

Family Decision Making for Educational Expenditure: New Evidence from Survey Data for Nigeria

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Abstract

This study examines the determinants of educational expenditures by households in Nigeria. Data from the Nigerian General Household Survey, Panel 2012/2013, Wave 2 was used and a double-hurdle model was employed for the analysis. The results suggest household income, the age, education, gender of the household heads and urban versus rural residence have a significant impact on the decision to spend on education. Such expenditures are income elastic overall, but are very different in magnitude for low income compared to higher income families. It is found that the income elasticity of education expenditures are approximately four times greater for households in the bottom two-thirds of the income distribution than for those on the top one-third of the income distribution.

Key words: Household Demand; Educational Expenditure; Double Hurdle Model; Nigeria

JEL Codes: R29, I10, B23

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1. Introduction

In Nigeria, around one million children of primary school age are out of school (World Bank WDI, 2016) and only approximately one half (49%) of secondary school age youth attend school. When considering the population over 15 years of age, approximately 27% of men and 43% of women have no formal education (Education Policy and Data Center (EPDC¹)).

Since 2000, the level of government expenditure on education has fluctuated wildly between 3% and 10% of total government expenditure (Babatunde, 2018). According to Obi and Obi (2014) government spending on education has been declining over time. Based on the level of government spending on education, it can be inferred that households are required to raise their expenditure for the education of their children to compensate for the shortfall in government financing of education. The low level of government expenditure allocated to education also results in public schools being of a lower quality than private schools. Hence, for some families, a quality education has largely become an investment by parents in a private school education.

Given the importance of household expenditure on education in the formation of human capital in Nigeria, a clear understanding of the nature and determinants of household expenditure on education is necessary to formulate their education policies. The very high level of learner dropouts from the education system, makes it imperative to understand the impact of variables such as the income of the family, the gender of the head of the family, and the size of the family on the willingness of families to make private expenditure towards the education of their youth (Nigeria National Population Commission (Nigeria) and RTI International. 2016).

There is substantial literature dealing with the drivers of household educational expenditure (Tansel and Bircan, 2006; Aslam and Kingdon, 2008; Qian and Smyth, 2011), however, only a

EPDC provides education data and visuals globally and also policy orientated analysis in developing countries,

few of these studies are available for sub-Saharan African countries (Ogundari and Abdulai, 2014). Most of the traditional studies (Pushkar, 2003; Sackey, 2007; Iddrisu et al., 2016) have used educational acquisition or child school attendance as a proxy for a household's demand for education. While, according to Qian and Smyth (2011), educational attainment is considered the only sectorial reflection for households' requests for education and the personal acquired level of education is highly dependent on their own innate abilities. Against this backdrop, this study attempts to examine the important determinants of a household's demand for education in Nigeria using their expenditure on schooling as a proxy for a household's demand for education.

The layout of the remainder of the paper is as follows: Section 2 reviews empirical literature, Section 3 data and methodology, Section 4 introduces and discusses the empirical results and the remaining Section 5 sets out the paper's conclusions.

2. Literature Review

In the household production model proposed by Becker (1965), a theoretical basis was provided for analyzing the factors that determine household demand for education. The interest of parents in the economic capabilities and success of their children encourages them to make investments in the education and health of their children (Becker and Tomes, 1986). Along with the model that is known as quality-quantity trade-off, the household attempts to maximize a double-recognizable efficiency function subject to its production functions, budget and time constraints. The efficiency of the function depends on the household and the community's characteristics with unobservable arguments such as the number of children, quality of children, leisure and consumption of market goods. The quality of children refers to the household production function with family members' time spent on assisting the child as well as the purchase of goods and services as the main arguments. It also implies that parental satisfaction may increase as more resources are devoted to the child. The related level of child quality may also be attained with various combinations of time

and goods. Tansel (1997) claims that child quality enhanced by education leads to an increase in child quality production, which could be dealt with as a function of the time spent by children in school and the expenditure of the household on education.

