

## What determines rural households' decision to enrol children in schools in Ghana?

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### Abstract

We use field data to investigate factors which influence parents' decision to enrol children in schools in rural Ghana. The empirical results identified a host of socio-economic and household-level factors including remittances parents expect from investing in education, parents perception of a child's desirable professions, cost of schooling and discount rate as significant determinants of parental school enrolment decision. When gender of the child and remittances are taken into account, we show male parents are more likely to invest in education of boys than girls because they expect significantly higher returns from their investment in boys. Female parents do not show such gender preference. The proportion of children enrolled in school is positively related to average cost of schooling for male parents Gender of parent plays a significant role in school enrolment decision making.

*JEL: Classification:* I20, J24, D91

*Keywords:* Education, Human Capital, School Enrolment, Unitary Model, Africa, Ghana

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## **1. Introduction**

When Ghana gained independence in 1957, only 3.6% of the country's population had formal education (UNESCO, 1958). The 1961 Population and Housing Census, which was the first comprehensive attempt to document socio-economic indicators in post-independence period, revealed great disparity in school enrolment between rural and urban areas of the country (Graham, 1971). Ghana experienced severe economic and political difficulties in late 1970s which resulted in a steep decline in productivity and living standards. Public spending on education and related services plummeted which had consequent effects on school enrolment that has persisted in rural areas over the decades. Abu-Ghaida and Klasen (2004) estimate primary school enrolment in rural Ghana at 31% compared to about 77% in the country as a whole. Recent estimates in 2008 Ghana Living Standard Survey (GLSS08) put school enrolment at about 86.3% for the country but the figure is 54% in rural areas. In an attempt to address the gap in rural and urban school enrolment, a range of programmes have been implemented by governments over the years aimed at increasing school enrolment in rural communities. They include construction of new school buildings in rural areas, Free Universal Primary Education, School Feeding Programme and Free School Uniforms programmes launched in 1980s to increase school enrolment. Direct costs of schooling to households which impose can impose financial burden on rural households and widen gender gap in access to education (Lucas and Mbiti, 2012). Policy measures which involve supplying school uniforms and books and waiving tuition fees can help reduce improve school enrolment.

However, policy policies tend to focus more on supply-side factors affecting school enrolment than demand-side factors which emanate within household level. Demand-side measures are more important in rural communities where the opportunity cost of school

enrolment is higher due to a concentration of economic activities which make child labour remunerative. Parents receive returns in the current period by engaging them in a range of income generating activities such as supplying labour in the family enterprise (agriculture, mining, fishing, petty trading, etc), providing childcare for younger siblings, undertaking household chores or paid work outside the home to supplement household income (Dillon, 2013). Consequently, school enrolment impose high cost on resource-poor households in rural because it involves the parent forgoing the opportunity to earn income from engaging children in income-generating activities in the current period, and incurring direct costs of schooling, in expectation of uncertain flow of remittances in the future. Therefore, measures to reduce rural parents' dependence on labour supply from children and expectation of remittances such as rural social security system should be considered in addressing the problem of rural-urban divide in school enrolment. The growing youth unemployment in Ghana and in most SSA countries, lack of rural income insurance and social security indicates that rural parents' consumption smoothing approach to education may provide an understanding of rural-urban in school enrolment.

We posit that rural parents deal with the household resource allocation problem by enrolling a proportion of their children to school (expecting uncertain returns in the future) and keep a proportion at home to work (yield certain returns in the current period) to supplement household income. Felderer (1975) suggests rural parents see children as investment and consumption goods. However, human capital and familial dimensions to the problem makes it more complex than conventional portfolio allocation and capital budgeting decisions. Rural-urban divide in school enrolment on educational and labour market prospects of children of rural residents is not limited to Ghana and sub-Saharan Africa (SSA). Fu and Ren (2010) notes that *hukou* (household registration) system in China 'overwhelmingly suggests that individuals'

human capital is largely determined by the place where they were born (i.e. rural or urban); and the place they received compulsory education has caused educational inequality and ‘affects their labour-market return’ (p. 592). Moulden and Bradford (1984) used path analysis to show that the local resident environment or catchment area has significant influence on children’s educational attainment, especially for girls.

