Returns to Education Revisited and Effects of Education on Household Welfare in Nigeria

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Abstract

Human capital development, especially higher educational attainment attaches high premium to human skills as an important factor of production. In view of this, the objective of the study is defined in two folds; *first*, to revisit returns to education in Nigeria and *second*, to investigate effects of education on the economic welfare of households in Nigeria. The study uses Double Hurdle (DH) model and Quantile Regression (QR), respectively for the objective one and two. Thus, our findings show that returns to schooling (i.e., labour market earnings) at primary, secondary and postgraduate levels are very low relative to schooling at the tertiary education in Nigeria. Also, we find the effects of primary, secondary and postgraduate education on household economic welfare to be substantially lower compared with that of tertiary education in the country. The implication of these findings is that investment up to completing tertiary education is vital for higher welfare through increasing labour market earnings among households in Nigeria.

Key Words: Education, Economic Welfare, Earnings, Returns, Nigeria

JEl Classification: C01, C21, D60, I25,

1.0.   Introduction

Human capital development, especially higher educational attainment attaches high premium to human skills as an important factor of production. Thus, one of important determinants of investment in education is its expected economic benefits inform of better earnings, higher economic welfare and in particular greater equity and economic growth in market economies.

Schultz's (1961) emphasized the role of education as an important determinant of labour market earnings and household welfare. This is because improvement in the levels of educational attainment among household members can be viewed as an important means of reducing poverty and inequality in the society as a whole (see Aslam *et al.,* 2008; Colclough *et al.,* 2009). For example, accessibility and quality of education has a strong influence on ability to absorb new knowledge and master new technologies, better employment opportunities, labour market participation, and increasing productivity of household members.

Interestingly, the returns to education have important policy implications in a number of ways as noted by Kimenyi *et al.*, (2006). For example, social returns to education are useful because they provide an indication of which sector of the educational system, the government should invest in. Besides, returns to education can help government in the evaluation of broad educational polices and also enable households to evaluate benefits of schooling decision in terms of expected future earnings. In other word, if returns to education are low, policies that promote education as an element of poverty alleviation strategy may be ill-conceived. Likewise, if the returns associated with education are high

but school enrollment is low, it may be an indication that individuals are not investing optimally in education perhaps due to market failure.

Consequently, a number of studies have investigated the magnitude and behavior of returns to education in sub-Saharan Africa (Aromolaran 2004 & 2006; Kimenyi *et al.,* 2006; Kazianga, 2004; Umaifo Oyelere, 2008, 2010, & 2011). Even though earlier estimates of returns to schooling in sub-Saharan Africa were high as should be expected in an economic environment characterized by relative scarcity of educated labor. More recent estimates have shown modest (or low) levels of returns to education in the region (Bennel (1996), Schultz (2004), Psacharpoulos and Patrinus (2004), Okuwa, 2004; Aromolaran (2004 & 2006), Kimenyi *et al.,* (2006), Kahyarara and Teal (2006), Sackey (2008), and Umaifo Oyelere, (2008, 2010, & 2011)). Umaifo-Oyelere, (2008) argued that a possible explanation for the observed low returns to education in SSA could be linked to first, the lack of complementary physical capital and investment for human capital and second, low quality of education in the region.

A number of studies have found evidence to support the claim that educational attainment affects economic welfare of households in Cote d'ivoire, Mozambique, and Ghana (see, Glewwe, 1991; Handa *et al.,* 2004; Teal, 2004) and Himaz and Aturupane (2011) argue that the real drivers of this effect are differences in the quality of education received or differences in skills that complement formal education of household members.

However, most of the previous studies on returns to education in Nigeria have focused on the actual estimation of social and private returns to education with little attention

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paid to its effect on household welfare (see, Okuwa, 2004; Aromolaran, 2004 & 2006; Umaifo Oyelere, 2008, 2010 & 2011). This paper intends to extend this frontier of knowledge about the relationship between education and labor market earnings in Nigeria by empirically investigating the impact of education on economic welfare of households using the 2003/2004 Nigeria Living Standard Survey (NLSS) data (to the best of our knowledge, this data has not been employed in literature to address the central issue of this paper.

Thus, the study will investigate the impact of households' educational attainment on two indicators of the overall welfare in Nigeria, namely: household labour market earnings and real per capita total expenditure (household welfare measure).[1] The study proposes to provide answers to the following research questions: *First*, is there any difference in returns to the different levels of educational attainment in Nigeria? Second, what is the effect of the different levels of education on household welfare? Given this, the study is expected to make significant contributions to our understanding of the effect of educational attainment on the economic welfare of households and thus provide some important empirical justification for policies aimed increasing household welfare through enhanced investment in education.

Our empirical evidence reveals that return to education is very low at primary, secondary and postgraduate levels, while returns to education rise at the tertiary education in Nigeria. Also, the results of the effect of education on measurement of household welfare show that the effect at primary, secondary, and postgraduate levels is modest as investment in tertiary education improves the welfare by more than ten percent across the welfare quantiles considered in the study. Hence, evidence from the

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[1] Conceptual and practical reasons favoring household expenditure over income as a welfare measure are discussed in Deaton (1997).

findings show that investment in the tertiary level of education contributes more to earnings as well as economic welfare of households in Nigeria.

