

School Attendance and Grade Progression in Nigeria:

Is Gender or Socioeconomic Status More Important?

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### **Introduction**

The Program of Action of the 1994 International Conference on Population and Development (ICPD) and the Millennium Development Goals (MDGs) both call for closing the gap in the formal educational attainment of girls in comparison to boys. The Program of Action noted that two-thirds of the world's illiterate people are women. This presumed gender disparity in education is also echoed in the objectives of the MDGs. One of the target objectives of the MDGs is that by the year 2015, all children, especially girls, will be able to complete a full course of primary school education. On the whole, the MDGs put forth the idea that, at both the primary and secondary education levels, the school enrollments of girls lag those of 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. The MDGs call for the elimination of gender inequality in education by 2015.

Despite or, perhaps, in part because of this increasing concern, empirical research suggests that differences in the school enrollments of boys and girls are narrowing worldwide (Knodel and Jones, 1996). Demographers and other scholars suggest that gender inequality in education varies by region. In most cases, girls' school enrollment rates are similar to or ahead of that of boys except in the case of the Middle East and South Asia. In these regions, girls' school enrollment rates are considerably lower than boys' rates (Knodel and Jones, 1996). Moreover, in some regions, e.g., Latin America,

the school enrollments of girls exceed that of boys. Empirical research shows a more pressing need is to enroll or to provide boys and girls who come from poor families with access to education at all levels (Filmer and Pritchett, 1999; Knodel and Jones, 1996). Indeed, research shows that differences in the educational attainment of children are greater by socioeconomic status and by urban/rural residence than by gender (Knodel and Jones, 1996; Lloyd 2005). In this research, we investigate factors that affect school attendance and successful grade progression among Nigerian children. Specifically, we examine the issue of whether Nigerian boys have a greater likelihood of attending school and being on track in grade progression than Nigerian girls. More importantly, we investigate whether socioeconomic factors or gender has a larger impact on children's schooling in Nigeria.

The Nigerian government has had difficulty putting its 1981 National Education Policy into practice. Rapid population growth, low levels of development, insufficient political will, and poor management of scarce resources have all been cited as reasons the country's education policy goals have not been achieved (UNICEF 2006). It is believed that this failure has tolled hardest on Nigerian women and girls. UNICEF (2006:1): states, "the national literacy rate for females is only 56 percent, compared to 72 percent for males, and in certain states [mainly in the northern part of the country], the female literacy, enrollment and achievement rates are much lower. For example, girls' net enrollment in Sokoto [in northern Nigeria], is 15 percent compared to 59 percent for boys."

### **Conceptual Framework**

A major theoretical perspective that has been used to explain the decision by families or parents to educate their children is the household production framework proposed by economists (Becker 1968; Becker 1991; Becker and Tomes 1976). In the household production framework, it is assumed first of all that parents are altruistic. Besides caring about their own well-being, they also care about the well-being of their children. The framework emphasizes that parents are the ones in charge of the various 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 altruistic parents make about the schooling of each member of their household – especially children – is guided by the differences in future returns to schooling. That is, parents are likely to send the child with the highest academic potential to school. They are also more likely to send their sons to school than their daughters if the labor market provides better employment opportunities for men than women (Buchmann, 2000) or if they believe that educating girls will not bring future monetary return to them in old age. For example, in sub-Saharan Africa, families think that educating girls is not as important as educating boys. Families do not believe it is beneficial to invest financially in their daughters' education because they will leave their immediate families for marriage. The returns from daughters' education are believed to be enjoyed by the marital family.

The household production framework highlights the importance of family economics in children's schooling decisions. However, this framework is less effective in incorporating the role that culture often plays in these decisions. Culture may offer an explanation over and above the household production framework. It may help explain why parents make seemingly irrational decisions. Proponents of the cultural argument suggest that religious values and patriarchal norms are important facets of a society, which can affect education decisions, especially those for girls (Buchmann, 2000; Csapo, 1981). Researchers suggest that patriarchal lineage and its preference for male children are at the heart of the gender disparity in school participation in sub-Saharan Africa (Buchmann, 2000; Davison and Kanyuka, 1992). In sub-Saharan Africa, patriarchy prescribes socially constructed roles upon women, which specify that their role in life is to become mothers and wives. Consequently, pushing forward the ideology that formal schooling is not a necessary factor in women's ability to realize their social roles as wives and mothers (Buchmann, 2000; Csapo, 1981; Davison and Kanyuka, 1992).

