



Analysis of Factors Influencing Household Expenditure on Education: Evidence from Kalambo District, Tanzania

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Ikisiri

Utafiti huu unatoa ushahidi jarabati kuhusu vipengele vinavyoathiri matumizi ya elimu katika ngazi ya kaya, Tanzania kwa kutumia ukaguzi wa kundiwakilishi wa kaya zilizochaguliwa katika wilaya ya Kalambo. Utafiti ulitumia data za msingi kuchunguza mambo hayo katika ngazi mbili; mkuu wa kaya na tabia za kaya. "Tobit regression model" na njia ya uchanganuzi elezi zilitumika kuamua vipengele vinavyoathiri matumizi ya elimu katika kaya. Hitimisho la utafiti linathibitisha kuwa kipato cha kaya, umiliki wa mali za kudumu, umri na hali ya ndoa ya mkuu wa kaya ni vipengele vya msingi vinavyoathiri kiasi cha kipato kilichotumika katika elimu. Mnyumbuko wa kipato unaonesha kuwa elimu siyo tu ni muhimu bali ni bidhaa ya anasa. Hata hivyo, matokeo yanaonesha kuwa kaya zinazoongozwa na wanaume zina matumizi madogo ukilinganisha na kaya zinazoongozwa na wanawake. Kwa mujibu wa uchanganuzi elezi, asilimia 64 ya wakuu wa kaya walikuwa na hiari ya kuongeza matumizi wakiamini kwamba watoto wao watapata elimu bora. Kwa kuzingatia kuwa, kaya na jamii kwa jumla, kila mmoja ana matumizi ya ziada, uboreshaji wa shule za umma utahamasisha kila kaya kuongeza matumizi katika elimu ya umma.

Abstract

This paper provides empirical evidence on the factors influencing education spending at the household level in Tanzania by using a cross-sectional household survey conducted on selected households in Kalambo districts. The study used primary data to identify the factors at two levels, household head characteristics and household characteristics. The Tobit regression model and the descriptive analysis methods were applied to determine the factors influencing household expenditure on education. The conclusion of this study shows that the household's income, ownership of durable assets, age, and marital status of the household head are key factors that influence the amount of income spent on education. The income elasticity demonstrates that education is both necessary and luxurious good. However, the results indicate that male-headed households spend less than female-headed households. According to the descriptive statistics, 64% of household heads are willing to increase their expenditure if they are confident that their kids will receive a better education. Considering that household and public spending supplement each other, the improvement of public schools motivate household to increase spending on public education.

Keywords: Education expenditure, household analysis, Tobit model

1. Introduction

Education is a right that every citizen in Tanzania should obtain. It has been considered a key factor in supporting economic growth and development and alleviating poverty in developing countries (Ebaidalla, 2018). Education is both a consumption and investment good (Dimoso, 2012). Since education provides a means of earning money and leads to higher-paid jobs, it is regarded as a smart investment (Al-samaral and Tessa, 2012). The nation as a whole gain from education and the individual who pursues it. Olaniyam and Okemakunde (2008) claimed, based on Schumpeter's method (1973), that the government invests in education to generate fresh concepts that would greatly advance technical advancement for economic growth and development.

In Tanzania, the education system has been affected by many social and economic transformations that the country has undergone. After independence, the government centralised education activities to eliminate inequalities in the provision of education based on gender, religion and ethnicity (Mushi, 2009). The establishment of private primary and secondary schools was not allowed (Cameroon and Dodd, 1970). Universal Primary Education (UPE) and agricultural based primary curriculums were introduced in 1967 as a result of Arusha Declaration with the education policy for self reliance. The implementation of UPE started with the abolishment of school fees at the primary level in 1973 (Mushi, 2009). Due to deficiencies which were marked in the implementation of policy

for self reliance, the Musoma resolution was formulated in 1974 (Galabawa, 1994). Secondary school graduates were required to serve one year in the national service and post secondary institution was declared open for adult workers and peasants who satisfied the minimum entry qualification (Biswalo, 1985).