The rest of the paper is organized as follows. Section 2 describes the data used. Section 3, provides the conceptual framework and empirical model to address the proposed research question in the study. Section 4 focuses on the results and discussion, while section 5 provides summary and conclusions drawn from the study.

2.0. The Data

The study employed data from the 2003/2004 Nigeria Living Standard Survey (NLSS). NLSS is a rich nationally representative sample of households which was conducted from September 2003 to August 2004 and coordinated by the Nigerian National Bureau of Statistics (NBS). The sampling design of the NLSS involves a two-stage stratified random sampling technique. The first stage was a cluster of housing units called the Enumeration Area (EA), while the second stage was the random selection of the housing unit.

The survey instrument used in NLSS is questionnaire which covered households' demographic variables, income from the wage and self-employed workers from household heads in the sample, food and non-food expenditure in the sample. There were seven interviewer visits to each selected household at a minimum of four-day intervals in a cycle of 30 days.

Thus, we employed 18, 883 households in the analysis. The definition and summary statistics of the variables are presented in Table A of the appendix.

3.0   Conceptual and analytical Framework

3.1.   Double Hurdle Model for earnings function: *Returns to education*

One of the challenges associated with survey data for estimating earnings function is the fact that a number of potential workers in the sampled households reported zero earnings (or only positive earnings were observed in the survey). Because of this, Mandala (1983) argued that the use of Ordinary Least Square (OLS) procedure for censored dependent variable such as earnings (or income) would yield inconsistent estimates from selection bias, since Gauss-Markov assumption of zero correlation between independent variables and error terms will be violated. Thus, a widely used econometric model for such dataset is the Tobit model originally proposed by Tobin (1958) to handle this problem.

But, Cragg (1971) argued that Tobit model is restrictive because it assumed the decision to participate in labour market earnings and amount of income (earning) to receive are governed by the same process.[2] In realization of this argument, the author proposed a Double Hurdle (DH) model that offers more flexibility to Tobit model in which two hurdles need to passed: 1) decision to participate in labour market earnings or likelihood to get a job and (ii) if decided to work or eventually worked, the amount of income to receive.

Another widely used approach in this context is Heckman's (1979) sample selection model. The model is designed to account for the fact that the observed sample in the censored data may be non-random due to sample selection problem. A typical example of this is in the case where the sample includes unemployed able bodied men who have

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[2] In other words, Tobit model is very restrictive by assuming variables which determined probability of participating in labour market earnings also determine the amount of income (earnings) to receive.

the potential to work but unable to find jobs at the time of survey. Similar to the DH model, Heckman's model recognizes that positive and zero observations are governed by the two distinct outcomes as outlined above.

But, DH model unlike Heckman's model allows for possibility of zero observation in the second stage (or second hurdle) other than sample selection problem in Heckman's model. As explained by Jones (1992), the probability of zero realization (outcomes) in Cragg's (1971) second hurdle is governed by some processes other than sample selection problem. That is, zero observation could be due to any or combination of the factors including sample selection problem. As such, we found that zero observation may arise for a number of reasons: *First*, an individual in a household may not be a participant in labour market, because of personal preferences, inadequate qualifications, or other disability. *Second*, an individual in a household may be a potential worker who chooses not to work at the current level of economic incentives or current market wage (a typical example of Heckman's selection problem). *Third*, it may be due to faulty report or random error effect (also known as random zeros) problem from the survey (Carlin and Flood, 1997). *Fourth*, it may be due to unemployment at the time of survey despite the fact that individuals are willing to participate in labour market (this is also a typical example of Heckman's selection problem).

However, these observations lend support to the application of DH model in literature, especially in the labour supply model. For example, a search in the literature shows that Lacroix and Frechette (1994), Matshe and Young (2004), and Blundell et al., (1987) previously employed DH model in labour supply model.

Thus, the household labour marketing earnings function (E_i^*) for the present study followed a standard form of Becker (1964) and Mincer (1974) model specification, but, due to the underlying data generating process (DGP) of DH model as outlined above, we specified earnings function for the study using the following procedure:[3]

$$d_i^* = m_k'\delta + \zeta_i \qquad d_j = \begin{cases} 1 & if \quad d_j^* > 0 \\ 0 & if \quad otherwise \end{cases}$$

$$E_i^* = x_j'\beta + \tau_i \qquad E_i = \begin{cases} E_i^* & if \quad d_i^* > 0 \ \& \ E_i^* > 0 \\ 0 & if \quad otherwise \end{cases} \qquad 1$$

where d_j^* is the latent variable representing first hurdle as well as the decision of a household heads whether to participant or not in labour market earnings, while d_j is observed variable associated with d_j^*; m_i' is vector of explanatory variables hypothesized to explain first hurdle which includes; (1) dummies representing educational level of household heads such as non-western (religious education), primary, secondary, tertiary (including national college of education-NCE, Higher National Diploma-HND and Bachelor of Science –Bsc degrees), and postgraduate education with no schooling being the reference level, (2) age, household size and occupational compositions of household members, (3) gender of household head, and (4) dummies representing households in rural and the regions in the country; [4] E_i^* is the latent variable representing second hurdle and also defined as the real monthly earnings from individual members of the

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[3] While estimating returns to labour market earnings in Nigeria, Aromolaran (2004, 2006) dropped zero observation, nevertheless, with DH model in the present study, the zero observation are taking into account in the analysis of returns to schooling to eliminate bias associated with selectivity due to censoring in the estimated returns to education in the study.