Several theoretical frameworks have been used in the analysis of the household demand for education; the recognition of the household and family as a basic social unit whose motivations are largely economic-driven is regarded as an important feature in the analysis. By using the household production model, Becker and Lewis (1973) illustrate that the shadow price of children is greater, with respect to their number (i.e. the cost of an additional child, holding quality constant), the higher the child's quality is. Similarly, the shadow price of the quality attribute of children (i.e. the cost of a unit increase in quality, holding quantity constant) is greater, the greater the number of children. It should be taken into consideration that raising child quality will be more expensive in cases where there are more children in the family because any increase will be applied to more units.

The determinants of the household's demand for education have been identified as the level of household income (Zimmerman, 2001 and Jayachandran, 2002), the level of parental education (Glick and Sahn, 2000; Schaffner, 2004), the sex of the household head (Lloyd and Blanc, 1996) and locality (urban versus rural) (Connelly and Zheng, 2003).

Glewwe and Patrinos (1999) found that a household's willingness to spend on education is increased when the income of the household is increased. They also found that urban households were willing to spend more resources on educating their children compared to rural households. Another issue studied with respect to household educational expenditure is gender discrimination against girls. Aslam and Kingdon (2008) investigated the intra-household allocation of educational expenditure in Pakistan and questioned whether the household found it more desirable to educate males compared to females. They found a clear pro-male bias exists both for the decision to send

a child to school and the amount spent conditional on the enrolment of children in middle schools. A bias in enrolment of children within the primary school age-group was observed but not in how much to spend conditional on enrolment.

Tansel and Bircan (2006) in their study of household expenditure on education in Turkey found that urban households tended to make greater investments in the schooling of their children compared to rural households. Qian and Smyth (2011) analyzed the determinants of both domestic and overseas educational expenditures. They found that household income had a significant impact on the degree of domestic and foreign educational expenditure and that the probability of sponsoring children to study abroad is also significantly affected positively by household income. In a similar study, Huy (2012) investigated the determinants of educational expenditure in Vietnam using the 2006 Vietnamese Household Living Standards Survey. He found that household income and parental education have a positive significant effect on educational expenditure. In addition, it was found that households with primary school age children or secondary school age children spend more on education compared to households with preschool age or college age children.

Two more researchers, Ogundari and Abdulai (2014) dealt with the analysis of determinants for a household's education as well as health care spending in Nigeria by using the 2004 General Household Survey Data for Nigeria. The authors illustrated that the greater the household's income, its size, and the level of the household head's education increases the household's decision to spend on educational services. In addition, they found that female-headed households tend to spend more (*ceteris paribus*) on the education of household members than male-headed households.

While there are a number of studies exploring the determinants of household educational expenditure, there is very little literature that has focused on sub-Saharan Africa. Consequently, this study attempts to provide evidence for quantifying the factors affecting the expenditure of

households in the context of Nigeria. The economic factors determining the decision of families to begin making educational expenditure followed by how much they spend on education are examined in detail in this study. The results of this study will provide policy makers with important information on the expenditure patterns and socio-economic determinants of private education expenditures.

We contribute to the existing literature by using a more recent data set that is an improved Nigeria General Household Survey, Panel 2012-2013, Wave 2 covering rural and urban regions. There are additional variables captured in this survey on education expenditure by the family, which were not included in the 2003-2004 data used by Ogundari and Abdulai (2014). This survey provides a more recent and comprehensive picture of expenditure patterns and socio-economic characteristics in household education expenditure in Nigeria. In addition, we generated a set of cohort variables, specifying the number of household members in four age groups from age 0 to 30 years. In this vein, we are able to examine the extent of the impact of the number of children in each category on the education expenditures of the household.

3. Data and Methodology

3.1 Data

The General Household Survey (GHS), Panel 2012-2013, Wave 2 was carried out by the National Bureau of Statistics, Nigeria with financial and technical support from the Bill and Melinda Gates Foundation and the World Bank (NBS, 2015)². The observations were selected randomly from

² Available on <http://microdata.worldbank.org>

GHS to form a sample GHS-Panel made up of 5000 households. It is representative of the national and zonal (urban/rural) levels of Nigerian households. The enumeration areas were chosen in the first stage proportional to the population of each state in Nigeria. Households were then selected randomly in the second stage and 4,986 households with 29,533 household members were administered questionnaires. Three sets were administered; household, agricultural and community. Two surveys were carried out. The first was carried out post-planting September-November 2012 and the second post-harvest February-April 2013. The survey is carried out every two years for the same set of households.

