RURAL NONFARM ACTIVITIES AND SCHOOLING OUTCOMES IN NIGERIA

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ABSTRACT

This paper investigates the impact of nonfarm activities on school enrollment of children ages 6 to 18 in Nigeria. Becker and Tomes' (1986) model of parental investment in children is used to model the relationship. A discrete time hazard model is used to empirically examine the effect of household nonfarm income and household participation in nonfarm activities on the hazard of children dropping out of school. In addition, the effect of nonfarm activities on whether an individual ever enrolls in school or not is examined using a probit model. The results show that children from households that earn income from nonfarm activities are not only more likely to ever enroll in school, but also complete more years of schooling than those from households that do not earn nonfarm income. These findings are not surprising because first, parents' income generally has a positive effect on children's schooling. Secondly, nonfarm income has been shown to reduce credit constraints of rural households and provide a steadier stream of income. The findings could also reflect households' greater willingness to invest in children's education when they feel less credit constrained and/or have more stable income stream.

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1. Introduction

In economic theory, human capital is believed to be one of the main engines of growth and sustainable development. A lot of emphasis is thus, placed on formal education as a route out of poverty. Parents are increasingly urged to invest in the education of their children as a means of ensuring them a comfortable standard of living in the future. The importance of children's education is aptly captured in the statement by Arvin and Summers (2000) "the significance of children's education cannot be over-emphasized given that countries will increasingly have to define the wealth of their nation in terms of the quality of human resources among their population" (page 264).

Nigeria is a developing country in West Africa with a 2004 poverty level of 57.8 percent (Nigerian Living Standards Survey Report (NLSS) 2004). The poverty level is higher in the rural areas with 64.1 percent of people described as poor compared to 35.4 percent in the urban areas (NLSS Report 2004). Development plans constructed by the Nigerian government put significant emphasis on education as a way to reduce poverty in a sustainable manner. Some of the education programs implemented in the country were not as successful as planned due to inadequate funds. Rising cost of schooling inhibit enrollment, particularly for rural households in Nigeria where poverty levels are higher. A key deterrent to investment in education of children from poorer households in developing countries is credit constraints. In such instances, family resources play a

crucial role in decisions about investment in children's education (Banerjee 2002). Poor parents may have to decide whether or not to enroll their children in school based on cost, and in multiple children households, which child or children to enroll. One of the ways rural households can overcome or mitigate credit limitations is by participating in nonfarm activities. Diversification of sources of income to rural nonfarm activities can lead to increased investment in education either through an increase in income level or more risk taking due to a more diversified and stable portfolio (Cruz-Dona and Martina 2000). In addition, participating in nonfarm activities can also expose participants to more information about the importance and returns to education.

The purpose of this paper is to examine school enrollment for individuals ages 6 to 18 in rural Nigeria with an emphasis on identifying the effect of nonfarm income and participation in nonfarm activities. The effect of nonfarm income and participation on the hazard of dropping out of school is examined using a discrete-time hazard model which is explained in more detail in the methodology section. In addition, the effect of nonfarm activities on whether an individual ever enrolls in school or not is examined using a Probit model. Nonfarm activities have become an important part of the livelihood of rural households in developing countries (Haggblade, Hazell, and Reardon 2005). Studies have shown the importance of earnings for children's schooling but very few have focused on the effect of nonfarm earnings on children's schooling for rural households in developing countries.

The dataset used in this study is the Nigerian Living Standards Survey (NLSS) which is modeled after the common Living Standards Measurement Survey. The NLSS

data consist of 14,512 rural households and covers the period September 2003 to August 2004. The paper proceeds by providing the conceptual framework with literature review in section 2. Section 3 provides background information and data on schooling in Nigeria. Section 4 presents the econometric model to be analyzed. Results are presented and discussed in section 5 and section 6 concludes.

2. Conceptual Framework and Literature Review

The main purpose of this paper is to examine the effect of household nonfarm income and participation in nonfarm activities on school enrollment of children in rural Nigeria. The relationship will be modeled using the Becker and Tomes (1986) theory of parental investment in children. The theory hypothesizes that parents maximize utility and are concerned about the welfare of their children. Optimal investments in children can be made when capital markets are perfect. In which case, parents will borrow whatever is necessary to maximize the net income (earnings minus debt) of their children. This way, parents can separate investments in children from their own resources. The borrowed funds can be made the children's obligation. Parents' expenditures on children's education will equate the marginal rate of return to the interest rate on the loans with the assumption that parents have perfect information about rates of return on investments on children.

With perfect capital markets, the only reason for variation in investment in education is variation in the expected returns to education (Lillard and Willis 1994). The source of such variation might be individual specific factors like ability of children or family specific factors like common genetic or environmental factors shared by family

members (Lillard and Willis 1994). Children born into certain families are at an advantage because their families have greater ability and favorable genetic attributes. Such families may have higher expected returns to education. Parental preferences such as greater emphasis on childhood learning, and other favorable cultural attributes can also affect expected returns to education. However, these factors are difficult to measure. There could also be variation in investment in education if cost and availability of schooling differs even in the presence of perfect capital markets (Lilard and Willis 1994).

In developing countries where markets function poorly, research has emphasized the role of family income constraints in explaining differences in schooling attainment (Cox Edwards and Ureta 2003). Without perfect capital markets, higher parental earnings is expected to induce greater expenditure on schooling of children and thus for poorer families lead to lower investments. Several studies conducted on the United States found that the effect of parent's income on schooling outcomes is positive and significant (Haveman and Wolfe 1995). Household income was also found to reduce the likelihood of dropping out of school for children in El Salvador (Cox Edwards and Ureta 2003). Some studies have also shown that the source of income matters ((Haveman and Wolfe 1995; Cox Edwards and Ureta 2003).

In the Becker and Tomes model (1986), it is suggested that the amount that poor parents are willing to invest in the child's education will be less than optimal (private optimum), but that this amount will be an increasing function of parental income up to the point where the marginal return to investment is equated to the rate of interest. Parents will compare the expected returns to children schooling to returns from

alternative investments that can also increase the human capital of the child like health, nutrition, clothing and shelter. Poor families may find it optimal to choose low levels of completed schooling for their children in order to enjoy a given level of consumption of food, health services, etc (Cox Edwards and Ureta 2003). The Becker and Tomes model (1986) assumes that parents' utility depends on children's utility and not on children's permanent income. However, the degree to which children are affected is determined by the interaction of this utility maximizing behavior with investment and consumption opportunities that parents have and luck.

Parental human capital usually measured as years of schooling or level of schooling attained, is another important factor in children's schooling attainment. The more schooling parents have, the more schooling their children are likely to have. More educated parents are more likely to provide a learning-friendly environment, to enroll their children in better schools, and to encourage post secondary schooling (Hazans and Trapeznikova 2006). More educated parents could also have better access to information about schooling and expected returns to education. The Becker and Tomes model (1986) assert that ability is transferred from parents to children and is usually positively associated with more schooling. Thus, the link between parents and children's schooling could be due to unobserved inherited characteristics rather than a causal effect of parental education per se in household production (Chevalier et al. 2005). It is believed that parental schooling may capture simultaneously genetic ability and motivation (Cox Edwards and Ureta 2003).

Haveman and Wolfe (1995) reviewed several studies on the determinants of children schooling outcomes in the United States and found that parental human capital was statistically significant and important in virtually every study controlling for income. Cox Edwards and Ureta (2003) found that the effect of parental schooling was significant and reduced the hazard of dropping out of school for children in El Salvador. Lillard and Willis (1994) look at the effects of parental education on the progress of children through elementary, secondary, and post secondary school in Malaysia. They found that parental schooling accounted for a large part of children schooling transitions from one level to another. In a study on Albania, Hazans and Trapeznikova (2006), found that parental education had a positive and significant effect on secondary school enrollment. They found that the effect of father's education was stronger and more significant than that of mother's education.

An interesting consideration is the extent to which any causal effect of parental education works through the additional household income usually associated with higher levels of education (Chevalier et al. 2005). Basically, parental schooling (which includes a measure of parental ability) can affect child schooling (through increase in ability) and also affect child schooling through an increase in household income associated with higher parental education. Also education can be seen as a source of permanent income, which suggests that the full effect of education would to some extent include the effect of income and the full effect of income to some extent would include the effect of education (Haveman and Wolfe 1995). To separate the effect of inherited parents' ability from parents' income on children's schooling, Plug and Vijverberg (2005) used a sample of

adopted children in the United States since adopted children do not share the parents' genes. They found that more financial resources of parents improve educational attainment of adopted children.

Parents' participation in the labor market (or any income generating activity) can also affect the investment in children's education. Apart from the obvious generation of income, participating in the labor market can lead to increased exposure to the outside world. The exposure may enable parents to acquire information (for example information on fertility, importance of education, and returns to education) and use them to their advantage and in the interest of the family's well-being (Arvin and Summers 2000).

Arvin and Summers (2000) examine the link between mother's labor force participation and children's education in developing countries using data from thirteen countries covering the period 1975 to 1993. In the first part of their study where they pooled all cross section of thirteen countries, they found that female labor force participation had a positive and significant effect on child's primary school enrollment. In the second part of the study, the authors ran a separate regression for each country and found a significant positive effect of maternal labor market participation on enrollment for six of the thirteen countries (Egypt, Guatemala, Indonesia, Kenya, Sri Lanka, and Tunisia).

Family structure is also an important factor that can affect children's schooling. The degree to which parents' earnings can affect children's schooling investment could also be affected by the number of children of school age in the household. When schooling investments must be financed by the family, additional children may reduce the

amount invested in each child. In Albania, Hazans and Trapeznikova (2006) found that the presence of younger siblings decreases the propensity to enroll in secondary school. Haveman and Wolfe (1995) found that living in a one parent family or having parents that have experienced a divorce or separation had a negative and significant impact on children's schooling in many of the studies they reviewed on the United States.

Another factor that could affect children's schooling is the location of the household and social networks such as migration networks, involvement in the community, and religion. Households that have social networks are expected to invest more in their children's education. They tend to have access to more information and support through the networks. Hazans and Trapeznikova (2006) found that households in Albania with migrant networks have higher enrollment. Parental preference like choice of neighborhood can also affect children's schooling. Households located near urban areas or cities may have better access to certain infrastructures. Availability of infrastructures like electricity and water can affect children's attainments. Cox Edwards and Ureta (2003) found that households with access to water or electricity had lower hazards of dropping out of school in El Salvador.

Some studies found neighborhood characteristics to be positively associated with children's schooling attainment, but often of marginally statistical significance (Haveman and Wolfe 1995). Hazans and Trapeznikova (2006) found that poor access to schools (longer distance and higher commuting costs) appears to be very important obstacles to enrollment in Albania. However, estimates of neighborhood characteristics should be interpreted with caution because parental choice of neighborhood is likely to be

dependent on family economic resources (Haveman and Wolfe 1995). Other parental investment variables have been found to be important such as number of geographic moves during child hood, school related parental practices, and the presence of reading materials in the home (Haveman and Wolfe 1995).

Individual characteristics of the children like age and gender can also affect investment in schooling. In some societies, there are more labor market opportunities for males than females. Parents might decide to invest more in male children's education than females if the expected return to males' education is higher. On the other hand, females may stay longer in school since males are more likely to drop out since it is easier for then to find employment. There could also be gender differences due to cultural biases against females that place a higher value on a male child, which could lead to more education expenditure on males than females. Age could also affect enrollment especially in poorer households. There could be late enrollment for children from poorer households making older children more likely to be enrolled in school. In addition after a certain age, enrollment might reduce as children are dropping out due to lack of funds or entry into the labor market.

Credit constraint is a major hindrance to parental investment in children's schooling. If parents are unable to borrow to finance investments in education, households' decisions are going to be constrained by their own resources (Cox Edwards and Ureta 2003). With better access to credit, parents could overcome some of the income constraints and the effects of the other factors mentioned above will be reduced. However, in developing countries households often have little or no access to credit. This

is particularly true for rural areas where formal financial markets are very limited and informal lenders demand very high interest rates. A study of two rural Philippine villages by Cruz-Dona and Martina (2000) found that households with better access to credit and basic infrastructure invested more in the education of children. They found that incompleteness of the credit market system contributed to discouraging parents in poor households from investing in education of their children especially for the poorer village.

Households may diversify into nonfarm activities such as self employment, wage employment and transfers (remittances), as a way of reducing credit constraints. Cruz-Dona and Martina (2000) found that in the less well-off village in the Philippines where there was limited access to credit and savings and a comparatively unstable income stream due to the practice of rain-fed agriculture, households diversified their income sources by participating in nonfarm activities such as domestic help and factory work. Participation in nonfarm activities may reduce credit constraints of parents by increasing income level of the household or by providing a steadier stream of income than agriculture (Reardon 1997), allowing for more investment in children's education.

The positive effect of nonfarm activities on education of children was shown by Cox Edwards and Ureta (2003) in a study of children in El Salvador controlling for income. The authors examined the effect of households receiving remittances and the remittance amount (separate from other income) on the hazard of dropping out of school of children age 6 to 24 in El Salvador. They found that the remittance amount has a significant effect on school retention for rural and urban households in El Salvador. In

addition, they found that participation in remittances has a large negative effect on the hazard of leaving school for rural households.