[4] We introduce four segment of spline as dummies representing levels of educational attainment by household heads in the study. The omitted category is those with no educational. Thus, we allow the returns to education to education per household to differ across levels of educational attainments of household heads.

households in the sample, while E_i is observed variable associated with E_i^* ;[5] x_i' is vector of explanatory variable hypothesized to explain second hurdle similar to m_i' of the first hurdle ; δ and β are parameters to be estimated as β - the coefficient of identified educational levels measures the extent to which schooling raises earnings above the reference level of no schooling; ζ_j and τ_j are random error of the regressions.

3.2. Quantile Regression for the determinants of household welfare: *the role of education*

The indicator of welfare between the poor and rich households is expected to respond differently to households' characteristics assumed to be exogenous in the household welfare model *ceteris paribus* as noted by Gleww (1991). But, Himaz and Aturupane (2011) revealed that effects of determinants of household's welfare indicator derived from Ordinary Least Square (OLS) assumed such effect is the same over the entire distribution of household welfare. In this case, Quantile Regression (QR) relaxes this assumption and allows effects of the determinants to differ at different parts of the distribution of household welfare. As noted by Hao and Naiman (2007), QR by construction is particularly useful if the distribution of the continuous response variables changes differently following the changes in the regressors.

Guided by this, the study examines the role of various educational levels of household heads and other demographic characteristics of the households on welfare indicator using QR in Nigeria. The empirical estimation of the determinants of households' welfare in this paper is primarily based on the work of Deaton and Muellbauer (1980) which was discussed extensively in Glewwe (1991). Hence, a typical household utility function,

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[5] E_i^* includes only household head's labour market earnings and excluded all market non-labour earnings such as fringe benefits, transfers, remittance, and working conditions.

which is a reduced form of earnings function (i. e., equation 1) and employed for the determinants of household welfare in the present study, is implicitly described below:

$$PCE_i = x_i^{'}\beta + \mu \qquad\qquad 2$$

where, PCE_i is the per capita monthly expenditure on food and non-food items used as a proxy for household welfare indicator in the study,[6] $x_i^{'}$ is the vector of explanatory variables (determinants) hypothesized to explain PCE_i similar to $x_i^{'}$ and $m_i^{'}$ of equation 1.

For the QR, we follow the specification below:

$$PCE_i = \alpha_\theta + x_i^{'}\beta_\theta + \mu_\theta \qquad\qquad 3$$

where, PCE_i and $x_i^{'}$ are as earlier defined, β_θ is the parameter to be estimated for different quantiles (θ) of the entire distribution of PCE_i, and μ_θ is the error term such that $Quant_\theta\left(\mu_\theta|x_i\right) = 0$. Thus,

$$Quant_\theta\left[PCE_i|x_i\right] = \alpha_\theta + x_i^{'}\beta_\theta \qquad\qquad 4$$

where, α_θ is the intercept for the specific quantile (θ) and $Quant_\theta\left[PCE_i|x_i\right]$ represents the conditional quantile of PCE_i .

But, θ^{th} quantile regression result is the solution to the following minimization problem which can be represented in a linear programming framework as:[7]

$$\min_\beta \frac{1}{n}\left[\sum_{i:y_i\geq x_i^{'}\beta_\theta} \theta\left|PCE_i - x_i^{'}\beta_\theta\right| + \sum_{i:y_i\geq x_i^{'}\beta_\theta} (1-\theta)\left|PCE_i - x_i^{'}\beta_\theta\right|\right] \qquad\qquad 5$$

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[6] y_i was derived by adding monthly household expenditure on food and non-food items and then adjusted it for spatial variation in prices. This was then divided by the number of household members.

[7] For the present study, we only reported three different levels of θ at 10%, 50%, and 90% to conserve space.

Koenker and Bassett (1978) argue that the Least Absolute Deviation (LAD) estimator of equation 5 is more efficient than the OLS estimator in the linear model. The LAD was employed in the present study, while we bootstrap all the standard errors of the parameters of equation 5.

3.3. **Returns to Education and Impact of education on welfare quantiles**

To estimate both the returns to education from equation 1 and impact of education on household welfare based on equations 2 for OLS and 3 for QR estimations, we followed the approach used by Kimenyi *et al.,* (2006) and defined as:

$$RI_h = \frac{exp\left(\beta_h - \beta_j\right) - 1}{y_h - y_j} \qquad 6$$

where, RI_h is returns to investment in *h-th* higher education, β_h is the estimated coefficient of *h-th* higher level of education (e.g., a dummy for completed secondary education); β_j is the estimated coefficient of *j-th* lower level of schooling (e.g., a dummy for completed primary education); y_h is the total number of years taken to attain a particular level *h-th* higher education; and y_j is the total number of years taken to attain a particular level of *j-th* lower level of educational system. Given this, in Nigeria, the average number of years of education spent on primary, secondary, tertiary (NCE, HND and B.sc graduates), and postgraduate (majorly masters' degree holders) education are taken as 6 years, 12 years, 16 years, and 18 years, respectively.

