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School Attendance in Nigeria: Understanding the Impact and Intersection of Gender, Urban-Rural Residence and Socioeconomic Status

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Introduction

International development agencies, policy makers, and scholars alike have often promoted and emphasized the importance of formal education for children in developing countries. Education is regarded as essential given its countless economic and non-economic benefits (Haveman and Wolfe 2001; Post 2002). Moreover, formal education is considered particularly important for girls and women, given that it leads to higher age at first marriage, greater knowledge of family planning, reduced family size, and greater access and openness to prenatal care during pregnancy (Haveman and Wolfe 2001; UNESCO 2008).

While the economic and social benefits of formal education are widely known, as of 2006, approximately 72 million school-age children[1] in developing countries were not in school, with 35 million of these children in sub-Saharan Africa (UNESCO 2008). Nigeria, the focus of this research, has eight million school-age children out of school,[2] the highest number in sub-Saharan Africa (UNESCO 2008). Also noteworthy for our purposes, research conducted in various developing countries suggests that the children who are not in school are disproportionately female, impoverished, and rural,[3] and in some instances, these children are doubly disadvantaged if they are female and belong to poor families or if they are female and reside in rural areas. These children are less likely to acquire the benefits of education as they transition into adulthood.

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[1]The definition of "school-age children" is not based on a particular age group, such as 6- to 11-year-olds, standardized across countries. Rather, it applies to children who are supposed to be in primary school in a given country who may range in age from 5 to 13 years. Thus, the global estimate of school-age children is the total national primary school-age population (UNESCO and UNICEF 2005).

[2]"Out of school children" is defined as children who have never attended or have not had any contact with school at all during the academic year in question (UNESCO and UNICEF 2005). It is calculated by subtracting the number of children who are reported as being enrolled in either primary or secondary education from the total number of children in primary school-age population (UNESCO and UNICEF 2005).

[3]See Lloyd and Hewett (2003), Lloyd (2005), and UNESCO (2007).

The Program of Action of the 1994 International Conference on Population and Development (ICPD) and the 2000 Millennium Development Goals (MDGs) both call for closing the formal educational attainment gap between girls and boys. These documents urge countries around the globe to focus on increasing girls' education and school enrollment rates as part of their development and population plans. Likewise, the Education for All (EFA) agenda, first developed in 1990, highlights the need for the elimination of gender disparities in girls' primary and secondary education by 2015, and it emphasizes that girls need access to a good quality basic education (World Bank 2009).

It appears that some countries are heeding calls to reduce the gender gap. Research suggests that differences in the school enrollment[4] of boys and girls have narrowed worldwide.[5] As of the early 2000's in Latin America, girls' enrollment exceeded that of boys.[6] A recent report by UNESCO and UNICEF (2005) indicates that globally, 83.8 percent and 80.5 percent of primary school age boys and girls, respectively, are in school. While this gender disparity appears to be smaller than it used to be, it persists and is non-negligible in the Middle East, South Asia, and sub-Saharan Africa.[7] For example, in Nigeria, the country in which this research is situated, in 2007 64 percent of boys and 58 percent of girls of primary school age were in school (UNESCO 2007).

Despite the persistence of such gender disparities, John Knodel and Gavin W. Jones (1996) and Maureen A. Lewis and Marlaine E. Lockheed (2006) suggest that closing the gender gap in school attendance and attainment per se should no longer be a top priority among international development agencies. Rather, such agencies are encouraged to pay special attention to the overlapping effects of gender and other household factors, such as urban-rural residence, socioeconomic status, ethnicity, language, and/or religion on children's educational attainment (Stromquist 2001; Lewis and Lockheed 2006). More importantly, John Knodel and Gavin W. Jones (1996) and Maureen A. Lewis and Marlaine E. Lockheed (2006) argue that the intersection of gender and socioeconomic disparity, and/or gender and urban-rural location, create greater impediments to girls' education than the effect of gender alone.[8] In sub-Saharan Africa in particular, Cynthia B. Lloyd and Paul C. Hewett (2003) indicate that there is a dire lack of education among children from the poorest households, especially among girls.

Moreover, scholars who conduct research in developing countries stress that socioeconomic and rural-urban disparities pose greater obstacles to children's educational attainment than gender (Knodel and Jones 1996; Filmer and Pritchett 1999; Lloyd and Hewett 2003; Lloyd 2005; Lewis and Lockheed 2006). UNESCO and UNICEF's (2005, 39) report shows that worldwide around 30 percent of rural children of primary school age are out of school compared to only 18 percent of urban children. Furthermore, empirical research conducted in developing countries shows a pressing need to provide children from poor families –

[4]School enrollment is defined as the number of children enrolled or registered in school (UNESCO and UNICEF 2005); the unit of measurement is students.
[5]See Knodel and Jones (1996), Lloyd and Hewett (2003), and Lewis and Lockheed (2006).
[6]See Stromquist (2001), Punch (2004), and Lewis and Lockheed (2006).
[7]See World Bank (2001), Fontana and Meulen Rodgers (2005), and Lewis and Lockheed (2006).
[8]See Filmer (2000), Stromquist (2001), and Lewis and Lockheed (2006).

regardless of gender – with access to education at all levels (Knodel and Jones 1996; Filmer and Pritchett 1999).

The foregoing discussion suggests that more needs to be known about how gender, urban-rural residence, and socioeconomic status bear on children's school attendance in particular contexts. Attention also needs to be paid to how gender interacts with both urban-rural residence and socioeconomic status to produce disparities in school attendance. Here, we address this issue through an in-depth analysis of Nigeria, a country struggling to educate its children adequately. We focus primarily on assessing whether residence and socioeconomic status pose greater obstacles to children's schooling in Nigeria than does gender. In addition, we investigate how the intersection of gender with both urban-rural residence and socioeconomic status works to impede or enhance children's school attendance. Next, we turn to the relevance of Nigeria as a setting for this research.

The Case of Nigeria

The Federal Republic of Nigeria was created in 1960 when the country gained independence after six decades of British colonial rule (Osaghae 1992). In 2006, Nigeria's population stood at 145 million, with over half (51%) of that number living in rural areas (UNESCO 2007, 1; World Bank 2008, 1). The country has hundreds of ethnic groups, with the major ones being the Hausa-Fulani, the Yoruba, the Igbo, and the Ijaw (Cohen and Goldman 1991; Encyclopedia of the Nations 2008). The three major religions are Islam, Christianity, and indigenous/traditional congregations (Cohen and Goldman 1991).

Western-style education was introduced in Nigeria by Christian missionaries for the first time in 1843 (Fafunwa 1974). The south was the first and main part of the country in which missionaries promoted education; the establishment of schools came later to the Muslim-dominated and more isolated north (Bray 1981). The education system in contemporary Nigeria is 6-3-3-4 in structure, with six years of primary school, three years each of junior and senior secondary school, and four years of tertiary education.

Nigeria has undertaken a number of educational initiatives in recent decades. In 1976, Universal Primary Education (UPE) was launched as a major education scheme.[9] It stipulated that primary education would be universal and free of charge to all children, though it stopped short of making it compulsory. The plan also set the age of entry into primary school at age six. During the 1976 establishment of UPE in the country, the government embraced an education program that places formal education at a superior position to informal or vocational education (Bray 1981). The Nigerian federal government argued that it took this stance in order to expand its education system and to achieve social and economic development (Bray 1981).

The 1981 National Policy on Education states that the process of educating should instill a spirit of national unity, bestow values and attitudes that are important for survival in Nigerian society, expose children to worldwide cultures and ways of life, 4) equip them with the skills and competencies that would contribute to the country's development (National

[9]See Bray (1981), National Education Policy (1981), Ozigi and Ocho (1981), and Obasi (1997).

Education Policy 1981). It also makes mention of remedying the country's past educational inequality with regard to girls and rural children (National Education Policy 1981).

In 2004, a new educational program called the Universal Basic Education (UBE) was enacted. It departed from its predecessor, UPE, in some key ways. First, it made school attendance compulsory. Specifically, it stipulated that all levels of government must provide children with free, compulsory and universal basic education for nine years – six years of primary and three years secondary school (Ejieh 2009). Second, the UBE put the onus on parents who must register their children for school and ensure that their children complete the basic education cycle. Third, it established penalties for parents who failed to abide by this law (Ejieh 2009).