Expenditure on education consists of school fees, registration, school repairs, parent/teachers association, school uniform/sports clothes, books and school supplies, transportation to and from school, food, boarding and lodging at school and extra tuition (extra classes) and other expenditure not categorized. The expenditures for education were collected at the individual level and household level. For uniformity, all were aggregated to the household level. After a data cleaning process our sample was limited to 4,729 observations.

The total income of the household, as reported in the survey, is difficult to measure accurately. However, the aggregate expenditure of the household can be calculated for the year and, in any case, is a good proxy for the permanent income of the family. Education is an investment that is made over several years with significant losses if interrupted. Hence, in estimating the determinants of the household demand for education, it is permanent income rather than current income that is the more relevant income measure. In this study, when reference is made to the income of the family, what is being referred to is the aggregate expenditure of the household during that period. No distinction is made as to whether these expenditures have been made from the spending of current income, by drawing down savings, or through borrowing.

The average annual income of the 4,729 households in our sample was 262,631 NGN in 2012³. These households, on average; make annual expenditures on educational related items equal to 42,334 NGN. Their education expenditure accounts for 16.1 % of total household income. Of the total number of households, 4,013 (85%) are headed by males and 716 (15%) are headed by females. However, some households do not spend any of their income on education. Perhaps they are too poor, do not have children, or do not desire to contribute to the financing of people outside of the immediate household. The household educational expenditure profile in Nigeria is shown in Table 1.

Table 1. Household educational profile in Nigeria 2012/2013.

	<i># of Families</i>	<i>Average Household Income (NGN 2012 Values)</i>	<i>Average Educational expenditure (NGN 2012 Values)</i>
Total	4,729	262,631	42,334
Families with Female Head	716	157,864	37,861
Families with Male Head	4,013	281,323	43,132
Families in Urban Areas	1,479	336,662	70,316
Families in Rural Areas	3,250	228,941	29,600

³ 1 USD = 160.8325 Nigerian naira (NGN) in 2012.

Household Head with Non-Agricultural Occupation	3,431	297,660	51,300
Household Head with Agricultural Occupation	1,298	170,038	18,632

Families with Positive Educational Expenditure

Total	3,147	342,757	63,615
Families with Female Head	413	201,490	65,639
Families with Male Head	2,734	364,097	63,309
Families with No Children (0-30 Years of Age)	351	357,408	74,170
Families only with Children 0-5 Years of Age	86	324,565	97,784

Families with Zero Educational Expenditure

Total	1,582	103,240	---
Families with Female Head	303	98,400	---
Families with Male Head	1,279	104,386	---
Families with Female Head who have Children 6-18 years	164	130,581	---
Families with Male Head who have Children 6-18 years	908	100,200	---

Source: Author's Calculations

To have a closer look at the zero expenditure households, we find that they constitute 1,582 families (33.4% of our total sample) and have an average income of 103,240 NGN. This contrasts with the 3,147 households who do spend on education and who have an average income of 342,757 NGN with an average education expenditure of 63,615 NGN or 18.5% of total income. From this information, we can see that those families making zero education expenditure have, on average, incomes of only 30.12% of those making such expenditure.

Of those 1,582 zero education expenditure households, 1,279 (81%) are headed by males and 303 (19%) are headed by females. Their average annual incomes were 104,386 NGN and 98,400 NGN respectively. Out of this total, 1,072 families (67.7%) have children between 6 and 18 years of age. Of the households headed by males, a total of 908 or 78% contained children between the ages of 6 and 18 and for female-headed households 164 or 54% of this cohort had children in the same age bracket. Overall, male-headed households not spending on education were poorer and had relatively more children than female-headed households who had children in this age bracket.