As stated earlier, in the absence of capital markets, households may overcome credit constraints by participating in nonfarm activities. The variable of interest in this paper is nonfarm income and parents' participation in nonfarm activities. It is hypothesized that nonfarm income and participation in nonfarm activities are likely to positively influence children's education. For example, participation could lead to increased enrollment, longer length of stay in school, and early enrollment. For the purpose of this paper, household income is grouped into two -- farm and nonfarm. Following Becker and Tomes model (1986) and the findings in the literature, the analysis include several control variables such as individual characteristics, parental education, neighborhood effects, and parental preferences.

3. Background and Data

3.1 Schooling in Nigeria

The formal education system in Nigeria is divided into four levels. There is pre-school education for children below the age of 6. This is not standardized or compulsory and could take between 1 and 3 years. Primary school education takes 6 years (primary 1 to primary 6). Secondary education is divided into two parts—junior secondary school and senior secondary school. Each part takes 3 years to complete. The fourth level is post secondary education which includes universities, polytechnics, and teaching colleges. Children between the ages 2 and 5 should be attending nursery school and kindergarten (pre-school), children ages 6 to 12 primary school, children ages 12 to 18 secondary

school, and those above 18 post secondary school institutions. Realistically enrollment does not always follow the official schedule.

This distribution is the official standard, but there are children who enroll later or earlier. In addition, there is the Islamic education system practiced mostly in the Northern part of the country. The Islamic education is run by teachers and Muslim scholars. In the urban areas, children enter Quranic School at the age of 4 to learn to write and recite the Quran (Reichmuth 1989). Enrollment is a bit later in rural areas where children enroll at the age of 7 years (Reichmuth 1989). Islamic school is likely to be important since it provides basic literacy training.

The importance of education for a developing country like Nigeria cannot be over emphasized. The government describes education as the bedrock of the development of the Nigerian state (FMINO 2007). Several efforts have been made by the government to ensure high enrollments rates especially at the primary school level. After the civil war ended in 1970, the government viewed education as a vehicle for rapid national development, achieving social change, and uniting a nation split by war (Csapo 1983). To this end, the Universal Primary Education (UPE) scheme was launched in September 1976 to provide primary education for everyone regardless of class or ethnicity (Csapo 1983). The UPE scheme led to a rapid increase in students' enrollment from 6.2 million in 1975/76 session to 14.8 million in 1992, a 139 percent increase (Denga 2002). The UPE program was, however, not as successful as expected due to shortage of funds. The rapid growth in enrollment led to shortage of school buildings and teachers (Denga

2002). Some state governments decided to impose some of the cost on parents to meet the needs of students (Denga 2002).

In the mid-eighties, there was a renewed effort to ensure basic education for all which led to the Universal Basic Education (UBE) program. This was carried out nationwide from 1991-93 (Denga 2002). In Nigeria, basic education was equated with six years of primary schooling at the time and currently the concept is expected to also cover the three years of Junior Secondary School (Denga 2002). Despite the objectives of the UPE and UBE programs, there have been problems with funding education in the country. Though these programs were intended to provide free education up to a certain level, it is often true that the financial burden on the government forces parents to get involved in funding the basic level of education (Denga 2002).

As the cost of running education in the country increased, there have been more participation of the private sector in schooling and parents are bearing a substantial amount of the cost. According to Denga (2002), since most parents are poor, children remain poorly equipped to learn. There is also the problem of access to school especially for children in rural areas where the learning facilities are most times far from their homes. Children in rural areas often walk for more than 2 kilometers from home to school and this can reduce the vitality of children and result in lateness, absenteeism and truancy (Denga 2002).

The country is divided into the North and South regions due to distinctive differences between them. The country has more than 250 ethnic groups, with varying languages and customs, and also has a variety of religions which tend vary regionally,

with Islam dominating in the North and Christianity dominating in the South (FMINO 2007). These differences could lead to different parental preferences. Poverty level also varies across the country with the highest proportion of poor people in the northwest and the lowest in the southeast (NLSS Report 2004). Due to these differences, it is important to examine if enrollment differs regionally in the country.

3.2 Data

The data used in this paper are from the Nigerian Living Standards Survey (NLSS) conducted from September 2003 to August 2004. This is a nationally representative dataset that has in depth detail into individual and household characteristics of rural and urban households in Nigeria. It covers such sectors as education, health, employment, and farm and nonfarm activities and is modeled after other standard Living Standard Measurement Survey datasets which are usually used for poverty assessment. The sampling design used is a two stage stratified sample design. The country is categorized into six regions: South-South, South East, South West, North Central, North East, and North West. There are thirty six states and the federal capital territory but only thirty three states and the capital territory are used in this analysis (Lagos, Kogi and Kwara states were not included due to unsuitable data)[1]. Data from the three problematic states were dropped. This eliminated 806 households leaving 13,706 households, or about 95 percent of the original sample.

[1] There were significant problems with the coding of variables in these three states. For some of the variables, almost all individuals and households have exactly the same entries. Some of the entries also appeared generated with variations of the same numbers. For example, all households in the states could have the following series of numbers: 9031, 10031, 11031, 12031, 1041, 2041, 3041, 4041, 5041, 6041, 7041, 8041 for value of **"**how many livestock raised in the past 12 months". Situations such as this led to the unsuitability of the data from these states.

This paper focuses on schooling, individual, and family characteristics of children ages 6 to 18 in rural households in Nigeria. Amongst the 13,706 rural households used in this paper, 68 percent have children age 6 to 18. There are 23,176 children that fall into this age group. The sample of interest consists of 22,445 unmarried individuals ages 6 to 18. Summary statistics are provided on the schooling status of the individuals. Table 1 displays number of individuals enrolled and enrollment rate per age group.

Table 1. Enrollment Rate by Age and Gender

	All		Male		Female	
		Enrolled		Enrolled		Enrolled
Age	N	(%)	N	(%)	N	(%)
6	866	35.6	442	33.7	424	37.9
7	834	38.4	440	37.5	394	39.4
8	1,045	43.9	577	45.5	468	42.3
9	801	49.4	432	49.2	369	49.6
10	1,194	46.9	659	45.4	535	49.0
11	577	53.6	296	54.5	281	52.8
12	1,176	55.7	641	54.5	536	57.2
13	780	53.2	455	56.2	326	49.5
14	829	58.0	433	55.1	396	61.6
15	816	49.6	438	42.9	378	60.3
16	717	59.8	396	55.6	321	65.7
17	514	52.6	288	47.4	226	61.1
18	726	52.1	413	47.7	313	59.3
All	10,875	48.5	5,909	46.9	4,966	50.4

Enrollment rate is defined as the number of children enrolled in school at the time of the survey divided by the total number of school age children per age group in the sample. Enrollment rate is 48.5 percent amongst children age 6 to 18. Female enrollment rate is slightly higher (50.4) than that of male (46.9 percent). Enrollment rate is at its lowest amongst 6 year olds (35.6 percent). This could be attributed to late enrollment especially amongst poorer households. Due to the late enrollment, Figure 1 illustrates the enrollment rate by age and gender extended to age 24. However, the rest of the paper is still focused on individuals age 6 to 18 since those are the ages when children should be

in primary and secondary school and (more importantly) to avoid endogeneity as older individuals are more likely to be involved in nonfarm activities.

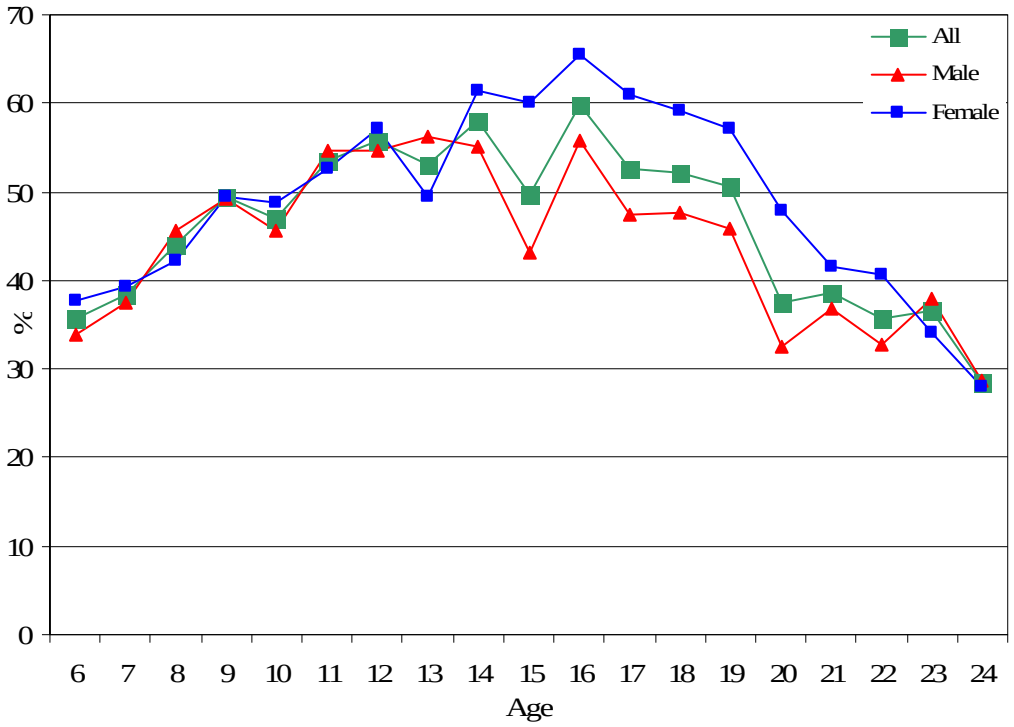

Figure 1. Enrollment Rate by Age and Gender

Amongst the 6 to 18 year olds, enrollment more or less increases overtime. There are four notable ages when there are declines in enrollment rate. There is a 2.5 percent decline at age 10 which is when children move to the last three years of primary education. This indicates that there is a decline after the first 3 years (first cycle) of primary school. The next decline (2.5 percent) is at age 13 which is when children make the transition to secondary school after completing primary school education. This shows that after primary education, fewer children continue on to secondary school.

Aside from some unusual dips in enrollment rate, the trend is upward sloping for children age 6 to 18, but slows down for older children above 14 years of age. The dips may be due to economic hardship during the year of birth for those cohorts. The increase in enrollment rates slow down after age 14 which coincides with the age when junior secondary school (JSS) ends and senior secondary school (SSS) education begins. Also the funding of universal basic education (UBE) ends with JSS. Thus, the decline in growth of enrollment rate after age 14 could be due to parents bearing higher costs with less assistance. In addition, there are more employment opportunities for older children. After age 18, enrollment more or less declines steadily.

Table 2 displays the enrollment rate by education level for individuals age 6 to 18. Primary school enrollment makes up 25.5 percent of the enrollment rate (24.7 percent for males and 26.5 percent for females). Junior secondary school enrollment is next with 11.3 percent followed by senior secondary enrollment with 9.4 percent. The remaining 2.2 percent are enrolled in the other category which consists of Quranic school, vocational school, and post secondary education.

Figure 2 illustrates enrollment rate by age and school level—primary, junior secondary, and senior secondary school. At the primary school level, the curve indicates late enrollment as there are children in their late teens currently enrolled in primary school. Still, the majority of those enrolled in primary school are in the official age group, 6 to 12. The curve for junior secondary and senior secondary education shows some early enrollment and late enrollment as well. Just as in the primary level, majority of the

children in the junior and senior secondary level are in the official age group—13 to 15 and 16 to 18 respectively.

Table.2. Enrollment Status by School Level and Gender

	All		Male		Female	
Enrollment	N	%	N	%	N	%
Not enrolled	11,570	51.5	6,691	53.1	4,879	49.6
Primary school	5,731	25.5	3,118	24.7	2,611	26.5
Junior secondary school	2,540	11.3	1,402	11.1	1,138	11.6
Senior secondary school	2,106	9.4	1,147	9.1	958	9.7
Other	498	2.2	242	1.9	259	2.6
Total Enrolled	10,875	48.5	5,909	46.9	4,966	50.4
Total (Both)	22,445	100	12,600	100	9,845	100

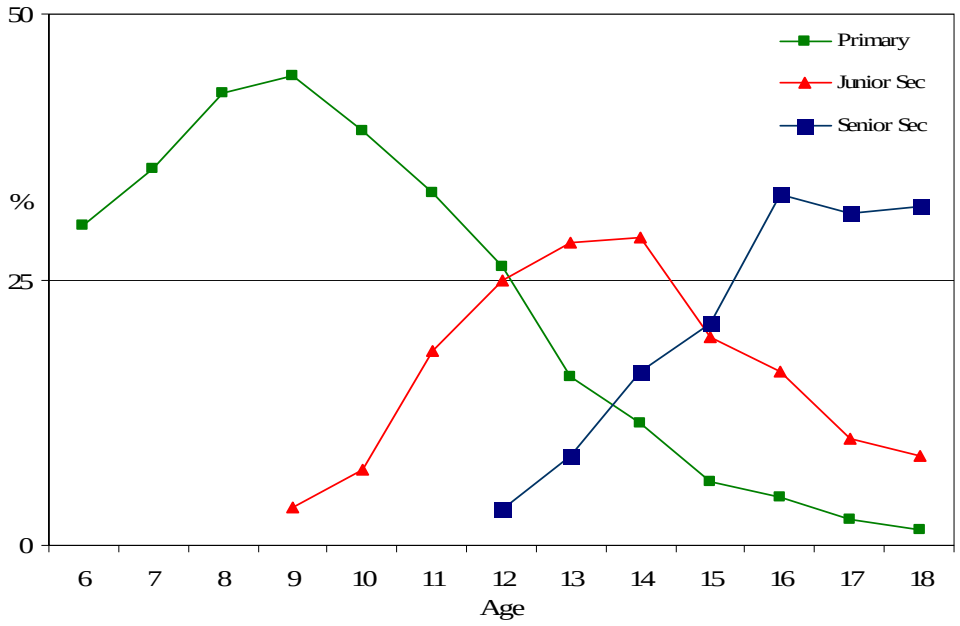

Figure 2. Enrollment Rate by School Level

Due to distinctive differences between the regions in Nigeria, enrollment rates are provided by region. Figure 3 illustrates the enrollment trends by region per age group. The rates are substantially higher in the South than in the North. The enrolment rates are all above 70 percent for the South regions (73.1 percent for the South-South region, 75

percent for the South East and 74.6 percent for South West region). For the North regions, enrollment is below 50 percent except for the North central that has 55.6 percent enrollment.