Elements of these policy initiatives illustrate the government's ongoing recognition of the challenges it faces in achieving its educational goals and reducing inequalities in this regard. These concerns are well founded. Indeed, data from the 2003 Demographic and Health Survey (DHS) indicate that the country's primary school net attendance rate (NAR)[10] is a relatively low 60 percent, and that this overall rate masks considerable inequality by gender, residence and wealth. The NAR is 64 percent for boys and 56 percent for girls (Huebler 2005). Similarly, the rate is 70 and 56 percent in urban and rural areas, respectively (Huebler 2005). More glaring, children from the richest households have an 83 percent net attendance rate, while the net attendance rate for those from poorest households stand at 40 percent (Huebler 2005). Moreover, UNESCO (2008) reports that there is a growing educational disparity in children's school enrollment in the country that is mainly geographic, socioeconomic, and gendered in nature – working to the disadvantage of rural children, poor children and girls. Specifically, UNESCO (2008) report found that the majority of children who have never attended school in the country are children from the poorest households (UNESCO 2008). Socioeconomic and geographical inequalities in children's schooling in the country are the largest for Nigerian women and girls. At the national level, the literacy rate is 56 and 73 percent for women and men, respectively (UNICEF 2006, 1). Within the country, females fair particularly poorly in some states, mainly in the north. In the northern state of Sokoto, for example, the net enrollment rate[11] for girls is 15 percent, which compares to 59 percent for boys. Similarly striking, UNESCO (2008, 62) indicates that "in Kaduna state, 48 percent of girls from the poorest 20 percent of households have never attended [school], compared with 14 percent in the richest quintile." Such disparities, along with Nigeria's ignoble distinction of having the highest number of school age children who are not in school of any country in sub-Saharan Africa (UNESCO 2008), suggest that Nigeria is a logical and critically important setting in which to investigate the role of gender, residence, and socioeconomic status on school attendance.

[10]The primary school net attendance rate (NAR) is calculated as the number of children of primary school or higher divided by the total number of children of primary school age (UNESCO and UNICEF 2005).

[11]The net enrollment ratio is calculated as the number of children who are enrolled in primary school and who belong to the age group that officially correspond to primary schooling, divided by the total population of children of same age (UNICEF, 1999).

Conceptual Framework

Our conceptual framework rests on multiple theoretical perspectives. A major perspective that has been used to explain the decision by families or households to educate their children is the household production framework proposed by economists.[12] This framework emphasizes that it is parents who make investment decisions – including the education of children – which affect all members of the household. Their first goal is to maximize the resources of all their family members, and afterwards they make decisions on how to reallocate the same resources among family members based on their own preferences (Becker and Tomes 1979; Buchmann 2000). Parents are presumed to be concerned with wealth maximization when making decisions about their children's schooling. The educational investment that parents make about the schooling of each member of their household – especially children – is guided by expected differences in future returns to schooling from each child.

In many developing societies, the labor market discriminates against females by restricting their access to employment and/or paying them a lower wage in contrast to males.[13] This may compel parents to favor the education of sons over daughters because of the perceived financial reward in doing so. Furthermore, given that many developing countries do not have pension plans, parents may consider educating the child who has the greatest odds of providing for them in old age (Huisman and Smits 2009). They may envision that the future expected return or remittances for educating sons rather than daughters is certain or greater because sons' loyalty will remain to their biological family (Colclough et al. 2000; Glick and Sahn 2000). These assumptions may not be correct. Scholars such as Parfait M. Eloundou-Enyegue and Anne Emmanuèle Calvès (2006) find that in sub-Saharan Africa daughters remit more to their parents than sons, and that as their level of education rises remittances to their parents increase substantially.

The household production framework can also help explain differences between the education of children in urban and rural areas. Perhaps the schooling of rural children lags behind their urban counterparts because rural parents may not see how their children's education will be put to use in their local labor market (Huisman and Smits 2009). In rural areas of developing societies where agriculture is the dominant employment sector, parents may not seek education for their children because prevailing employment opportunities do not require it.[14] In addition, rural parents in developing nations might worry that formal schooling may lead to the out-migration of their children to urban places (Lakin and Gasperini 2003). Furthermore, in rural areas of various developing societies, parents may be hesitant to send their children to school when roads and infrastructure are for the most part not good (Lewis and Lockheed 2006). The costs of travelling may be seen as too burdensome for their children and they may be less willing to send them to school (Huisman and Smits 2009).

[12]See Becker (1968), Becker and Tomes (1976), Becker (1991).
[13]See Buchmann (2000), Glick and Sahn (2000), Lewis and Lockheed (2006), Huisman and Smits (2009).
[14]See Buchmann and Brakewood (2000), Colclough et al. (2000), and Huisman and Smits (2009).

The household production framework can also inform class disparities in educational attendance and attainment. In poor households, parents may not send their children to school if the direct cost of educating their children is too great. In many developing countries these costs often include school uniforms, text and exercise books, and parent-teacher association fees (Colclough et al. 2000; Huisman and Smits 2009). In addition, poor households may view child labor as an important income source (Basu 1999). They may perceive education as competing with children's time to participate in child labor activities either in the market place or in the household, and for that reason they may not send their children to school, but rather send them to work.[15] As Buchmann (2000, 1352) concludes from her research in Kenya, "poor families cannot afford to act on calculations of future returns to education if doing so jeopardizes immediate family welfare.… [T]he allocation of children to productive activities in the home or labor market is a common survival strategy for poor families." Thus, in poor families, children may not be sent to school because of insufficient financial resources.

The arguments within the household production framework can also inform how gender interacts with poverty to produce inequality in children's education. Within this framework, the premise for why parents, regardless of their socioeconomic status, make the decision to discriminate against daughters in terms of educational investment is based on the notion that females face discrimination in employment and pay in the formal labor market. There is also the presumption that the expected return from educating daughters is often enjoyed by their marital homes instead of their biological families who made the initial investment. This concern is exaggerated among poor families, given their inability to pay for both the direct and indirect costs of their children's education and their greater reliance on children for labor in the market and/or in the home. More broadly, previous research shows that in developing countries there is a greater tendency for girls to be discriminated against in poor families than in rich families (World Bank 2001), an implication being that the economic pressures of poverty toll more heavily on girls.

The household production framework highlights the importance of family economics in children's schooling decisions. However, this framework is not particularly effective in incorporating the influence that local culture exerts on these decisions. Cultural differences may offer an additional explanation regarding parental decisions that seem irrational on economic grounds. In Nigeria and Kenya, proponents of the cultural argument suggest that religious values and patriarchal norms often affect education decisions, frequently to the detriment of girls.[16] Researchers suggest that in Kenya and Malawi, patriarchal lineage and its preference for male children are at the heart of the gender disparity in school participation, which is also apparent in other parts of sub-Saharan Africa (Davison and Kanyuka 1992; Buchmann 2000). In that region, patriarchy prescribes socially constructed roles for women, which specify that their role in life is wife and mother. In a focus group discussion and in-depth interviews in Nigeria (Aderinto 2001), for instance, patriarchal lineage is found to govern all aspects of women's lives, both within the family and in the public domain. This qualitative research shows that women are subjected to many forms of

[15]See Basu (1999), Buchmann (2000), and Colclough et al. (2000).
[16]See Csapo (1981), Buchmann (2000), and Buchmann and Hannum (2001).

male authority, control, and decision making, as men use their dominant position in both the public and domestic spheres (Aderinto 2001).

There are numerous ways through which women are subordinated in Nigeria. There is a superior-subordinate relationship that exists between men and women within the family and the society at large in which women are expected to take care of the domestic sphere while men provide for families' financial needs (Aderinto 2001). Furthermore, they are required to be fertile and, more importantly, bear sons instead of daughters (Aderinto 2001; Ozo-Eson 2008). This attitude is based on the belief that male children are more valuable than their female counterparts because they carry their fathers' names and have the right to their families' property (Ozo-Eson 2008).

A similar rationale is given for favoring the education of boys over girls in Nigeria. Families give their daughters away in marriage at an early age to release themselves from the financial burden of educating them (Aderinto 2001; Csapo 1981). In fact, when their daughters are still at home, they are expected to perform household chores and to cater to the needs of men and others within households (Aderinto 2001). This practice is more prevalent in rural Nigeria. In a focus group discussion, it was found that there is a common belief in Nigeria that educating girls is, in general, a waste of family resources because their future entails marriage, motherhood, and/or being confined to the domestic sphere (Aderinto 2001; Ozo-Eson 2008). Formal schooling is not necessary for women to realize their social roles as wives and mothers.[17]

In theorizing about gender differences in children's education in sub-Saharan Africa, explanations suggested by the household production framework and by the cultural perspective complement each other. Both theoretical perspectives provide an economic rationale for why families discriminate against daughters about education. Both frameworks indicate that a major reason why families discriminate against daughters in education is uncertainty about future returns from the investment. Given labor market discrimination and the presumed allegiance that daughters have to their marital homes, many families (especially among the poor) do not believe that it is wise to invest in their daughters' education. Thus, we hypothesize that 1) boys are more likely than girls to attend school,[18] and 2) the penalty of being a girl for school attendance is greater among poor households.

