Determinants of Household Education Expenditure in Uganda: Do the Poor Spend More on Education than the Rich?

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Abstract

This study estimates the Tobit and IV Tobit models using data from the Uganda National Household Survey (UNHS) 2019/20 to analyse factors that influence household education spending, and examine the impact of different income groups on education spending in Uganda. The findings show a positive relationship between household income on the one hand; and the level of education of the head of household, household size, urban residence, female-headed household and education spending on the other. Furthermore, higher-income households are found to have a high-income elasticity of demand than low-income households. An increase in total household income for high-income quintile households is found to increase educational expenditures by a percentage point than for low-income quintile households. Due to this disparity, the government is advised to revise its cost-sharing approach to public education spending, which needs to be supplemented by household education spending.

Keywords: *household education expenditure, households, Engel curve, Tobit estimation models, Uganda*

JEL Classification: *D1, I21, I22, I24, C24, R20*

1. Introduction

Education, as a core component of human capital, has been considered a key factor for supporting economic growth and development; and in alleviating poverty in developing countries. The human capital theory asserts that individuals gain knowledge and skills through education to access jobs, which increases productivity and economic growth; and ultimately leads to poverty reduction (Bryant, 1990; Becker, 2009; Mincer, 1970; Schultz, 1961).

Thus, human capital development is significant for developing countries, including Uganda, which aim to transform their agricultural-based economies to prosperous modern undertakings. For example, the Uganda Vision 2040 prioritises harnessing human capital development to achieve socio-economic transformation (NPA, 2010). Thus, education is prioritised in the Human Capital Development Programme of the Third National Development Plan (NDPIII) as a fundamental in the country's industrialisation agenda (NPA, 2020).

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To increase access to primary and secondary education, the Ugandan government has implemented various programs: Universal Primary Education (UPE), Universal Secondary Education (USE), and Universal Post O-Level Education and Training (UPOLET). In addition to the government, other stakeholders—such as the private sector (especially parents) and development partners—have contributed to these programs.

Furthermore, while governments are mostly the primary funders of education systems globally, the Ugandan government is not one of them. In Uganda, households are the primary funders of the education system, with household education spending as a share of GDP being higher than public education spending (Table 1). Since 2010/11, household education spending has increased, reaching 3.6% of the GDP in 2013/14, whereas public education expenditure has remained constant at 2%. Rising costs of education account for this increase.

Table 1: Household and Public Education Expenditure in Uganda

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

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

The educational attainment of a population remains one of the significant indicators of the quality of a country's human capital and socio-economic development (UBOS, 2018). For Uganda, notwithstanding several policy interventions, the country is yet to achieve its targeted 11 expected average years of schooling (NPA, 2020), despite an increase from 4.7 in the FY2012/13, to 6.1 in the FY2019/20 (UBOS, 2021). Specifically, about four in every ten people (36.4%) had some primary education, and one in every ten people had completed primary education (13.4%); secondary education (15.4%); and post-secondary (8.5%) in 2019/20 (ibid.). In comparison with its counterparts in the East African Community (EAC), Uganda's average years of schooling are lower than Kenya's (6.6) and Tanzania's (6.2). However, it is higher than Rwanda's (4.4), and that of the Sub-Saharan Africa's average (5.7).

However, the government and households continue to invest in children's education, which ensure that the country's human capital acquires the requisite knowledge and skills to contribute to the socio-economic transformation of the country (Acevedo & Salinas, 2000; Tilak, 1991). Still, despite the importance of investments and school resources in impacting school outcomes, the government's fiscal space is constrained as to guarantee the increase of enormous resources to improve education outcomes because prioritisation is mainly biased towards infrastructural development, at the expense of social sectors such as education. This bias is evidenced by the shrinking share of the education sector's national

budget, which has decreased from 10.4% in FY2019/2020 to 9% in FY2020/2021. In addition, the share of the education budget for primary education has continued to decline from 65% in FY2003/04 to 41.75% in FY2020/21. In the other subsectors, the situation is as follows: secondary education subsector (20.58%), tertiary education (20.33%), BTVET (12.06%); and others (5.33%).