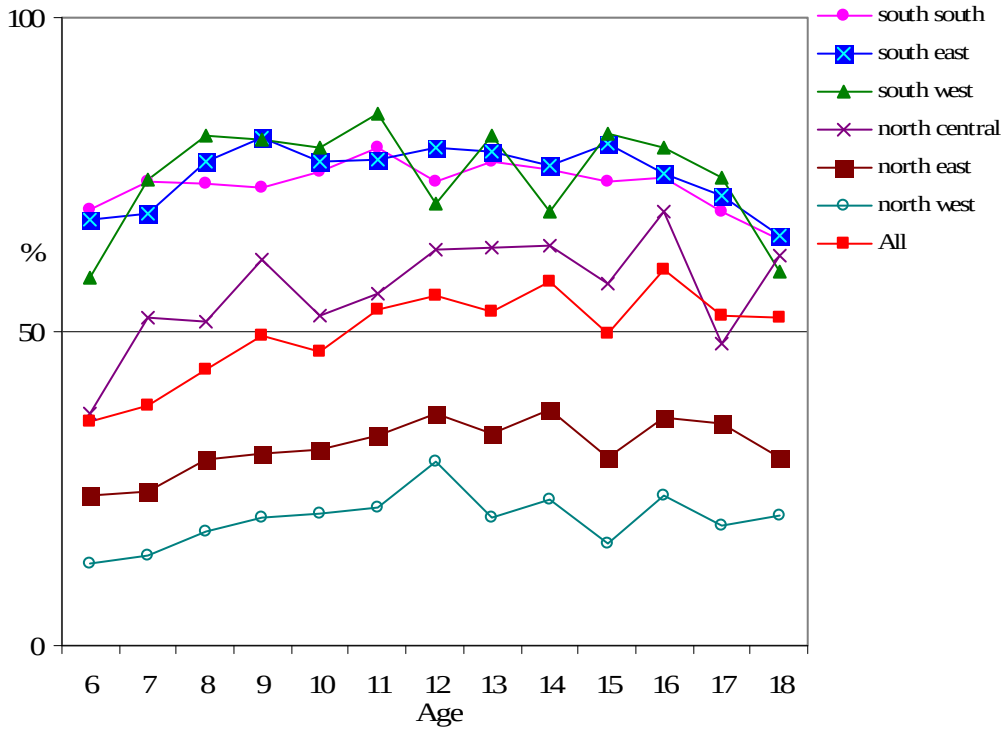

Figure 3. Enrolment Rate by Age and Region

The North West has the lowest enrollment rate in the sample with 19.3 percent followed by the North East with 30.7 percent. The differences in region could be attributed to higher poverty rates in the North regions. In addition, most of the major urban centers are located in the South region providing more access to schools than the Northern households have.

As an initial experiment into the differences between children enrolled in school and those not enrolled, a t-test for differences is conducted. Table 3 displays the mean nonfarm income and percentage of children from households that participate in nonfarm

activities of the entire sample, enrolled, and not enrolled individuals in columns 2 to 4. The t-test results are displayed in the last column of Table 3.

Table 3. Summary Statistics for Children Age 6 to 18

Variables	All	Enrolled	Not Enrolled	t-test
Number of children in sample	22,445	10,875	11,570	
Individual characteristics				
Average age	11.2	11.6	10.8	-19.31***
Male (%)	55.7	54.1	57.1	5.28***
Family characteristics				
Participate in nonfarm activities (%)	36.0	43.8	28.6	-25.05***
Household Income				
Average nonfarm Income	54,066	77,935	31,771	-9.50***
Average farm Income	95,312	78,242	111,255	5.70***
Wealth index	-0.12	0.11	-0.13	-17.04***
Father's education (%)				
Primary school	26.5	35.9	17.6	-31.74***
Junior secondary	2.8	3.4	2.2	-7.42***
Senior secondary	7.3	10.2	4.5	-15.96***
Vocational	0.3	0.4	0.2	-2.64***
Post secondary	5.6	8.5	2.9	-18.49***
Quranic	16.6	7.0	25.6	38.67***
Unknown	0.3	0.4	0.2	-3.10***
Mother's education (%)				
Primary school	20.8	30.0	12.2	-33.39***
Junior secondary	2.5	4.0	1.2	-12.12***
Senior secondary	4.7	7.3	2.3	-16.34***
Vocational	0.2	0.2	0.1	-2.18**
Post secondary	2.3	3.3	1.3	-9.58***
Quranic	14.8	6.5	22.5	34.62***
Unknown	0.2	0.2	0.3	1.68*
Average number of female siblings	1.4	1.4	1.3	-7.72***
Average number of male siblings	1.7	1.6	1.7	3.52***
Female headed households (%)	6.8	10.0	3.7	-20.40***
Non muslim household (%)	53.3	74.3	33.6	-68.71***
Migration network (%)	1.5	2.6	0.5	-11.50***
Participate in community projects (%)	44.0	50.2	38.3	-18.59***
Access to running water (%)	25.6	28.0	23.4	-4.37***
Access to electric meter (%)	17.7	23.0	12.8	-19.82***

* (**) (***) denotes statistical significance at the 10 (5) (1) percent level.

As discussed in section 2, certain factors such as individual characteristics, parental education, neighborhood effects, and parental preferences are anticipated to matter for child schooling. These are also included in Table 3. The mean age of individuals in the sample is 11 years. There are more males (55.7 percent) than females (44.3 percent) in the sample. About 36 percent of the children reside in households that participate in nonfarm activities. Income is measured as the sum of all income generating activities of the households and its members. Mean farm income (95,312 Naira) is higher than mean nonfarm income (54,066 Naira). This is because more households participate in agriculture than in nonfarm activities.

It is apparent from the t-test that there are significant differences between the children that were enrolled and those that were not enrolled. Those that were enrolled are more likely to be from households that participate in nonfarm activities. The individuals enrolled in school are also from households that earn more from nonfarm activities but earned less from farm activities.

The explanatory variables of interest in this analysis are nonfarm activities and how they affect children's enrollment. Table 4 displays enrollment by participation in nonfarm activities. Amongst households that participate in nonfarm activities, 58.8 percent of the children are enrolled in school and for non-participants 42.4 percent are enrolled.

Table 4.Enrollment Status of Children (Age 6-18) from Participant and Non-participant Households in Nonfarm Activities

	Participants		Non-participants	
	N	%	N	%
Enrolled	4,385	58.8	6,353	42.4
Not enrolled	3,067	41.2	8,640	57.6
Total	7,452	100	14,993	100

To show the importance of nonfarm activities, Table 5 displays the household activities and average incomes. Nonfarm activities include nonfarm self employment, nonfarm wage employment, transfers, and other nonfarm activities. Nonfarm self employment is the most common form of nonfarm activity with 58 percent of the children residing in households that participate and those households have an average income of 93,037 Naira. The most common nonfarm self employment activities are in commerce and manufacturing including retail trade, oil refining, hotel and restaurants, passenger transportation, food processing, textile and clothing, food sellers, and quarrying. Next is nonfarm wage employment with 28.6 percent of children from households that participate in it.

Table 5. Household Income Generating Activities: Participation and Average Earnings

Type of household activities	Participation (%)	Average Earnings (Naira)
Farm activities		
Crop	98.8	79,062
Agricultural wage	4.0	575,656
Livestock	56.8	6,688
All (Farm activities)	90.6	105,202
Nonfarm activities		
Nonfarm wage	28.6	316,400
Nonfarm self employment	58.0	93,037
Transfers	14.2	16,353
Others	20.9	18,074
All (Nonfarm activities)	36.0	150,388

Nonfarm wage activities bring in the highest nonfarm income with an average income of 316,400 Naira. Professional and clerical wage employments are the most common for households that participate in nonfarm wage employment. Transfers and

other nonfarm activities have 14.2 and 20.9 percent of children from households that participate in them, respectively. Almost all the children are from households that participate in farm activities. Amongst these, 99 percent are from households involved in crops, 57 percent in livestock activities, and only 4 percent in farm wage activities.

From the descriptive analysis presented in this section, it can be inferred that there are notable differences between children who are enrolled in school and those that are not enrolled in school. Children who are enrolled in school are from households that have higher participation rates in nonfarm activities and earn more income from the activities on average. A more detailed analysis is conducted in the second part of this section.

4. Methodology

The purpose of this paper is to examine the effect of nonfarm activities on children's school enrollment in rural Nigeria. As discussed in section 2, it is hypothesized that nonfarm income and participation will have positive effects on child schooling. Theoretically, parents' income is one of the major determinants of children's schooling attainment as it captures the budget constraints of the child's household. Of particular interest in this paper is nonfarm income. Studies have shown that though some rural nonfarm activities provide low income, they are important from a welfare perspective as they may offer means of economic security for those not able to participate in agriculture, and also provide a source of income during seasonal or longer term unemployment in agriculture (Lanjouw and Lanjouw 2001). Therefore, it will be important to also look at participation in nonfarm activities to capture effects that income alone might not capture. Both nonfarm income and participation in nonfarm activities are therefore included as

determinants of enrollment. Farm income (total income less nonfarm income) is also included as income as a whole is an important factor in child schooling. In addition, almost all households participate in farm activities.

There is the obvious fact that income in general influences schooling, and this may be what nonfarm income itself will capture. Also, it is assumed in this analysis that participation in nonfarm activities is exogenous to children's schooling attainment. This variable is susceptible to two potential sources of endogeneity. First, households' participation in nonfarm activities could be influenced by the need to finance children's education such that parents' participation and children's education are simultaneously determined. This source of endogeneity is addressed by conducting additional analysis on households whose nonfarm activities were started before children were of school age. The results are then compared to the full sample to examine significant differences, if any.

Second, there is the possibility that there are unobservable differences between households that participate in nonfarm activities and non participants, which could create omitted variable bias. Unfortunately, the variable for participation is time invariant which does not allow the use of panel data techniques. Also, no good instruments could be constructed with the available data to reduce the endogeneity problem. To mitigate these potential problems and control for observable differences, several control variables are included when estimating the effect of nonfarm income and participation on schooling attainment. These variables are age, gender, parental education, wealth, number of siblings, female-headed household, religious preferences, migrant network, community

participation, access to running water, and access to electric meter. These are variables expected to matter for schooling from reviewing the literature and following from the theoretical model.

Nonfarm income will capture the effect of nonfarm income level on child schooling. Following Cox Edwards and Ureta (2003), it is argued that the variable participation in nonfarm activities will capture any additional effect of nonfarm income on children's schooling that acts through channels other than the budget constraint, and any systematic differences in attitudes toward the schooling of children across families that do and those that do not participate in nonfarm activities. Both nonfarm income and participation in nonfarm activities are expected to increase enrollment and lower the hazard of dropping out of school.

To examine the effects of nonfarm income and participation in nonfarm activities on enrollment, two analyses will be conducted. The first analysis is the initial step in seeing the relationship between nonfarm activities and enrollment. The analysis focuses on the first step of entry into school by examining the effect of nonfarm income and participation on whether a child ever enrolls in school or not. This first analysis uses all individuals age 6 to 18 in the sample (22,445). This will be done using a Probit regression analysis. The dependent variable "ever attended school" is a discrete variable with 1 representing ever enrolled in school and 0 representing those that never attended school. Nonfarm income is measured in tens of thousands of Naira. Participation in nonfarm activities is a discrete variable with 1 representing participants and 0 representing non participants. The relationship is expressed mathematically below:

$Ever\_attended = \beta 0 + \beta 1\ RNF + \beta 2\ P\_RNF + \beta 3\ \boldsymbol{W} + u$

where: *Ever_attended* is ever enrolled in school

NF is nonfarm income

P_RNF is participation in nonfarm activities

W are the control variables listed previously

u is the error term

The second analysis examines the effect of nonfarm income and participation on the hazard of leaving school. A discrete time hazard model (a model of survival analysis) is used to examine the effect because we only have information on the year each individual drops out, not the exact day that they drop out and ties are therefore a problem (Singer and Willett 2003). This makes a discrete model better compared to a continuous model. Survival analysis is appropriate for this study because the research question involves the timing of an event occurrence—how many years does it take for individuals to drop out of school? The target event is dropping out of school which indicates two outcomes—enrolled or dropped out. Event occurrence refers to moving from one state to another, from being enrolled to dropping out in this case. The construction of the data for the discrete time hazard model is explained in more detail later.