4.0. **Results and Discussion**

Table B and C of the appendix present the result of the determinants of labour marketing earnings based on equation 1 and determinants of household welfare proxied

by real monthly per capita total expenditure based on equations 2 for OLS and 3 for QR estimations, respectively. Both labour market earnings and per capita expenditure are the two major indicators of overall household welfare considered in the analysis. Because the study is designed to specifically address the returns to education via labour marketing earnings and effect of education on measurement of household welfare, table 1 only presents the results to address these issue based on equation 6. Hence, subsequent discussion focused on this table.

Nevertheless, it is important to address two important issues before discussing the results. *First*, we recognize that while endogeneity of schooling in earnings equation (i.e., equation 1) is a problem, studies have shown that the problem has always been linked to lack of valid instrument for the years of schooling (see, Aromolaran, 2004; Kimenyi *et al.,* 2006). Thus, information on instrument such as parents' education, and inherent ability etc are not available in the NLSS data for the analysis. As such, we do not attempt to control for endogeneity of schooling in the study.[8] *Second*, our discussions focus on the effects of primary, secondary, tertiary and postgraduate educations on the identified indicators of welfare. The contribution of non-western education was not discussed because it was not significant in table B and C of the appendix.

Returns to education

The first column of table 1 presents the results of returns to education computed from table B of the appendix. The estimates show returns to labour market earnings at primary, secondary, tertiary, and postgraduate levels of education to be 1.3%, 1.6%,

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[8] Uwaifo-Oyelere (2010, 2011) constructed pseudo instrument for schooling representing various educational reforms while estimating returns to education in Nigeria and the author observed that there is no significance difference between the estimates with and without instrument.

18.9%, and 0.60%, respectively in the sample.[9] Based on this, six main conclusions are discernible from these findings. *First*, the result suggests that going to primary and secondary schools do not pay unless an individual is able to obtain tertiary degree. *Second*, a return to education at primary, secondary and postgraduate levels are very low and these estimates are statistically not different from each other in this study. *Third*, returns to tertiary education dominates returns to schooling (or returns to schooling is driven by returns to tertiary education) in the study, which lends support to the finding of Aromolaran (2006) that returns to education is substantial at post-secondary education in Nigeria. *Fourth*, the finding highlights the importance of higher educational attainments on earnings among households in the sample. *Fifth*, considering the level of income inequality in Nigeria, benefits of returns to tertiary education, are most likely to be unequally distributed in the country. *Sixth*, the low returns to postgraduate education show how unattractive postgraduate education is in Nigeria for income earning purposes. Most people that do postgraduate studies in Nigeria today do it because they have no job after graduation not because they acquired any significant additional skill. Infact, this estimate is a pointer to that fact that postgraduate education in Nigeria is not very market relevant. In addition, many of those seeking postgraduate education in Nigeria seek it for status purposes not for any form of income enhancing skills development.

Therefore, we compared our estimates with other results in the literature that draws from different dataset from Nigeria. Given this, we take a closer look at the recent finding of Uwaifo-Oyelere, (2011) based on the General Household Survey (GHS) data covering 1997/1998, 1998/1999, 1999/2000, and 2004/2005 and presented in column two, three, four and six of table 2, respectively. Also, our estimate from the 2003/2004

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[9] The low returns to postgraduate education may probably be due to the small number in the sample. As such, this remains an area for further investigation.

Nigeria Living Standard Survey (NLSS) data is presented in column five of the table. Thus, from the table, it is obvious that both GHS and NLSS datasets revealed that a return to an extra year of primary and secondary education are undoubtedly very low(or modest), while private returns to education generally increase with the tertiary education in Nigeria. For example, our estimates of low returns to schooling at lower educational levels based on the NLSS data is closely related to 2.5% and 3% obtained for private returns to primary and secondary education, respectively as reported by Umaifo-Oyelere (2011) from the 1997/1998 GHS data. The author also found private returns to primary and secondary education of 2.7% and 3.3%, respectively from the 1998/1999 GHS data. Likewise, the author obtained private returns to primary and secondary education of 3.7% and 4.7%, respectively from the 1999/2000 GHS data and private returns to primary and secondary education of 4.2 % and 4.3%, respectively from the 2004/2005 GHS data. Similarly, we found that Okuwa (2004) reported for return of about 1.6%, 12.7%, 10.7% and 16.7% for secondary education, college of education, polytechnic education, and university education, respectively from the 1995 Nigerian Labour Market Survey (NLMS) data carried out by National Manpower Board. The implication of these findings is that even with different datasets, empirical evidence show that returns to education at the lower levels of educational attainment such as primary and secondary remains low, while returns to schooling rise significantly with education among households in Nigeria.

Furthermore, we reconcile the results with evidence in literature that the overall average rate of returns to education in Nigeria has been modest (or low) at 1.5% and 2.8% as shown by Aromolaran (2004) for the GHS data covering 1997/98-1998/99 and Umaifo-Oyelere (2010) based on 1997/98-1999/2000, respectively. Judging from our estimates and evidence from previous studies, the return to education is not universally

low across various educational levels in the country. Hence, our estimate lend support to recent findings that the low overall returns to schooling observed in the country may be driven by the low returns at lower levels of education in the country. Thus, with different datasets, there is evidence indicating that returns to tertiary education could be trending upward as returns to primary and secondary education remains modest (or low) in the country.