Whereas the government provides tuition-free education through UPE and USE, household education expenditure remains a central component of human capital investment in achieving national education goals. However, increased household expenditure adversely affects poor households since it may 'crowd out' other crucial investments that improve households' welfare, thereby affecting their quality of life. Furthermore, increased household education expenditure may create educational inequalities between the poor and the rich, and ultimately increase social inequalities (Chi & Qian, 2016). Consequently, there is significant attention from policymakers and researchers to understand the drivers and impact of household education expenditure on education outcomes (Gustafsson & Shi, 2004).

Even though there are no longer any extended tuition fees in UPE or USE schools in Uganda, parents still incur education-related costs to improve their children's educational outcomes since insufficient of funding from the government leads to inadequately-managed primary schools. Apart from funding school tuition fees, other costs include registration, educational materials, examination fees, school uniforms, meals, and transportation. The fees for public schools are broken down into several different components, resulting in several separate payments (see Figure 1). Due to the increase in prices of goods and services required to operate schools and the shrinking public education expenditure, the per unit cost required to improve education achievement is UGX59,000 compared to the current UGX 10,000 that is provided by the government (NPA, 2018).
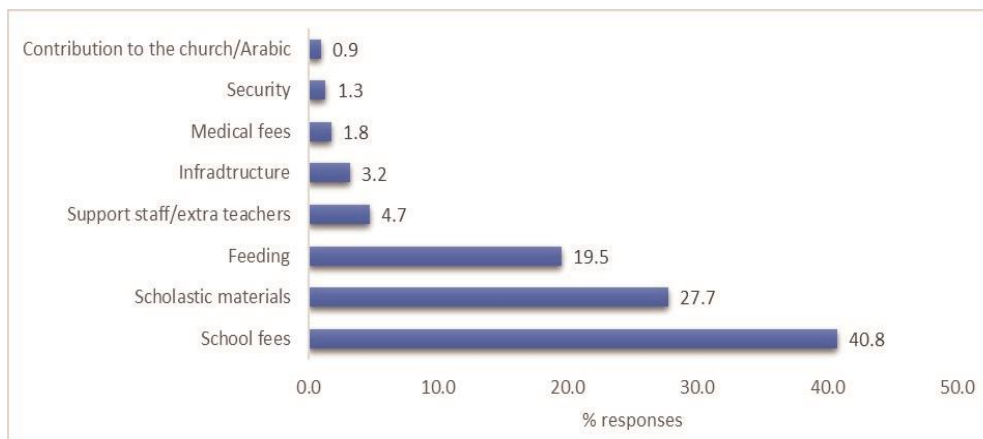

Figure 1: Items Paid for by Households in Public Primary Schools (% responses)
Source: Extracted from the National Education Accounts Report (NEA), MoES 2016

Actual household spending on education has increased significantly over the last decade, at an annual rate of 8.3% on average (NPA, 2018). In real terms, private education spending rose from UGX104,072 per year in 2002/3 to UGX230,105 in 2016/17, and to UGX440,000 in 2019/20 (UBOS., 2021). However, the distribution of this high household education expenditure between the rich and the poor remains largely unknown, as empirical analysis is still scanty. Yet, a better understanding of household education spending and educational attainment is critical for appropriate decisions by families, schools, and policy makers on the allocation of educational resources. Hence, this study aims to increase the understanding of the contribution of household education expenditure in Uganda's educational attainment by empirically examining who pays more between the rich and the poor.

Several studies have analysed factors that influence education spending and found that household income is a significant factor, with the effect varying across studies (Psacharopoulos, Arieira & Mattson, 1997; Binder, 1998; Chung & Choe, 2001; Qian & Smyth, 2011; Donkoh & Amikuzuno, 2011). For example, some studies show a negative income elasticity for wealthy households, whereas others show a positive income elasticity of demand.