Turning now to the 3,147 households that did spend on education, we find that 2,734 (87%) are male-headed and 413 (13%) are female-headed. Families headed by males had, on average, annual incomes of 364,097 NGN and made educational expenditure of 63,309 NGN or 17.3% of their income, while the 413 female-headed households had an average income of only 201,490 NGN yet were spending 65,639 NGN or 32.5% of their income on education expenditure. These female-headed households had, on average, only 55.33% of the income of male-headed households yet were spending, on average, a greater absolute amount on educational expenditure than the households headed by males.

Of the families making educational expenditures, we find that only 351 families (11%) have no children less than 30 years of age. These families were either making expenditure on adults older than 30 years of age or for the education of others living outside of the household.

It is interesting to consider the families (86) who have only children less than 6 years of age. These children will be primarily attending private nurseries or kindergartens. We find that this group spends on average 97,784 NGN per year on education expenditures. This is greater than any other household group. Such kindergartens also provide an element of child daycare service; hence the families are willing to pay more for the educational services provided to these pre-school children.

Another way to examine the factors that determine educational expenditure is to consider the influence of urban versus rural living locations and also agriculture versus non-agriculture related occupations of the household heads. Out of our total sample of 4,729 households, close to 31.5% of these families (1,479 in total) live in urban areas with an average income of 336,662 NGN while 68.5% of households (3,250 in total) live in rural areas with an average annual income of 228,941 NGN. Families in urban areas spend, on average, 70,316 NGN on education while in rural areas the amount of educational expenditure is 29,600 NGN. The average incomes of urban dwellers is approximately 1.5 times that of rural dwellers. In the same vein, the proportion of income spent on education by urban dwellers of 20.8% is approximately 1.6 times that of rural households of 12.8%.

In this sample of families, 3,431 (72%) of household heads have non-agricultural occupations. On average, they have 291,660 NGN annual income and spend, on average, 51,300 NGN on education. The 28% of families engaged in agriculture (1,298 families) had average incomes of 170,038 NGN, which was somewhat lower than for those in non-agriculture, however, on average, they spent much less on education of only 18,632 NGN annually. While non-agriculture families spend approximately 18% of their income on education, farming households, on average, spend only approximately 11% of their income on education. This may be due to the absence of convenient school infrastructure in farming areas as well as the likelihood that the opportunity cost of child labor is greater for farming families than for non-farming families.

3.2 Methodology

The theoretical model applied here is assumed to be a strictly concave household utility function (Schultz, 1961; Becker, 1965; Ogundari and Abdulai, 2014).

$$U = U(E_i; C_i; L_i; Z) \quad (1)$$

Households seek to maximize utility, U which is dependent upon the consumption of commodities and services, C_i , leisure, L_i , quality of education, E_i , and individual characteristics Z of the respondents. The household education production function is signified as $E_i = f(Z, \varepsilon_i)$, where ε_i shows the unobservable determinants of E_i . The household gets a time endowment in each period when it is assigned between leisure represented by ‘L’ and work hours represented by ‘S’ for pay as:

$$T_i = L_i + S_i \quad (2)$$

As noted by Ogundari and Abdulai (2014), the household spending options are granted to be made conditional on the budget constraint for purchased goods and services as follows:

$$\sum_i P_i C_i = Y \quad (3)$$

Where P_i is a vector of exogenous prices and Y is exogenous money income. Household characteristics such as age composition, education and the main occupation of the household head, gender of household head, and location of the household are variables determining the demand by households for educational expenditure. The household is able to solve its utility maximization problem regarding the optimal consumption of goods and services entered into the household utility function. This maximization will be subject to the nature of the utility function as well as for time and budget limitations. The household demand for goods and services can be expressed as:

$$C_i = C(Z, Y, P_i, \varepsilon_i) \quad (4)$$

Hence, the reduced-form demand function for education, E , of households may then be expressed as:

$$E_i = e(Z, Y, P_i, \varepsilon_i) \quad (5)$$

3.2.1 Empirical Specification

Prices are assumed constant across all households, hence, the education demand equations in Equation 5 can be used for specification of the household demand for education as:

$$\ln W_i = \alpha_i + \beta \ln Y_i + \sum_k \gamma_k Z_{ki} + \xi_i \quad (6)$$

Where W_i denotes the expenditure for household i for education. The vector Z stands for a household's socio-demographic variables (gender of household head, education of household head, major occupation of household head, number of children, family size and location of the household). α_i , β and γ are the estimated parameters while ξ symbolizes the random error. Here β is the elasticity of demand for education with respect to a household's total expenditure.