We posit that both economic and cultural factors are important in Nigeria. The household production framework alone cannot be used to understand Nigerian children's schooling. The country is a male-dominated society with cultural beliefs that promote the social, economic, and educational advancement of males over females. In addition, we expect that religious values will play an important part in the schooling of children, especially girls. Research in sub-Saharan Africa has found that children of Christian parents have more years of schooling than children with Muslim parents (Buchmann 2000). In Northern Nigeria, many Muslim households and families resist sending their children, in particular girls, to formal educational institutions because they believe that formal education is an essentially

[17]See Csapo (1981), Davison and Kanyuka (1992), and Buchmann (2000).
[18]The level of observation throughout this paper and the units of analysis consist of children who were or were not attending school during the 2003–2004 academic year.

Christian social institution (Csapo 1981). In Northern Nigeria, girls especially are prevented from attending school because their households and families believe that formal education interferes with the traditional Hausa (the dominant tribe in Northern Nigeria) way of life and Islamic teaching, which promote the seclusion of women from the outside world (Csapo 1981). Many families interpret this to mean that their daughters should not leave their household to attend school or to participate in the public sphere. Traditional African religions hold a distinct view on children's education based on the sex of the child and/or their age (Mazonde 2010). Specifically, there is division of labor to the type of education that children can obtain, which is gendered in nature. The values within the traditional African religions endorse the preparation of girls for domestic roles and it teaches them how to take on this role as adolescents and mothers through play and informal education. Formal education thus is not presumed as necessary for girls to meet this adult role (Mazonde 2010). Therefore, we expect that children whose parents' religion is Christianity are more likely to be attending school than Muslim children or adherents to other traditional religions, and the lower odds of school attendance among children with parents who are Muslim or other traditional religion vis-à-vis Christian will be especially apparent for girls.

In sub-Saharan Africa, research has found that children who live in urban areas have higher levels of schooling than children in rural areas.[19] In developing countries, urban children have greater access to schools (Lakin and Gasperini 2003) because of shorter travel time to school and more transportation options, among other factors (Lloyd 2005). The availability of transportation in urban areas reduces travel time and the physical burden of traveling to school. The reduction in travel time, living near a school, and access to public transportation may all contribute to greater school attendance rates for urban children. Researchers such as Michael Lakin and Lavinia Gasperini (2003), Maureen A. Lewis and Marlaine E. Lockheed (2006), and Janine Huisman and Jeroen Smits (2009) suggest that in rural areas of developing countries, girls' attendance is particularly sensitive to travel time because of parental concerns about safety and sexual harassment.

In developing countries, another explanation of why urban residence leads to higher school attendance is that families who live in urban areas are also likely to have greater exposure to mass media. Mass media present information about diverse issues such as how children and youth elsewhere in the world live and the types of life-fulfilling activities (i.e., formal schooling) that they pursue (Lloyd 2005). Finally, urban families tend to have higher incomes and greater wealth than rural families, factors that consistently influence school attendance in developing countries. In a survey conducted in rural areas of India, Lakin and Gasperini (2003) find that the main reason that rural parents give for why they never enroll and/or stop their children from attending school is their inability to pay for the direct costs of their education. Moreover, globally, children's labor contributions to the family income are thought to be greater in rural areas and thus compete with school attendance for children's time (Edmonds and Pavcnik 2005).

In many developing countries, another explanation for the differences in urban and rural children's education is the reluctance of rural parents to encourage greater educational

[19]See Hollous (1991), Townsend et al. (2002), and Eloundou-Enyegue and Calvès (2006).

attainment for fear that it will lead to children's out-migration to the city (Lakin and Gasperini 2003). But, this fear would be mitigated somewhat if parents could count on remittances. Educational advantages among urban children may also be rooted in the fact that urban labor markets feature greater demand for skilled and educated workers. This expectation may encourage urban parents to educate their children. Quite the opposite is true of parents in rural settings, where employment opportunities that value formal schooling are less prevalent. Lakin and Gasperini (2003, 89) state that "when school learning is perceived to be irrelevant to rural life and likely to draw children to the city, parents may see no point in sending their sons and especially their daughters to schools." We expect that: 1) children who live in urban areas are more likely than their rural counterparts to be attending; 2) the greater the distance to school, the lower the likelihood that children are attending school; 3) rural residence will reduce school attendance more so for girls than boys; and 4) the travel distance to school will have a greater negative effect on school attendance for girls than boys.

Research shows that in developing countries parents' education has a positive relationship with their children's education.[20] In sub-Saharan Africa, research has shown that children who are born into families with greater financial resources are more likely to be enrolled or stay in school than children whose families have fewer financial resources.[21] One explanation is that educated parents have more economic resources to invest in their children's education than do uneducated parents. In developing countries, educated parents are more likely than parents with little or no education to be aware of the personal prestige, formal employment opportunities, and social mobility that formal schooling affords (Huisman and Smits 2009). In southern Nigeria, this knowledge leads educated parents to place a greater personal value on education for their children (Hollos 1991).

Previous research in developing countries[22] also indicates that a mother's education, especially at the secondary education and above, proves more important in increasing the school enrollment and years of education of daughters than a father's education because educated mothers have the bargaining power to direct household resources into their children's, especially daughters', education (Glick and Sahn 2000). Moreover, educated mothers are willing to educate their daughters because they are aware of the social benefits that formal education confers upon the individual, and well educated mothers may be a particularly select group – having themselves overcome barriers to education – further increasing the impact of mother's education (Huisman and Smits 2009).

In developing countries, empirical research also indicates that children from wealthier households have a greater likelihood of being enrolled in school, and they have more years of schooling than those from poor households.[23] Wealthy households have the ability to pay for the direct costs of schooling, such as school uniforms, books, and fees. In addition,

[20]See Fuller et al. (1995), Knodel and Jones (1996), Lloyd and Blanc (1996), Buchmann and Brakewood (2000), Colclough et al. (2000), Glick and Sahn (2000), Ersado (2005), and Huisman and Smits (2009).
[21]See Fuller et al. (1995), Lloyd and Blanc (1996), and Buchman (2000).
[22]See Lloyd and Blanc (1996), Lewis and Lockheed (2006), and Huisman and Smits (2009).
[23]See Filmer and Pritchett (1999), Filmer (2000), Buchmann and Hannum (2001), Lloyd (2005), Lewis and Lockheed (2006), and Huisman and Smits (2009).

children from wealthy families are less likely to be prevented from attending and/or withdrawn from school for child labor activities (Basu 1999; Huisman and Smits 2009). Thus, we posit that: mother's education, father's education, and household wealth will all positively impact the likelihood that children will attend school. Moreover, we expect that among girls, mother's education, particularly secondary education and above, will have a greater positive impact on school attendance than that for father's education at the same level.

We also examine the effect of parental attitudes[24] toward formal education on children's educational attainment, and we hypothesize that children, especially girls, whose parents value child labor and boys' (over girls') schooling will be less likely to attend school than their counterparts whose parents do not hold such beliefs. Scholars warn that the process of observing individuals' attitudes is not easy because attitudes are abstract and within the mental locus of people (Delamater 2000). In an attempt to study people's attitudes on various subjects, researchers use either direct or indirect methods to observe or gain knowledge about their attitudes. In the direct method, individuals are asked questions about their attitudes on one or more objects, and the researcher records the answers that they provide. With the indirect method, the researcher records people's attitudes by observing their behaviors or reactions to particular concepts. In addition, with the indirect method, the researcher learns about people's attitudes by not fully disclosing to the respondents what is being measured (Delamater 2000).

Attitudinal measures capture a different array of influences than those immediately suggested by the household production framework. The latter is strictly concerned with wealth maximization and future expected returns from investments in children's education. On the other hand, attitudes toward education often are rooted in cultural traditions and can be non-economic in nature. Quite often, people develop their attitudes or belief systems from their religion, social class affiliation, economic position, education, and/or parents. Accordingly, we include measures of attitudes along with these other key correlates of school attendance.