However, other studies have found the opposite effect. (Hausman, Newey & Powell, 1995; Tilak, 2000, 2002; Fernandez & Rogerson, 2001; Psacharopoulos & Papakonstantinou, 2005; Tansel & Bircan, 2006). Aside from household income, region and urban residency also impact household education investment. Notably, the literature shows that urban families invest more money in their children's education than rural families (Donkoh & Amikuzuno, 2011; Psacharopoulos, Arieira & Mattson, 1997; Kanellopoulos & Psacharopoulos, 1997).

Other factors that play a significant role in deciding the amount of money spent on education include the number of children who are enrolled in school, work status of both parents, total annual income of the family, and the gender of the person who is in charge of the household (Knight & Shi, 1996; Tilak, J. B, 2002; Lakshmanasamy, 2006; Qian & Smyth, 2011; Choudhury, 2011). Included here also are the level of education held by the household's primary wage earner, number of children in a household who are of school age, employment status of parents, total annual income of a household, and the gender of the primary wage earner.

Very few empirical studies have examined the educational expenditures for African households. In Uganda, the authors found only one study (NPA, 2018), which employs the Ordinary Least Square (OLS) model to empirically investigate the determinants of private education spending as per the UPE policy in rural and urban areas in various regions of Uganda. The study found that families with higher levels of education spend more money on their children's education. In addition, the number of children in the home between the ages of 6 and 12 years old; as well as the area in which one resides, per capita income, household expenditures, and household assets: all were found to have a favourable influence on primary education expenditures.

Another critical policy issue for this study centres on how household expenditure varies within income groups, which sheds light as to how increasing household education investments affects low-income households. Additionally, policymakers generally have less information on household demand for education, which limits the formulation of successful educational policies (Sarwar & Muhammad, 2019). Thus, this study investigates educational expenditures made by households for all children attending any level of schooling. In general, the study lays emphasis on the demand-side factors of education in Uganda, particularly because many studies on Uganda focus on the supply-side components of education. Lastly, in terms of the methodological contribution, the study uses the log-normal Tobit econometric model, which solves the widespread left-censoring problem that occurs in the data on household expenditures.

2. Literature Review

The body of empirical research that has been conducted on the subject of household education expenditure has established a link between the characteristics of a household head, features of a household, characteristics of a community, and the amount of money that a household spends on education. This link is directly related to the amount of time a household spends on education. The household head factors include education level of a home head (Glick & Sahn, 2000; Ogundari & Abdulai, 2014; Kim & Lee, 2010); household head sex (Sarwar & Muhammad, 2019; Ebaidalla, 2018; Rizk & Abou-Ali, 2016); household head age (Lloyd & Blanc, 1996; Rizk & Owusu-Afriyie 2014); household (Jayachandran, 2002; Qian & Smyth, 2011; Huy, 2012); and locality factors that take into account a household's area of residence (Connelly & Zheng, 2003; Tansel & Bircan, 2006; Sarwar & Muhammad, 2019; Jenkins, Amala, & Bahramian, 2019). Studies on household demand for education reveal that household income matters for education demand, with education demand increasing as household income increases.

Similarly, household education expenditure is positively associated with urban households versus rural households (Glewwe & Patrinos, 1999; Kim & Lee, 2010; Donkoh & Amikuzuno, 2011). The findings are consistent with Tansel and Bircan (2006), and Jenkins, Amala & Bahramian (2019), who find that households in urban areas in Turkey and Nigeria spend more on education than those in rural areas. Similarly, Qian and Smyth (2011) discover a significant positive impact of household income on educational spending, with the level of household income influencing the likelihood of educating a child abroad. Furthermore, Huy (2012) reveals that Vietnamese families with higher wealth and parents who have completed higher levels of education put a greater emphasis on their children's education. Parents who have achieved a higher level of education are more likely to put in a greater amount of effort than parents who have completed a lower level of education. This is perhaps the most important finding.