The early 1980s, external shocks and deficient economy policy caused an economic crisis that needed to be resolved through economic restructuring and recovery. The government turned towards free market policies by adopting a Structural Adjustment Programme (Al-Samaral and Tessa, 1992). The adoption of liberalization and free market policies reduced public expenditure on education. The efforts done by the government include the cost-sharing policy that allows private primary schools to operate. Education was considered an enterprise whose costs were driven by market forces of demand and supply (Al-Samaral and Tessa, 1992; Sumra, 1993; Galabawa, 1994; Mushi, 2009).

Primary Education Development Plan (PEDP) and Secondary Education Development Programme (SEDP) were introduced in 2002 and 2004 respectively, to expand school access, improve education quality, and increase school retention at the primary and secondary levels. The government committed to providing capital grants of TZS 10,000 per primary school pupil and TZS 25,000 per secondary school student per year to help public schools run themselves to a high standard (Mbele and Katabaro, 2003; Makumba, 2014). The grants were intended to help with the purchase of

learning and teaching materials, classroom and laboratory renovation, and school administration (Makumba, 2014). In 2015, the government implemented a free education policy for government schools up to the secondary level. Fees and mandatory contributions were eliminated.

Regarding financing education in Tanzania, funds come from domestic resources, general budget support, project support, non-state actors, private sectors, and other stakeholders, including parents, who contribute about 32.1% of public education expenditure (ESA-2012). The government's budget has been increasing regularly since 2009/10 when the budget was TZS 9.51 trillion to 34.9 trillion in 2020/21. The GDP has increased from TZS 40.94 trillion in 2009/10 to 148.5 trillion in 2020/21. The proportional allocation of the national budget to the education sector as a percentage of GDP at current market prices indicates a decreasing

trend. The data show a continuing decrease in budget allocation as a percentage of GDP from 4.3 percent in 2009/10 to 3.1 percent in 2020/21. On average, the overall allocation has only 3.6 percent, which is 2.4 less compared to the international standard benchmark of 6 percent that Tanzania is committed to attaining (TE Network, 2021). Also, the overall allocation of the education sector budget as a percentage of the national budget is 14 percent which is less by 6 percent compared to the international standard benchmark of 20 percent of the national budget allocation to the education sector that Tanzania is committed to attaining. Moreover, the allocation is below the SADC protocol of 25% of the budget. Table 1 presents the education sector budget allocation as a percentage of the total government budget and GDP from 2009/2010 to 2020/2021

Table 1: Education sector budget allocation as a percentage of total government budget and GDP from 2009/2010 to 2020/2021

Year	Total budget (In millions TZS)	GDP (at current prices in millions of TZS)	Education sector budget (in millions TZS)	Education sector (in sector (as % of total budget)	Education sector budget (as % of GDP)
2009/10	9,513,685	40,936,805	1,743,900	18.3	4.3
2010/11	11,609,557	48,283,324	2,045,400	17.6	4.2
2011/12	13,525,895	56,846,228	2,283,000	16.9	4.0
2012/13	15,119,644	65,585,228	2,890,149	19.1	4.4
2013/14	18,248,983	74,778,620	3,171,631	17.4	4.2
2015/16	19,649,500	83,904,228	3,465,101	17.6	4.1
2016/17	24,495,500	93,725,581	3,870,178	17.2	4.1
2017/18	29,500,000	105,747,227	4,768,358	16.2	4.5
2018/19	31,700,000	129,043,901	4,641,498	14.6	3.6
2019/20	33,000,000	139,893,804	4,510,000	13.6	3.2
2020/21	34,880,000	148,522,112	4,720,000	13.5	3.1

Source: (TE Network, 2021; Penn World Table, version 10.0)

Since independence, education is not a cost-free activity for households, even when students attend public schools where fees are not charged. Apart from the opportunity for education, households complement government efforts in funding and getting students ready for school. The funding gap in government spending on education is left for the individual student or family to fill. Household expenditure substitutes or complements public efforts (Ngwilizi, 2013).

This study aims specifically to identify the factors influencing household expenditure on education. Given the importance of education in economic growth and development, the factors influencing household education expenditure have gained attention from both researchers and policymakers. However, most of the existing literature has focused on the macroeconomic perspective and government expenditure on education. On the other hand, the issue of household's expenditure on education has gained little attention in Tanzania. The few existing studies have no common conclusion (e.g, Ngwilizi, 2013 and Owen and Nerman, 2011). This seems to suggest that contextual characteristics for instance, culture and traditions within a country determine the importance of the factors. Furthermore, despite various interventions in education sector since independence evidence shows the pattern of spending at the household level varies. For instance, despite the increase in school enrolment after introduction of UPE, structural difference in education attainments has remained over the period. Less privileged children still

receive less education than better off children in Tanzania (Owens and Nerman, 2011). There is a need for accurate information on what brings the difference in expenditure pattern in the order to formulate a sound education policy for planning purposes.