Given these two conceptual frameworks, we suggest that in Nigeria both economic and cultural factors are important. 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 boys/men over that of girls/women. In addition, we expect that religious values will play an important part in the schooling of children, especially girls, knowing that more than 70 percent of Nigerians are Muslim by religion (Invest East 2008; Muslim Population Worldwide, 2008).

### **Literature Review**

Research shows that patriarchal and religious values do indeed impede the schooling of girls in contrast to boys in Sub-Saharan Africa. Research suggests that in some settings, families and parents prefer to send their sons to school rather than their daughters (Buchmann, 2000; Lloyd and Blanc, 1996). One explanation is that parents assume that boys' education is a better investment because returns from boys' schooling will be kept within the family rather than, as feared in the case of girls, lost to the marital family. In addition, in some societies, cultural norms suggest that it is better to send boys to school assuming it is they, more so than their sisters, who will head families and hold important positions within society (Buchmann, 2000). This normative belief system is based on the premise that education liberates girls and makes them less controllable in a patriarchal society (Csapo, 1981). Thus, we hypothesize that boys are more likely than girls to be currently attending school and to be on track in grade progression.

Research has found that children who live in urban areas have higher levels of schooling than children who reside in rural areas (Eloundou-Enyegue and Calves, 2006; Hollous, 1991; Townsend, et al. 2002). Urban residence leads to higher educational attainment of children in part by providing children with greater access to schools. Urban children typically have greater levels of school attendance than rural children because of shorter travel time to school among other factors (Lloyd 2005). In addition, transportation is more likely to be available in urban areas. The availability of transportation in urban areas cuts travel times and reduces 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.

Families who live in urban areas are also likely to have greater exposure to the mass media. The mass media presents information about a variety of issues such as how children and youth elsewhere around the world are living their lives, and the type of life-fulfilling activities (i.e., formal schooling) that they pursue. Finally, urban families tend to have higher incomes and greater wealth than rural families, factors that influence school attendance throughout developing countries. Moreover, children's labor contributions to the family economy are thought to be greater in rural areas and thus compete with school attendance for children's time. Therefore, we expect that: 1) children who live in urban areas are more likely to be currently attending school and to be on track in grade progression than children who reside in rural areas, and 2) the greater the distance to school, the lower the likelihood that children are attending school and on track in grade progression.

Research shows that parents' education has a positive relationship to their children's education. Children whose parents are educated are more likely to be enrolled and have more years of schooling than children whose parents are not educated (Fuller, Singer and Keiley, 1995; Knodel and Jones, 1996; Lloyd and Blanc, 1996). One explanation is that educated parents have more economic resources to invest in their children's education than uneducated parents. 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 (Buchman, 2000; Fuller, Singer and Keiley, 1995; Lloyd and Blanc, 1996). Educated parents are more likely than parents with little or no education to be aware of the personal prestige and social mobility that formal schooling affords. This knowledge leads educated

parents to place a greater personal value on education for their children. Thus, we posit that: 1) The higher the mother's education, the more likely children are to attend school and be on track in grade progression; 2) The higher the father's education, the more likely children are to attend school and be on track in grade progression; and 3) The higher the household wealth, the more likely children are to attend school and be on track in grade progression.

Research in sub-Saharan Africa has also found that children whose parents' religion is Christian have more years of schooling than children whose religion is Islam (Buchmann, 2000). Many Muslim households and families resist sending their children to formal educational institutions because they believe that formal education is a conglomerate of Christianity (Csapo, 1981). Islamic teaching also promotes the seclusion of women from the outside world, which many families interpret as meaning that their daughters should not leave their household to attend school. We expect that children whose parents' religion is Christianity are more likely to be currently attending school and to be on track in grade progression than Muslim children or adherents to other traditional religions.