We show that school decisions in rural Ghana are influenced by parent- and child-specific factors including expectations of remittances (returns) from their investment, cost of schooling, gender of the child, age of the child, parent’s educational attainment, number of children in the household, parent’s discount rate, number spouses, land ownership and a host of other factors. The aim is to address the gap in the literature and provide policy makers with research evidence to address the rural-urban divide in school enrolment and human capital development. The rest of the paper is structured as follows: Section 2 presents the modelling framework and data collection. Section 3 presents and discusses the empirical results. And finally, section 4 supplies some concluding statements and policy recommendations.

## **2. Modelling framework and data collection**

The neoclassical household behaviour model (a.k.a unitary model) contextualizes the basic framework of intra household decision making (Samuelson, 1956). The model assumes members of a household have a common utility function and behave as a single entity in taking economic decisions (Vermeulen, 2002). The intuition behind the unitary model is particularly useful for examining household decisions in rural Ghana. Households and communities in rural Ghana by tradition and culture commonly headed by unitary figures (often males) who make or sanction decisions on education, land tenure, marriage and crop production. Consequently, we

assume that unitary parent (heads of household) have homothetic preferences and maximize quasi-concave utility function in human capital investment subject to income and wealth constraints (Thomas, 1990).

The parent allocates a proportion of his or her wealth, gained from current labour market activities, to current consumption and the rest is invested in education of children with the expectation of yielding returns in the form of remittances in the future as retirement income. In Haddad et al. (1997) examined the extent to which parents would forgo current consumption to allocate resources to children's education. Becker (1994) notes that parental decision to invest in children's human capital yields returns which would accrue not only to the children but also to parents in the form of transfers it generate in the future.

From the above, we can bifurcate the unitary parent's life into: child rearing stage when the parent is in the labour market, denoted by  $t = 1$  (Period 1) and retirement (old age) stage  $t = 2$  (Period 2). The parent with no gender bias in relation to the children consumes composite goods  $c_1$  and  $c_2$  in periods 1 and 2 respectively. The household is endowed with wealth  $w$  and  $N$  discrete number of children, of which the proportion  $\alpha$  is kept at home to work to generate income to boost current consumption, and  $1-\alpha$  proportion (with  $\alpha \in (0,1)$ ) sent to school as investment in human capital. The number of children  $N$  is an exogenous positive integer because the emphasis is on human capital investment decisions not on fertility. If  $(1-\alpha) > 0$ , that is, when parents send a child to school, they are faced with the decision to trade-off certain proportion of  $c_1$  for an uncertain  $c_2$  including future remittances conditional on child securing employment in the future. Due to uncertainty in flow of returns (remittances) in the future, the parent may reduce the risk associated with enrolling children in school by discounting utility associated with

future remittances at the rate  $\delta$  (with  $\delta > 0$ ) through increasing  $\alpha$  to meet current consumption. Therefore, the household's expected utility function from the schooling decision is:

$$Eu(c_1, c_2) = u_1(c_1) + \frac{u_2(c_2)}{1 + \delta} \quad (1)$$

The utility function is assumed to be concave such that  $u_1' > 0, u_2' > 0, u_1'' < 0, u_2'' < 0, u_{12}' = u_{21}' > 0$ . Becker (1981) notes that intra household resource allocation approach involve present costs and future benefits. The household receives immediate current consumption boosting benefits from  $\alpha N$  number of children kept at home, but incurs a cost of educating  $z = (1 - \alpha)N$  children enrolled in school. Therefore, the functional form of current period benefit  $\mu(\alpha N)$  increases monotonically with number of children kept at home but decreases with number of children sent to school. However, the cost function  $T(z)$  increases with the number of children sent to school (i.e.  $z$  increases).

For analytical convenience, we assume that the total benefit of educating children,  $\theta z$ , is linear in the number of children sent to school (where  $\theta$  is the marginal benefit per child). Given that the realization of the return (benefit) is probabilistic, we denote  $p$  as the probability associated with return from investing in children's education and  $q$  as price of a composite good. Following standard consumer choice theory,  $q$  is assumed to increase at the rate of interest  $r$ . From the above, we can express the proportion of children enrolled in school as a linear function of vector of pertinent household and parent-specific variable:<sup>1</sup>

$$\alpha_i = \beta \mathbf{X} + \varepsilon_i \quad (2)$$

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<sup>1</sup> A full derivation of Equation (2) is supplied in the Appendix.