2. Literature Review

The empirical literature indicates that many variables including household characteristics and household head characteristics influence household education expenditure. However, the universal findings show that household income and education level of the household are the most significant factors affecting education expenditures (e.g, Ngwilizi, 2013; Ebaidalla, 2018; Phon, 2018; and Maniriho et al., 2021).

Hapuarachchi (2020) used primary data to identify the determinants of household education expenditure in Sri Lanka. The multiple regression model and the descriptive analysis method were applied to establish relationships between determinants and household expenditure on education. The findings of the study indicated that the household income, the number of schoolchildren and the household head's level of education have a significant effect on household expenditure on education. Furthermore, the head's age was a negative determinant of the household expenditure on education. According to the findings educated household heads prefer to invest more in their children's education.

Prahitama *et al.* (2019) used Tobit Model to analyze the factors that influence household expenditure on education in Semarang city in Indonesia. The result of

the study shows that the factors that influence household expenditure for education include the number of household members, the number of working household members, the proportion of household members who attend school and food expenditure in the household.

Ebaidalla (2018) examines the factors that influence households' expenditure on education in Sudan, using the National Baseline Household Survey (NBHS) data (2009). The results of the Tobit model indicate that household income, head education, head age, household size, number of school-age children and residing in urban areas are the most significant factors affecting education expenditure. The effect of household income is found to be positive and significant in the highest income quintile.

Maritim (2017) used a multiple regression Model to study the relationships between determinants and household expenditure on education in Kenya by using a descriptive research design. The findings of the study indicated that the gender of school going children, education level of the household head, occupation of the household head, household size and total household income have a significant effect on household expenditure. In households where the heads have a high education level, the spending on education is relatively high. However, Tin *et al.* (2012) found that the households where heads have lower education levels are more concerned with their children's education which leads them to spend more on their education in Malaysia

Awudu and Ogundari (2014) analysed the determinants of household's education and Healthcare spending in Nigeria by using a double-hurdle model. The empirical results show that a household's decision to whether to spend and how much to spend is positively and significantly related to household income, household size and the level of education of the household head. Moreover, female-headed households tend to spend more on the education of household members and healthcare services compared to male-headed households. Likewise, Donkoh and Amikuzuno (2011) found that families headed by female households have a high probability of spending in education in Ghana. Moreover, Ngwilizi (2013) found that the sex of the household is not the important factor in Tanzania for the household to invest in education.

Owen and Nerman (2011) using household budget survey data covering mainland Tanzania in 2001 and 2007, investigated the determinant of demand for education in Tanzania. The data was used to test whether the determinant of demand for education changed during the Tanzanian government's push for Universal Primary Education (UPE) in 2000's. The study found that despite the increase in enrolment as the result of the abolition of school fees, yet costs seem to be of limited economic significance and important structural differences in schooling remain. Less advantaged children still receive less education than better off children.

2.1. Theoretical Framework

Economists regard education as both a consumer and capital goods. As a consumer good it offers utility to a

consumer and serves as an input into the production of other goods and services. As a capital good, education can be used to develop the human resources necessary for economic and social transformation (Maritim, 2017). The study used the human capital theory founded by Smith (1776) in identifying the expectations of households in investing in education. The provision of formal education is seen as a productive investment in human capital which is considered to be more equally worthwhile than that of physical capital. According to human capital theory, the parental decision to invest in children's human capital is motivated by the return that will accumulate not only to children but also share of return that will generate transfers to parents in the future (Phon, 2018; Rosen, 1987; Al-samarrai and Tessa, 1992). Therefore, expenditure on education should be considered an investment since it is undertaken with the view of increasing personal income.