The hazard model will not only allow us examine the determinants of the hazard of dropping out but will also allow us to observe where the drop out rates are concentrated graphically.

The discrete time hazard model is represented mathematically as:

Logit $h(t_j)=[\alpha_0 D_0 + \alpha_1 D_1 + \ldots. + \alpha_J D_J] + [\beta_1\ RNF + \beta_2\ P\_RNF + \beta_P\ \boldsymbol{W}]$

Where $h(t_j)$ is the conditional probability that an individual will experience the event in time period *j* given that he or she has not experienced the event in any previous time period. The first set of terms on the right hand side represents the baseline logit hazard. This is the value of the logit hazard when all predictors are zero. Each intercept parameter represents the value of the logit hazard in that particular time period for individuals in the baseline group. In this analysis, the time period is D0 to D12. The functional form for the baseline hazard is non-parametric. The sample is not restricted to any functional form as the shape of the functional form is of less interest in this analysis. The second set of terms represents the shift in the baseline hazard corresponding to unit differences in the associated predictors which are nonfarm income (*RNF*, in 10,000s of Naira), participation in nonfarm activities (*P_RNF*), and other control variables (***W***). Each slope parameter assesses the effect of a one unit change in that predictor on the hazard of dropping out, statistically controlling for all other predictors in the model.

Several control variables were included in both analyses as mentioned earlier. Gender and age of individuals are included. Controlling for gender allows for the possibility that parents might have preferences for investment in schooling of boys versus girls. This could be due to social factors like culture or differences in expectation in returns to investment for males and females. Parental education has been found to be important for child schooling (Haveman and Wolve 1995). There are separate variables for maternal and paternal education as some studies found different effects on schooling (Hazans and Trapeznikova 2006). Parental education is measured here using indicator variables for different levels of education. For example, fathers with primary education

have a value of 1 and 0 otherwise. It should be noted that fathers who have secondary education must have completed primary education but they are not included amongst fathers with primary education. There is a separate variable for each level of education.

Household wealth is also expected to affect children's schooling. Using factor analysis, the wealth index is constructed from a set of indicators made up of household asset variables (excluding agricultural assets). Examples of the household asset variables are vehicles, houses, furniture, household appliances, etc. The approach of using factor analysis to construct the wealth index was also used in Filmer and Pritchett (2001). The scoring factors from the factor analysis of the variables used to construct the index are presented in Appendix A. The wealth index serves as control for household assets that could affect children's schooling.

The number of individuals of school age in a household is expected to affect investment in schooling (Haveman and Wolfe 1995). To control for this, number of male and female siblings are included in the analysis. Location of a household could also affect schooling investment (Cox Edwards and Ureta 2003). To control for local conditions, indicator variables for access to running water and presence of electric meter are included in the analysis. To control for gender differences of household heads, an indicator variable for female-headed household is included. Social networks can positively affect schooling through access to information. To control for this effect, indicator variables for migration network and non Muslim households are included.

It is important to note that current family income especially in a year, is a rather crude measurement of the economic resources devoted to a child or the budget

constraints faced by a family (Haveman and Wolfe 1995; Cox Edwards and Ureta 2003). It can lead to a downward bias in the estimated effect of household income on children's schooling (Cox Edwards and Ureta 2003). Thus, if one is using cross sectional data which is the case in this paper, current family income measures permanent income with error (Haveman and Wolfe 1995). It does not provide the best measurement of the available income for the period of a child's schooling which mostly takes several years. However, due to data unavailability, current income is used.

In addition, the current study cannot particularly identify the separate effects of household income and parental schooling on child schooling (due to data constraints). The study still makes the important contribution of highlighting the effect of nonfarm income (separate from other sources of income) and participation in nonfarm activities on children's schooling controlling for parental education.

4.1 More on the Discrete-time Hazard Model

In the hazard model, it is assumed that children age 6 to 18 who indicate that they have ever attended school and are not currently enrolled have dropped out of school. This is a reasonable assumption to make from two particular questions in the survey that asks 1) have you ever attended school, and 2) did you attend any institution at anytime during the past 12 months. Children that are still enrolled in school at the time of the survey and have not completed schooling (12 years of primary and secondary education) will be right censored as we did not observe them experience the target event (dropping out). Right censored just means that we did not observe the students drop out of school. That is, we did not have the opportunity to observe them drop out of school, or not. Also

individuals who have completed 12 years of schooling and above are right censored as the analysis is focusing on primary and secondary school education.

In summary, we have three groups of children in the dataset:

Group 1: Children who are currently enrolled and have less than 12 years of schooling.

Group 2: Children who dropped out without completing 12 years of schooling

Group 3: Children who have completed 12 years of schooling

Survival analysis allows us to use all available information in the observations that are right censored (Singer and Willett 2003). Only those children who completed 12 years of school are believed to have never dropped out. Following Cox Edwards and Ureta (2003), everyone age 6 to 18 are included in the analysis even if they never attended school.

Never enrolled in school is viewed as the first stage of the schooling process. For those that never attended school, they dropped out in the first stage which will be referred to as grade 0. Everyone starts at this stage and will either continue on to enroll in 1st year of primary school or not attend school at all. The hazard of failing in this first stage simply refers to the hazard of never enrolling in school at all (Cox Edwards and Ureta 2003). The beginning of time here is just before grade 0 (at which point nobody has experienced the target event), and the scale for clocking time is the academic year. Thus we have 13 periods, first period is grade 0 when no one has enrolled and 12 years covering the length of primary education to the end of secondary school education.

To determine the length of spell (using the terminology of survival analysis which refers to a single transition into, or out of a state) each individual has, we use the

information on whether an individual ever enrolled or not, completed years of schooling, and whether or not an individual is still enrolled. Three examples are given to clarify this. 1) If an individual has no years of schooling, then the length of time is 1. This is the time when he experiences the event by not enrolling. 2) If an individual completed 7 years of schooling and is not currently enrolled in school, then the length of time is 8 (the first year is when he decided to enroll in school and the other 7 years are the time in school). 3) If another individual has the same 7 years of completed schooling and is still enrolled, he or she also has the same length of time (8) but is censored since we did not observe him/her dropping out of school. The individual could have dropped out a year after the survey, but we only have cross sectional data, so we treat them as censored and everyone who is not enrolled as dropped out.

The data is expanded such that for each person there is a data row for each time period they were at risk (if length of time is 8, then the individual has 8 rows). The binary dependent variable “dropped out” is created to represent the instance when an individual dropped out of school. If an individual’s survival time is censored, the indicator is equal to 0 for each time period; if an individual survival time is not censored, then the indicator variable is equal to zero for all but the last time period when it is equal to 1.

Due to censoring, one cannot use simple means and standard deviations to describe the average length of time in school before students drop out. A more appropriate description is provided in a life table (Table 6). A life table tracks the event histories from the beginning of time till when data collection ended. In this case, it shows

the history of students dropping out from the year when they decide to enroll or not, to entering first grade, till the time the survey took place for those that enrolled.

The first and second columns of Table 6 show the time intervals. The number of people at risk in each interval is presented in the third column. The fourth column shows the number of children that dropped out in each time interval. The fifth column shows the number of children that were censored at the time of the survey in each time interval year; that is, children that were still enrolled at the time of the survey. The sixth column shows the hazard function in each interval. The hazard function is the proportion of children that dropped out of school amongst those that were in the risk set. The risk set are those that completed the previous school year and thus were eligible to start the next school year.

Table 6. Life Table Describing the Number of Years in School for the Sample of Individuals Age 6 to 18

		Number			Proportion of	
Grade Year	Time interval	Enrolled at beginning of the year (Risk set)	Dropped out during the year (Death)	Censored at the end of the year (Lost)	Children at the beginning of the year who left during the year (Hazard function)	All students still enrolled at the end of the year (Survivor function)
0	[0,1)	22,445	0	0	0.0000	1.0000
1	[1,2)	22,445	6,183	0	0.3195	0.7245
2	[2,3)	16,262	301	574	0.0190	0.7109
3	[3,4)	15,387	464	1,045	0.0317	0.6887
4	[4,5)	13,878	551	1,280	0.0425	0.6600
5	[5,6)	12,047	633	1,234	0.0570	0.6235
6	[6,7)	10,180	528	1,129	0.0565	0.5892
7	[7,8)	8,523	695	1,051	0.0908	0.5380
8	[8,9)	6,777	324	955	0.0528	0.5104
9	[9,10)	5,498	751	918	0.1610	0.4343
10	[10,11)	3,829	228	711	0.0679	0.4058
11	[11,12)	2,890	243	660	0.0997	0.3673
12	[12,13)	1,987	238	577	0.1507	0.3158
13	[13, 14)	1,172	160	1,012	0.2730	0.2399

The last column of Table 6 displays the survival function. The survival function is the probability that an individual will survive (not drop out) past the current time. The median lifetime is the estimate of central tendency used in survival analysis. It is the point in time that we estimate that half the sample has experienced the event. This is the value of time T for which the value of the estimated survival function is 0.5. The estimated median grade at which a student drops out is 7^{th} grade (time period 8).

The sample hazard and survival functions are graphed below for all individuals in the sample and by participation in nonfarm activities. Children from households that earn income from nonfarm activities will be referred to as being from participant households and those that are from households that do not earn income from nonfarm activities will be referred to as being from non participant households. Figure 4 shows the sample hazard function for the entire sample. Hazard of dropping out is at its highest in grade 0. This is the interval where the decision is made to enroll in school or not. The hazard of dropping out is at the lowest in the first of year of primary school (grade 1), after which it steadily rises.

The hazard function shows us that individuals are more likely to drop out of school in grade 6 and 8. There is a dip in hazard in 7^{th} grade which is the beginning of the junior secondary school. Still, the hazard function can be described as monotonic—it steadily increases over time after the 1^{st} grade. Figure 5 shows the corresponding sample survival function for the entire sample.

The basic discrete-time hazard model assumes that the shape of the hazard function is similar across groups, but that its relative level differs. Figure 6 shows the

sample hazard function for children from participant and non participant households. The hazard function is higher for children from non participant households than for those from participant households. Thus in each grade, the conditional probability of dropping out of school is greater for children from non participant households.

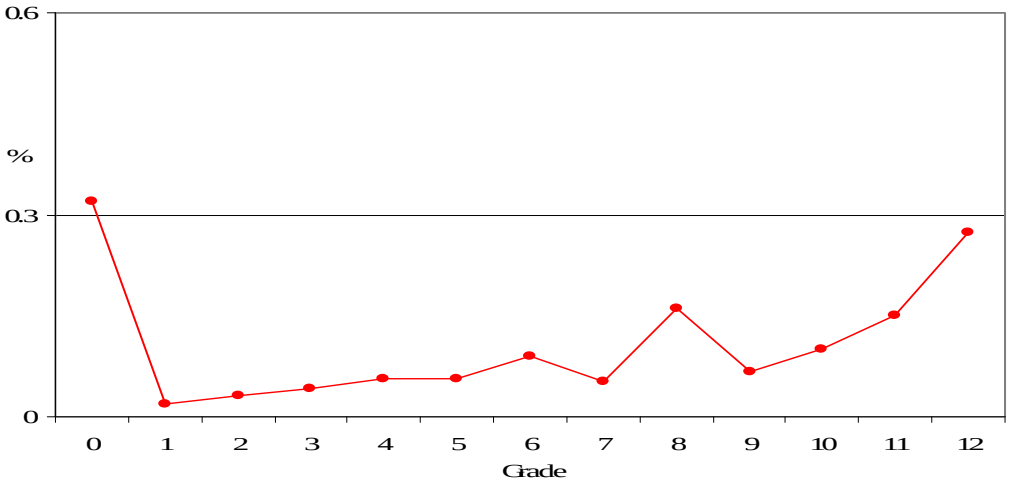

Figure 4. Sample Hazard Function for the Entire Sample

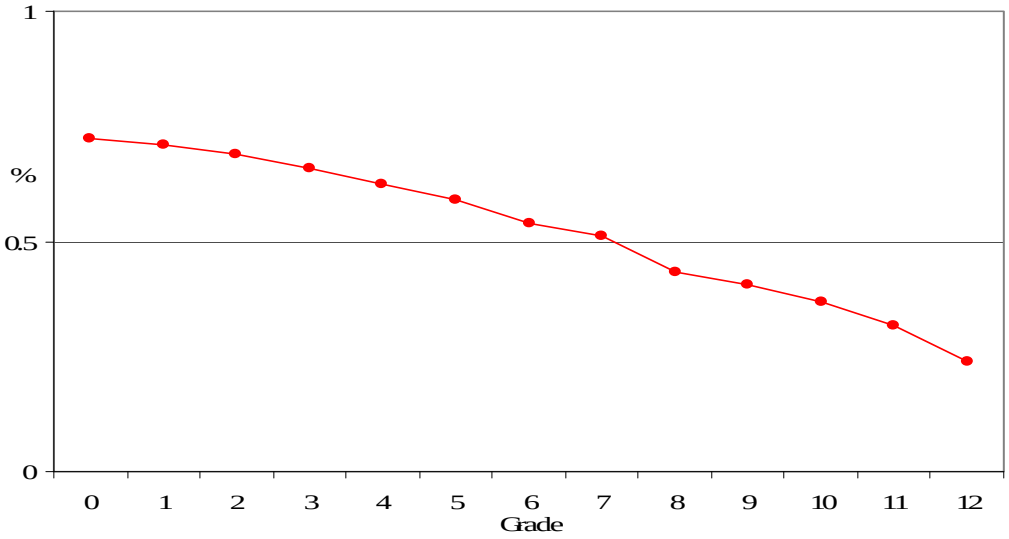

Figure 5. Sample Survival Function for the Entire Sample

Figure 7 shows the survival function for children from participant and non participant households. Children from participant households have substantially higher

probability of attaining any given grade level than those from non participant households. For example in grade 0 (where the decision is made to ever enroll or not), the probability of enrolling in schooling is 81 percent for children from participant households and 65 percent for those from non participant households.

