1993). Daughters, education, and family budgets Taiwan experiences. *Journal of Human Resources*, 863-898.

Raza, S. H., Shah, Z. A., & Haq, W. (2022). Role of birth order, gender, and region in educational attainment in Pakistan. *12*(1), 1-10.

Rose, P., & Al-Samarrai, S. (2001). Household constraints on schooling by gender: Empirical evidence from Ethiopia. Comparative Education Review,. (45(1)), 36-63.

Rosenzweig, M. R. (1978). The value of children's time, family size and nonhousehold child activities in a developing country: Evidence from household data. *Research in population economics*, 331-347.

Rumbaut, R. (2005). Turning points in the transition to adulthood: determinants of educational attainment, incarceration, and early childbearinng among children of immigrants. *Ethnic and Racial Studies, 28*(6), 1041–1086.

Sackey, H. A. (2007). The determinants of school attendance and attainment in Ghana: a gender perspective.

Sánchez, M. V., & Sbrana, G. (2009). *Determinants of education attainment and development goals in Yemen. Prepared for the Project Assessing Development Strategies to achieve the Millennium Development Goals in the Arab Region, UNDP-RBAS,UN-DESA and World Bank.* UNDP and the World Bank.

Sander, W. (1992). The effects of ethnicity and religion on educational attainment. *Economics of Education Review*(11(2)), 119-135.

Sawada, Y., & Lokshin, M. (2001). Household schooling decisions in rural Pakistan.

Schultz, T. W. (1961). Investment in human capital. *The American economic review, 51*(1), 1-17.

Simkins, C. (2001). The Determinants of Educational Attainment. Working Paper Number 31. . *School of Economic and Business Sciences, University of the Witwatersrand.* .

Smits, J., & Hoşgör, A. G. (2006). Effects of family background characteristics on educational participation in Turkey. *International Journal of Educational Development*(26(5)), 545-560.

Strauss, J., & Thomas, D. (1995). Human resources: Empirical modeling of household and family decisions. Handbook of development economics. 1883-2023.

Sudha, S. (1997). Family size, sex composition and children's education: Ethnic differentials over development in Peninsular Malaysia. . *Population Studies*(51(2)), 139-151.

Suryadarma, D., & Suryahadi, A. (2010). Determinants of Education Attainment in Developing Countries: Can Higher Skills Compensate for Poverty? .

Tamusuza, A. (2011). Leaving school early: the quest for universal primary education in Uganda. *Journal of Statistique Africain*(11), 110-151.

Tansel, A. (1997). Schooling attainment, parental education, and gender in Cote d'Ivoire and Ghana. *Economic Development and Cultural Change*(45(4)), 825-856.

Tansel, A. (2002). Determinants of school attainment of boys and girls in Turkey: individual, household and community factors. *Economics of education review,*(21(5)), 455-470.

Thomas, D. (1994). Like father, like son; like mother, like daughter: Parental resources and child height. *Journal of human resources*, Vol 29(4), 950-988.

UBOS. (2018). *Uganda National Household Survey Report 2016/2017.* Kampala: Uganda Bureau of Statisitcs.

UBOS. (2019). *REPORT ON THE MASTER LIST OF EDUCATION INSTITUTIONS IN UGANDA (MEIU).* Kampala: Uganda Bureau of Statistics.

UBOS. (2020). *Uganda National Household Survey Report 2019/2020.* Kampala: Uganda Bureau of Statistics.

UNDP. (2022). *The 2021/2022 Human Development Report.* New York: United Nations Development Programme.

Uwezo. (2016). *Are our children learning. Sixth Annual Learning Assessment Report.* Uwezo.

Uwezo. (2019). *Are our Children Learning? Uwezo Uganda Eighth Learning Assessment Report.* Kampala: Twaweza East Africa.

White, L. H. (2017). *Human capital and its critics: Gary Becker, institutionalism, and anti-neoliberalism.*

Wilson, K. (2001). The determinants of educational attainment: Modeling and estimating the human capital model and education production functions. *Southern Economic Journal*, 518-551.

Wodon, Q., Male, C., Onagoruwa, A., Savadogo, A., & Yedan, A. (2017). *Child Marriage, Early Childbearing, Low Educational Attainment for Girls, and Their Impacts in Uganda.* World Bank.