3. Methodology

3.1. Data collection

This paper used primary data collected directly from household heads having children who were studying in secondary

schools in both public and private schools, and secondary data from unpublished and published documents related to the study. The study employed a cross-sectional design in which data were collected from a sample at a single point in time (Kothari, 2004). A total of 105 households were chosen as a representative sample size using Slovin's formula (Dhokhikah *et al.*, 2015). A stratified random sampling method was used to sample households. The selected households had socioeconomic factors including age, educational background, family income and marital status.

3.2. Description of Variables and Measurement

This study measured qualitative variables on a nominal scale, while quantitative variables were measured on an ordinal, interval, or ratio scale. Based on the literature review analyzed, the dependent variable is the fee per capital expenditure in education. The independent variables were divided into two groups: household head characteristics and household characteristics, as shown in Table 2. The study adopted a similar method of variable measurement used by Hapuarachchi (2020).

Table 2: Variables Measurements

Variable	Scale	Explanation of a Variable	Expected sign
Dependent variable			
Fee per capita expenditure	Ratio	Amount of fees (including tutorial fees) paid per student (continuous)	
Independent variables			
Household head characteristics			
Age of household	Ratio	Total years of the household head when contacted by a researcher (continuous variables)	+ /-
Sex	Nominal	Dummy variable with the female household head being a reference category. 1 if is the male household head 0 otherwise	+/-
Marital status	Nominal	1 if the household head is married 0 if not married (Dummy variable)	+
	Ordinal	The Dummy variable with nonformal being a reference category 1 if primary education, 0 nonformal	+
Education level		1 if secondary education, 0 nonformal 1 if college education, 0 nonformal 1 if university education, 0 nonformal	
Sector of occupation	Nominal	The Dummy variable with the private occupation being a reference category 1 if government sector 0 private sector	+
Household characteristics			
Household size	Ratio	Total number of individuals living in the household (continuous variable)	+/-
Household income	Ratio	Annual household income (continuous variable)	+
Land possessions	Ratio	Acres of land possessed by a household when contacted by a researcher (continuous variable)	+
House ownership	Nominal	The Dummy variable 1 if the household possesses a house, 0 if does not possess	+/-

3.3. Estimation Model and Techniques

Data on household expenditure for education is censored data. The variable is divided into two categories. Households that do not pay fees mean zero, and households that pay a fee with some positive values. This study follows

(Prahutana *et al.*, 2019) by employing the Tobit approach. Household zero expenditure is easily censored by using the Tobit model.

By referring to Carson and Sun (2007), the Tobit model is defined as:

$$y_i = \begin{cases} y_i^* = x_i\beta + \epsilon_i, & \text{for } y_i > c \\ c & \text{, for } y_i \leq c \end{cases} \dots\dots\dots (i)$$

Where, y_i is the dependent variable and censored data. The value of y_i will be equal to y_i^* if the value of y_i is greater than constant c and will be c if the value of y_i is less or equal to constant c . x_i is a vector of independent variables where $x_i = (X_{1i} X_{2i} \dots X_{pi})$. β is the vector parameter of independent variables where the value of $\beta = (\beta_0 \beta_1 \beta_2 \dots \beta_p)$.

ϵ_i is an error of y_i compared based on the estimation of y_i . The value of ϵ_i is assumed normal distribution with zero mean and variance constant σ^2 . In Tobit regression Model, the value of constant c is assumed to be zero (Carson and Sun, 2007). Therefore, equation (i) can be written as:

$$y_i = \begin{cases} y_i^* = x_i\beta + \epsilon_i, & \text{for } y_i > 0 \\ 0 & \text{, for } y_i \leq 0 \end{cases} \dots\dots\dots (ii)$$

Therefore, household fee per capita education expenditure is defined as $y_i = 0$ if $y_i^* = 0$ and $y_i = y_i^*$ if $y_i > 0$. The dependent variable was observed when education expenditure is not zero. Tobit model was estimated by using the maximum likelihood estimation techniques to capture all the expenditure information (Amemiya, 1973).