$\mathbf{X}$  is a matrix of explanatory variables including, but not limited to, the perceived probability of the child getting a job in the future, the discount rate (measure as the parent's time preference), rewards parent expect to receive from children's education, the average cost of education, income of head of household, assets of parent, land ownership and the number of children in the household which influences school enrolment, and  $\varepsilon_i$  is a vector of normally distributed error terms. It is hypothesized a priori that  $\beta \neq 0$  for all elements of  $\mathbf{X}$ .

The data used in this study were obtained from a household surveys conducted between January to March 2012 in rural Ghana. We interviewed 800 heads of household but the sample was reduced to 720 due to missing values for several interviewees. In determining the sample size of this study, a multi-stage sampling was used. Firstly, geographical regions in the country were stratified into two broad strata: Northern and Southern strata. The Northern stratum consist of Upper West, Upper East, Northern, Brong Ahafo and Ashanti region; and the Southern stratum consists of the Volta, Central, Eastern, Greater Accra and Western regions. This was done to give each region a fair chance of representation. We used simple random sampling (SRS) technique to select two regions from each stratum. The SRS technique was further used to select two districts from each of the selected regions. Finally two villages were selected from each district to make a total of 16 communities, and 50 households were interviewed from each community. The questionnaire was divided into six sections requiring: socioeconomic and demographic information of the household, information of spouses, children in the household aged between 6-15 years, indication of wealth, household monthly expenditure and head of household's attitude to risk. Most of the questions were short closed and few open ended which ensured that each questionnaire was delivered and collected by the research assistant in one visit.

### 3. Results and Discussion

This section presents and discusses results of Equation (2) which was estimated using Baum et al. (2007) enhanced IV/GMM 2SLS regressions estimation routines. To examine the influence of gender of parent on decision- making, we ran separate regressions on sub-samples of male and female heads households and the full sample. Columns 1 and 2 of Table 1 contain empirical results of male and female headed households respectively, while Column 3 contains full sample results. The cost of education is endogenous to systems and we found number of spouses as suitable instrumental variable for male headed household, and the number of male children per household was suitable instrument for the for female sample (Bound et al., 1995). The R-square shows that on average about 46% of total variation in the model are explained by the explanatory variables, and F-statistics and diagnostic tests confirm that the models are robust.

*[Insert Table 1 about here]*

The results show that rewards parents expect from children's education have significantly positive effect on number of children parents enrol in school in rural Ghana. The null hypothesis that benefits from children's education do not influence number of children parents enrol in school was rejected at 5 % level for the full- sample and female headed households; and 1% and 10% for boys and girls male headed of households respectively. These findings confirm that remittances are significant determinants of the number of children enrolled in school in rural Ghana. A 10% increase benefits from children's education increase would lead to 4% increase in school enrolment. Unlike female parents, the proportion of children enrolled in school by male parents is significantly related to the number of male children in the household. The full sample results show that proportion of children enrolled in the household is positively related to number



of male children but negatively related to number of female children. However, both coefficients are statistically insignificant. This result confirms the relationship between expected benefits and number of children enrolled in school found by Bennell (1996).

The result further show that parents educational attainment is positive and statistically significantly related to number of children enrolled in school. Parents' educational attainments significantly influence the number of children enrolled in school. Previous studies show a positive link between parental education and school enrolment of children, especially for girls (Kambhampati and Pal 2001; Weir, 2007). Improvement in female education has been linked to family health and good home management (Lundborg et al., 2014).

The probability of child getting desired jobs or going into desirable professions in the future is also statistically significant in explaining parents' decision to invest in children's education-- significant at 5%. The results show that the higher the parent's perception of a child's chances of getting the desirable jobs in future, the higher would be their investment in education. Parents' investment in a child's education decrease as perceived probability of the child getting suitable jobs decreases. This implies that school enrolment would increase if they expect children to have favourable employment opportunities after schooling which they could benefit from. Dimova et al. (2010) show that job opportunities for highly-educated workers in West Africa tend to be limited to a relatively small formal sector jobs. Foltz and Gajigo (2012) conclude that education is considered as an investment and parents invest in children's education if the benefits exceed the cost. Earlier study by Mincer (1975) shows that differences in earnings reflect differences in returns to education between individuals. However, the results further indicate that male parents are more likely to consider a child's future career and job prospects in making school enrolment decisions than female headed households. In rural Ghana, men are generally employed in

farming, mining, fishing and related activities while women are housewives, petty traders or unemployed. In particular, majority of female headed households consist of women who were divorced or separated.