Research in sub-Saharan Africa has shown that later-born children are more likely to attend school, complete their education, or be enrolled in school than earlier-born children.[25] It is important to note that sibship size and number of children in the household have been found to have independent effects on children's schooling (Chernichovsky 1985; Lloyd and Gage-Brandon 1994). The number of children in the household may include children who are fostered into a household but are not siblings of the other children. This is because earlier born children may be called upon to support – directly or indirectly – some of the costs of their younger siblings' education (Buchmann and Hannum 2001). The educational attainment of earlier-born children may be cut short because of the need to contribute to

[24]While our modeling assumes that parental attitudes have an impact on children's school attendance, we recognize that some parents might give answers to attitudinal items so as to rationalize their children's school attendance or lack thereof, implying that obverse causal order may be at play. Lacking panel data, there is no clean way to attack this problem empirically. We feel that attitudes about education are formed early in life and are thus set before decisions regarding children's school attendance are made, and we follow other cross-sectional research in retaining parental attitudes as predictors of school attendance (Fuller et al. 1995; Buchmann 2000). Our results should be interpreted with that caveat in mind.

[25]See Gomes (1984), Lloyd and Gage-Brandon (1994), Fuller et al (1995), Buchman (2000).

households through participation in formal labor market or through domestic duties. In particular, research in Ghana shows that girls who have younger siblings have a lower probability of ever being enrolled in school than boys who have younger siblings (Lloyd and Gage-Brandon 1994). In northern Nigeria, earlier-born girls' education is hindered because their parents may need their help in caring for younger siblings while they are at work (Pittin 2002).

Apart from birth order, research in sub-Saharan Africa suggests a positive relationship between number of children in a household and school enrollment (Chernichovsky 1985). This is because additional children can provide the extra income and hands needed for performing domestic duties. Research in developing countries also indicates, however, that a greater number of children in a household lowers the probability that children attend school because increases in the number of children put a strain on available household resources. Thus, we hypothesize that: 1) children who have older siblings are more likely to attend school than children who have younger siblings. Moreover, the sex composition of the sibling-set is posited to affect school attendance; 2) female children with younger siblings are expected to be less likely to attend school than those without younger siblings; 3) Having younger siblings will decrease school attendance of girls more than boys; and 4) in addition, apart from these effects of sibship structure, number of total children in the household will reduce school attendance.

Data and Methods

To test our hypotheses we conducted descriptive and multivariate analysis of data from the 2004 Nigeria EdData Survey (NDES). The data were collected by the National Population Commission [Nigeria] and ORC Macro (2004). The 2004 NDES is a nationally representative face-to-face survey that focuses on the nature and correlates of children's education. Here, we detail the data and our analytic methods.

Data

The households interviewed for the 2004 NDES were drawn from the 2003 Nigeria Demographic and Health Survey (NDHS) sample. The sample procedure for 2003 NDHS utilized the list of enumeration areas (EAs) that was constructed for the 1991 Population Census. The EAs are categorized by states and, within each state, local government areas. Local government areas (clusters) are stratified according to whether they are urban or rural, with the latter being those with less than 20,000 residents. In total, 365 clusters were selected – 165 urban and 200 rural. Of these, 360 clusters were utilized for the 2004 NDES. In total, the 2004 NDES sampled 4,563 households with children aged 4 to 16 present, and was successful at interviewing 4,268 of these, for a response rate of over 90 percent. Parents/guardians were asked individual survey questions on each present child aged 4 to 16. In total, survey questionnaires were completed on 9,695 children. The 2004 NDES consists of a household questionnaire, a parent/guardian questionnaire, an eligible child questionnaire (which asks parents/guardians about their present children), and the independent child questionnaire. The latter was administered to children aged 13 to 16 who did not have parents or guardians who could answer questions about their schooling. To be

eligible for the independent child questionnaire, children must either be the head of their household, or the spouse, son-in-law, or daughter-in-law of the household head. These children were asked the same questions about themselves that were asked of the parents/guardians in the eligible child questionnaire.

The eligible child questionnaire contains items about children's schooling status, including whether they attended school during the 2003–2004 school year, whether they dropped out of school, or if they never attended school. This questionnaire also asks about their household expenditures on schooling, the reasons why children may have missed school for a long period, reasons for school drop out, and other items related to school attendance. The sample is not self-weighting. We divide the weight provided in the eligible child questionnaire by its mean to yield a weighted N approximately equal to the sample size.

The parent/guardian questionnaire collects background information on the parent or guardian's age, education, and religion, as well as information on distance to schools and attitudes about formal education for children. They were also asked questions about the kind of schools their children attend and why they attend a particular school. For convenience, hereafter we use the term "parents" to refer to "parents or guardians."

The household questionnaire was used to verify that the household was the same one surveyed in the 2003 NDHS, to identify the children who were qualified for the eligible child questionnaire, and to identify those for whom anthropometric and literacy/numeracy data were needed. The socioeconomic status variable we use here, the household wealth index, was derived from the household questionnaire.

Dependent Variable

School attendance is constructed from this following question: "Has (Name) attended a formal school at any point during the current school year [2003–2004]?"[26] This variable was coded 1 to indicate attendance, and 0 otherwise. We recognize that the phrasing of this question means that a child coded 1 might have since dropped out; it should not be construed as a measure of current attendance.

Independent Variables

Definitions of variables and descriptive statistics for all variables are given in Appendix Tables A and B. Beginning with the key variables of gender, residence, and socioeconomic status, the measures for the children's and their parents' characteristics are operationalized as follows. The sex of child is coded 1 for males and 0 for females. The place of residence is coded 1 for urban and 0 for rural. A household wealth index was constructed by the NDES based on ownership of a radio, television, paraffin lamp, bicycle, motorcycle/scooter, and car/truck, as well as items about lighting, water and fuel sources, sanitation facilities, and floor material. These items are combined into an asset score that we divided into quintiles of economic status. Households in the lowest quintile serve as the reference category.

[26]Formal schools were defined by those constructing the survey to be those following a Western-style approach and curriculum. Children attending Koranic schools are not included in this definition or our analysis.

We control for children's age, trichotomized as ages 4 to 8 years (the reference group), 9 to 12 years (age2), and 13 to 16 years (age3). Other control variables include parental education, which is measured separately for mothers and fathers using the dummy variables of no education (reference), incomplete primary, complete primary, incomplete secondary education, and complete secondary or higher education; distance to schools, measured by the walking time in minutes to the nearest primary and secondary school and dichotomized into those who lived less than twenty minutes away (coded zero) and those who lived twenty minutes or more away (coded one). In addition, the control variable of total number of children in a household was derived by calculating the number of individuals in the household who were below age 18. This variable is entered into the analysis in continuous form. The sibship size variable was separated into four distinct groups of older brother, younger brother, older sister, and younger sister. Within each group of child's sibling sex composition three dummy variables were created denoting that a child has zero (reference), one, or two or more siblings in each category. Religion is trichotomized into Islam (reference), Christianity, and traditionalist or other religion. Finally, two attitudinal variables were used to capture parental attitudes toward school. These variables were coded 1 (and 0 otherwise) if parents agreed that 1) children should be kept home for work or housework, whenever necessary, or that 2) it is more important for a boy to attend school than a girl[27].

Model Estimation Techniques

Logistic regression analysis is used to estimate the impact of the explanatory variables on current school attendance. The logistic model allows us to estimate the effect of various independent variables on the log odds that a child is attending school. Hence, the dependent variable in this logistic model is binary response, and we model the log odds of attending school.

The equation used to estimate regression coefficients for attending school is:

$$\mathrm{In}(\mathrm{p}/(1-\mathrm{p}))=\mathrm{b0}+\mathrm{b1X1}+\mathrm{b2X2}+\mathrm{b3X3}+\ldots.+\mathrm{bkXk} \quad (1)$$

where p denotes the probability of school attendance and the left-hand side of the equation refers to the natural logarithm of the odds (the log odds or "logit") of school attendance, and where the b's are parameter estimates corresponding to the effects of the independent variables (the x's).

Findings

School Attendance

Models of school attendance are shown in Table 1. Here we focus on the effects of gender, residence, and socioeconomic status. The results indicate a clear gender gap in current school attendance among Nigerian children whereby male children are consistently and significantly more likely to be attending school. This finding holds across all models that control for place of residence, child's age, parental education, time to nearest school, socioeconomic status, sibship size, religion, and parental attitudes toward school. Model one

[27]Appendix Tables 1 and 2 provide the mean and frequency distribution, respectively, of all the variables in the analysis.

shows that other things being equal, the odds for boys to attend school are 84 percent greater than girls' odds.