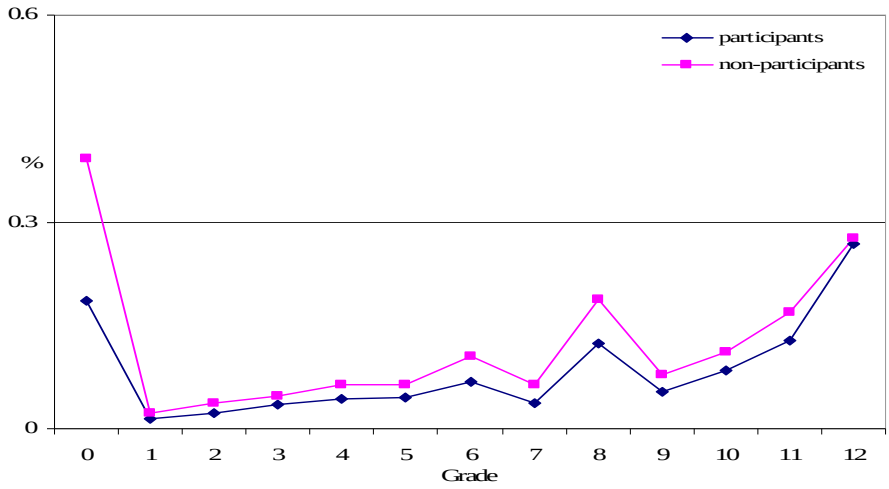

Figure 6. Sample Hazard Function by Participation in Nonfarm Activities

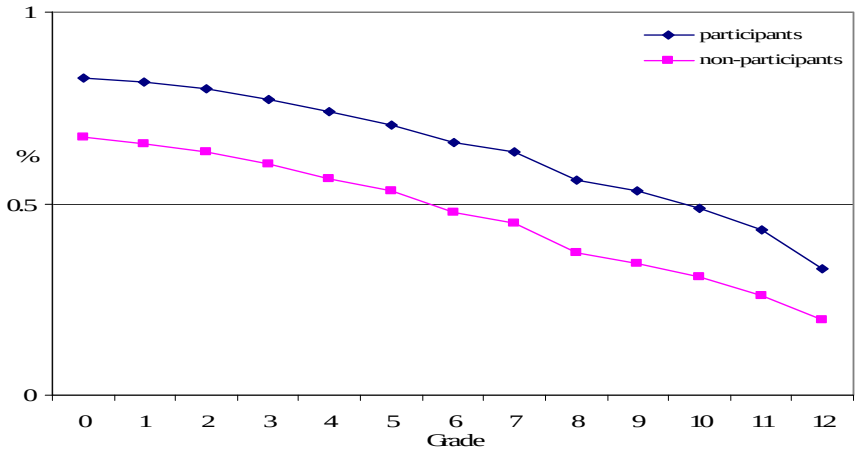

Figure 7. Sample Survival Function by Participation in Nonfarm Activities

The estimated median grade at which a student drops out for those from participant households is approximately 10 and for those from non participant households is approximately 6. From the sample survival and hazard functions, it can be inferred that

earning income from a nonfarm activity increases the survival time of a child in school and reduces the hazard of dropping out at every grade level. This is the same inference made from the descriptive statistics in section 3.2 from Table 3. From section 3.2, it was shown that children currently enrolled in school are from households that are more likely to participate in nonfarm activities.

Apart from the two analyses mentioned earlier, additional analyses will also be conducted to check robustness of the study. The hazard function will be analyzed without individuals that never enrolled in school to examine if the impact of nonfarm income is more or less effective compared to that of the full sample. These results are presented in Table 7 in the next section with the Probit regression results and the hazard function results with all individuals.

In addition, interaction effects of the time indicators with the participation variable and parental education variables are included in the hazard function. Due to the evidence of late enrollment, a sensitivity check is also conducted by extending the age group to 24 for comparison to those ages 6 to 18. Separate analyses are done for the North and South regions to examine if the effect of nonfarm activities differs by region. Separate analyses are also done for primary and secondary school level individuals to examine if the effect of nonfarm activities differs by school level. Those results and several others are presented and discussed in more detail in section 5.3.

5. Results

5.1 Main Results

Table 7 presents the results of the two analyses: effect of nonfarm income and participation in nonfarm activities on 1) the likelihood of ever enrolling in school (column 2), and 2) the hazard of dropping out of school, with and without individuals that never enrolled in school (column 4 and column 6 respectively). The results of the hazard function with all individuals will be referred to as hazard 1 and the results of the hazard function with only individuals that ever enrolled in school will be called hazard 2. Hazard 2 results will only be discussed for nonfarm income and participation in nonfarm activities. For the control variables, only the Probit regression and hazard 1 results will be discussed.

Nonfarm income[2] has a small significant effect on the likelihood of ever enrolling in school and on the hazard of dropping out. A 10,000 Naira (about $100) increase in nonfarm income, will increase probability of being enrolled by 0.07 percent (average nonfarm income is 54,066 Naira), holding all other regressors at their means. An additional 10,000 Naira of nonfarm income reduces the estimated odds of dropping out of school by 0.2 percent in every grade in hazard 1 and by 0.2 percent in hazard 2. The effect of nonfarm income level is of small magnitude in the Probit and hazard functions.

The effect of participation in nonfarm activities is much larger and significant. Being from a participant household significantly increases the probability of being enrolled by 4 percent. Participation also reduces the estimated odds of dropping out of

[2] Income unit is in ten thousands of Naira (about $100)

school by 21 percent in hazard 1 and by 12 percent in hazard 2. Participation is more effective when we include individuals that never enrolled in school. This shows that nonfarm income has more impact on entry into school than on staying in school once an individual is enrolled. The difference in magnitude of the effect of nonfarm income level and participation indicates that the important factor is entering the nonfarm market. Once a household is in the market, the effect on children's schooling is substantial but the income level in itself is of less importance.

These findings about nonfarm income are not surprising because first, parents' income generally has a positive effect on children's schooling. Secondly, nonfarm income has been shown to reduce credit constraints of rural households and provide a steadier stream of income (Haggblade , Hazell, and Reardon 2005; Cruz-Dona and Martina 2000). Therefore, these findings could also be reflecting households' greater willingness to invest in children's education when they feel less credit constrained and/or have more stable income stream.

Household farm income also has a small (0.02 percent) but positive effect on the likelihood of ever enrolling in school but was not significant for the hazard of dropping out. This indicates that though income generally increases schooling, in this particular sample, nonfarm income appears to be more important when we separate income into farm and nonfarm. Even though the effect of nonfarm income is small, participation appears to be strong and significant. Due to the potential problems mentioned earlier (endogeneity and omitted variable bias), no strong causal interpretation

can be given to the findings. Still the results definitely indicate a strong correlation between nonfarm activities and higher children's schooling.

Table 7. The Effect of Nonfarm Activities on School Enrollment (Age 6-18)
Probit Model Dependent Variable: Ever Enroll
Hazard Model Dependent Variable: Dropout

	Probit		Hazard 1		Hazard 2	
	Marginal effects	z-stat	Odds ratio	z-stat	Odds ratio	z-stat
Nonfarm income	0.0007	2.00**	0.9980	2.04**	0.9983	1.66*
Participation in nonfarm activities	0.0449	6.40***	0.7949	7.80***	0.8850	3.21***
Farm income	0.0002	2.07**	1.0003	0.72	1.0010	2.24**
Age	0.0872	16.30***	0.6155	19.53***	0.1880	34.34***
Age squared	-0.0031	13.38***	1.0099	9.40***	1.0441	23.11***
Male	0.0245	4.30***	0.9224	3.35***	1.0145	0.44
Father primary education	0.1551	20.17***	0.6118	13.60***	1.0881	1.84*
Father junior secondary education	0.1418	9.44***	0.5547	7.53***	1.0259	0.29
Father secondary education	0.1335	11.62***	0.4764	12.40***	0.8207	2.79***
Father vocational education	0.0683	1.40	0.4345	3.04***	0.3163	2.70***
Father post-secondary education	0.1509	11.60***	0.3167	14.34***	0.5433	6.50***
Father Quranic education	0.0697	6.45***	0.7063	6.63***	0.9419	0.77
Father unknown education	0.0788	1.66*	0.5723	2.48**	0.7534	1.07
Mother primary education	0.0365	3.58***	0.7874	5.85***	0.7689	5.37***
Mother junior secondary education	0.0482	1.71*	0.7636	2.61***	0.7406	2.64***
Mother secondary education	0.0556	2.55**	0.8246	2.39**	0.7979	2.53**
Mother vocational education	0.1132	0.99	1.1863	0.54	1.1657	0.45
Mother post-secondary education	-0.0017	0.05	1.0150	0.13	0.9088	0.77
Mother Quranic education	0.0782	7.33***	0.8217	3.75***	1.1660	2.03**
Mother unknown education	0.0799	1.78*	1.0195	0.09	1.5364	1.79*
Wealth index	0.0183	3.42***	0.9802	1.14	0.9764	1.21
Female siblings	0.0042	1.73*	0.9782	2.40**	0.9771	3.05***
Male siblings	0.0025	1.20	0.9507	4.76***	0.9561	1.81*
Female headed household	0.0289	2.14**	0.9126	1.80*	1.0018	0.03
Household is non-Muslim	0.0772	8.92***	0.7962	6.05***	1.0810	1.45
Household migration network	0.0511	1.58	0.5340	4.31***	0.5217	3.86***
Household participates in community projects	0.0348	6.00***	0.8286	7.66***	0.8938	3.43***
Access to running water	0.0117	1.62	0.9182	2.82***	0.9623	0.96
Access to electric meter	0.0453	4.65***	0.7515	7.12***	0.8503	3.29***
D0			0.2241	14.96***		
D1			0.0115	38.37***	0.0004	52.41***
D2			0.0207	34.93***	0.0008	49.51***
D3			0.0357	30.59***	0.0028	44.38***
D4			0.0650	25.49***	0.0097	37.27***
D5			0.0848	22.84***	0.0225	31.56***
D6			0.1849	16.13***	0.0745	22.92***
D7			0.1374	17.81***	0.0795	21.75***
D8			0.5756	5.41***	0.3920	9.00***
D9			0.2574	11.67***	0.2097	13.43***
D10			0.4398	7.14***	0.3985	8.13***
D11			0.7504	2.46**	0.7183	2.92***
Observations	22,445		120,875		98,430	

State dummy variables not shown. * (**) (***) denotes statistical significance at the 10 (5) (1) percent level.

Age and gender also matter. An additional year in age increases the chance of ever enrolling in school by 9 percent up to age 14, when an additional year reduces the chance of ever enrolling by 0.3 percent. The odds of dropping out of school are about 38 percent lower for each additional year in age until age 15 (approximate) when the odds

become 1 percent higher. This could be an indication of late enrollment in the first few years of schooling and higher dropouts of much older children. Males are also more likely to ever have enrolled in school than females. The estimated odds of dropping out of school are 8 percent lower for males than for females. This could be attributed to cultural biases such as earlier marriage for female children which leads to fewer years in school.

As found in the literature, parental education is an important factor in determining a child's schooling attainment. All levels of father's education have positive significant effects of children ever enrolling in school except for vocational education which is insignificant. For the hazard model, the estimated odds of dropping out of school is 39 percent lower for children whose fathers have primary education; 45 percent lower for those whose fathers have junior secondary education; 52 percent lower for those whose fathers have senior secondary education; 57 percent lower for those whose fathers have vocational education; 68 percent lower for those whose fathers have post secondary education; 29 percent lower for those whose fathers have Quranic education; and 43 percent lower for those who did not know their father's education level. The results show that the higher the father's education level, the more likely their child will be enrolled and the lower the hazard of dropping out.

Maternal education is also an important determinant of child schooling. Mother's primary, secondary, and Quranic school education have positive significant effects on the likelihood of ever enrolling. The estimated odds of dropping out of school is 21 percent lower for children whose mothers have primary education; 24 percent lower for those who mothers have junior secondary education; 18 percent lower for those whose mothers

have senior secondary education and Quranic education. Mother's vocational education and post secondary education did not have significant effects. The comparison group for each parental education level is those that did not have that education level. These findings are not unexpected as educated parents are more likely to be better informed about the importance of education. They are also more likely to be equipped to help their children with school work.

Higher household wealth index increases the likelihood of ever enrolling in school but did not significantly affect the hazard of dropping out of school. It appears that wealth is more important for entry into school than for length of stay in school. Having male and female siblings reduced the estimated odds of dropping out of school by 5 percent and 2 percent respectively. Number of female siblings has a positive significant effect on the likelihood of ever enrolling in school. This is unexpected as more siblings are expected to reduce schooling attainment. A plausible explanation cannot be given for this finding.