The interaction of child gender with expected benefit and probability of securing desired jobs is included in the model examine gender biases in parents expectation of remittances and expectation children getting desirable jobs. The results confirm that benefits and probability of going into desirable professions are statistically significant determinants of parent's decision to invest in education of children of both sexes. However, male parents strongly associate remittances with investment in sons' education than daughters; while female do not distinguish between sons and daughters in terms of preference for remittance. Nonetheless, age of the child is a significant factor for female parents than male parents. The age of the child is not statistically significant for both boys and girls under male headed household, but statistically significant for female heads of households. This is because most rural women who are not formally employed use labour supply from girls to assist them in house work, childcare and small scale economic activities to supplement the household income. Consequently, as children grow older, the opportunity cost of sending the child to school become higher with female headed household.

The a priori expectation is that the average cost of education and the number of children parents enrol in schools are negatively related. However, our results show a statistically significant positive relationship between the average cost of education and the number of male children enrolled in school in the male sub-sample and the overall sample. These results are supported by GLSS08 report which shows that increasing numbers of children are enrolled in schools regardless of rising costs. These findings contradict Pritchett and Filmer (1999) conclusion that average cost of education is inversely related to the number of children enrolled

in school. The positive relationship between cost of education and number of children enrolled in rural Ghana could be due to intangible benefits associated with investment in children's education as well as policies geared towards increasing uptake of formal education. Moreover, parents select specific schools because they believe that those schools offer better education and enable their children to get good exam even though it costs them more.

The discount rate variable is negatively related to the number of children enrolled in school but only statistically significant for male headed household. In theory, parents with higher discount rates are likely to enrol lower proportion of children to school than heads with lower discount rate for a given level expected benefit. The negative relationship indicates that rural parents consider children as both investment goods and consumption goods. The investment component is so strong that it outweighs the consumption component. Lang and Ruud (1986) show inverse relationship between discount rate and present consumption and investment in education. However, parents also derive intangible benefit from investing in their children's education. For example, the community may accord higher respect and societal recognition to parents who enrol their children in school. Therefore parents may consider esteem factors and intangible benefits alongside tangible reward to their investment attached to educating their children. In addition, parents may invest in their children's education because they consider it as part of their parental responsibility. Therefore, rural parents can allocate more resources to their children's education than convention investment appraisal rules would suggest. Becker and Tomes (1994) show that culture and societal influence also affect parents' decision on human capital investment.

Household assets are positive and significant determinant of school enrolment. The null hypothesis that asset of household does not influence the proportion of children enrolled in

school was rejected at 5 and 10% for the combined sample and male sample respectively. Households with higher income have access to more resources to invest in the child's education. Donkoh & Amikuzuno (2011) noted that household income is one of the main determinants of school enrolment.

The size of land owned by the head of household was not statistically significant in explaining the decision to invest in children education but shows the expected negative sign. The inverse relationship between land ownership and school enrolment indicate that parents with large land would prefer more of their children to work on the land than enrol them in school and vice versa. Kenny et al. (1979) found that due a decline in labour supply requirements of children in farming activities, parents have increased the number of hours their children spend in school as a result of the benefits they expect to receive. The results shown in both regressions indicate that land ownership is not a significant factor in parents' decisions about children's education probably because they expect higher returns on education in modern times than from farming activities.

The gender specific coefficient in full-sample result indicates that the gender of the parent and child play significant role in parents' decision to send their children to school. The results further shows that male headed households have access to greater resources than female headed households. This evidence is supported by findings of the GLSS08 which shows that more women in Ghana live below the poverty line than men.