But, we argued that low returns to primary and secondary education in the study may be a consequence of Nigerian educational system. For example, the curriculums of the lower level of Nigerian educational system in particular secondary education is merely designed as a selection mechanism for the universities and other tertiary education in the country. Thus, the curriculums failed to take into account, basic requirement that could prepare graduates of the lower level of education to fit perfectly within the structure of minimum labour market skills or requirement in Nigeria.

Therefore, a closer look at what was obtained in Kenya by Kimenyi *et al.,* (2006) showed that returns to primary, secondary, university education was estimated to be about 8%, 23%, 25%, respectively by the authors. Thus, result showed that return to education, especially at the lower level of education is very low in Nigeria compared to what was obtained in Kenya.

Further analysis show that the difference in income earned between individuals with primary education and those with no schooling in the sample was about 7.51% higher for those with primary education.[10] Also, we find that individuals with secondary tertiary and postgraduate education have about 16.7%, 77.3% and 20.83% earnings higher than those with no schooling at all respectively. The observed differences in

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[10] The differences was computed using this relationship $\left[exp(\beta_h)-1\right]x100$, where β_h is from the appendix B.

earnings between individuals with tertiary and post graduate education in reference to those with no education may be due to the very small number of sample in the postgraduate category as highlighted in foot note 9. Besides, it may be due to the fact that those with postgraduate qualification are employed base on the tertiary qualification. For example, those working in banking and telecom industry are employed base on the tertiary qualification even though most of the people working in these industries have postgraduate qualification in Nigeria. Nevertheless, the implication of these findings is that individuals in the sample with higher education; especially tertiary education such as University, Higher National Diploma and college of education degrees are capable of having higher earnings than those with no education at all.

Effect of education on household welfare

The column two, three, four and five of table 1 presents the results of the extent to which different levels of schooling computed from table C of the appendix raise household welfare above the reference level (i.e., no schooling) in Nigeria. Given this, the results of the OLS estimations from equation 2 shows that the impact of extra year of primary, secondary, tertiary, and postgraduate education on household welfare are 2.5%, 0.33%, 9.64%, and 0.10%, respectively in the study.[11] The implication of these findings is that with higher level of education, such as tertiary education, economic welfare of the households in the sample increased higher than it did with extra year of primary, secondary, and postgraduate education.

Across the welfare quantile from the QR estimations based on equation 3, the first quantile ($Q_{0.1}$) and the last quantile ($Q_{0.9}$) represents the poorest households (or households in the lower income group) and richest households (or households in upper

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[11] The OLS estimation assumes that the effect of education is the same over the entire distribution of indicator of welfare employed in the study.

income group), respectively in the sample, while households within the quantile ($Q_{0.5}$) represents middle income group. Given this, we found that on average an extra year of education of household heads at primary, secondary, tertiary and postgraduate level increased welfare of the households in the first quantile ($Q_{0.1}$) by 1.86%, 0.48%, 10.16%, and 0.14%, respectively. For the households in the middle income group ($Q_{0.5}$), we find that an extra year of primary, secondary, tertiary, and postgraduate education of household heads increased household welfare by 2.5%, 0.27%, 10.05%, and 0.11%, respectively; while for the households in the upper income group ($Q_{0.9}$), an extra year of primary, secondary, tertiary, and postgraduate education of household heads increased household welfare by 2.84%, 0.38%, 10.03%, and 0.07%, respectively.

These findings however, have a number of implications which includes: *First*, the effect of education of household heads at primary, secondary, and postgraduate level on economic welfare is generally low as investment in tertiary education improves the welfare by more than ten percent across each welfare quantiles in the study. *Second*, there is a widening gap between the contribution of the lower level of education such as primary and secondary levels and higher level such as tertiary education to economic welfare of the households in the sample. This observation is similar to what was obtained previously in the analysis of returns to education. *Third*, the results seem to suggest that both the poorest and richest households experienced the same level of welfare attainment at all level of education in the study. *Four*, the results show that the overall impact of education on household welfare is driven mostly by household investment in tertiary education. In other words, household investment up to completing tertiary education may have a significant implication on economic welfare of the households in the future.

Furthermore, we take a closer look at the results of the OLS and QR estimation, and our findings show that the disparity observed between tertiary education and other levels of educational attainment are the same across all welfare quantiles. For example, the effect of primary, secondary, and postgraduate education is low across the welfare quantile as equally obtained from the OLS estimation. Besides, the effect of tertiary education is as high as 10% across the welfare quantile as obtained from the OLS estimation. This is an indication that there is no evidence of differences in class welfare with regards to the effects of education on household welfare in the sample.