Schooling appears to be influenced by household structure and social networks. Being from a female-headed household increases the likelihood of ever enrolling in school and also reduces the odds of dropping out by 9 percent. The reason behind this could be that women are more likely to spend on their children. Therefore, a female head could be more willing to invest in children's education even if it means reducing own consumption. Being from a non-Muslim household increases the likelihood of enrolling in school and the estimated odds of dropping out are reduced by 20 percent. This could

be reflecting the fact that most Muslim households in Nigeria are located in the North where enrollment rates are much lower.

Having migrant networks appears to very important for children's schooling in rural Nigeria. Migration networks increases the likelihood of enrolling in school and reduces the hazard of dropping out by 47 percent. This could be attributed to the fact that the networks are usually in urban areas in the Nigeria and sometimes in an economically more developed country. Thus, such households may have more access to information about education and its importance. In addition, they may be more knowledgeable about access to education and have more feasible set of expected returns to education. Similarly, children from households that participate in community projects are more likely to be enrolled in school and the odds of dropping out are 17 percent lower for them.

Finally, access to certain infrastructure also has a positive significant effect on the likelihood of enrolling in school and lowered the hazard of dropping out. Having access to an electric meter increases the likelihood of enrolling in school. Access to running water was not significant for ever enrolling in school. The estimated odds of dropping out of school is 8 percent lower for children who have access to running water and 25 percent lower for those with access to electric meters. This could be an indication of residing in better neighborhoods with more schools and other infrastructure. Also the children could have more time to spend on school work if access to the infrastructure lead to lower need for household labor/chores.

Since the NLSS survey was collected over a 1 year period (September 2003 to August 2004), a dummy for survey month was included for each individual in the analysis. This variable did not significantly change the results and is not reported here. In addition, grandparents' education was included in the analysis but led to a significant loss of data. This result is also not included here. Survey month dummy and grandparents' education variables were therefore dropped from the analyses.

5.2 Estimated Hazard and Survival functions

Graphic representation of estimated hazard and survival functions are good instruments for identifying and summarizing trends of the effect of nonfarm income on the hazard of dropping out over time. Figures 8 and 9 illustrate the combined effects of the coefficient estimates of nonfarm income and participation in nonfarm activities and the level of the baseline hazard function. Basically, the function shows the shift in the baseline hazard function from a change in level of nonfarm income. Income is grouped into three levels; no participation and thus, zero nonfarm income, participation with low income, and participation with high income (discrete variables are set to zero and continuous variables set to their means).

The baseline group is a male who is from a household that earns no income from nonfarm activities. Figure 8 shows that the estimated hazard for male children who are from households with high nonfarm income is the lowest. Correspondingly, Figure 9 shows the importance of the effect of income from nonfarm activities on the probability of surviving and it operates over both low and high income levels. A male child from a high nonfarm income household has higher survival function.

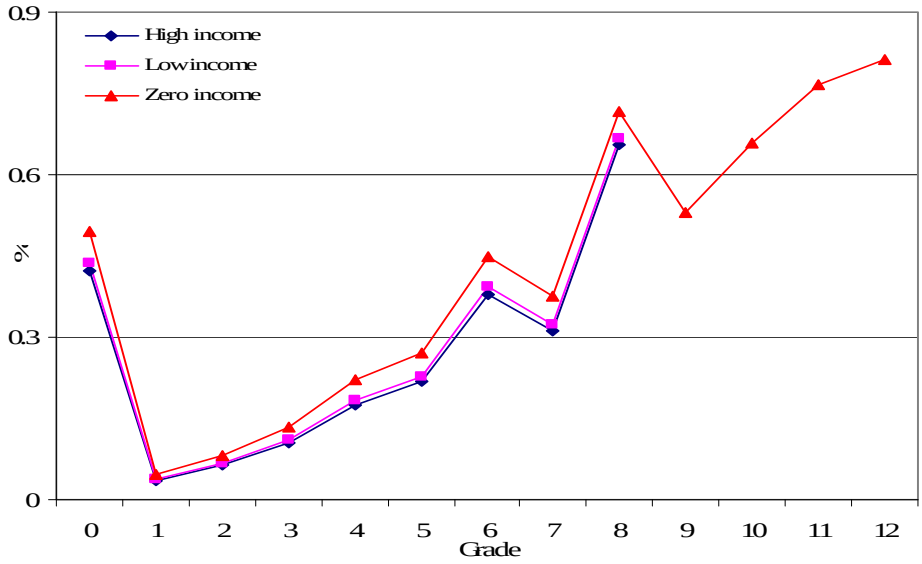

Figure 8. Estimated Hazard Function by Nonfarm Income Level

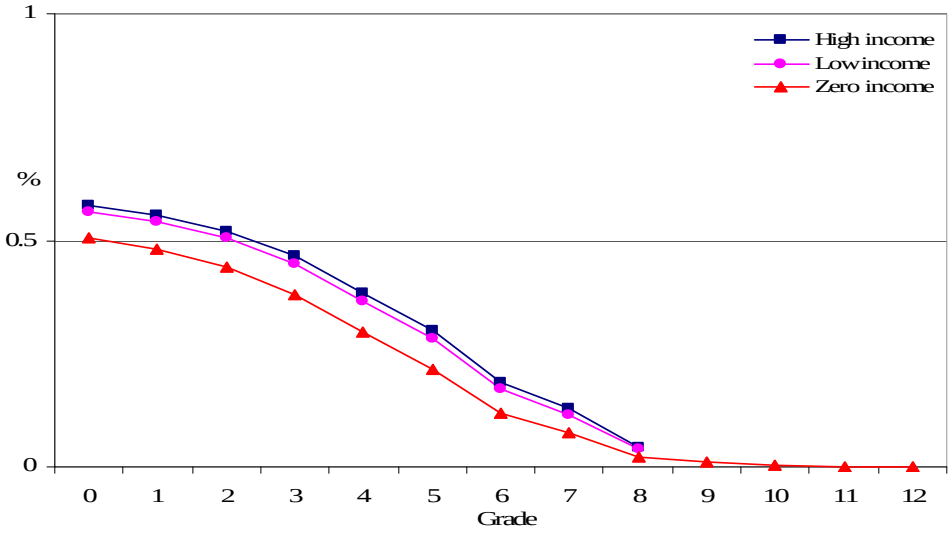

Figure 9. Estimated Survival Function by Nonfarm Income Level

Since the differences in hazard and survival function between low and high nonfarm income participants are small, from now only two groups will be used—participants and non-participants. The combined effects of the coefficient estimate of participation in nonfarm activities and the baseline hazard function are displayed in

figures 10 and 11. Male children from participant households have lower estimated hazard function at every grade level (figure 10) than male children from non participant households and the corresponding survival functions are illustrated in figure 11.

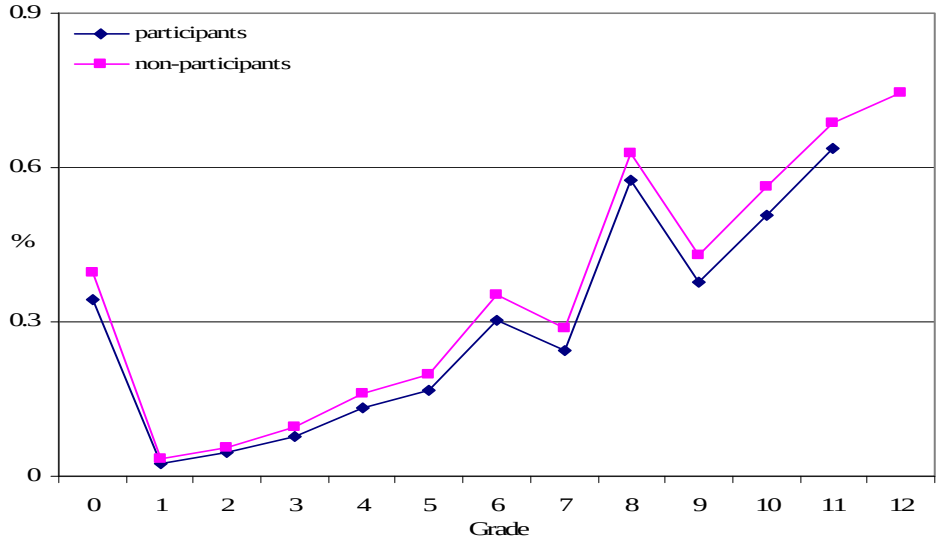

Figure 10. Estimated Hazard Function by Participation in Nonfarm Activities

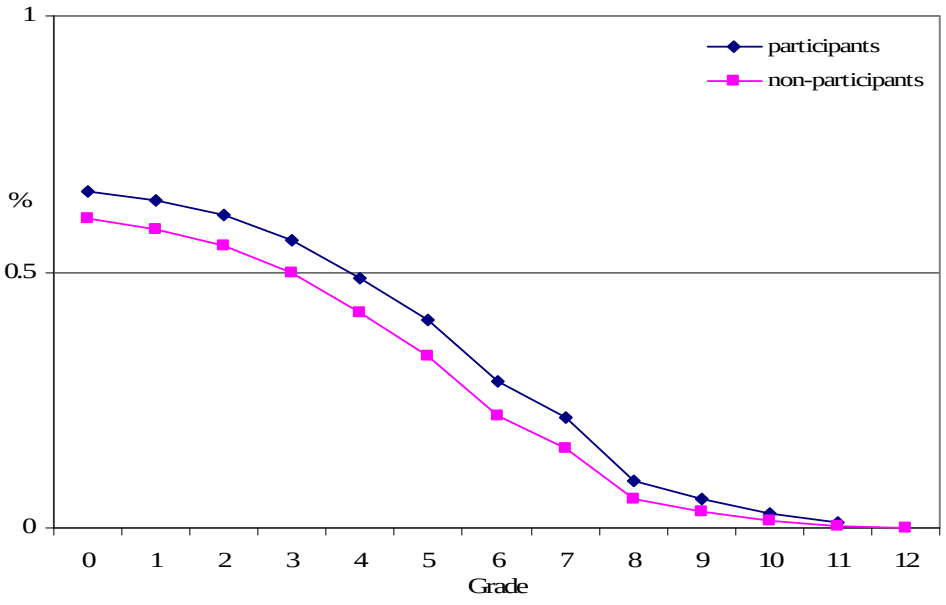

Figure.11. Estimated Survival Function by Participation in Nonfarm Activities

5.3 Additional Analyses

Several additional analyses were carried out for a more robust study which are discussed below[3]. The majority of the results remain the same as in the first estimation, suggesting the robustness of the analyses. The age group was expanded to children age 24. Table 8 displays the results of children age 6 to 24. Nonfarm income and participation increase the likelihood of ever enrolling in school at about the same magnitude as the effect for 6 to 18 years old (0.6 percent and 4 percent respectively). The effect is also similar for the hazard model. Nonfarm income reduces the hazard of dropping out by 0.2 percent and participation reduces the hazard by 19 percent.

Another analysis is the inclusion of interaction effects of participation in nonfarm activities and the time indicators (d0 to d12). This did not significantly change the results of the analysis. A test of joint significance was conducted on the interaction variables and their coefficients were found to be jointly significant at the 1 percent level. A different analysis involved the inclusion of interaction effects of parental education and the time indicators. Paternal education variables were recoded into one indicator where the value is 1 if father has secondary education and above and zero otherwise. The same was done for mother's education. Again, the coefficients of the interaction variables were found to be jointly significant at the 1 percent level.

5.3.1 Limited Sample

To address one of the potential reasons that participation in nonfarm activities could be endogenous (reverse causality), the sample was limited to children from

[3] The additional results are discussed but not presented in this paper.

households that started the nonfarm business before the children were of school age. The results did not differ significantly. Nonfarm income is not significant here but participation in nonfarm activities is significant. Participation lowers the estimated odds of dropping out of school by 20 percent. The effects of the other variables were not changed significantly, either.