## **5. Conclusion and policy recommendations**

This study identified a number of factors including returns parents expect from children, future job prospects, household wealth, discount rate of parent, number of children in the

household, parents' educational level, the age of the child and gender of the parent as key determinants of households' decision to invest in education. Contrary to previous studies, our results show that average cost of schooling is positive rather than negatively related to school enrolment in rural Ghana. This could be due to intangible benefits parents associate with investing in education and quality parents associate with schools that charge higher fees.

We offer the following recommendations to enable the government of Ghana to increase school enrolment in rural areas. Firstly, government policies aimed at influencing the level of school enrolment should not concentrate only on supply-side issues because demand-side factors at household level are vital in school enrolment decisions. Therefore, government should create more job opportunities for school-leavers and graduates. For example, the National Youth Employment Programme must be expanded to employ more young people especially from rural areas. The lack of formal job opportunities coupled with demand for labour supply of children in family-owned businesses such as petty-trading, farming; fishing which do not need specialized skills, help to inflate the opportunity cost of schooling. Therefore, policies aimed at increasing job opportunities for the educated in the country can help to reduce the opportunity cost of investing in children's education. Secondly, government should involve rural parents in formulation of educational policies. This could be done by organising focus group discussions at community level to know the expectations of parents before coming out with the policies. This is because parents' expectations are likely to be taken into account if they are involved in decision making process. Finally, eliminating liquidity constraints can also have positive effects on children school enrolment. In particular, it would be possible to use microcredit programmes to enable parents, who are unable to procure loan because of lack of collateral, to acquire loans and this situation will encourage them to invest in their children's education.

## References

- Abu-Ghaida, Dina, and Stephan Klasen. "The Costs of Missing the Millennium Development Goal on Gender Equity." *World Development* 32, no. 7 (2004): 1075-107.
- 17.
- Baum, Christopher F, Mark E Schaffer, and Steven Stillman. "Enhanced Routines for Instrumental Variables/Gmm Estimation and Testing." *Stata Journal* 7, no. 4 (2007): 465-506.
- Becker, Gary S. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press, 1994.
- . "Altruism in the Family and Selfishness in the Market Place." *Economica* 48, no. 189 (1981): 1-15.
- Becker, Gary S, and Nigel Tomes. "Human Capital and the Rise and Fall of Families." In *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education (3rd Edition)*, 257-98: The University of Chicago Press, 1994.
- Bennell, Paul. "Rates of Return to Education: Does the Conventional Pattern Prevail in Sub-Saharan Africa?". *World Development* 24, no. 1 (1// 1996): 183-99.
- Binder, Melissa. "Community Effects and Desired Schooling of Parents and Children in Mexico." *Economics of Education Review* 18, no. 3 (1999): 311-25.
- Bound, John, David A Jaeger, and Regina M Baker. "Problems with Instrumental Variables Estimation When the Correlation between the Instruments and the Endogenous Explanatory Variable Is Weak." *Journal of the American statistical association* 90, no. 430 (1995): 443-50.

- Dillon, Andrew. "Child Labour and Schooling Responses to Production and Health Shocks in Northern Mali." *Journal of African Economies* 22, no. 2 (2013): 276-99.
- Dimova, Ralitzia, Christophe J Nordman, and François Roubaud. "Allocation of Labor in Urban West Africa: Insights from the Pattern of Labor Supply and Skill Premiums." *Review of Development Economics* 14, no. 1 (2010): 74-92.
- Donkoh, SA, and JA Amikuzuno. "The Determinants of Household Education Expenditure in Ghana." *Educational Research and Reviews* 6, no. 8 (2011): 570-79.
- Duflo, Esther. "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *The World Bank Economic Review* 17, no. 1 (June 1, 2003 2003): 1-25.
- Felderer, B. "Optimal Allocation of Resources to the Educational Sector in a System of Regions." *Environment and Planning A* 7, no. 1 (1975): 59-70.
- Foltz, Jeremy D, and Ousman Gajigo. "Assessing the Returns to Education in the Gambia." *Journal of African Economies* 21, no. 4 (2012): 580-608.
- Fu, Qiang, and Qiang Ren. "Educational Inequality under China's Rural-Urban Divide: The Hukou System and Return to Education." *Environment and planning. A* 42, no. 3 (2010): 592.
- Ghana Statistical Service. "Ghana Living Standard Survey 2008 Ghana Housing and Population Census, Ghana Statistical Service, Accra, Ghana." (2008).
- Graham, Charles Kwesi. *The History of Education in Ghana from the Earliest Times to the Declaration of Independence*. Vol. 108: Psychology Press, 1971.