One of the major challenges that has been associated with using household survey data in the analysis of expenditure patterns is that a nontrivial portion of the data often reports zero expenditure on any particular set of commodities or services. Zheng and Zimmer (2008) claimed that there would be a significant problem when there are many observations on a single data point (i.e., zero in this case) and, as a result, no single standard distribution can fit the data well. The data set used in this analysis is censored in the sense that approximately 34% of the observed values for household expenditure on education have zero values. The estimation of Equation 6 using traditional Ordinary Least Square (OLS) techniques only considers positive expenditure values. Hence, ignoring the zero outcomes will introduce a bias (Maddala, 1983).

3.2.2 Double-Hurdle Model

One of the commonly used methods in accounting for zero observations is the Tobit model (Tobin, 1958). However, the Tobit model does not take into account the fact that positive and zero observations are determined by two distinct decisions (Masterson, 2012). Hence, this study employs the double-hurdle (DH) model proposed by Cragg (1971). Firstly, it takes into

consideration the decision to spend on education and, secondly, it considers the related decision on how much to spend. This model has a lot in common with Heckman's (1979) two-step approach. Both of these models recognize the positive and zero observations that are governed by two distinguished outcomes as outlined above. Unlike Heckman's procedure, the double model can accommodate zero observations in the second stage (or second hurdle). The household's first hurdle decision, known as the selection equation, is specified as:

$$d_i^* = m_i' \delta + \zeta_i \quad d_i = \begin{cases} 1 & \text{if } d_i^* > 0 \\ 0 & \text{if otherwise} \end{cases} \quad (7)$$

Where d_i^* denotes the decision to spend on the education of household members and is the latent variable associated with the observed variable d_i ; m_i' represents a vector of variables hypothesized to explain the first hurdle; δ is the vector of coefficients to be estimated and ζ_i is the random error. The households' second hurdle decision, also known as the intensity of spending equation, can be represented by:

$$W_i^* = x_i' \tau + \xi_i \quad W_i = \begin{cases} W_i^* & \text{if } d_i^* > 0 \text{ and } W_i^* > 0 \\ 0 & \text{if otherwise} \end{cases} \quad (8)$$

Where W_i^* denotes the amount spent by the household and is the latent variable associated with the observed variable W_i ; x_i' represents a vector of variables hypothesized to explain the second hurdle; τ are the coefficients to be estimated and ξ_i is the random error.

Although advantageous, a primary limitation of the DH model relates to the interpretation of the effects of the first hurdle on the second hurdle (Yen and Jones, 1996; Yen, 2005). In this respect, Burke (2009) proposed a way to estimate the general impacts of the variables that are independent in both hurdles. The partial effects of both hurdles are incorporated by calculating the average partial effects (APE) of these variables.

4. Empirical Findings

We start our empirical analysis with the application of Wu-Hausman tests in order to check for the potential degree of endogeneity of the size and income of household variables. According to Himaz (2010), household size has the potential to be endogenous due to the fact that parents who strongly desire to have educated children may prefer to have smaller families. At the same time, they are willing to make greater educational expenditure. The result shows that the null hypothesis of having no potential endogeneity cannot be rejected⁴. The description of variables used in the study are reported in Table 2.