Further analysis from the OLS estimations show that household heads in the sample with primary education contribute about 15.2% more to household welfare, compared to household heads with no education at all.[12] Also, household heads with secondary, tertiary, and postgraduate education contribute about 17.5%, 62.7%, and 18.2%, more to household welfare respectively, compared to those with no education at all. Also, from the welfare quantiles, we found that household heads within the lowest quantile ($Q_{0.1}$) and with primary, secondary, tertiary and postgraduate education contribute about 11.2%, 14.4%, 60.9%, and 16.9%, 63.9%, and 17.7% more to household welfare, respectively compared to those with no education. Likewise, household heads within the highest quantile ($Q_{0.9}$) and with primary, secondary, tertiary, and postgraduate education contribute about 17.1%, 19.8%, 67.8%, and 20.2% more to household welfare, respectively, compared to those with no education. The implication of these findings is that even with the OLS and QR estimations, the welfare differential between household heads with education and those with no education at all was found to be

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[12] The differences was computed using this relationship $\left[exp\left(\beta_h\right) - 1\right] x100$, where β_h is from the appendix C.

pronounced most at the tertiary level, which is consistent with the previous results of effect of education on household welfare presented in table 2.

Thus, the findings from the study seem to suggest that household heads with tertiary education are able to translate their investment into higher welfare vis-à-vis higher labour market earnings and real per capita consumption (or expenditure) in Nigeria. This, however, may be due to the fact that tertiary education unlike primary and secondary education goes with specific types of job skills that translate to better payment and productivity for household heads in the sample.

Table 1: **Returns to Education and Effect of education on household welfare**

Levels Of Education	**Returns to education**	Effect of education on household welfare		
		OLS Estimate	*Quantile Regression Estimate*	
			$Q_{0.1}$	$Q_{0.50}$	$Q_{0.90}$
Primary	0.0125	0.0253	0.0186	0.0250	0.0284
Secondary	0.0157	0.0033	0.0048	0.0027	0.0038
Tertiary	0.1895	0.0964	0.1016	0.1005	0.1003
Postgraduate	0.0059	0.0010	0.0034	0.0011	0.0007

Table 2: **Returns to education from previous and present study**

Levels of Education	1997/98 GHS data	1998/99 GHS data	1999/2000 GHS data	2003/04* NLSS data	2004/05 GHS data
Primary (%)	2.5	2.7	3.7	1.3	4.2
Secondary (%)	3.0	3.3	4.7	1.6	4.3
Tertiary (%)	8.6	8.0	13.0	19.0	22.3

Source: Uwaifo-Oyelere (2011); Estimates from the present study*

5.0. Summary and Conclusions

In this study, we examined the influence of educational attainment of household heads on two indicators of overall welfare considered in the analysis vis-à-vis returns to education (especially labour market earnings) and the effect of education on economic welfare of households (proxied by real per capita total expenditure) in Nigeria.

Our findings show that the returns to schooling at primary and secondary levels of education are very low relative to returns to schooling at the tertiary education level. This finding lends support to the finding of Aromolaran (2006) that returns to education is substantial at post-secondary level in Nigeria. Also, we find the effect of primary and secondary education on household economic welfare to be substantially lower compared with that of tertiary education. In other words, an extra year of schooling at the tertiary education level would increase the economic welfare of households substantially more than what an extra year of schooling at primary and secondary levels of education would achieve.

In summary, the effects of schooling on the two indicators of overall welfare considered in the study (earnings and total expenditure) display similar trends in the study. For example, both results show that returns to education and impact of education on household welfare are not only driven by extra investment in tertiary education, but are low(or modest) at the lower levels of education such as primary, secondary and postgraduate education in the sample.

A number of policy implications are derives from the findings of this study. *First*, since investment up to completing tertiary education is vital for higher levels of economic welfare via increasing labour market earnings it is important to put in place education policy designed to help provide students who choose to pursue tertiary education with

study loans in place of scholarships or grants which is limited in coverage and scope.[13]

Second, following Schultz (2004), argument that if private returns to schooling increases at a more advanced level of education such as tertiary education as observed in the present study, then poorer households who on average educate their children up to the primary and secondary levels will face lower returns, while richer households who on average educate their children up to tertiary level face much higher returns. Consequently, poorer households would be motivated to invest less per child than the richer households at primary and secondary levels since returns to these levels of education are low. Hence, the study proposes the design of public policies that support increased government investment in the lower levels of education, such as free education made available up to secondary education.[14] *Third*, one reason for low returns to schooling at primary and secondary levels of education may be the low quality of teaching delivered to the students through poorly trained teachers and low quality academic materials. Consequently policy directed at enhancing teaching and learning environments in the primary and secondary schools is likely to enhance returns to schooling at these levels of education. *Fourth*, another possible explanation for the low returns to school at primary and secondary levels of education is the fact that the curriculum seem to be designed as a mere selection mechanism for entrance into tertiary educational institutions and not to acquire skills required for entrance into the labor market. Consequently, the review of the current curriculum to allow students at secondary education level to acquire some forms of labor market relevant skills may be required.

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[13] A good example of this is the Nigerian student Loan Board which was established in 1972 and later replaced by the Nigerian Education Bank in 1993. This policy was designed to serve as a major intermediary in Nigeria's education credit market as it's related to student lending, lending for publishing, research/thesis financing among others. Unfortunately, this policy left a lot to be accomplished because of lack of continuity or political strong will that characterized its operation by successive government.

[14] Presently, the Universal Basic Education in Nigeria ensures that free education is made available up to only primary level in the country with exception of very few states especially in south west of the country that offer free education up till secondary level.