Woldehanna, T. J. (2005). Children's educational completion rates and achievement: implications for Ethiopia's second poverty reduction strategy (2006-10). Young lives, London, GB.

Wolfe, B. L., & bBehrman, J. R. (1986). Child quantity and quality in a developing country: Family background, endogenous tastes, and biological supply factors. *Economic Development and Cultural Change*(34(4)), 703-720.

Wolfe, B. L., & Behrman, J. R. (1984). Who is schooled in developing countries? The roles of income, parental schooling, sex, residence and family size. *Economics of education review*,(3(3)), 231-245.

World Bank. (2019). *Uganda Economic Update, Economic Development and Human Capital in Uganda-A Case for Investing More in Education.* Kampala: World Bank Group.

Appendix

TABLE A4.1: DESCRIPTIVE STATISTICS FOR THE CONTINUOUS VARIABLES AND PERCENTAGE DISTRIBUTIONS FOR THE CATEGORICAL VARIABLES.

Continuous Variables

Variables	7 -Years of Primary Education (Age 13-17)		11 Years of Secondary Education (Age 18 -20)	
	Boys	**Girls**	**Boys**	**Girls**
Age of the Child				
N	4,088	4,291	1,788	2,009
Mean	14.84	14.82	18.98	19.02
(St. Dev.)	1.38	1.40	0.84	0.84
(Min)	13	13	18	18
(Max)	17	17	20	20
Household Educ expenditure (Log)				
N	4,088	4,291	1,788	2,009
Mean	5.03	5.08	5.19	5.20
(St. Dev.)	0.65	0.69	0.69	0.72
(Min)	2.96	2.14	2.96	3.15
(Max)	9.34	9.34	8.65	9.33
Household Size				
N	4,088	4,291	1,788	2,009
Mean	6.95	6.93	6.60	6.00
(St. Dev.)	2.58	2.62	3.03	2.97
(Min)	1	1	1	1
(Max)	25	25	25	20

Categorical Variables

Variables	7 -Years of Primary Education (Age 13-17)		11 Years of Secondary Education (Age 18 -20)	
	Boys	**Girls**	**Boys**	**Girls**
Household Head Age group				
Head aged 40-49	38.53%	37.31%	34.84%	26.63%
Head aged 20-29	2.13%	3.24%	10.01%	25.44%
Head aged 30-39	17.25%	18.78%	7.38%	9.76%
Head aged 50-59	23.21%	21.74%	27.35%	21.95%
Head aged 60 &above	18.88%	18.92%	20.41%	16.23%
Household Head Education				
No Education	10.67%	11.81%	11.40%	16.53%
Some primary	44.66%	43.69%	56.43%	52.00%
Completed primary	14.73%	15.24%	12.72%	12.80%
Some O'level above	16.24%	14.43%	10.96%	11.73%
O'level Above	13.69%	14.83%	8.48%	6.93%
Urban				
Rural	77.74%	76.93%	75.11%	73.02%
Urban	22.26%	23.07%	24.89%	26.98%
Female Household Head				
Yes	68.44%	65.84%	31.48%	30.29%
No	31.56%	34.16%	68.52%	69.71%
Region				
Central	17.47%	16.59%	18.90%	17.62%
Eastern	37.21%	36.43%	34.06%	35.69%

Northern	21.99%	23.09%	22.76%	23.69%
Western	23.34%	23.89%	24.27%	23.00ss%

TABLE A4.2: ESTIMATION RESULTS FOR THE ORDERED PROBIT MODEL (7- YEARS OF PRIMARY EDUCATION)