Table 8. The Effect of Nonfarm Activities on School Enrollment (Age 6-24)

Probit Model Dependent Variable: Ever Enroll
Hazard Model Dependent Variable: Dropout

	Probit		Hazard 1		Hazard 2	
	Marginal effects	z-stat	Odds ratio	z-stat	Odds ratio	z-stat
Nonfarm income	0.0006	2.19**	0.9984	1.79*	0.9988	1.35
Participation in nonfarm activities	0.0414	6.78***	0.8111	7.69***	0.9148	2.57**
Farm income	0.0002	2.52**	1.0000	0.14	1.0007	1.81*
Age	0.0554	18.74***	0.5985	35.20***	0.2269	52.90***
Age squared	-0.0017	15.60***	1.0122	23.71***	1.0381	43.39***
Male	0.0234	4.62***	0.9227	3.52***	1.0235	0.77
Father primary education	0.1419	21.23***	0.6374	13.44***	1.0934	2.14**
Father junior secondary education	0.1274	9.80***	0.6049	6.94***	1.0947	1.12
Father secondary education	0.1177	12.00***	0.4621	13.88***	0.7566	4.27***
Father vocational education	0.0577	1.34	0.4667	2.96***	0.3576	2.61***
Father post-secondary education	0.1373	12.29***	0.3070	15.59***	0.5021	7.81***
Father Quranic education	0.0628	6.65***	0.7034	7.08***	0.9119	1.26
Father unknown education	0.0732	1.81*	0.6885	1.89*	0.8987	0.47
Mother primary education	0.0351	3.95***	0.8053	5.72***	0.7912	5.25***
Mother junior secondary education	0.0445	1.80*	0.7793	2.56**	0.7649	2.52**
Mother secondary education	0.0487	2.60***	0.8302	2.47**	0.8160	2.44**
Mother vocational education	0.0745	0.82	1.4026	1.18	1.3353	0.92
Mother post-secondary education	-0.0026	0.09	0.9560	0.42	0.8898	0.99
Mother Quranic education	0.0722	7.75***	0.8218	3.94***	1.1798	2.32**
Mother unknown education	0.0722	1.82*	1.0594	0.29	1.5011	1.83*
Wealth index	0.0162	3.56***	0.9763	1.48	0.9724	1.54
Female siblings	0.0040	2.05**	0.9782	2.92***	0.9780	2.14**
Male siblings	0.0024	1.46	0.9543	5.20***	0.9590	3.46***
Female headed household	0.0266	2.37**	0.9525	1.08	1.0543	1.04
Household is non-Muslim	0.0775	10.20***	0.7605	7.76***	1.0301	0.60
Household migration network	0.0273	1.03	0.5737	4.48***	0.5410	4.25***
Household participates in community projects	0.0323	6.35***	0.8342	7.91***	0.8978	3.58***
Access to running water	0.0188	3.00***	0.8928	4.01***	0.9556	1.24
Access to electric meter	0.0419	5.00***	0.7370	8.21***	0.8142	4.56***
D0			0.5447	7.71***		
D1			0.0267	36.96***	0.0012	52.19***
D2			0.0461	33.39***	0.0024	49.23***
D3			0.0777	28.60***	0.0076	43.99***
D4			0.1356	22.93***	0.0238	36.74***
D5			0.1716	20.02***	0.0506	30.73***
D6			0.3643	11.98***	0.1600	20.43***
D7			0.2586	14.73***	0.1583	19.55***
D8			1.2990	3.25***	0.9377	0.79
D9			0.3770	9.91***	0.3173	11.69***
D10			0.6143	5.13***	0.5705	5.98***
D11			1.0323	0.34	0.9989	0.01
Observations	25,962		156,798		130,836	

State dummy variables not shown. * (**) (***) denotes statistical significance at the 10 (5) (1) percent level.

The estimated hazard and survival functions for the limited sample are displayed below in figures 12 and 13 and are similar to that of the full sample.

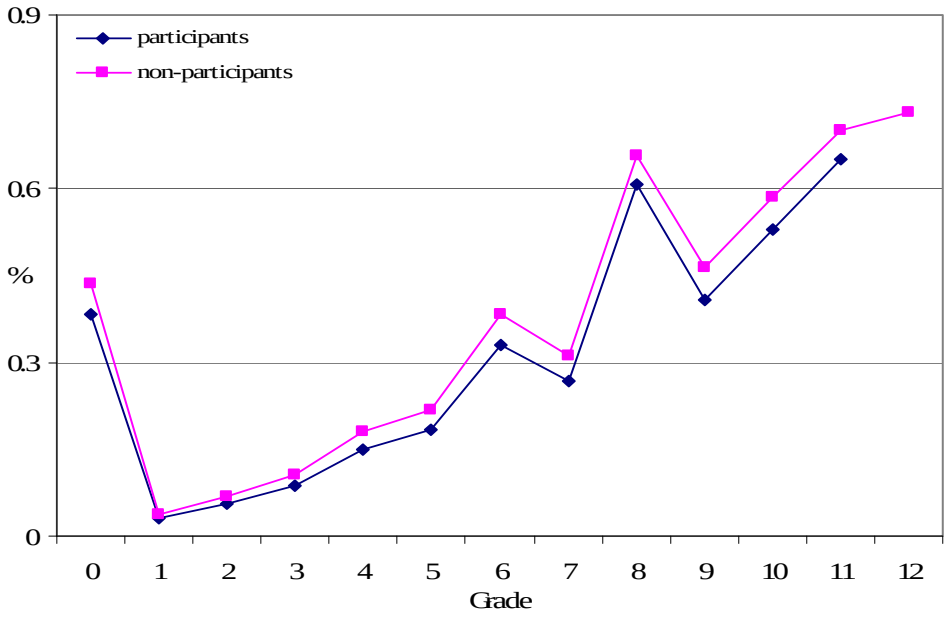

Figure 12. Estimated Hazard Function by Participation in Nonfarm Activities (Limited Sample)

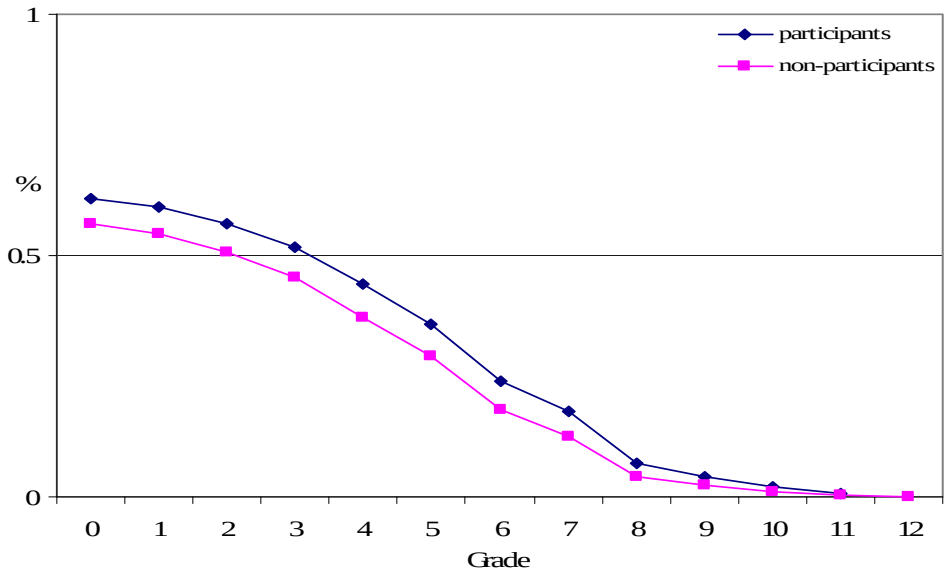

Figure.13. Estimated Survival Function by Participation in Nonfarm Activities (Limited Sample)

5.3.2 North and South Region

Separate analyses were also carried out for the South and North region because summary statistics in Table 3 in section 3.2 shows substantial differences in the enrollment rates between the two regions. The South regions have enrollment rates ranging from 73 percent to 75 percent, while the North regions have enrollment rates ranging from 19 percent to 56 percent. The effect of nonfarm income is only significant for the North region and it lowers the estimated odds of dropping out by 0.3 percent. There is also a notable difference in the effect of participation in nonfarm activities. The estimated odds are lowered by 23 percent for North region and by 15 percent for South region. Thus, nonfarm activities have more effect on children's education in the North than in the South. This could be attributed to uncontrolled for differences between the North and South regions.

Figure 14 illustrates the estimated hazard function for the North and South region. The shape of the hazard function is very similar to that of the full sample and children from households that earn income from nonfarm activities have lower hazards than those that do not earn income from it. In the earlier grade levels, the shape of the hazard function is flatter in the South region than in the North region.

Overall, the hazard function of the South is lower than that of the North. N prefix represents functions for the North and S prefix represents functions for the South. The corresponding survival functions are higher for children from participant households in

the North and South regions than those that do not participate. These are displayed in figures 15 and 16.

However, it should be noted that for the South region, the estimated hazard function is much lower than that in the North and the estimated survival function is much higher than that of the North region. For example looking at the first stage where the decision is made to either enroll in school or not (grade 0); the estimated hazard is 43 percent for children from participant households in the North and 3 percent for those in the South while the estimated survival is about 57 percent for children from participant households in the North region and 97 percent for those from the South. This could be a result of differences in socio-economic conditions or preferences of parents from the two regions.

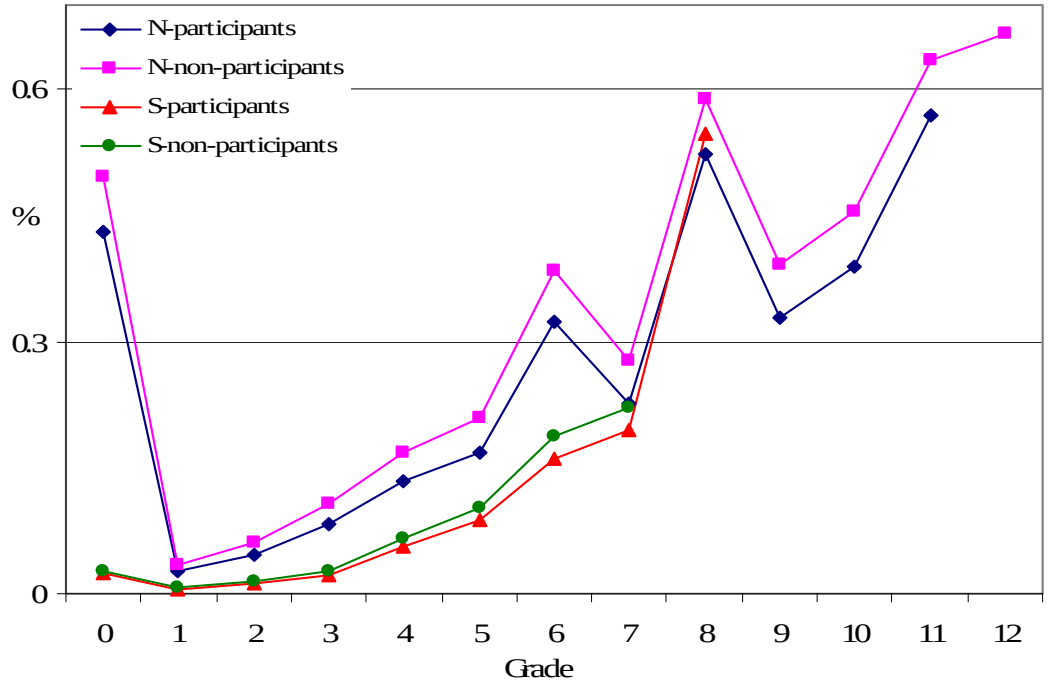

Figure 14. Estimated Hazard Function by Participation in Nonfarm Activities, North and South Regions

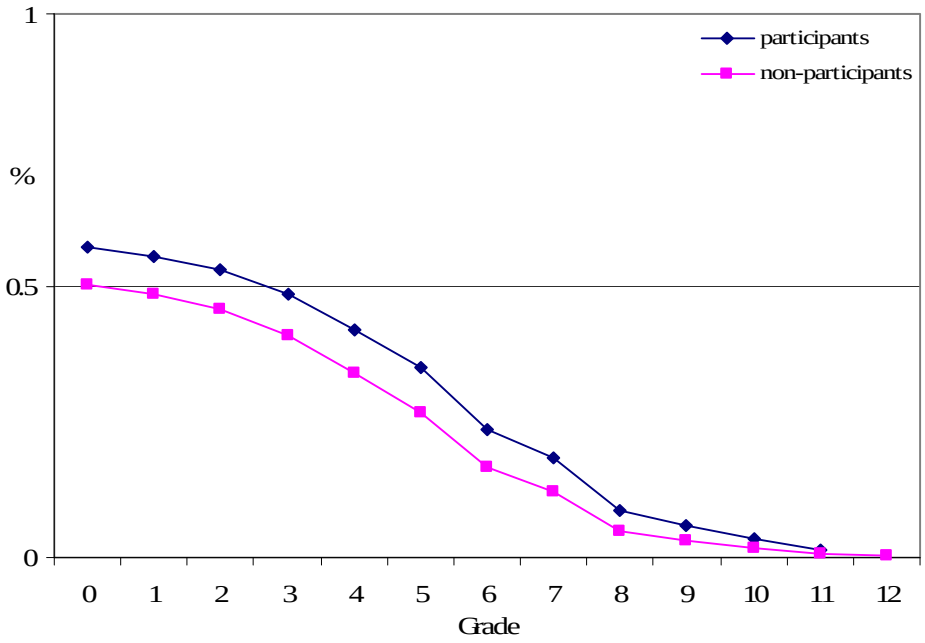

Figure 15. Estimated Survival Function by Participation, North Region

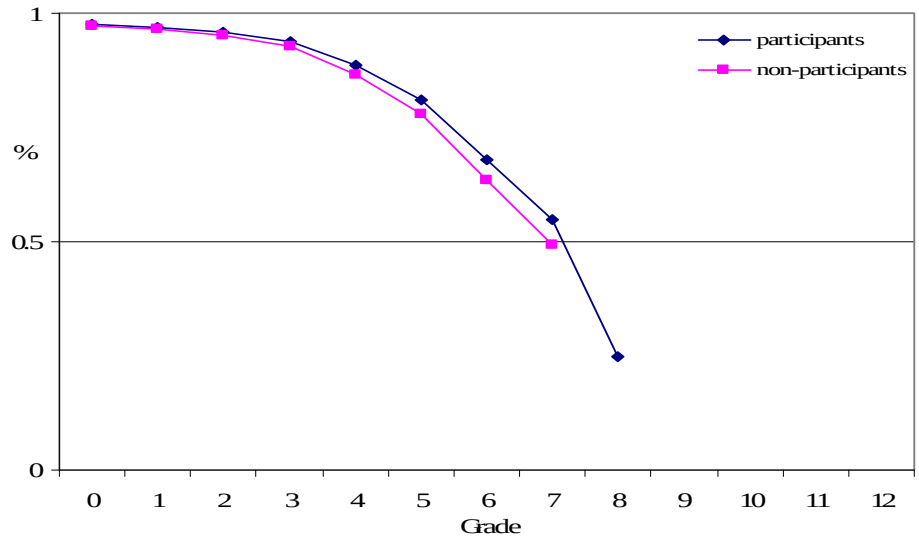

Figure 16. Estimated Survival Function by Participation, South Region

5.3.3 Primary and Secondary School

Separate analyses were also conducted for primary school and secondary school education levels. The results are presented in Table 9. Nonfarm income was not significant for primary or secondary education. However, the estimated odds of dropping out of primary and secondary school are reduced by 18 percent and 11 percent respectively for children from participant households.