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Appendix

Table A: Summary statistics of the variables used in the determinants of wage and household welfare in the study

Variables	Description	Pooled	$Q_{0.1}$(lowest)	$Q_{0.50}$(Middle)	$Q_{0.90}$(Highest)
Real Total Earnings	Real monthly earnings	19046.51			
PCE	*Real* per capita total expenditure on *food & non-food*	30058.17	7227.85	18580.32	60409.55
D_Non-Western Education	Equal to 1 if household head has non-formal education	0.0085	0.0122	0.0098	0.0070
D_Primary Education	Equal to 1 if household head has primary education	0.0410	0.0292	0.0399	0.0466
D_Secondary Education	Equal to 1 if household head has secondary education	0.3373	0.2408	0.3159	0.4206
D_Tertiary Education	Equal to 1 if household head has tertiary education	0.0596	0.0222	0.0299	0.1162
D_Postgraduate	Equal to 1 if household head has postgraduate education	0.0849	0.0809	0.0995	0.0667
D_HHS_1	Equal to 1 if household composition is 1	0.1121	0.0137	0.0325	0.2894
D_HHS_2-4	Equal to 1 if household composition is from 2 to 4	0.3971	0.2385	0.3964	0.4508
D_HHS_5-9	Equal to 1 if household composition is from 5 to 9	0.4238	0.5925	0.5063	0.2348
D_Male_Head	Equal to 1 if household head is male	0.8562	0.9105	0.9007	0.7851
D_Professional	Equal to 1 if occupation of head is professional	0.0626	0.0384	0.0452	0.0971
D_Civilservants	Equal to 1 if occupation of head is civil servant	0.0513	0.0362	0.0406	0.0732
D_Salesservice	Equal to 1 if occupation of head is sales service	0.1374	0.0973	0.1050	0.1925
D_Agriculture	Equal to 1 if occupation of head is farming	0.6255	0.7504	0.7039	0.4563
D_Transport	Equal to 1 if occupation of head is transport	0.0253	0.0163	0.0222	0.0362
D_Manufacturing	Equal to 1 if occupation of head is manufacturer	0.0153	0.0111	0.0144	0.0199
D_Age less20	Equal 1 if household's age composition < 20years	0.0022	0.0015	0.0014	0.0039
D_Age20-29	Equal 1 if household's age composition is from 25-29years	0.0859	0.0362	0.0719	0.1305
D_Age30-39	Equal 1 if household's age composition is from 30-34years	0.2267	0.2119	0.2356	0.2191
D_Age40-49	Equal 1 if household's age composition is from 35-39years	0.2592	0.2966	0.2765	0.2104
D_Age50-59	Equal 1 if household's age composition is from 40-44years	0.1975	0.2300	0.2112	0.1697
D_Age>59	Equal 1 if household's age composition age is >59years	0.2285	0.2237	0.2033	0.2663
D_Rural	Equal 1 if household is located in the rural area	0.7610	0.8550	0.8130	0.6423
D_Southsouth	Equal 1 if household is located in the region	0.1513	0.0980	0.1395	0.1871
D_Southeast	Equal 1 if household is located in the region	0.1421	0.0488	0.1254	0.2166
D_Northeast	Equal 1 if household is located in the region	0.1768	0.2004	0.1951	0.0998
D_Northcentral	Equal 1 if household is located in the region	0.1697	0.2877	0.1781	0.1359
D_Northwest	Equal 1 if household is located in the region	0.2014	0.2866	0.2477	0.1074

The income and PCE are expressed in naira which is the Nigerian currency unit-1US$=130 naira as at the time of the survey

Table B: Determinants of labour marketing earnings in Nigeria

Variables	Estimates of determinants of household earnings			
	First Hurdle		Second Hurdle	
D_Non-Western Education	0.1313	(0.1913)	0.0528	(0.0662)
D_Primary Education	0.2044**	(0.0934)	0.0724**	(0.0317)
D_Secondary education	0.0246	(0.0415)	0.1541***	(0.0166)
D_Tertiary education	0.1277*	(0.0680)	0.5729***	(0.0322)
D_Postgraduate	0.0051**	(0.0693)	0.1892***	(0.0238)
D_HHS_1	-0.1831**	(0.0856)	-0.8023***	(0.0324)
D_HHS_2-4	-0.2171***	(0.0754)	-0.4877***	(0.0266)
D_HHS_5-9	-0.2219***	(0.0732)	-0.3267***	(0.0256)
D_Male_Head	0.0061	(0.0476)	0.2358***	(0.0198)
D_Professional	-0.1375***	(0.0748)	0.3567***	(0.0357)
D_Civilservants	-0.2371***	(0.0749)	0.3389***	(0.0364)
D_Salesservice	-0.1770***	(0.0593)	0.2570***	(0.0282)
D_Agriculture	0.3178***	(0.0579)	-0.1484***	(0.0251)
D_Transport	-0.2634***	(0.0925)	0.1736***	(0.0462)
D_Manufacturing	-0.2654**	(0.1101)	0.2365***	(0.0568)
D_Age20-29	0.3679***	(0.0772)	-0.1245***	(0.0307)
D_Age30-39	0.3264***	(0.0606)	-0.0503**	(0.0246)
D_Age40-49	0.2278***	(0.0577)	0.0018	(0.0235)
D_Age50-59	0.0784**	(0.0355)	-0.0325**	(0.0149)
D_>59	-1.0493**	(0.4632)	0.3869**	(0.0194)
D_Rural	0.2795***	(0.0404)	-0.2203***	(0.0184)
D_Southsouth	0.7283***	(0.0665)	0.3764***	(0.0231)
D_Southeast	0.5876***	(0.0643)	0.3096***	(0.0237)
D_Northeast	0.5939***	(0.0668)	-0.0245	(0.0239)
D_Northcentral	-0.9114***	(0.0440)	0.2572***	(0.0249)
D_Northwest	0.7838***	(0.0696)	-0.0546**	(0.0238)
Constant	1.0727***	(0.1137)	9.6028***	(0.0461)
Sigma	0.8044***(0.0043)			