Table 2. Variable Description

Variables	Descriptive
<i>Income</i>	Log of Real Total Mean Food/Nonfood Expenditure Per Year
<i>Gender</i>	=1, if Household Head is Male, 0 otherwise
<i>Occup</i>	=1, if Occupation of Household Head is Agriculture, 0 otherwise.
<i>Sector</i>	=1, if Household lives in Rural area, 0 otherwise
<i>Age1</i>	If Age of Household Head is < 30 years
<i>(Base category)</i>	
<i>Age2</i>	If Age of Household Head is between 31-40 years
<i>Age3</i>	If Age of Household Head is between 41-50 years
<i>Age4</i>	If Age of Household Head is between 51-60 years
<i>Age5</i>	If Age of Household Head is above 60 years
<i>Educ1</i>	If Educational level of Household Head is below primary
<i>(Base category)</i>	
<i>Educ2</i>	If Educational level of Household Head is secondary
<i>Educ3</i>	If Educational level of Household Head is post-secondary
<i>hhsiz</i>	Number of Members in the Household
<i>AgeNo0-5</i>	Number of household members in this age range
<i>AgeNo6-10</i>	Number of household members in this age range

⁴ The result is not presented in the interest of brevity, but available upon request.

AgeNo11-18

Number of household members in this age range

AgeNo19-30

Number of household members in this age range

Because the estimated coefficients in the DH model are normally difficult to interpret, this study tries to shed light on their average partial effects. The discussion focuses on these estimations since the APE of independent variables illustrates the overall effects of independent variables on education spending.

Table 3 reports on the results of the study on the determinants of spending on education for Nigerian households. Table 3, column 2, shows the probability of the possible spending on schooling (*probit*) by households. Both conditional and unconditional estimations are provided in columns 3 and 4, respectively. The focus is on the unconditional estimations because their parameter values consider the impacts of both the decision to spend and the amount to spend. From Table 3, column 2, row 2, it is found that household income (proxied by Income⁵) raises the probability of spending on schooling. Fundamentally, wealthier households are more likely to send their children to school. As was seen from the descriptive statistics discussed above, the gender of the household head significantly affects the demand for expenditure on schooling. The negative and significant coefficient on the gender variable (Gender) suggests that households headed by males tend to spend less on schooling (*ceteris paribus*) than those headed by females. This finding is consistent with those of Lloyd and Blanc (1996) and Blackden and Bhanu (1999) which found that female-headed households in developing countries are likely to make more investments in the education of their children than male-headed households in the same situation.

⁵ Expenditure is used instead of household income because false reporting of income and expenditure fluctuates less than income. This is because income is synonymous with random shock and also due to informal sector prevalence in developing nations and it captures wealth.

Education of the household head has a positive and significant effect on the probability of a household spending on education. The coefficients for secondary education and post-secondary education are all positive and highly significant. The amounts spent by families with household heads having secondary education and post-secondary education are approximately 74% more compared to those with primary and below primary education. Those with secondary and post-secondary education know the value of education and will not hesitate in allocating a greater proportion of their income to the education of their families.

Table 3. Determinants of educational spending for households in Nigeria

Variables	Probability	Conditional	Unconditional
Income	0.415*** (0.022)	0.755*** (0.023)	1.220*** (0.053) ⁶
Gender#	-.307*** (.064)	-.350*** (.068)	-0.848*** (0.152)
Educ2	0.264*** (0.051)	0.329*** (0.051)	0.735*** (0.112)
Educ3	0.229*** (0.067)	0.674*** (0.062)	0.740*** (0.150)
Sector#	-0.063 (0.051)	-0.355*** (0.049)	-0.248* (0.135)
Occup#	-0.144*** (0.049)	-0.160*** (0.053)	-0.396*** (0.109)
hhsiz	0.127*** (0.010)	-0.065*** (0.008)	0.296*** (0.024)

⁶ As the standard deviations reported by the Craggit command in Stata describe only the data and should not be considered a parameter estimate. Hence, to inference on an APE, we applied the bootstrapping technique with 100 iterations. Bootstrap standard errors provide a valid statistical inference in the presence of heteroscedasticity. Numbers in parenthesis are the bootstrapped standard errors.