Variables	(1) Boys	(2) Girls
Child Characteristics		
Age of the Child	0.289***	0.322***
	(0.0160)	(0.0169)
Household head Characteristics		
Head aged 20-29	-0.198	-0.205
	(0.148)	(0.143)
Head aged 30-39	-0.0647	-0.0750
	(0.0555)	(0.0557)
Head aged 50-59	-0.129*	0.0526
	(0.0526)	(0.0540)
Head aged 60 &above	0.0451	0.0657
	(0.0565)	(0.0572)
Household Head Education		
Some primary	0.0416	0.0410
	(0.0593)	(0.0604)
Completed primary	0.302***	0.177*
	(0.0742)	(0.0735)
Some secondary	0.393***	0.384***
	(0.0746)	(0.0771)
Completed secondary	0.577***	0.426***
	(0.103)	(0.0998)
Post-secondary plus	0.893***	0.747***
	(0.104)	(0.104)
Female Household Head	0.177***	0.161**
	(0.0497)	(0.0505)
Household Characteristics		
Household Educ expenditure (Log)	0.170***	0.228***
	(0.0115)	(0.0125)
Household Size	-0.0176*	-0.0230**
	(0.00818)	(0.00813)
Urban	0.227***	0.242***
	(0.0511)	(0.0530)
Region	(.)	(.)
Eastern	-0.105	-0.227***
	(0.0631)	(0.0662)
Northern	-0.302***	-0.720***
	(0.0686)	(0.0729)
Western	-0.0671	-0.306***
	(0.0680)	(0.0703)
/		
cut1	3.040***	3.866***
	(0.305)	(0.320)
cut2	3.953***	4.608***

	(0.281)	(0.298)
cut3	4.589***	5.350***
	(0.280)	(0.295)
cut4	5.333***	6.086***
	(0.281)	(0.297)
cut5	6.040***	6.822***
	(0.284)	(0.300)
cut6	6.794***	7.599***
	(0.288)	(0.305)
cut7	7.656***	8.547***
	(0.293)	(0.310)
N	2793	2766
LR chi2(17)	798.15***	1051.28***
Pseudo R2	0.0801	0.1082

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4.3: Estimation Results for the Random Effects Ordered Probit Model (7 years of schooling)

	(1)	(2)
Variables	Boys	Girls
Child Characteristics		
Age of the Child	0.387***	0.473***
	(0.0241)	(0.0299)
Household head Characteristics		
Head aged 20-29	-0.227	-0.310
	(0.204)	(0.205)
Head aged 30-39	-0.0829	-0.0848
	(0.0761)	(0.0815)
Head aged 50-59	-0.161*	0.0932
	(0.0729)	(0.0797)
Head aged 60 &above	0.0386	0.0611
	(0.0774)	(0.0842)
Household Head Education		
Some primary	0.0598	0.0569
	(0.0814)	(0.0889)
Completed primary	0.418***	0.294**
	(0.103)	(0.110)
Some secondary	0.517***	0.579***
	(0.104)	(0.116)
Completed secondary	0.801***	0.571***
	(0.144)	(0.147)
Post-secondary plus	1.165***	1.022***
	(0.147)	(0.155)
Female Household Head	0.223***	0.183*

	(0.0663)	(0.0712)
Household Characteristics		
Household Educ expenditure (Log)	0.225***	0.317***
	(0.0171)	(0.0211)
Household Size	-0.0200	-0.0306*
	(0.0114)	(0.0123)
Urban	0.318***	0.362***
	(0.0711)	(0.0794)
Region		
Eastern	-0.150	-0.303**
	(0.0867)	(0.0970)
Northern	-0.403***	-1.011***
	(0.0948)	(0.113)
Western	-0.0893	-0.437***
	(0.0927)	(0.104)
cut1		
_cons	4.173***	5.558***
	(0.416)	(0.491)
cut2		
_cons	5.295***	6.588***
	(0.400)	(0.484)
cut3		
_cons	6.116***	7.623***
	(0.411)	(0.504)
cut4		
_cons	7.091***	8.657***
	(0.430)	(0.532)
cut5		
_cons	8.016***	9.686***
	(0.451)	(0.561)
cut6		
_cons	8.998***	10.77***
	(0.475)	(0.594)
cut7		
_cons	10.12***	12.08***
	(0.505)	(0.635)
sigma2_u		
_cons	0.706***	0.956***
	(0.119)	(0.158)
N	2793	2766
adj. R^2		

Source Author's Computation

TABLE A4.4: ESTIMATION RESULTS FOR THE ORDERED PROBIT MODEL FOR 11 YEARS OF SCHOOLING

	(1)	(2)
Variables	Boys	Girls
Child Characteristics		
Age of the Child	0.223***	0.158**