In cases where gender discrimination is established for girls, the literature also reveals differences in household spending on education between boys and girls. According to Aslam and Kingdon (2008), households in Pakistan are more willing to spend on boys' education than that of girls. Household income and parental

education remain essential factors in explaining increased household education spending in Africa (Ogundari & Abdulai, 2014; Rizk & Owusu-Afriyie, 2014; Rizk & Abou-Ali, 2016; Jenkins, Amala & Bahramian, 2019).

Bayar and iLahan (2016), on the other hand, looked into factors that impact the amount of money a household spends on education to establish whether lower-income households spend less on education. The goals of the study were twofold: first, to investigate the factors that influence education spending in Turkish families; and second, to determine the impact that various income brackets have on education spending. The authors estimated the effects of the Tobit model in 2002, 2010, and 2013 using data from a household budget survey (HBS) undertaken by the Turkish Statistic Institution (TurkStat). According to the findings, higher household income levels result in higher education expenditures. They also discovered that households with higher human capital invest more in their children's education. In addition, the income elasticity of education expenditure was found to be greater in poorer households than in richer ones, implying that the poor were more sensitive to changes in income regarding education expenditures.

Unlike Bayar and iLahan (2016), our study addresses the endogeneity problem by using household income as an instrument for total expenditure, as Hausman et al. (1995) suggested. As a result, not only do we estimate the Tobit model, but we also get robust estimation results from the IV Tobit. In addition, unlike Bayar and iLahan (2016), our study employs the most recent nationally representative data, and accounts for heteroscedasticity via logarithmic transformations of household education expenditure and total expenditure. On the other hand, this formulation can estimate the total expenditure elasticity of household education expenditure. Taking the logarithm of private tutoring expenses resulted in a problem because household expenditures were discovered to be zero. We assigned one value to household expenditures rather than zero to address this issue.

Only NPA (2018) has empirically investigated factors driving private education spending under UPE policy in rural and urban areas, and across different regions in Uganda. The study employed the OLS model and discovered that primary education expenditure is positively related to household education level, household expenditure, household assets, number of children aged 6–12 years, and area of residence. Given the scarcity of studies on household education spending in Africa, and Uganda in particular, this study adds to the existing literature by examining the determinants of household education spending in Uganda, given the scarcity of studies on this matter in Sub-Saharan Africa, and specifically in Uganda.

3. Methodology
3.1 Data
This study uses data from the 2019/20 Uganda National Household Survey (UNHS). The UNHS is a nationally representative survey that aims to provide reliable estimates of key indicators at the national, rural-urban, and regional levels; and separately for ten sub-regions. The survey uses a two-stage stratified sampling

design in which enumeration areas (EAs) are first classified by districts and areas of residence. Then, the EAs are drawn using the probability proportional to size (PPS) technique. Thereafter, households are drawn using the systematic random sampling in method the second stage. Finally, the UNHS is made up of make-ups. Since the socioeconomic module collects information on household characteristics, it was deemed as the most relevant for this analysis.

3.2 Empirical Models

Therefore following Sial, Sarwar and Ul Hassan (2020), and Sarwar and Muhammad (2019), the empirical model adopted by the study relates household spending on education to household head, and household and community characteristics. The analysis of household education spending is based on the logarithmic Engel curve framework that connects spending with household income and other household factors.

Correspondingly, the overall household education spending for all school-going children is given as:

$$lnE_i = \alpha_i + \beta lnY_i + \sum_k \gamma_k Z_{ki} + \xi_i \qquad (1)$$

Where E_i denotes the education expenditure of household i. The vector Z stands for a household head, household and community characteristics (sex of household head, education level of household head, household income, household size, and location of a household). $\alpha_i \beta$ and γ are the estimated parameters, while ξ symbolises the random error.

Equation (1) expresses household spending on education and household income in the logarithmic form to show the income elasticity of education demand concerning a household's total expenditure, β. When the income elasticity is negative, it signifies that education is inferior. On the other hand, a positive income elasticity value shows that the interest is normal (Sarwar & Muhammad, 2019). When a household's income elasticity is much greater than zero, but less than one, the good in question is regarded as required for a household. If this is not the case, then the good is considered a luxury for a household if the income elasticity of the household is positive and bigger than one.