Age2	.344*** (.085)	-.102 (.107)	0.819*** (0.194)
Age3	0.530*** (0.088)	0.314*** (0.106)	1.386*** (0.182)
Age4	0.423*** (0.090)	0.423*** (0.109)	1.152*** (0.212)
Age5	0.321*** (0.083)	0.419*** (0.107)	0.898*** (0.209)
AgeNo0-5	0.011 (0.020)	-0.100*** (0.020)	0.0007 (0.054)
AgeNo6-10	-0.065*** (0.022)	-0.095*** (0.022)	-0.187*** (0.057)
AgeNo11-18	0.028 (0.018)	-0.015 (0.018)	0.064 (0.048)
AgeNo19-30	0.018 (0.020)	-0.022 (0.018)	0.040 (.045)

*** 0.01, ** 0.05 and * 0.1. #, Effect of the binary variables (dy/dx) are computed for discrete change of dummy from 0 to 1.

Whether a household resides in urban or rural areas, (Sector) has a significant impact on the educational spending of the family. Households living in rural areas have a lower probability of spending on education and also the amount they spend is significantly lower than for urban dwellers. The combined result is that rural households spend approximately 24% less than urban households. This result is no doubt reinforced by the fact that most private schools are situated in urban areas.

The results also indicate that households whose heads have farming as their main occupation (Occup) do not spend as much on schooling compared to those in other occupations. This is

expected as children who are available to work on the farm may have a greater opportunity cost of their time compared to those from non-farming families. The impact of farming as an occupation is compounded by the fact that farming is a rural occupation. Farming families spend approximately 39% less than their non-farming rural neighbors. When we include the additional impact of living in rural areas, we find that farming families only spend approximately a third as much on education as do Nigerian urban dwellers.

The majority of poor and less educated people live in rural areas and are unlikely to send their household members to quality schools that can provide them with the opportunity to attend tertiary institutions in the future. Studies on regional and rural-urban education disparity in China have reported consistent findings that children from less developed regions and rural areas are less likely to enter college (Qian and Smyth, 2008).

Different categories of the age of household heads have a statistically significant effect on household educational spending (Age2-Age5). Accordingly, the probability of spending on schooling is higher for household heads whose age falls into the interval of 41-50 years followed by household heads aged between 51-60 years. These two groups tend to spend between 138% and 115% more on schooling than those with household heads who are 30 years of age or less. We also find that households headed by people over 60 years of age will spend almost 90% more than families with household heads less than 30 years old.

The set of new socio-demographic variables introduced in the model covers the number of children in each age range; 0-5years (pre-primary), 6-10 years (primary school), 11-18years (secondary) and 19-30 years (tertiary). The critical age category of children with respect to educational expenditure is 6-10 years. Those families who have children between 6-10 years of age spend significantly less on education than those with children who are older.

This result is created because only at this age category (primary school) does the government provide education without school fees. This finding is important in order to understand the impact on families of the state providing educational subsidies. For each child receiving primary education (6-10 years), the empirical results indicate that an amount equal to 18.7% of the otherwise normal amount spent on educational related expenditure is reduced for primary school aged children. From the Nigeria Education Data Survey, we find that school fees as a percentage of household total expenditure on education is 18.9% (2015 Nigeria Education Data Survey (NEDS)-USAID). It appears to be the case that there is a one for one cutback in household educational expenditures as a result of the government financing of school fees for primary school age children. The financing of school fees by the government not only provides an incentive for children to enter school but, for those who would otherwise attend, this policy also releases income for financing other household expenditure.

The variable measuring household size (hhsz) has a significant and positive impact on the probability that a household will spend on education. However, household size seems also to have a negative effect on the level of expenditure on education for those willing to make such expenditure. Large households may not have the resources to spend as much on education after other higher priority expenditure is made whose demands increase with household size. Yet, the unconditional impact is both positive and highly significant. The amount spent on each additional child adds on average 29.6% to the total expenditure by families on education

According to Table 3, column 4, it is clear that a 10% increase in household income will increase spending on education by approximately 12%. Education expenditures generally have an income elasticity of demand that is greater than one in Nigeria. The results appear to support the findings of Subramanian (1995) for India and Himaz (2010) for Sri Lanka which reported education expenditure elasticities above one.