Briefly looking through the sequence of models, Model 1 also includes residence, child's current age, mother's and father's education, and travel time to the nearest primary and secondary schools. The parameter estimates for all of these variables are statistically significant and in the expected direction. The odds that urban children would attend school are 65 percent greater than rural children's. Children who are aged 9–12 and 13–16 have 3.23 and 2.53 greater odds of school attendance when compared to those in the youngest age group (4–8)[28]. Children whose mothers have at least some primary education are significantly more likely to attend school than children whose mothers have no education, and the effects increase monotonically with mother's education. At the extreme, children whose mothers completed secondary or higher education are over 14 times more likely to attend school than those whose mothers have no education. Father's education shows similar but weaker effects on school attendance. The difference in magnitude for mother's and father's education suggests that in the Nigerian context, mother's education has a particularly strong effect on children's current school attendance. Results in Model 1 one also indicate that living 20 or more minutes from the nearest primary school reduces the odds of school attendance by 27 percent compared to children who live closer. In the case of the distance to the nearest secondary school, living 20 or more minutes away reduces the odds of school attendance by 52 percent.

Model 2 adds the household wealth index as this may account for some of the effect of parental education and rural residence. Household wealth has a large positive and significant effect on children's school attendance. Nigerian children in the richest quintile of households have six times greater odds of attending school than those from the poorest households. That the impact of gender is much smaller in magnitude than those of the wealth categories is consistent with the findings of John Knodel and Gavin W. Jones (1996) and Maureen A. Lewis and Marlaine E. Lockheed (2006) who conclude that socioeconomic disparities have a greater influence on children's educational attainment than gender disparities in many regions of the world.

With household wealth controlled, the effect of residence becomes insignificant, suggesting that the economic deprivation of rural families largely accounts for the lower prevalence of school attendance among their children. The inclusion of the wealth variable also led to attenuation in the effect of mother's education, especially at the higher end. For example, the odds ratio for mothers with secondary or higher education (compared to none at all), decline from 14.2 to 8.8 when the wealth variable is included in Model 2. This decrease suggests that some of the influence of mother's education is due to the higher socioeconomic status of well-educated mothers.

The inclusion of child's sibling sex composition and the total number of children in the household in Model 3 had little impact on the estimates for the variables already in the

[28]As the compulsory school age in Nigeria is age 6, we also ran a separate analyses that excluded the 4- and 5-year olds. The pattern of results was the same, although the significance of the coefficient for the oldest age group slipped below significance, suggesting those aged 13–16 did not differ in their odds of school attendance when compared to those aged 6–8.

model. Indeed, the total number of children in the household had no significant impact on children's current school attendance. However, the results for sibship size show that having at least one older brother or two or more older sisters increases the odds of school attendance. Children who have two or more older brothers have 40 percent greater odds of attending school than children who have no older brothers. Similar results emerge for children who have two or more older sisters. This is regardless of whether older brothers/sisters attend or have attended school. The odds ratios on the younger siblings of either gender are not statistically significant. Thus, it is inconclusive that having younger siblings is detrimental to children's current school attendance in Nigeria.

Results from Model 4 suggest that Christian children are five times higher more likely to attend school than Muslim children. Indeed, while only marginally significant, even children of traditional and other religions are twice as likely as Muslim children to attend. The inclusion of religion further attenuated the effects of parental education, especially for mothers who completed secondary and higher education the effect of which halved (from 9.22 to 4.33). Some of the effect of mother's education reflects the tendency for Christian women to be well-educated, which itself has a positive effect on attendance.

Parental attitudes toward education are added in Model 5. As noted, these coefficients should be interpreted with caution in terms of causality, as some parents may – through their responses to attitudinal items – be rationalizing past decisions regarding their children's school attendance. With this caveat in mind, we note that children of parents who agree that children can be kept home for work or help if necessary have 23 percent lower odds of attending school. Similarly, children of parents who agree that boys' schooling is more important than that of girls have 45 percent lower odds of attending. A provocative implication is that parental gender bias poses a greater threat to children's schooling than parental attitudes on children's labor contributions. The inclusion of these two variables led to a minor attenuation in the effects for mother's education, father's education, wealth index, and religion.

Our concern is with educational inequalities by gender, residence, and socioeconomic status, and Table 1 has confirmed disadvantages for girls, rural residents, and those with less wealth. To explore these findings more deeply, we estimate models separately for boys versus girls, urban versus rural residents, and poor versus non-poor children. The intent is to uncover differences in the effects of other variables on school attendance. We test for the significance of these differences by running full interaction models between gender, residence and status, respectively, and the other variables in the model. We then re-estimate group-specific models the coefficients for which appear in Appendix Tables C, D, and E, with daggers denoting significant differences in coefficients between groups. Here we highlight just those differences that are significant and meaningful.

Several interesting gender differences emerge. Girls are disproportionately advantaged by having a mother with an incomplete primary education, having two or more older sisters, and being Christian. That is, the beneficial effects of these characteristics for school attendance are greater for girls than boys. To our surprise, there is no difference in the effects of mother's education at the incomplete secondary and secondary and higher

education levels on both girls and boys' attendance. On the other hand, a traveling time of 20 or more minutes to the nearest secondary school poses a greater obstacle to girls' school attendance. Finally, age effects are significantly greater for boys, suggesting a cohort difference in attendance by gender. Also surprisingly, there is no difference in girls' and boys' attendance by household wealth quintiles in the country. Thus, it is inconclusive that girls face a disproportionate penalty as household wealth declines. We also do not find any evidence that parental attitudes about child labor or about the pre-eminence of boys' schooling decreases girls' attendance more so than boys'. It could be, therefore, that it is not gender attitudes per se that are at play, but rather the kinds of parents that hold particular attitudes.

While our substantive focus is on gender interactions, we also sought to determine differences by residence and wealth in the determinants of children's school attendance. Being a child of a mother with incomplete primary education (vs. no education), belonging to the third wealth quintile (vs. the lowest), and having two or more older sisters (vs. no older sisters) increases school attendance more for rural than urban children. A travel time greater than 20 minutes (vs. fewer minutes) has a greater detrimental effect for rural than urban children. Finally, the increase in school attendance with age (being 9–12 versus younger) is much stronger in urban than rural areas.

To assess differences in the determinants of school attendance by socioeconomic status, we compared the first and second wealth quintiles (somewhat arbitrarily designated "poor") to the third and higher quintiles ("non-poor"). Being aged 9–12 (versus younger) and having a father with complete secondary or higher education (vs. none) increases the likelihood of school attendance more for non-poor than poor children. On the other hand, the positive effect on attendance of being in a Christian household is greater among the poor. Finally, living 20 or more minutes to the nearest primary and secondary schools poses a greater obstacle to school attendance among poor children.

Conclusions

Children's schooling contributes importantly to the social and economic development of nations (Lloyd 2005). Increasing rates of school enrollment and retention, along with the elimination of gender disparities in education are important components of the Millennium Development Goals.

Our findings demonstrate that both gender and parental socioeconomic status have significant impacts on school attendance. Although gender is an important determinant of school attendance, indicators of household socioeconomic status – household wealth and mother's and father's education – are more important. Mother's education is more important than father's education, but neither has the impact of household wealth. Children from the wealthiest quintile were seven to nine times more likely to be enrolled than those from the poorest quintile. Thus, one answer to the basic question posed in this paper as to whether gender, place of residence, or socioeconomic status are more important is quite clear: socioeconomic disparities in school attendance are several times larger than those by gender.

Studies from a number of nations have found large differences in the school enrollment rates of rural and urban children with the disadvantage falling disproportionately on rural children.[29] The rural disadvantage in Nigeria is almost wholly accounted for by differentials in household wealth. Urban labor markets require a better educated labor force, which attracts people who are educated and offer jobs at higher salaries. Although urban children were much more likely to be enrolled than rural children in the simplest model, this difference disappeared completely once household wealth was controlled. This finding held even with travel time to the nearest primary or secondary school controlled, indicating that rural/urban differences in school enrollment were not simply a function of urban residential propinquity to schools.