Figure 17 illustrates the survival functions for children from participant and non participant households for primary and secondary school. Earning nonfarm income reduces the dropout hazard for children from participant households. Correspondingly, children from participant households have higher survival function. P prefix represents functions for primary school and S prefix represents functions for secondary school.

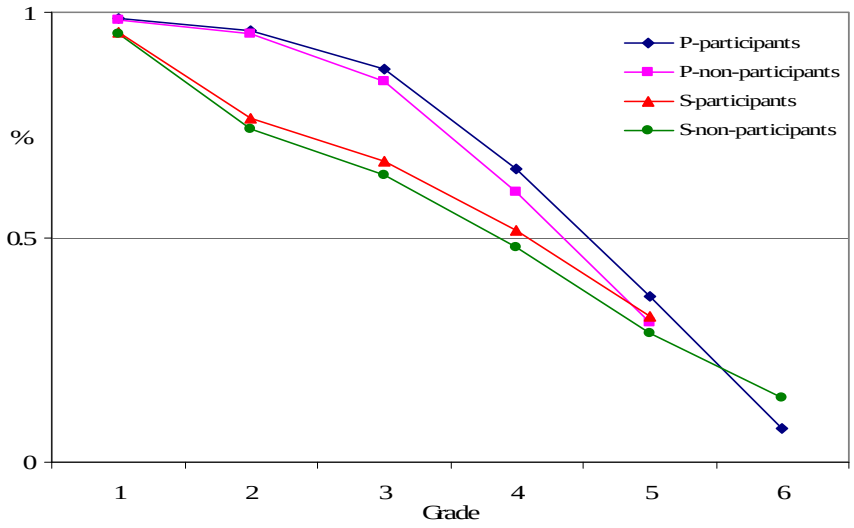

Figure 17. Estimated Survival Function by Participation in Nonfarm Activities, Primary and Secondary School

The survival function for primary school is higher than that for secondary school. Children are more likely to drop out of secondary school than primary school. This is not

unexpected as the higher the education level, the less the enrollment especially in rural areas where households are poorer and can only afford a few years of education.

Table 9. The Effect of Nonfarm Activities on Primary and Secondary School Enrollment

Dependent Variable: Dropout

	Primary school		Secondary school	
	Odds ratio	z-stat	Odds ratio	z-stat
Nonfarm income	0.9989	0.81	0.9978	1.45
Participation in nonfarm activities	0.8150	4.05***	0.8903	1.91*
Farm income	1.0009	1.69*	1.0013	1.60
Age	0.0879	37.96***	0.1868	8.24***
Age squared	1.0956	33.86***	1.0407	5.86***
Male	1.0198	0.46	0.9600	0.76
Father primary education	1.1664	2.52**	1.0503	0.66
Father junior secondary education	1.0007	0.00	1.1015	0.81
Father secondary education	1.0131	0.12	0.7734	2.54**
Father vocational education	0.3388	2.00**	0.2178	2.07**
Father post-secondary education	0.7022	2.77***	0.4324	5.73***
Father Quranic education	0.9756	0.25	0.6735	2.77***
Father unknown education	1.1361	0.37	0.4692	1.56
Mother primary education	0.7519	4.28***	0.7737	3.36***
Mother junior secondary education	0.4915	3.92***	0.9412	0.39
Mother secondary education	0.6453	3.37***	0.9229	0.62
Mother vocational education	0.3970	1.20	1.9963	1.72*
Mother post-secondary education	0.9652	0.20	0.8705	0.74
Mother Quranic education	1.0791	0.78	1.1574	1.02
Mother unknown education	1.3424	1.04	1.6433	0.96
Wealth index	1.0095	0.32	0.9674	1.17
Female siblings	0.9607	2.00**	0.9273	3.24***
Male siblings	0.9739	1.57	0.9644	1.72*
Female headed household	0.9282	0.85	1.0727	0.85
Household is non-Muslim	1.1061	1.43	1.0848	0.91
Household migration network	0.5392	2.46**	0.5519	2.51**
Household participates in community projects	0.8838	2.81***	0.9078	1.84*
Access to running water	0.8892	2.15**	1.0325	0.50
Access to electric meter	0.9064	1.38	0.8384	2.41**
D1	0.0034	49.77***	0.0501	23.51***
D2	0.0071	46.86***	0.2790	11.61***
D3	0.0259	42.47***	0.1600	15.14***
D4	0.0863	32.66***	0.3346	9.42***
D5	0.1956	21.99***	0.6576	3.65***
Observations	35,615		22,153	

State dummy variables not shown. * (**) (***) denotes statistical significance at the 10 (5) (1) percent level.

6. Conclusions

The analyses in this paper examine the effect of nonfarm income and participation in nonfarm activities on school enrollment of rural children in Nigeria. The results show that children from households that earn income from nonfarm activities are more likely to ever enroll in school. It also shows that when they enroll in school, children from such households are less likely to drop out than those from households that do not earn nonfarm income. Furthermore, the results show the importance of parental education. At all levels of education, paternal education positively affects children's schooling and this is mostly the case for maternal education as well. The analyses also show the importance of household structure, social networks, and neighborhood characteristics for children's schooling.

The results are consistent with previous literatures that have found that higher household income, parental education and favorable household characteristics have positive effects on children school attainment. In addition, the analyses showed that the hazard of dropping out of school is at the highest in the last year of junior secondary school which coincides with end of funding from Universal Basic Education program in Nigeria. This strengthens the belief that inadequate funds deter parents from investing in their children's education.

Human capital is an essential aspect of economic development. However, attaining optimal formal education can be constrained by household resources. Children from higher income households are more likely to obtain higher levels of education than those from poorer households. The level of poverty in rural Nigeria is substantial and

households also face limited access to credit which can lead to lower enrollment rates. Adequate access to credit and information could increase enrollment in these areas. Studies have shown that nonfarm income can reduce credit constraints by increasing household income and/or providing a steadier stream of income (Haggblade, Hazell, and Reardon 2005). Thus, households that participate in nonfarm activities are more likely to invest in the education of their children, amongst other things.

The findings in this paper have some important implications for rural Nigeria. First, it is recommended that policies focusing on the rural sector should not be limited to the farm sector alone even though most rural households participate in the farm sector. In designing policies to increase school enrollment and graduation, the government needs to recognize the role of the nonfarm sector. Access to such activities could improve the enrollment rate in rural Nigeria. Although investment in children's education might not be able to change the current poverty level in the household, it could break the poverty cycle for the children. In addition, parents can enjoy the returns to their investment once the child enters the labor market. Hence in the long run, increasing investment for children's education will benefit both parents and children.

Second, increasing the level of access to formal credit market is a way to encourage poorer households to increase investment in education. Greater access to credit market should allow households to be in a better position to mitigate (probably ex post) the variability of income streams (Cruz-Dona and Martina 2000). This consequence, along with the increased availability of credit, should presumably encourage parents to

invest more in the education of their children amongst other things (Cruz-Dona and Martina 2000).

Third, access to infrastructures such as electricity and running water appears to be important for children's schooling. Thus, any additional public investment in primary or secondary school education in rural areas in developing countries should be combined with complementary public expenditures directed at alleviating the deficiency of infrastructures (Cruz-Dona and Martina 2000). Raising children's education level will increase stock of human capital and individuals will be able to participate in the global economy and contribute in a meaningful way (Arvin and Summers 2000). Therefore, investment in children's education will increase the human capital of a nation and will be beneficial to all in the long run.

APPENDIX A:

Scoring Factors for Variables Entering the Computation of the Wealth Indices

Wealth index		Agriculture wealth index	
Variables	Scoring coefficients	Variables	Scoring coefficients
Brick home	-0.0022	Cattle	-0.0102
Toilet	-0.0008	Horse	-0.0107
Running water	-0.0014	Sheep	-0.0140
Electric meter	0.0043	Small animals	-0.0053
Cement floor	0.0078	Pigs	-0.0004
Own home	-0.0010	Other animals	-0.0019
Furniture	0.2000	Tractor	0.0109
Sewing	0.2143	Plough	-0.0067
Stove	0.2062	Cart	0.0117
Refrigerator	0.2170	Other animal drawn equipment	-0.0101
Conditioner	0.2184	Sprayer	0.1334
Fan	0.2126	Outboard motors	0.3054
Radio cassette	0.1876	Canoes	0.5362
Gas cooker	0.2178	Nets	0.5862
Generator	0.2174	Other agricultural assets	0.1091
Video	0.2172		
Washer	0.2171		
Television	0.2106		
Camera	0.2163		
Electric iron	0.2137		
Bicycle	0.1974		
Motorcycle	0.2127		
Car	0.2154		
House	0.1940		
Land	0.2008		
Shares	0.2148		
Water transport	0.2149		
Outboard motor	0.2102		
Mattress	0.1596		

The type of factor analysis used here is the Principal Component Analysis. The factor scores acts as weights assigned to each variable (normalized by its mean and standard deviation) in the linear combination of the variables that constitute the first principal component (Filmer and Pritchett 2001).

REFERENCES

Arvin, B. Mak and Jennifer L. Summers (2000). "Maternal Participation in the Labor Market and Child Education Outcome in Developing Countries." *Canadian Journal of Development Studies* 21(2): 255-267.

Banerjee, Abhijit V. (2002). "Education Policy and the Economics of the Family." Department of Economics Working Paper Series, Massachusetts Institute of Technology.

Becker, Gary S. and Nigel Tomes (1986). "Human Capital and Rise and Fall of Families." *Journal of Labor Economics* 4(3): 1-39.

Chevalier, Arnaud, Colm Harmon, Vincent O'Sullivan, and Ian Walker (2005). "The Impact of Parental Income and Education on the Schooling of their Children." The Institute for Fiscal Studies, London.

Cox Edwards, Alejandra and Manuelita Ureta (2003). "International Migration, Remittances, and Schooling: Evidence from El Salvador." *Journal of Development Economics* 72(2): 429-461.

Cruz-Dona, Rena Dela and Alan Martina (2000). "Some Links between Education, Household, Well-being, and Credit Markets: Evidence from Rural Philippines." *Oxford Development Studies* 28(3): 289-308.

Csapo, Marg (1983). "Universal Primary Education in Nigeria: Its Problems and Implications." *African Studies Review* 26(1): 91-106.

Denga, Daniel I. (2002). "Evolving a New Education Culture: The Universal Basic Education Focus", *The African Symposium* 2(4). Journal Online. Available at http://www2.ncsu.edu/ncsu/aern/educult.html

Federal Ministry of Information and National Orientation (2007). Abuja, Nigeria. http://www.nigeria.gov.ng/economy.

Filmer, Deon and Lant H. Pritchett (2001). "Estimating Wealth Effects Without Expenditure Data—or Tears: An Application" *Demography* 38(1): 115-132.

Haggblade, Steven, Peter B. Hazell, and Thomas Reardon. Forthcoming. *Transforming the Rural Nonfarm Economy*. Baltimore, Md.: Johns Hopkins University Press.

Haveman, Robert and Barbara Wolfe (1995). "The Determinants of Children's Attainments: A Review of Methods and Findings." *Journal of Economic Literature* 33(4): 1829-1878.

Hazans, Mihails and Ija Trapeznikova (2006). "Access to Secondary Education in Albania: Incentives, Obstacles, and Policy Spillovers." Online. Available at http://ssrn.com/abstract=912810, as of September 2006.

Lanjouw Jean and Peter Lanjouw (2001). "The Rural Non Farm Sector: Issues and Evidence from Developing Countries." *Agricultural Economics* 26(1): 1-23.

Lillard, Lee A. and Robert J. Willis (1994). "Intergenerational Educational Mobility: Effects of Family and State in Malaysia." *The Journal of Human Resources* 29(4): 1126-1166.

National Bureau of Statistics (2004). "Nigerian Living Standards Survey Report." Abuja, Nigeria.

National Population Commission of Nigeria (2006). Abuja Nigeria. http://www.population.gov.ng

Plug, Erik and Wim Vijverberg (2005). "Does Family Income Matter for Schooling Outcomes? Using Adoptees as a Natural Experiment." *Economic Journal* 115(506): 879-906.

Reichmuth, Stefan (1989). "New Trends in Islamic Education in Nigeria: A Preliminary Account." *Die Welt des Islams New Series* 29(1/4): 41-60.

Singer, Judith D. and John B. Willett (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. New York: Oxford University Press.

Stock, James and Mark Watson (2003). *Introduction to Econometrics.* Boston, MA.: Addison Wesley.

World Bank (1996). "Nigeria – Poverty in the Midst of Plenty – The Challenge of Growth with Inclusion." World Bank Poverty Assessment Report No. 14733. The World Bank, Washington, DC.

World Bank (2005). "Country Profiles". The World Bank, Washington, DC.