We also examine how the educational beliefs of Nigerian children's parents or guardians hamper or assist children's educational attainment by introducing attitudinal measures to examine the influence of parental beliefs. We hypothesize that children whose parents value child labor and boys schooling are less likely to be attending school or be on track in grade progression than their counterparts whose parents do not hold such beliefs.

In the context of Ghana, Kenya and South Africa, empirical research has shown that children who have older siblings are more likely to attend school, complete their education or be enrolled in school than their counterparts who do not have older siblings (Buchman, 2000; Fuller, Singer and Keiley 1995; Lloyd and Gage-Brandon, 1994; Gomes, 1984). A pathway through which having older siblings increases the educational attainment of children is that older siblings may be willing to support directly or indirectly, through remittance to their parents, some of the costs of their younger siblings' education.

In addition, besides older siblings providing financial support to their parents in the form of remittances for their younger siblings' education and welfare, extended family members also contribute monetarily to the upkeep of children and older adults within their families. In many African countries, older adults and children often depend financially on their extended family networks in order to meet their basic needs and educational costs. Empirical work by Ezewu (1986: 227) indicates that in Nigeria "it does appear that the extended family system is not, after all, as inimical to school education as it is thought in some quarters. Rather, it actively participates in some reasonable measure in the schooling of the youth in Nigeria."

In the context of sub-Saharan Africa, studies have found that children who have younger siblings are more likely to have never attended school than children who do not have younger siblings. In particular, this research 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). Girls' education may be hindered because their parents may need their help in caring for younger siblings while they are

away at work (Pittin 2002). Thus, we hypothesize that children who have older siblings are more likely to be attending school or to be on-track in grade progression than children who have younger siblings. Moreover, the sex composition of the sibling-set is posited to affect school attendance and grade progression. Female children with younger siblings are expected to be less likely to be attending and on on-track in grade progression.

### **Methods and Data**

The 2004 Nigeria Demographic and Health Survey EdData Survey (2004 NDES) are used to test the hypotheses set forth in the preceding section. The 2004 NDES provides key education indicators influencing household decisions about children's school attendance. The two dependent variables used to capture children's education are school attendance and grade progression. Independent variables include children's individual characteristics, household attributes, distance to school, sibling composition, number of children living in household, the religious affiliation of parents, and parental attitudes toward schooling. In our analyses, we use logistic regression and Heckman maximum likelihood logistic regression with sample selection. In this section we detail the data, dependent variables, independent variables, and model estimation techniques.

#### **Data**

This research uses the 2004 Nigeria Demographic and Health Survey EdData Survey (2004 NDES). The primary objective of the 2004 NDES is to provide information about the education of primary and secondary school-age children in Nigeria. The survey contains data on numerous factors thought to influence Nigerian children's school attendance. The 2004 NDES also has data on the costs of schooling (both monetary and non-monetary) and on parents and/or guardians' attitudes about schooling. In addition,

the survey contains data on the age that children first attended or dropped-out of school, the reasons children were over-age when first enrolled in school, why children never enrolled in school, the frequency of and reasons for students' absenteeism, household expenditures on schooling and other contributions to schooling, distances and travel times to schools, and parents' and/or guardians' perceptions of school quality, and the benefits and disadvantages of schooling.

The households interviewed for the 2004 Nigeria Demographic and Health Survey EdData II Survey (2004 NDES) were drawn from the 2003 Nigerian Demographic and Health Survey (DHS) data. In total, the 2004 NDES sampled and interviewed 4,563 households that have at least one child between the ages of four to sixteen residing in their households. The 2004 NDES consists of four separate questionnaires, the household questionnaire, the parent/guardian questionnaire, the eligible child questionnaire, and the independent child questionnaire.

The independent child questionnaire only interviewed children between the ages of thirteen to sixteen who did not have parents or guardians who could answer questions about their schooling. In order to be eligible for interview the children in the independent child questionnaire must either be the head of their household, the spouse of the head of household, or the son-in-law or daughter-in-law of the household head. These children were asked the same questions asked of the parents/guardians in the eligible child questionnaire.