	(0.0483)	(0.0581)
Household head Characteristics		
Head aged 20-29	0.190	0.522
	(0.255)	(0.358)
Head aged 30-39	0.118	-0.109
	(0.151)	(0.162)
Head aged 50-59	-0.0509	0.130
	(0.0918)	(0.105)
Head aged 60 &above	0.222*	0.238
	(0.110)	(0.129)
Household Head Education		
Some primary	0.0519	0.0979
	(0.127)	(0.148)
Completed primary	0.431**	0.289
	(0.147)	(0.173)
Some secondary	0.424**	0.346*
	(0.151)	(0.175)
Completed secondary	0.358*	0.369
	(0.178)	(0.205)
Post-secondary plus	0.624***	0.795***
	(0.173)	(0.210)
Female Household Head	0.264**	0.304**
	(0.0974)	(0.110)
Household Characteristics		
Household Educ expenditure (Log)	0.162***	0.367***
	(0.0200)	(0.0308)
Household Size	0.00759	-0.0266
	(0.0149)	(0.0177)
Urban	0.207*	0.236*
	(0.0958)	(0.105)
Region		
Eastern	-0.560***	0.0188
	(0.128)	(0.155)
Northern	-0.757***	-0.520**
	(0.140)	(0.173)
Western	-0.266*	-0.209
	(0.135)	(0.166)
/		
cut1	3.245***	4.627***
	(0.957)	(1.159)
cut2	3.702***	5.040***
	(0.942)	(1.145)
cut3	4.102***	5.158***
	(0.938)	(1.143)
cut4	4.495***	5.564***
	(0.936)	(1.139)

cut5	4.934***	6.166***
	(0.937)	(1.139)
cut6	5.379***	6.750***
	(0.940)	(1.142)
cut7	5.664***	7.069***
	(0.942)	(1.145)
cut8	6.176***	7.525***
	(0.945)	(1.149)
cut9	6.761***	8.088***
	(0.948)	(1.151)
cut10	7.637***	9.205***
	(0.952)	(1.159)
N	731	567
adj. R^2		

Source Author's Computation

TABLE A4.5: ESTIMATION RESULTS FOR THE RANDOM EFFECTS ORDERED PROBIT MODEL FOR 11 YEARS OF SCHOOLING

	(1)	(2)
Variables	Boys	Girls
Child Characteristics		
Age of the Child	0.252***	0.202**
	(0.0609)	(0.0751)
Household head Characteristics		
Head aged 20-29	0.203	0.630
	(0.286)	(0.440)
Head aged 30-39	0.133	-0.143
	(0.171)	(0.200)
Head aged 50-59	-0.0600	0.132
	(0.104)	(0.130)
Head aged 60 &above	0.248	0.295
	(0.127)	(0.162)
Household Head Education		
Some primary	0.0626	0.116
	(0.143)	(0.182)
Completed primary	0.489**	0.354
	(0.175)	(0.217)
Some secondary	0.482**	0.435*
	(0.179)	(0.222)
Completed secondary	0.413*	0.453
	(0.207)	(0.259)
Post-secondary plus	0.698***	0.979***
	(0.207)	(0.283)
Female Household Head	0.288*	0.378**
	(0.112)	(0.142)
Household Characteristics		
Household Educ expenditure (Log)	0.186***	0.446***
	(0.0319)	(0.0575)
Household Size	0.00740	-0.0332

	(0.0171)	(0.0222)
Urban	0.226*	0.267*
	(0.110)	(0.131)
Region		
Eastern	-0.625***	0.00393
	(0.157)	(0.193)
Northern	-0.844***	-0.640**
	(0.178)	(0.227)
Western	-0.300	-0.254
	(0.155)	(0.207)
cut1		
_cons	3.743**	5.813***
	(1.170)	(1.550)
cut2		
_cons	4.256***	6.313***
	(1.179)	(1.559)
cut3		
_cons	4.704***	6.456***
	(1.195)	(1.564)
cut4		
_cons	5.143***	6.950***
	(1.215)	(1.586)
cut5		
_cons	5.634***	7.682***
	(1.241)	(1.627)
cut6		
_cons	6.133***	8.399***
	(1.271)	(1.676)
cut7		
_cons	6.454***	8.789***
	(1.291)	(1.704)
cut8		
_cons	7.029***	9.344***
	(1.329)	(1.743)
cut9		
_cons	7.685***	10.03***
	(1.372)	(1.791)
cut10		
_cons	8.668***	11.38***
	(1.442)	(1.891)
sigma2_u		
_cons	0.259***	0.478***
	(0.258)	(0.326)
N	731	567
adj. R^2		

Source: Author's Computation