4. Results and Discussion

4.1. Descriptive statistics

The study results in Table 3 reveal that 95 (91%) of the sampled households are headed by males. Among the sampled households, 95(90.5%) household heads were married and only one respondent (0.9%) was divorced. This implies that most of the households in the study area

had both parents which is essential for providing parental care for their children. Moreover, the findings indicate that majority of the respondents 40 (38.1%) had a college education and only three respondents (2.9) had no formal education, this implies that most of the respondents had a higher level of education and they know the importance of education since they have attained a high level of education. Furthermore, on the occupation of the respondents the study results show that majority of respondents 60 (57.1%) were salaried workers and 3 (2.9%) were rentier. This imply that most of the respondents were assure of having stable source of income necessary for providing financial support for their children.

Table 3: Characteristics of respondents (n = 105)

Variable	Category	Frequency	Percentage
Sex	Male	95	90.5
	Female	10	9.5
Marital Status	Married	95	90.5
	Divorced	1	0.9
	Widowed	4	3.8
	Separated	5	4.8
Education	No formal education	3	2.9
	Primary level	17	16.2
	Secondary level	16	15.2
	College	40	38.1
	University level	29	27.6
Occupation	Farmers	25	23.8
	Petty shops	17	16.2
	Salaried employee	60	57.1
	Rentier	3	2.9

The descriptive statistics for the sampled population show that the average income per household is 1,077,715 TZS, and the average per capita income is 215,344 TZS. The findings indicate that households apportion at least 7 % of their total spending to education. However, female household head devotes about 17% more of their income to education when compared to the male household head.

With regard to the willingness of households to spend in improving the quality of education, the study results presented in Table 4 indicated that at least 64% of the household sampled are willing to spend more. This implies that many households are willing to increase their expenditure if they are sure that their children will get a better-quality public school education.

Table 4: Willingness to Spend to Improve Quality of Education in Public schools

Suggestions	Frequency	Percentage (%)
Not willing to spend more	6	5.7
Willing to spend more	67	63.8
Willing to spend the same	32	30.5
Willing to spend less	0	0
Total	105	100

4.2. Empirical Results

4.2.1. Tobit Specification Test

The household fee per capita expenditure was transformed into a logarithmic form to improve its linearity. In line with (Prahutama, 2019; Phon, 2018; Tansel and Bircan, 2004), the value of one was added in place of zero expenditure to give

the value of zero logarithms. Moreover, the compatibility of Tobit assumptions with the data at all levels of significance was verified by using Lagrange Multiplier (LM). The results in Table 5 show that LM statistic tests are less than the bootstrap critical values. Therefore, no Tobit assumptions are violated

Table 5: Tobit Model Specification Test

Variables	LM	Bootstrap critical value		
		10%	5%	1%
Household head characteristics	0.837	4.6997	5.8009	14.6478
Household characteristics	0.394	4.6044	7.6034	17.64

The goodness of fit of the model was measured by p-values and Pseudo likelihood ratio. The results in Table 6 suggest that the model fits the data well.

Table 6: Measurement of the fitness of the Tobit Model

Variables	P- value	Pseudo R2
Household head characteristics	0.0000	0.0479
Household characteristics	0.0000	0.0449

Results in Table 7 show that the gender of the household head is statistically significant with a negative coefficient at a 1% significance level. According to the findings, male-headed households spend approximately 6 times less on education as compared to female-headed households. The findings contradict the study's prior expectations. The previous assumption was that a male-headed household spends more than a female-headed household. These findings are consistent with previous research (Ogundari and Awudu, 2014 and Donkoh and Amikuzuno, 2011), which found that households headed by females spend more on their children's education than male-headed households in developing countries.

The study results show that, Age and age squares had positive and negative prior expected signs, respectively. Both variables are statistically significant at the 5% level of significance. According to the findings, as the age of the household increases by one year, the education expenditure increases by 1.1 times. When a household head reaches the age of 48, household education expenditure is likely to peak. At this age, when the age is increased by one year, the household head devotes about 0.013 times less expenditure than the previous year. Generally, household education spending rises with the age of the household head but at a slower rate. A younger household head is expected to spend more, but spending will decrease as the head ages

increase. The findings are also consistent with the research conducted by (Hapuarachchi, 2020; Ebaidalla, 2018; Tin *et al.*, 2012; and Andreous, 2012).