- Haddad, Lawrence James, John Hoddinott, and Harold Alderman. "Intrahousehold Resource Allocation in Developing Countries: Models, Methods, and Policy; International Food Policy Research Institute ". *John Hopkins University Press, Baltimore* (1997).
- Kambhampati, Uma S, and Sarmistha Pal. "Role of Parental Literacy in Explaining Gender Difference: Evidence from Child Schooling in India." *The European Journal of Development Research* 13, no. 2 (2001): 97-119.
- Kenny, Lawrence W, Lung-Fei Lee, GS Maddala, and Robert P Trost. "Returns to College Education: An Investigation of Self-Selection Bias Based on the Project Talent Data." *International Economic Review* (1979): 775-89.
- Lang, Kevin, and Paul A Ruud. "Returns to Schooling, Implicit Discount Rates and Black-White Wage Differentials." *The Review of Economics and Statistics* 68, no. 1 (1986): 41-47.
- Lucas, Adrienne M, and Isaac M Mbiti. "Does Free Primary Education Narrow Gender Differences in Schooling? Evidence from Kenya." *Journal of African Economies* 21, no. 5 (2012): 691-722.
- Lundborg, Petter, Anton Nilsson, and Dan-Olof Rooth. "Parental Education and Offspring Outcomes: Evidence from the Swedish Compulsory School Reform." *American Economic Journal: Applied Economics* 6, no. 1 (// 2014): 253-78.
- Mincer, Jacob. "Education, Experience, and the Distribution of Earnings and Employment: An Overview." In *Education, Income, and Human Behavior*, edited by F. Thomas Juster, 71-94: NBER, 1975.
- Moulden, M, and MG Bradford. "Influences on Educational Attainment: The Importance of the Local Residential Environment." *Environment and Planning A* 16, no. 1 (1984): 49-66.



- Pritchett, Lant, and Deon Filmer. "What Education Production Functions Really Try to Show: A Positive Theory of Education Expenditures." *Economics of Education review* 18, no. 2 (1999): 223-39.
- Samuelson, Paul A. "Social Indifference Curves." *The Quarterly Journal of Economics* 70, no. 1 (1956): 1-22.
- Thomas, Duncan. "Intra-Household Resource Allocation: An Inferential Approach." *Journal of human resources* (1990): 635-64.
- UNESCO. "World Survey of Education, Unesco Volume 2, Part 2." (1958).
- Vermeulen, Frederic. "Collective Household Models: Principles and Main Results." *Journal of Economic Surveys* 16, no. 4 (2002): 533-64.
- Weir, Sharada. "An Examination of Some Mechanisms Underlying Externality Benefits of Girls' Schooling." *Journal of Population Economics* 20, no. 1 (2007): 203-22.

**Table 1: Instrumental variable regression result on investment in education**

Dependent variable: Proportion of children enrol in school

Variables	Male headed household	Female headed household	Full sample
Benefit from child education	0.21	0.523*	0.442
Benefit from child education (boy)	0.128***	0.851**	3.312**
Benefit from child education (girl)	0.018*	0.016**	0.364**
Number of boys	0.044*	0.434	0.012
Number of girls	1.283	0.276	-0.02
Parental education-Primary level	0.861***	0.961	0.965**
Secondary level	0.095**	0.173*	0.444**
Tertiary level	0.017**	0.158***	1.006***
Prob. Child get the desired job	0.056	0.712*	0.529
Prob. Child get the desired job(boy)	0.476**	0.665**	0.132**
Prob. Child get the desired job(girl)	0.107**	0.097**	0.546**
Child age	0.953	0.876	0.998
Child age (boy)	0.226	0.087*	0.111
Child age (girl)	2.771	0.231*	0.373
Cost of educating a child	3.23***	-0.991	1.321***
Head of household discount rate	-0.034*	-0.401	-0.009
Asset of head of household	0.431*	0.237	1.241**
Monthly expenditure of head household	0.418	0.123	0.376
Plot of Land	-0.081	0.432	-0.562
Male headed household			1.081***
Constant	5.314***	3.004*	3.134**
Observations	608	112	720
R-squared	0.438	0.472	0.457
F-statistics	74.16	67.83	53.99
P>F	0.000	0.001	0.000
Weak identification test (Cragg-Donald Wald F statistic)	29.968	11.342	7.238
Underidentification (Anderson canon. corr. LM statistic)	29.545	14.006	7.283