Consistent with findings from earlier research, children from Christian households are much more likely to be attending school than Muslim children (Csapo 1981; Buchmann 2000) and the influence of religion on school attendance is second in importance only to household wealth. Sibship size was not related to school attendance, while sibling composition exerted modest effects in different directions for younger brothers in comparison to older sisters. Finally, two indicators of parental attitudes were used to measure cultural factors influencing school attendance. Again, with caution in view of questions about causality noted above, we find that children of parents who felt it acceptable to keep children home from school to work or help out around the household were less likely to be enrolled. Similarly, children whose parents regarded boys' schooling as more important than girls' schooling were only about half as likely to be enrolled as children whose parents disagreed with this statement. Thus, traditional parental attitudes with regard to gender were slightly more influential than those regarding children's labor contributions. Because parental attitudes with regard to gender exert a larger negative impact on children's schooling in comparison to their attitudes toward children's labor contribution, policies need to be directed at parents that stress the importance of education for both their sons and daughters. The mass media can be used to reach parents about the importance of girls' education. Another policy that can address children's labor contributions and their role in retarding schooling attendance is one that would reward parents with some form of compensation for allowing their children to attend school. One type of compensation that has been tried elsewhere is in the form of food provided to children while in school (see Duraisamy et al. (1997) on India; Ahmed and del Ninno (2002) on Bangladesh). In Bangladesh, the school enrollment of children increased once their households were offered monthly food rations by the Food for Education subsidy program.

The evidence also shows that Christianity, having two or more older sisters, and mother's education (at the incomplete primary level) present girls' with a schooling advantage. However, distance away from a secondary school hinders Nigerian girls' schooling. In the residence specific model, rural children face a schooling disadvantage by residing more than 20 minutes from a primary school, but their chances of attending school rise by having a mother with incomplete primary education and by belonging to the middle household wealth quintile. The schooling of poor children is hampered when they live away from primary and

[29]See Lloyd et al. (2000), Ersado (2005), and Eloundou-Enyegue and Calvès (2006).

secondary schools. Thus it is clear that distance to school is another constraint to schooling among girls, rural children, and poor children. An obvious policy option is to situate new schools closer to where these disadvantaged children reside, thus reducing the average travel time between home and school for these children (see Glick 2008). The household production framework was used to inform our understanding of how gender intersects with poverty to produce inequality in children's schooling in Nigeria. The evidence from the group specific models do not support the widely held belief that girls from poor households are doubly disadvantaged with regard to school attendance. Rather, it is inconclusive that the penalty for being in a poor household is greater for girls than boys. This finding for Nigeria departs from previous research in developing countries which suggests that poverty decreases enrollment or attendance more for girls than boys (Filmer 2000; World Bank 2001). Furthermore, the gender specific model provides support for the presumption that religious values have special ramifications for girls' schooling. We find that Christians are more likely to attend school, and that this is particularly so among girls.

Nigeria clearly has a challenge in increasing school enrollment rates and eliminating gender and socioeconomic disparities in school attendance. Policies and programs should focus on socioeconomic factors retarding the schooling of children from lower socioeconomic segments of the population. Similarly, special efforts may be required to encourage parents to educate their daughters as well as their sons. The large Muslim populations in the northern part of the country may require different forms of public education such as sex segregated primary and secondary schooling if gender differences in education are to be eliminated.

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Appendix

Appendix Table A

Definitions of Variables and Means (Standard Deviations)

Variable name	Definition	Mean
Individual characteristics		
Male	Child is male	0.52 (0.49)
Female (Ref.)	Child is female	0.48 (0.49)
Urban	Child lives in an urban area	0.31 (0.46)
Rural (Ref.)	Child lives in a rural area	0.69 (0.46)
Age 9–12	Child is bewteen the age of nine and twelve	0.35 (0.47)
Age 13–16	Child is bewteen the age of thirteen and sixteen	0.22 (0.41)
Age 4–8 (Ref.)	Child is bewteen the age of four and eight	0.43 (0.49)
Household characteristics *Mother's Education*		
Zero education (Ref.)	The child's mother has never attended school	0.58 (0.49)
Incomplete Primary	The child's mother has not completed primary school	0.08 (0.27)
Complete Primary	The child's mother has completed primary school education	0.15 (0.35)
Incomplete Secondary	The child's mother has not completed secondary school	0.10 (0.30)
Complete Secondary	The child's mother has completed secondary school	0.08 (0.28)
Father's Education		
Zero education (Ref.)	The child's father has never attended school	0.44 (0.49)
Incomplete Primary	The child's father has not completed primary school	0.12 (0.32)
Complete Primary	The child's father has completed primary school education	0.14 (0.34)
Incomplete Secondary	The child's father has not completed secondary school	0.12 (0.32)
Complete Secondary	The child's father has completed secondary school	0.15 (0.36)
Wealth index		
Poorest (Ref.)	Household ranked in the first quintile of wealth	0.23 (0.42)
Poorer	Household ranked in the second quintile of wealth	0.22 (0.41)
Middle	Household ranked in the three quintile of wealth	0.20 (0.40)
Richer	Household in the fourth quintile of wealth	0.18 (0.38)
Richest	Household in the fifth quintile of wealth	0.16 (0.36)

Variable name	Definition	Mean
Distance to School		
Time to the nearest primary school in community		
< twenty minutes (Ref.)	Child lives less than twenty minutes from the nearest primary school	0.76 (0.42)
>=twenty minutes	Child lives at least twenty minutes or more from the nearest primary school	0.23 (0.42)
Time to the nearest secondary school in community		
< twenty minutes (Ref.)	Child lives less than twenty minutes from the nearest secondary school	0.29 (0.45)
>=twenty minutes	Child lives at least twenty minutes or more from the nearest secondary school	0.71 (0.45)
Sibship Size		
Zero Older Brothers (Ref.)	Child has no older brothers	0.41 (0.49)
One Older Brother	Child has one older brother	0.29 (0.45)
Sibship Size		
Two or More Older Brothers	Child has two or more older brother	0.30 (0.45)
Zero Younger Brothers (Ref.)	Child has no younger brothers	0.21 (0.40)
One Younger Brother	Child has one younger brother	0.32 (0.46)
Two or More Younger Brothers	Child has two or more younger brothers	0.47 (0.49)
Zero Older Sister (Ref.)	Child has no older sisters	0.41 (0.49)
One Older Sister	Child has one older sister	0.28 (0.45)
Two or More Older Sisters	Child has two or more older sister	0.30 (0.45)
Zero Younger Sister (Ref.)	Child has no younger sisters	0.23 (0.42)
One Younger Sister	Child has one younger sister	0.31 (0.46)
Two Younger or More Sisters	Child has two or more younger sister	0.45 (0.49)
Total children present	Number of individuals in the household who were below age eighteen.	5.25 (2.14)
Religion		
Muslim (Ref.)	Child's religion is Islam	0.62 (0.48)
Christian	Child's religion is Christianity	0.37 (0.48)
Traditional & Other	Child' s religion is traditional and other	0.003 (0.05)
Parent/Guardian's Attitude		
Agrees children can be kept home for work/help, if necessary	The parent or guardian of a child agrees that children should be kept home for work or housework, whenever necessary	0.25 (0.43)

Variable name	Definition	Mean
Disagrees (Ref.)	The parent or guardian of a child disagrees that children should be kept home for work or housework, whenever necessary	0.75 (0.43)
Agrees boys schooling more important	The parent or guardian of a child agrees that it is more important for a boy to attend school than a girl	0.40 (0.49)
Disagrees (Ref.)	The parent or guardian of a child disagrees that it is more important for a boy to attend school than a girl	0.60 (0.49)
Dependent Variable		
Currently attending school (N=4851)	answered yes that child is currently attending school	0.67 (0.46)

Appendix Table B

Frequency of Categorical Variables

Variable name	Frequency	Percent
Individual characteristics		
Sex		
Male	2,523	52.01
Female	2,328	47.99
Place of Residence		
Urban	1,724	35.54
Rural	3,127	64.46
Current Age		
Age 4–8	2,041	42.07
Age 9–12	1,694	34.92
Age 13–16	1,116	23.01
Household characteristics *Mother's Education*		
Zero Education	2,817	58.07
Incomplete Primary	434	8.95
Complete Primary	680	14.02
Incomplete Primary	515	10.62
Complete Secondary	405	8.35
Father's Education		
Zero Education	2,133	43.97
Incomplete Primary	622	12.82
Complete Primary	717	14.78
Incomplete Primary	610	12.57
Complete Secondary	769	15.85
Wealth index		
Poorest	1,199	24.72
Poorer	1,019	21.01
Middle	990	20.41
Richer	867	17.87