Moreover, the study results in Table 7 show that the household head's primary education is statistically significant at a 5% significance level. However, household heads with primary education, secondary or college education spend less than nonformal education. University level of education had no discernible effects. The positive coefficient shows that household heads with a university level of education spend at least 1.16 times more than those without formal education. These findings are consistent with those of (Phone, 2018; Ebaidalla, 2018; Maritim, 2017; and Hapuarachchi, 2020), who confirmed that well-educated household heads are willing to spend more on their children's education to bring them up to par. Furthermore, the findings support the human capital theory's a prior prediction that people with higher human capital spend more on education.

Furthermore, the results in Table 7 indicated that the coefficient for the household head's marital status is positive and significantly influences household education spending. The study shows that married households influence the amount spent on education at a 1% significance level. The positive coefficient indicates that married households spend eight times more than unmarried households. The results of the study support the findings obtained by Rojas (2014), who found that the marital status of the household head has a positive effect on household spending in basic education in Colombia

Moreover, the results in Table 7 show that, the household head's occupation of the household head has no significant impact on the household's education spending. However, the positive coefficient indicates that households working in the government sector have a higher significant effect than those working in the private sector. The marginal coefficient of 0.018 shows that the significant effect is minimal when comparisons between variables are considered. The findings are consistent with previous studies (Maritim, 2017 and Prahutama *et al.*, 2019), which found that salaried household heads invest more in education.

With regard to the income of the households, results in Table 7 indicated that the household's income is statistically significant at a 1% significance level. The positive coefficient revealed that expenditure on education increases as the income of the household increases. The marginal effects suggest that as the income of the household increases by one unit, on average, the level of education expenditure increases by two. Therefore, household education expenditure is more elastic to changes in household income. The findings are similar to the studies of (Hapuarachchi, 2020; Tin *et al.*, 2012; Ngwilizi, 2013), who reported the positive effect of income on household spending.

The results in Table 7 also indicated that, the sign of the coefficient of land ownership is positive. The variable has a significant influence on the expenditure of education at the 10% level of significance. The marginal effect reveals that, when the household decides to increase 1 acre of land, household education spending also

increases by 0.089. This indicates that households with large land pay more. The findings are consistent with the findings of Maniriho *et al.* (2021), who concluded

that ownership of land and other productive assets significantly impacts household expenditure in Rwanda.

Table 7: Tobit Results

Variable	Estimates of regression		
	Coefficient	Standard error	Marginal effects
Household Head Characteristics			
Gender of house head (Male)	-12.715***	3.122	-6.337***
Age	2.277**	0.480	1.135**
Age2	-0.026**	0.005	-0.013**
Edu2 (Primary)	-8.518**	3.317	-4.438**
Edu3 (Secondary)	-2.547	3.090	-1.264
Edu4 (college)	-2.573	2.701	-1.282
Edu5 (university)	3.334	3.495	1.162
Marital status (married)	15.927***	3.496	7.935***
Occupation Sector (Public)	0.035	2.127	0.018
Constant	-46.955**	21.671	
Household characteristics			
Income of household	4.460***	0.093	2.446***
Acres of land	0.177*	2.384	0.089*
Household size	1.796	2.930	0.904
House ownership	2.193	0.979	1.103
Constant	-66.128***	16.146	

*Significance at 10% **Significant at 5%, ***Significant at 1%

5.0. Conclusion and Recommendations

This study aimed to analyze factors that influence household education spending. The findings suggest that the household's income, gender, and marital status of the household head are the most important factors in determining the amount of money spent on education. The findings show that a male-headed household spends less than a female-headed household. According to the findings, married households spend more on education than single households. Age and age squared of the household head shows that education spending increases with age at a decreasing rate. Furthermore, the findings show that land ownership is a

statistically significant factor in household education spending. According to the study's findings, the household's social and economic status continues to influence the household's educational expenditure pattern.

According to the study, wealthy households devote more of their income to education expenditure. It is suggested that the policy should target low-income households. Subsistence farming is the primary occupation of the majority of poor households. As a result, increased subsidies for better-quality fertilizers, seeds, pesticides, and insecticides for poor peasants are proposed. Moreover, the majority of female-headed households

earn a low income. Women, on the other hand, allocate a greater portion of their incomes to education expenditures. A policy that supports the economic activities of the majority of poor female household heads will improve the household's educational status. Since the results showed that the majority of households are willing to spend more on quality education in public schools, the teaching and learning environment in public schools will motivate households to spend more on public education.

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