Because the distribution of household education expenditure has a mass at zero, the study will adopt the Tobit analysis as its estimation method, which allows for a mass point in the distribution of the household education expenditure variable.

In addition, the study estimates equation (1) for households with school-going children at all levels of education. Most importantly, it employs a better model to assess the determinants of spending on education. The Tobit regression model represents the household education spending variable in terms of the latent variable E^* as follows:

$$E_i^* = x_i\beta + \xi_i , \xi_i|x \sim N(0, \sigma^2) \qquad (2)$$
$$E_i = 0 \; if \; E_i < 0$$
$$E_i = E_i^* \; if \; E_i^* \geq 0$$

Or
$$E_i = \max(0, E_i^*)$$

where E_i is the actual observed household spending on education; E_i^* is the latent variable for household education spending; x_i represents the vector that includes child, household and community covariates; β represents the vector of parameters; ξ_i represents the normally distributed error term with zero mean and constant variance (σ^2).

The study transforms the household education variable into log form to ensure it is normally distributed since the Tobit model assumes the dependent variable's normality. This model introduces log normality, including a non-zero threshold and log normality of E as follows:

$$E^* = \exp(x_i\beta + \xi_i), \xi_i N(0 - \sigma^2) \qquad (3)$$

Where,
$$E_i = 0 \; if \; lnE_i^* \leq \gamma$$
$$E_i = E_i^* if \; lnE_i^* > \gamma$$

Therefore, at the data censoring point, household spending on education $E_i = 0$. As such, the threshold is $\gamma \neq 0$; where the γ is the lowest uncensored value of the log normality of lnE_i. The study further addresses econometric issues, including censoring problems due to zero expenditures of some households, endogeneity and heteroscedasticity to obtain unbiased estimation results.

Estimating the amount a household spends on education typically requires collecting data from household surveys. These surveys ask the households being surveyed to provide an estimate of the amount of money they have spent over a specific period on a variety of items, one of which must be the amount spent on the education of members of the household. Furthermore, most of these surveys include information on enrolment status (such as the level of education, current class, type of school, and so on), as well as the socio-economic and demographic characteristics of family members (location, wealth, etc.). In this way, it is possible to estimate the cost per enrolled child by the degree of education and other pertinent dimensions by intersecting the various forms of information. In this sense, the totality of the costs incurred by each level of education is a household's total education expenditure, which is equivalent to the entire amount spent on education by a household.

Several factors influence the decision to invest in a child's education, affecting the expected utility. Three issues have received considerable attention in the literature (Gertler & Glewwe, 1990; Kabubo-mariara & Mwabu, 2007). First, the study's dependent variable is 'household education spending,' which refers to all expenses incurred by a household to educate one or more members. For example, consider an educational system with n levels of schooling, such as preschool, primary, secondary, post-secondary, and tertiary education. The total household spending on education will be as follows:

$$E_i = \sum_{k=1}^{n} E_{ik} \qquad (4)$$

Where for a given household i, E_i is the total education expenditure; E_{ik} is the total education expenditure incurred for k; and k is the level of education from preschool to tertiary education.

However, it is essential to consider some econometric issues while examining the determinants of education spending to obtain unbiased estimation results. In particular, if the censoring problem occurs because some households have zero education spending, such household spending will be non-normal. In this context, the OLS will produce biased and inconsistent results because of the non-normality of household education spending. Therefore, the Tobit model is preferred to the OLS (Sarwar & Muhammad, 2019).

The independent variables for the study majorly include household and community characteristics. These comprise household head education; household size defined as the number of people residing in the same room/house; age of household head, household expenditure; residing in an urban area; household head's sex; and region dummies for central, Eastern, Western and Northern to understand the regional disparities in household education spending.