From the results of the impact of increases in household income on education expenditure for those who are already making such expenditure (Table 3, column 3), it is estimated that the income elasticity of demand for education is approximately 0.75. At the same time, the elasticity with respect to income for the increase in the probability of households moving from zero to a positive figure is approximately 0.4. It is the combination of these two impacts which yield an income elasticity of demand for education expenditure of 1.22 (Table 3, column 4). From these results, we can conclude that the impact of increasing income is very important to induce households to start spending on education. These outcomes are consistent with the result of Gao et.al (2014) who found that providing more income for poor families helps them to spend more on education. This is further borne out when we examine the income elasticities for education expenditure for different income groups. To conduct this analysis, we ranked all households according to their

incomes and estimated the income elasticities of demand for the bottom third of households, the middle third, and the top third. The results of these estimations are presented in Table 4.

Table 4. Elasticities of Demand for education expenditures with respect to total expenditures by households

Quantiles of total expenditure ⁷	β	Bootstrapped. S.E,s	No of households
Lowest (1/3)	1.54***	(0.13)	1577
Middle (1/3)	1.40***	(0.31)	1576
Top (1/3)	0.36**	(0.16)	1576

Expenditure is expressed in Nigerian currency, naira (US\$1=160.8325 naira). *** 0.01 and ** 0.05.

The findings show that household demand for education is elastic (1.54 and 1.40) for the poorest families (the bottom two thirds of income distribution). On the other hand, the income elasticity of demand is less than one for the top one third of income distribution. The estimated income elasticity shows that there is a significant difference in the magnitude of expenditure elasticities across income quantiles with elasticities decreasing as the level of income increases. Microeconomic theory would suggest that as income increases beyond a certain point, a smaller proportion of any increase of total income would be spent on education. The high-income elasticities of demand for the bottom two thirds of income distribution are a consequence of a significant number of households beginning to spend on education who previously made no such expenditure. This component of the income elasticity of demand is much smaller for those with the highest one third of incomes.

⁷ This study considered three different classes of income; the first class (quantile-1) denotes families having the bottom 33% of household income in our sample, quantile-2 those families with the middle 33% of incomes and quantile-3 the top 33% of household incomes.

5. Conclusion

This study examined the determinants of expenditure patterns for education using the Nigerian General Household Survey, Panel 2012-2013, Wave 2. The findings showed that household income, education of the household head, rural versus urban sector, the occupation of the household head, age of the household head and gender of the household head all have significant effects on educational spending. Moreover, it can be inferred that overall the income elasticity of demand for education is greater than one. The estimated elasticity of demand for educational expenditure of 1.54 for households with incomes in the bottom third of the income distribution is very much larger than is the estimated income elasticity of demand of 0.36 for those with incomes in the top third of the income distribution.

These results would suggest that Nigerian households, at every income level, have a very strong desire to educate their youth. For the poorest families, however, they do not have sufficient income to even start making such expenditure. At the same time, if the real income of the poor increases, expenditure on the education of the family becomes a priority.

Another significant determinant of the level of spending on education is related to the level of education of the household head. Based on the findings, it can be revealed that household heads with post-secondary level education are willing to spend almost 74% more on schooling.

The results of the study also reveal that household size has a positive and significant effect on the extent of spending on education, but the relationship between these two variables is less than proportional. The negative effects of gender (male) on household educational expenditure shows that households who are female-headed are likely to spend more (*ceteris paribus*) on education than male-headed households. These findings are in line with the reported results by Lloyd and Blanc (1996) and Blackden and Bhanu (1999), who illustrated that children who are in female-headed households in Sub Saharan Africa have better rates of enrolment rather than those in male-

headed households. Moreover, households who have farming as the main occupation of the head tend to spend less on education than those engaged in other economic occupations.

Nigeria faces a challenge in the education of its rural youth whose families are engaged in agriculture. Because Nigeria is a major oil producing country with problematic macroeconomic policies, the naira often becomes overvalued when oil prices rise. This causes the terms of trade to move against agriculture and reduces the income of farmers. This in turn reduces the affordability of education for their children. Perhaps in this situation direct expenditure programs that reward poor families who send their children to school might be effective.

If Nigeria is going to achieve a higher level of economic development, the education of its youth, both male and female, is likely to be prerequisite. This study provides an improved empirical understanding of the determinants and constraints of the private financing of education in the country.

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