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## Appendix

From the above, the expected net benefit of investing in a child's education,  $A$ , is specified as:

$$A = \frac{p\theta N(1-\alpha)}{1+r} - T((1-\alpha)N) \quad (2)$$

Therefore, the household's budget constraints is given by,

$$w + \mu(\alpha N) + \frac{p\theta N(1-\alpha)}{1+r} - T((1-\alpha)N) \leq qc_1 + q(1+r)c_2 \quad (3a)$$

$$w + \mu(\alpha N) + \frac{p\theta N(1-\alpha)}{1+r} - T((1-\alpha)N) = q(c_1 + (1+r)c_2)$$

The corresponding Langragian function of the unitary parent's utility of schooling investment is:

$$L(c_1, c_2, \alpha, \lambda) = u(c_1) + \frac{u(c_2)}{1+\delta} + \lambda \left( w + \mu(\alpha N) + \frac{p\theta N(1-\alpha)}{1+r} - T((1-\alpha)N) - q(c_1 + (1+r)c_2) \right) \quad (3b)$$

A first order derivative of (3b) with respect to present and future consumption and the parent wealth would give us the optimum values of current consumption and endowment to invest in a child's education,

$$\frac{\partial L}{\partial c_1} = u_1(\cdot) - \lambda q = 0 \quad (4)$$

$$\frac{\partial L}{\partial c_2} = 0 \Rightarrow \frac{u_2(\cdot)}{1+\delta} - \lambda q(1+r) = 0 \quad (5)$$

$$\frac{\partial L}{\partial \alpha} = 0 \Rightarrow \mu_\alpha = \frac{\theta p N}{1+r} - T_\alpha \quad (6)$$

$$\frac{\partial L}{\partial \lambda} = 0 \Rightarrow w + \mu(\alpha N) + \frac{p\theta N(1-\alpha)}{1+r} - T((1-\alpha)N) - q(c_1 + (1+r)c_2) = 0 \quad (7)$$

We divide equation (4) by equation (5)

$$\frac{u_1(\cdot)}{u_2(\cdot)} = \frac{(1+\delta)}{(1+r)} \quad (8)$$

For further analytical convenience, we assume a linear utility function of the form  $u(c) = \ln c$ . In addition, the following functional forms are assumed:  $T(\cdot) = v(1-\alpha)N$ , and  $\mu(\alpha N) = (\alpha N)^2$ .

Consequently, equation (8) is rewritten as:

$$\frac{c_2}{c_1} = \frac{(1+\delta)}{(1+r)} \Rightarrow c_2 = \frac{(1+\delta)}{(1+r)} c_1 \quad (9)$$

Using a specific functional form Equation (7) can be re-specified as

$$w + (\alpha N)^2 + \frac{p\theta N(1-\alpha)}{1+r} - \nu(1-\alpha)N - qc_1 \left( \frac{2+r+\delta}{1+\delta} \right) = 0 \quad (10)$$

Similarly, we can specific functional forms to re-specify Equation (6) as:

$$2\alpha N^2 = \frac{\theta p N}{1+r} + \nu N \quad (11)$$

Making  $\alpha$  the subject of the relation from Equation (11), we have

$$\alpha = \frac{\nu(1+r) - \theta p}{2N(1+r)} \quad (12)$$

Thus,

$$\begin{aligned} \alpha &= f(\nu, r, N, p, \theta) \\ \alpha_i &= \beta \mathbf{X} + \varepsilon_i \end{aligned} \quad (13)$$

$\mathbf{X}$  is a matrix of explanatory variables consisting of determinants of school enrolment, and  $\varepsilon_i$  is a vector of normally distributed error terms. The empirical results of this paper are obtained from estimation of Equation (13). It is assumed a priori that  $\hat{\beta} > 0$  for  $r, p,$  and  $N$  and  $\hat{\beta} < 0$  for  $\nu$  and  $\theta$ .