When a household's education spending is regressed on total household expenditures, the Engel curve models frequently exhibit an endogeneity bias (Hausman et al., 1995; Tansel & Bircan, 2006). In particular, the inclusion of household expenditure in the regression makes it endogenous. Smith and Blundell (1986) propose an exogeneity test for an explanatory variable in a Tobit model. Their method consists of two steps. First, the endogenous variable is estimated using ordinary least squares over a set of instruments and the exogenous variables of the Tobit model.

In a scenario where the null hypothesis is believed to be true, exogenous household spending is assumed, and equations (2) and (3) are used to estimate the conventional Tobit model. On the other hand, if the null hypothesis is not accepted, then the expenditures of households become endogenous, which requires a new model to be utilised to accurately estimate the parameters of interest. One of the most effective methods for resolving this issue is employing an estimation method known as instrumental variables (IV). Tansel and Bircan (2006) posit that the Engel curve analysis frequently encounters problems with heteroscedasticity. As a consequence of this, employing logarithmic transformation typically results in a reduction of heteroscedasticity. Consequently, this study used the logarithmic transformation for both the total and household education expenditures.

Furthermore, to address the issue of endogeneity, we used household income as an instrument for total expenditure. According to Hausman et al., household income

and spending are highly correlated. Because household income does not directly influence the distribution of expenditure shares in a two-stage budgeting process, the instrument can be considered legitimate. Within the parameters of this discussion, the IV-Tobit is also utilised. Amemiya's estimator is also used here (1978). According to Newey, this estimator is effective (1987). The method employs generalised least squares on the structural and reduced form parameters of the Tobit model. Instead of 0 for household expenditures, we assigned it a value of 1.

4. Results and Discussions
4.1 Descriptive Statistics

Descriptive statistics for the variables used in the empirical analysis are reported in Tables 1 and 2. Firstly, Table 1 provides a detailed summary of the dependent variable, i.e., household educational expenditures. Values in the column show that amongst all households, 8,549 households invest in education (last row), while the rest spend no money on education in Uganda. The variable is positively skewed and has non-normal kurtosis (second column) if all the households are considered. This shows that the dependent variable is not normally distributed. Generally, a positively skewed variable that is not normally distributed is transformed into a logged form. It can be seen in the very last column of the table that the distribution of the log of the variable that it is dependent on is approximately normal if $ln>0$, as the mean and median are nearly equal, and the standard deviation is slight. Furthermore, the skewness and kurtosis coefficients are -0.148 and 3.159, respectively. The dependent variable has zero skewness, is symmetric, and can be confidently considered normally distributed. Given the distribution of the log of positive education expenditure, the log-normal Tobit model is an appropriate choice for estimating the proposed model in the study.

Table 1: Summary Statistics of Dependent Variable

Statistics	Education Expenditures	Positive Education Expenditures	Log of Positive Education Expenditures
Mean	1190000	1200000	12.766
Medium	348000	356000	12.78269
Minimum	0	300	5.714
Maximum	7.24E+08	7.24E+08	20.4
Standard Deviation	10100000	10200000	1.558
Skewness	57.415	57.092	-0.148
Kurtosis	3636.824	3595.62	3.159
No. of Obs.	8649	8549	8549

Source: Author's Computation based on UNHS Data, 2019/20

Table 2 presents summary statistics of the independent variables for households with positive education expenditure, and those with zero education expenditure. Positive education spending households have a higher average log of total household income (5.126) compared to no-education spending households (4.905). Mostly, families with a household head aged 40–49 years spend more money on their children's education than those with a household head aged 20–29 years.