Variable name	Frequency	Percent
Richest	776	16.00
Distance to School		
Time to the nearest primary school in community		
<twenty minutes	3,606	74.34
>=twenty minutes	1,245	25.66
Time to the nearest secondary school in community		
<twenty minutes	1,334	27.50
>=twenty minutes	3,517	72.50
Sibship Size		
Older Brother		
Zero Older Brothers	1,913	39.44
One Older Brother	1,393	28.72
Two or More Older Brothers	1,545	31.85
Younger Brother		
Zero Younger Brothers	1,028	21.19
One Younger Brother	1,595	32.88
Two or More Younger Brothers	2,228	45.93
Older Sister		
Zero Older Sister	1,935	39.89
One Older Sister	1,408	29.02
Two or More Older Sisters	1,508	31.09
Younger Sister		
Zero Younger Sister	1,156	23.83
One Younger Sister	1,558	32.12
Two or More Younger Sisters	2,137	44.05
Religion		
Muslim	2,846	58.67
Christian	1,975	40.71
Traditional & Other	30	0.62
Parent/Guardian's Attitude Children can be kept home for work/help, if necessary		
Agrees	1,205	24.84
Disagrees	3,646	75.16
Boys schooling more important		
Agrees	1,830	37.72
Disagrees	3,023	62.32
Dependent Variable		
Currently attending school		
1=yes	3,366	69.39
0=no	1,485	30.61

Appendix Table C

Odds Ratios and Logit Coefficients from Logistic Regression Analysis of Current School Attendance Status of Nigerian Children, by Gender, Aged 4–16 on Selected Independent Variables, 2003–2004

	Model	
Variable	**Male Children Only**	**Female Children Only**
Place of Residence		
Urban	1.10 (0.10)	1.08 (0.08)
Rural (Ref.)		
Age		
Age 9–12	†4.66*** (1.54)	†2.05*** (0.71)
Age 13–16	†2.83*** (1.04)	†1.28 (0.25)
Age 4–8 (Ref.)		
Mother's Education		
Zero education (Ref.)		
Incomplete Primary	†0.90 (−0.10)	†1.68* (0.52)
Complete Primary	1.30 (0.26)	1.17 (0.16)
Incomplete Secondary and Complete Secondary or Higher	1.91* (0.64)	2.46** (0.90)
Father's Education		
Zero education (Ref.)		
Incomplete Primary	1.34 (0.29)	1.62* (0.48)
Complete Primary	1.94** (0.66)	1.63* (0.49)
Incomplete Secondary	2.93*** (1.07)	2.19** (0.78)
Complete Secondary & Higher	2.16** (0.77)	3.42*** (1.23)
Distance to School		
Time to the nearest primary school in community < twenty minutes (Ref.)		
>=twenty minutes	0.70* (−0.35)	0.81 (−0.21)
Time to the nearest secondary school in community < twenty minutes (Ref.)		
>=twenty minutes	†0.84 (−0.17)	†0.53** (−0.63)
Wealth Index		
Poorest (Ref.)		
Poorer	1.51* (0.41)	1.89*** (0.63)

Variable	Model	
	Male Children Only	Female Children Only
Middle	2.74*** (1.00)	2.11*** (0.74)
Richer	3.59*** (1.28)	5.08*** (1.62)
Richest	7.43*** (2.00)	8.30*** (2.11)
Sibship Size		
Zero Older Brothers (Ref.)		
One Older Brother	1.07 (0.07)	1.20 (0.18)
Two or More Older Brothers	0.96 (−0.03)	1.19 (0.18)
Zero Younger Brothers (Ref.)		
One Younger Brother	1.43* (0.35)	1.04 (0.04)
Two or More Younger Brothers	1.31 (0.27)	1.08 (0.08)
One Older Sister	1.02 (0.02)	1.05 (0.05)
Two or More Older Sisters	1.25 (0.22)	1.49* (0.40)
Zero Younger Sisters (Ref.)		
One Younger Sister	1.05 (0.05)	0.82 (−0.19)
Two or More Younger Sisters	0.95 (−0.04)	0.94 (−0.05)
Total children present	0.99 (−0.006)	0.99 (−0.0001)
Religion		
Muslim (Ref.) Christian	†3.34*** (1.21)	†6.84*** (1.92)
Traditional & Other	1.62 (0.48)	1.91 (0.65)
Parent/Guardian's Attitude		
agrees children can be kept home for work/help, if necessary	0.71* (−0.33)	0.80 (−0.22)
Disagrees (Ref.)		
agrees boys schooling more important	0.53*** (−0.62)	0.54*** (−0.62)
Disagrees (Ref.)		
−2 log likelihood	2114.07	1893.44
Model chi-square	405.78	392.02
Pseudo R2	0.2955	0.3806
N	2523	2328

† Note. – indicates that there exis t differences in regression coefficient.

Ref.=reference group.

Source: Nigeria Demographic and Health Survey EdData Survey 2004.

! p=<0.10.
* p=<0.05.
** p=<0.01.
*** p=<0.001.

Appendix Table D

Odds Ratios and Logit Coefficients from Logistic Regression Analysis of Current School Attendance Status of Nigerian Children, by Residence, Aged 4–16 on Selected Independent Variables, 2003–2004

	Model	
Variable	**Urban Children Only**	**Rural Children Only**
Place of Residence		
Male	1.92** (0.65)	2.01*** (0.70)
Female (Ref.)		
Age		
Age 9–12	†5.59*** (1.72)	†2.67*** (0.98)
Age 13–16	2.62*** (0.96)	1.96*** (0.67)
Age 4–8 (Ref.)		
Mother's Education		
Zero education (Ref.)		
Incomplete Primary	†0.47* (−0.73)	†1.62* (0.48)
Complete Primary	0.68 (−0.38)	1.30 (0.26)
Incomplete Secondary and		
Complete Secondary or Higher	1.64 (0.49)	2.16! (0.77)
Father's Education		
Zero education (Ref.)		
Incomplete Primary	†2.77*** (1.02)	1.31 (0.27)
Complete Primary	2.32** (0.84)	1.88** (0.63)
Incomplete Secondary	5.16** (1.64)	2.19*** (0.78)
Complete Secondary & Higher	3.59*** (1.28)	2.97*** (1.08)
Distance to School		
Time to the nearest primary school in community < twenty minutes (Ref.)		
>=twenty minutes	†1.19 (0.17)	†0.71** (−0.34)
Time to the nearest secondary school in community < twenty minutes (Ref.)		

	Model	
Variable	**Urban Children Only**	**Rural Children Only**
>=twenty minutes	0.84 (−0.17)	0.60** (−0.51)
Wealth Index		
Poorest (Ref.)		
Poorer	1.21 (0.19)	1.63*** (0.49)
Middle	†0.82 (−0.19)	†2.64*** (0.97)
Richer	3.04** (1.11)	3.64*** (1.29)
Richest	5.58*** (1.71)	4.71** (1.55)
Sibship Size		
Zero Older Brothers (Ref.)		
One Older Brother	1.42 (0.35)	1.02 (0.02)
Two or More Older Brothers	0.76 (−0.27)	1.13 (0.11)
Zero Younger Brothers (Ref.)		
One Younger Brother	0.94 (−0.06)	1.31! (0.27)
Two or More Younger Brothers	†0.50* (−0.68)	†1.41 (0.35)
One Older Sister	0.74 (−0.29)	1.12! (0.12)
Two or More Older Sisters	†0.79 (−0.22)	†1.54** (0.43)
Zero Younger Sisters (Ref.)		
One Younger Sister	0.66 (−0.41)	1.04 (0.04)
Two or More Younger Sisters	0.71 (−0.33)	1.01 (0.01)
Total children present	1.09* (0.08)	0.97 (−0.02)
Religion		
Muslim (Ref.)		
Christian	4.94*** (1.59)	4.60*** (1.52)
Traditional & Other	3.62* (1.28)	1.34 (0.29)
Parent/Guardian's Attitude		
agrees children can be kept home for work/help, if necessary	1.01 (0.01)	0.75* (−0.28)
Disagrees (Ref.)		
agrees boys schooling more important	0.54** (−0.61)	0.55*** (−0.58)

	Model	
Variable	**Urban Children Only**	**Rural Children Only**
Disagrees (Ref.)		
−2 log likelihood	1032.93	2897.84
Model chi-square	222.84	554.56
Pseudo R2	0.3530	0.3070
N	1724	3127

† Note. – indicates that there exis t differences in regression coefficient.

Ref.=reference group.

Source: Nigeria Demographic and Health Survey EdData Survey 2004.

! p=<0.10.
* p=<0.05.
** p=<0.01.
*** p=<0.001.