*** **,* implies that the estimated parameters are significantly different from zero at 1%, 5%, and 10% significance level, respectively.
Figure in parenthesis is standard error; dependent variable is log of income from individual household members that are working.

Table C: Determinants of Household welfare in Nigeria*

Variables	OLS Estimates	Quaintile Regression Estimates		
		$Q_{0.1}$	$Q_{0.5}$	$Q_{0.9}$
D_Non-western education	0.0196 (0.0501)	0.0421 (0.0639)	0.0547 (0.0533)	-0.0559 (0.0893)
D_Primary Education	0.1413***(0.0240)	0.1057* (0.0621)	0.1400***(0.0276)	0.1575***(0.0309)
D_Secondary education	0.1609***(0.0124)	0.1342***(0.0208)	0.1560***(0.0143)	0.1802***(0.0141)
D_Tertiary education	0.4870***(0.0234)	0.4753***(0.0407)	0.4938***(0.0256)	0.5175***(0.0374)
D_Postgraduate	0.1671***(0.0180)	0.1545***(0.0327)	0.1627***(0.0164)	0.1843***(0.0237)
D_HHS_1	1.1412***(0.0242)	1.2951***(0.0473)	1.1837***(0.0372)	1.0653***(0.0454)
D_HHS_2-4	0.5531***(0.0199)	0.6169***(0.0299)	0.6089***(0.0266)	0.4732***(0.0338)
D_HHS_5-9	0.1895***(0.0193)	0.2796***(0.0309)	0.2323***(0.0305)	0.1097***(0.0338)
D_male_Head	0.0438***(0.0146)	-0.0033 (0.0169)	0.0513***(0.0179)	0.0395***(0.0139)
D_Professional	0.0794***(0.0259)	0.0493 (0.0533)	0.0897***(0.0237)	0.1189** (0.0476)
D_Civilservants	0.0284 (0.0263)	0.0578 (0.0441)	0.0310 (0.0252)	0.0340 (0.0513)
D_Salesservice	0.0272 (0.0205)	0.0515 (0.0391)	0.0267 (0.0216)	0.0111 (0.0389)
D_Agriculture	-0.0219 (0.0184)	0.0173 (0.0226)	-0.0391***(0.0157)	-0.0613* (0.0367)
D_Transport	0.0072 (0.0330)	0.1053* (0.0585)	-0.0116 (0.0256)	-0.0419 (0.0673)
D_Manufacturing	-0.0071 (0.0404)	-0.0119 (0.0931)	-0.0033 (0.0479)	0.0019 (0.0741)
D_Age<20	-0.1116 (0.0993)	-0.0578 (0.1505)	-0.0263 (0.1062)	-0.2087 (0.3575)
D_Age20-29	0.0588***(0.0205)	0.0656***(0.0245)	0.0586***(0.0157)	0.0169 (0.0381)
D_Age30-39	-0.0067 (0.0153)	-0.0228 (0.0296)	-0.0029 (0.0119)	-0.0002 (0.0204)
D_Age40-49	-0.0016 (0.0143)	-0.0036 (0.0226)	0.0013 (0.0170)	-0.0061 (0.0163)
D_Age50-59	0.0049***(0.0011)	0.0021 (0.0017)	0.0036***(0.0006)	0.0093***(0.0017)
D_Rural	-0.1942***(0.0134)	-0.1650***(0.0243)	-0.2049***(0.0179)	-0.2322***(0.0196)
D_Southsouth	0.0161 (0.0173)	0.0059 (0.0306)	-0.0348 (0.0236)	0.0691***(0.0188)
D_Southeast	0.2791***(0.0178)	0.2529***(0.0396)	0.2395***(0.0164)	0.2772***(0.0346)
D_Northeast	-0.1311***(0.0179)	-0.0882** (0.0439)	-0.1549***(0.0195)	-0.1804***(0.0281)
D_Northcentral	-0.2095***(0.0169)	-0.4968***(0.0359)	-0.1711***(0.0181)	-0.0528* (0.0308)
D_Northwest	-0.1382***(0.0177)	-0.1057***(0.0369)	-0.1826***(0.0176)	-0.1385***(0.0259)
Constant	9.6196***(0.0320)	8.8195***(0.0501)	9.6262***(0.0397)	10.4506***(0.0695)
R²	0.3118	0.1535	0.1915	0.1956

*Dependent variable is log of real per capita total expenditure on food & non-food taking as a proxy for household welfare