Table 2: Descriptive Statistics of Independent Variables

Variables	Obs	Mean	SD	Min	Max
Households with Positive Education Expenditures					
Household Educ expenditure (Log)	8549	5.126	0.697	-0.104	10.459
Household Size	8549	5.913	2.263	1	25
Household Head Age group					
Head aged 20–29 (=1)	671	12.237	1.494	5.714	15.862
Head aged 30–39 (=1)	2319	12.556	1.445	5.714	16.706
Head aged 40–49 (=1)	2502	13.045	1.522	7.315	20.4
Head aged 50–59 (=1)	1598	13.014	1.579	5.714	17.194
Head aged 60 &abo~1)	1459	12.595	1.66	6.911	19.928
Household Head Education					
Completed Primary	1204	12.783	1.44	5.714	16.551
Completed Secondary	652	13.333	1.397	8.613	16.727
No formal education	1332	12.184	1.557	5.714	19.703
Post-secondary plus	733	14.045	1.403	8.854	17.256
Some primary	3225	12.435	1.433	5.714	16.495
Some secondary	1329	13.102	1.508	6.911	20.4
Urban					
Rural	6389	12.546	1.526	5.714	20.4
Urban	2160	13.418	1.466	7.315	19.928
Gender					
Male	5790	12.836	1.532	5.714	20.4
Female	2759	12.62	1.602	5.714	19.703
Region					
Central	1750	13.509	1.299	9.024	17.256
Eastern	2926	12.577	1.529	6.911	17.123
Northern	1750	12.12	1.633	5.714	16.481
Western	2123	12.948	1.444	8.295	20.4
Households with Zero Education Expenditures					
Household Educ expenditure (Log)	100	4.905	0.758	3.415	7.498
Household Size	100	4.31	2.024	1	11

Notes: (i) Values against categories of dummy variables are the averages, standard deviations, minimum and maximum of expenditures on education for each category; (ii) The average of expenditures on education for categories of dummy variables with zero education expenditures has not been reported in table because of their zero values.

Source: Author's Computation based on the UNHS Data 2019/20

The average of the log of total education expenditure is 12.62 for a female-headed household, which is to some extent lower than that of a male-headed household. However, households with heads that have completed post-secondary education have a higher positive education expenditure (8.13) than those with heads who have only completed primary schools.

4.2 Tobit and IV Tobit Models

Table 3 presents the estimates for the log-normal Tobit and IV Tobit regression. However, the estimates for the Tobit model are not directly interpreted. Therefore, the marginal effects are presented in columns 3 and 4, respectively.[1] As shown in Table 3, the results show several variables as significant at 5%, and with the expected signs.

Table 3: Log-normal Tobit and IV-Tobit Estimates

Variable	Tobit Model		IV Tobit Model	
	Coef.	*ME*	*Coef.*	*ME*
Household Educ expenditure (Log)			1.457***	1.457***
			(0.069)	(0.069)
Household Head Age group				
Head aged 20–29 (=1)	-0.608***	-0.608***	-0.482***	-0.482***
	(0.068)	(0.068)	(0.067)	(0.067)
Head aged 30–39 (=1)	-0.339***	-0.339***	-0.22***	-0.22***
	(0.044)	(0.044)	(0.044)	(0.044)
Head aged 50–59 (=1)	0.016		-0.063	-0.063
	(0.049)	0.016	(0.048)	(0.048)
Head aged 60 &above (=1)	-0.435***	-0.435***	-0.489***	-0.489***
	(0.05)	(0.05)	(0.05)	(0.05)
Household Head Education				
Some primary	0.156***	0.156***	0.057	0.057
	(0.051)	(0.051)	(0.052)	(0.052)
Completed Primary	0.395***	0.395***	0.228***	0.228***
	(0.063)	(0.063)	(0.065)	(0.065)
Some secondary	0.513***	0.513***	0.273***	0.273***
	(0.063)	(0.063)	(0.07)	(0.07)
Completed Secondary	0.601***	0.601***	0.333***	0.333***
	(0.077)	(0.077)	(0.084)	(0.084
Post-secondary plus	0.928***	0.928***	0.444***	0.444***
	(0.077)	(0.077)	(0.096)	(0.096)
Female-Headed Household	0.173***	0.173***	0.204***	0.204***
	(0.038)	(0.038)	(0.037)	(0.037)
Income Quintile				
Quintile 2	0.556***	0.556***		
	(0.051)	(0.051)		
Quintile 3	0.883***	0.883***		
	(0.053)	(0.053)		
Quintile 4	1.301***	1.301***		
	(0.055)	(0.055)		
Quintile 5	1.97***	1.97***		
	(0.061)	(0.061)		
Household Size	0.294***	0.294***	0.33***	0.33***
	(0.008)	(0.008)	(0.009)	(0.009)

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[1]For log-normal Tobit estimation, setting of lower limit of dependent variable is mandatory. Thus, setting of zero (i.e. zero education expenditures) as lower limit creates problem because the STATA mistakenly treats these observations to missing observations. To avoid this problem, we set 2.996 (the minimum positive value of dependent variable) as the lower limit.