Appendix Table E

Odds Ratios and Logit Coefficients from Logistic Regression Analysis of Current School Attendance Status of Nigerian Children, by Socioeconomic Status, Aged 4–16 on Selected Independent Variables, 2003–2004

	Model	
Variable	**Poor Household Only**	**Nonpoor Household Only**
Sex		
Male	1.95*** (0.67)	1.99*** (0.69)
Female (Ref.)		
Place of Residence		
Urban	1.71** (0.53)	1.31! (0.27)
Rural (Ref.)		
Age		
Age 9–12	†2.52*** (0.92)	†4.52*** (1.51)
Age 13–16	2.07*** (0.73)	2.34*** (0.85)
Age 4–8 (Ref.)		
Mother's Education		
Zero education (Ref.)		
Incomplete Primary	1.07 (0.07)	1.60 (0.47)
Complete Primary	1.50! (0.41)	1.36 (0.31)
Incomplete Secondary and Complete Secondary or Higher	3.02** (1.10)	3.51*** (1.25)

Variable	Model	
	Poor Household Only	Nonpoor Household Only
Father's Education		
Zero education (Ref.)		
Incomplete Primary	1.62** (0.48)	1.39 (0.33)
Complete Primary	2.20*** (0.78)	1.81** (0.59)
Incomplete Secondary	2.58*** (0.95)	2.64* (0.97)
Complete Secondary & Higher	† 1.76 (0.57)	†4.16*** (1.42)
Distance to School		
Time to the nearest primary school in community < twenty minutes (Ref.)		
>=twenty minutes	†0.62*** (−0.46)	†1.12 (0.11)
Time to the nearest secondary school in community < twenty minutes (Ref.)		
>=twenty minutes	†0.32*** (−1.13)	†0.82 (−0.18)
Sibship Size		
Zero Older Brothers (Ref.)		
One Older Brother	†0.92 (−0.07)	†1.48! (0.40)
Two or More Older Brothers	1.17 (0.16)	0.95 (−0.04)
Zero Younger Brothers (Ref.)		
One Younger Brother	1.28 (0.24)	1.12 (0.12)
Two or More Younger Brothers	1.10 (0.09)	1.14 (0.13)
Sibship Size (continued)		
One Older Sister	1.03 (0.04)	1.00 (0.004)
Two or More Older Sisters	1.26 (0.23)	1.48* (0.39)
Zero Younger Sisters (Ref.)		
One Younger Sister	0.96 (−0.04)	0.95 (−0.05)
Two or More Younger Sisters	0.95 (−0.04)	1.02 (0.02)
Total children present	1.01 (0.01)	0.95 (−0.04)
Religion		
Muslim (Ref.)		
Christian	†5.02*** (1.61)	†2.85*** (1.05)
Traditional & Other	1.16 (0.15)	NA

Variable	Model	
	Poor Household Only	Nonpoor Household Only
Parent/Guardian's Attitude		
agrees children can be kept home for work/help, if necessary	0.71* (−0.34)	0.89 (−0.11)
Disagrees (Ref.)		
agrees boys schooling more important	0.51*** (−0.67)	0.56*** (−0.56)
Disagrees (Ref.)		
−2 log likelihood	2240.40	1825.01
Model chi-square	409.81	294.64
Pseudo R2	0.2713	0.2661
N	2218	2633

† Note. – indicates that there exis t differences in regression coefficient.

Ref.=reference group.

Source: Nigeria Demographic and Health Survey EdData Survey 2004.

! p=<0.10.

* p=<0.05.

** p=<0.01.

*** p=<0.001.

Table 1

Odds Ratios and Logit Coefficients from Logistic Regression Analysis of Current School Attendance Status of Nigerian Children, Aged 4–16 on Selected Independent Variables, 2003–2004

	Model				
Variable	(1)	(2)	(3)	(4)	(5)
Sex					
Male	1.84*** (0.60)	1.88*** (0.63)	1.84*** (0.60)	1.91*** (0.65)	1.94*** (0.66)
Female (Ref.)					
Place of Residence					
Urban	1.65*** (0.50)	0.96 (−0.03)	0.95 (−0.04)	1.07 (0.07)	1.06 (0.06)
Rural (Ref.)					
Age					
Age 9–12	3.23*** (1.17)	3.19*** (1.16)	3.35*** (1.21)	3.08*** (1.12)	3.03*** (1.11)
Age 13–16	2.53*** (0.93)	2.44*** (0.89)	2.68*** (0.98)	2.12*** (0.75)	2.08*** (0.73)
Age 4–8 (Ref.)					
Mother's Education					
Zero education (Ref.)					
Incomplete Primary	2.17*** (0.77)	2.39*** (0.87)	2.29*** (0.83)	1.20 (0.18)	1.24 (0.21)
Complete Primary	2.84*** (1.04)	2.53*** (0.93)	2.56*** (0.94)	1.31 (0.27)	1.25 (0.22)
Incomplete Secondary	4.97*** (1.60)	3.84*** (1.34)	3.82*** (1.34)	1.80* (0.58)	1.74* (0.55)
Complete Secondary or Higher	14.23*** (2.65)	8.80*** (2.17)	9.22*** (2.22)	4.33** (1.46)	4.22** (1.44)
Father's Education					
Zero education (Ref.)					
Incomplete Primary	1.98*** (0.68)	1.87*** (0.62)	1.90*** (0.64)	1.43** (0.36)	1.42* (0.35)

	Model				
Complete Primary	3.10*** (1.13)	2.62*** (0.96)	2.82*** (1.03)	1.88*** (0.63)	1.79*** (0.58)
Incomplete Secondary	3.79*** (1.33)	3.44*** (1.23)	3.63*** (1.28)	2.75*** (1.01)	2.50*** (0.91)
Complete Secondary & Higher	4.80*** (1.56)	3.26*** (1.18)	3.58*** (1.27)	2.93*** (1.07)	2.55*** (0.93)
Distance to School					
Time to the nearest primary school in community < twenty minutes (Ref.)					
>=twenty minutes	0.73** (−0.30)	0.80* (−0.21)	0.81* (−0.20)	0.71** (−0.32)	0.75** (-0.28)
Time to the nearest secondary school in community < twenty minutes (Ref.)					
>=twenty minutes	0.48*** (−0.71)	0.62*** (−0.47)	0.62*** (−0.47)	0.65** (−0.42)	0.68** (−0.37)
Wealth Index					
Poorest (Ref.)					
Poorer		1.35** (0.30)	1.39** (0.33)	1.68*** (0.51)	1.66*** (0.50)
Middle		2.05*** (0.72)	2.05*** (0.72)	2.44*** (0.89)	2.30*** (0.83)
Richer		3.54*** (1.26)	3.41*** (1.22)	4.82*** (1.57)	4.24*** (1.44)
Richest		6.78*** (1.91)	6.67*** (1.89)	8.42*** (2.13)	7.32*** (1.99)
Sibship Size					
Zero Older Brothers (Ref.)					
One Older Brother			1.25* (0.22)	1.17 (0.16)	1.14 (0.13)
Two or More Older Brothers			1.40** (0.33)	1.18 (0.17)	1.09 (0.09)
Zero Younger Brothers (Ref.)					
One Younger Brother			1.12 (0.11)	1.25† (0.22)	1.21 (0.19)

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	Model				
Two or More Younger Brothers			1.03 (0.03)	1.21*** (0.19)	1.18 (0.16)
One Older Sister			1.11 (0.10)	1.04 (0.04)	1.05 (0.04)
Two or More Older Sisters			1.48** (0.39)	1.33* (0.28)	1.33* (0.29)
Zero Younger Sisters (Ref.)					
One Younger Sister			0.84 (−0.16)	0.94 (−0.05)	0.94 (−0.05)
Two or More Younger Sisters			0.82 (−0.18)	0.94 (−0.05)	0.95 (−0.04)
Total children present			0.98 (−0.01)	0.99 (−0.009)	0.99 (−0.005)
Religion					
Muslim (Ref.)					
Christian				5.78*** (1.75)	4.63*** (1.55)
Traditional & Other				2.18! (0.78)	1.56 (0.44)
Parent/Guardian's Attitude agrees children can be kept home for work/help, if necessary					0.77*
Disagrees (Ref.)					
agrees boys schooling more important					0.55***
Disagrees (Ref.)					
−2 log likelihood	4561.63	4437.10	4388.54	4140.20	4076.47
Model chi-square	609.49	652.36	670.34	672.06	728.73
Pseudo R2	0.2520	0.2724	0.2803	0.3211	0.3315
N	4851	4851	4851	4851	4851

Note. – Logit Coefficients are in parenthesis. Ref.=reference group.

Source: Nigeria Demographic and Health Survey EdData Survey 2004.

! p=<0.10.

* p=<0.05.

** p=<0.01.

*** p=<0.001.