Urban	0.289***	0.289***	0.12***	0.12***
	(0.04)	(0.04)	(0.043	(0.043)
Region				
Eastern	-0.63***	-0.63***	-0.49***	-0.49***
	(0.048)	(0.048)	(0.051)	(0.051)
Northern	-0.881***	-0.881***	-0.649***	-0.649***
	(0.054)	(0.054)	(0.06)	(0.06)
Western	-0.248***	-0.248***	-0.104***	-0.104***
	(0.05)	(0.05)	(0.051)	(0.051)

Notes: (i) Dependent Variable: natural logarithm of households spending on education; ii). *** and ** indicate 1% and 5% significance, respectively. Standard errors are in parentheses;

Source: Author's Computation based on UNHS Data, 2019/20

In the first regression, household income is shown to positively and significantly affect educational investment. Furthermore, the results show that households in higher income quintiles, such as quintile 5, have a higher income elasticity of 1.97 compared to those in lower income quintiles, such as quintile with 20.556.

In this regard, considering other factors as constant, a 1% increase in household income for those in quintile 5 increases spending on education by 1.97% compared to those in quintile 2. This suggests that education is a luxury for households in quintile 5. This finding is consistent with other studies (Acar, Günalp & Cilasun, 2016; Rizk & Owusu-Afriyie, 2014; Jenkins, Amala & Bahramian, 2019). However, since the income elasticity is positive and less than one for the lower income quintiles, this confirms that education is necessary for middle and lower households.

There is a negative correlation between the age of the household head and household spending on higher education. Therefore, household heads in the IV Tobit model spend less on their children's education regardless of age. However, the results align with those of NPA (2018), which show that families in their twenties and thirties spend far less on their children's primary education than families in their forties.

In addition, the average amount spent by female heads of households on their children's education is 17.3% higher than that of male heads of households. This is because females place a higher value on enrolling and educating their children than males (Aslam & Kingdon, 2008; Jenkins, Amala & Bahramian, 2019). Furthermore, spending for urban households increased by 28.9% compared to rural households. This is because urban households face higher education costs than rural households. This is consistent with the findings of Kim and Lee (2010); Jenkins, Amala and Bahramian (2019); Rizk and Abou-Ali (2016); Rizk and Owusu-Afriyie (2014): all of whom also discover higher education spending for parents living in urban areas. The findings also show regional differences in education spending, with households in Uganda's eastern, northern, and western regions spending significantly less on education than those in the central region.

5. Conclusion

Uganda has implemented several programmes—including UPE, USE and UPOLET—to improve education participation, learning outcomes and attainment levels; since human capital development is central to the country's development agenda. Thus, the government targets to increase schooling years from 6.1 to 11 years by 2025, as per the National Development Plan.

Public schools in Uganda no longer charge tuition fees. Yet, parents continue to spend more money on education-related items—including school uniforms, scholastic materials, lunch, and transport—to facilitate their children's educational outcomes. However, increasing household spending is likely to cause some welfare losses, particularly in the low-income eastern and northern regions.

The findings show that household education spending is positively related to household income, which implies that households are motivated to spend more on education as their incomes rise. However, the study also found that spending on education remains low for low-income households, even though they spend a larger proportion of their income on education than high-income households. The implication of this finding is that increasing education spending is welfare constraining for the poor, which may compromise their access to good education and welfare improvement. Given the income disparities between the rich and the poor, the government is advised to take a different cost-sharing approach to public education spending, which should be supplemented by household education spending.

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