In the eligible child questionnaire, even though children between the ages of four to sixteen years old are the subjects, their parents or guardians were the survey respondents. The eligible child questionnaire contains information about children's

schooling status including whether they attended school during the 2003 to 2004 school year, whether some of these children dropped out of school, or never attended school. This questionnaire also asks the children's parent or guardian about their household expenditures on schooling, the reasons why children may have missed school for a long period, reasons for school drop out, and attendance and other questions.

The parent/guardian questionnaire contains background information on the parent or guardian's age, education, literacy, and religion. This questionnaire also asks the children's parent or guardian about education issues, such as school quality, travel distance and other questions about the advantages and disadvantages of formal schooling for children. In this questionnaire, the parents/guardians were also asked questions about the kind of school, location and reason why their children attend a particular school.

The household questionnaire was developed to achieve three goals. First, it was used to verify that the household was the same one surveyed in the 2003 Nigerian Demographic and Health Survey (2003 NDHS). Second, it seeks to identify the children who are qualified for the eligible child questionnaire and those whose anthropometric and literacy/numeracy data need to be collected. Lastly, it was employed to select a parent or guardian for each of the eligible children.

### **Dependent Variables**

The dependent variable school attendance is constructed from the following question. "Has (Name) attended a formal school at any point during the current school year [2003-2004]?" The children whose parents or guardians answered "yes" on their behalf were coded as one and those who replied with "no" were coded as zero.

To calculate grade progression we first restricted the sample to children who were currently attending school in the academic year 2003-2004. We then used child's current age, age at first matriculation to primary school, and current grade level at the time of interview to determine grade progression. Specifically, a child was defined as "behind" (coded 1) if  $[(\text{current age} - \text{age at first matriculation}) - \text{grade level}] \geq 2$ . We allowed for a one-year adjustment period because some children in the sample had already experienced their birthday while others had not. This is a conservative measure of school progression and likely to underestimate the true proportion of children who are behind in school progression.

### **Independent Variables**

The measures for the children's and their parents' characteristics are coded as follows. The sex of child is coded one if the child is male and zero if female. Type of place of residence is coded one for urban residence and zero for rural residence. Parental education is measured separately for mother's and father's education as dummy variables with five categories. The categories are zero education, incomplete primary, complete primary, incomplete secondary education, and complete secondary or higher education. The reference group is zero education.

The walking time either to primary/secondary school in minutes are the two variables used jointly to measure access to the nearest primary/secondary school. Distance to the nearest primary or secondary school was dichotomized into those who lived less than twenty minutes (coded zero) and those who lived twenty minutes or more (coded one).

A household wealth index was constructed by the NDES to examine a household's socioeconomic status or wealth instead of its income or expenditures on goods and services. Households were asked if they owned a radio, television, paraffin lamp, bicycle, motorcycle/scooter, car/truck, lighting, water and fuel sources, sanitation facilities, and floor material. An asset score was recorded if a household had any or all of the items listed. This asset score was divided into quintiles of economic status. Households in the lowest quintile serve as the reference category.

The total number of children in a household was derived by calculating the number of individuals in the household who were below age eighteen. This variable is entered into the analysis in continuous form. The sibling composition variable was separated into four distinct groups of older brother, younger brother, older sister, and younger sister. Within each group of sibling composition three dummy variables were created denoting that a child has either zero, one, or two or more siblings in each category. The zero category serves as the reference (coded zero). Religion is measured in three categories: Islam, Christianity, traditionalist and other. Islam serves as the reference group.

Two attitudinal variables were included. A dummy variable with a response of agree, disagree or don't know was created from answers to two questions as to whether parents thought that: 1) children should be kept home for work or housework, whenever necessary and 2) it is more important for a boy to attend school than a girl. Those who answered with agree were coded as one and those who replied with disagree and do not know were coded as zero.

### **Model Estimation Techniques**

Logistic regression analysis is used to estimate the impact of the explanatory variables on current school attendance and grade progression. The logistic model allows us to estimate the effect of various independent variables on the odds that a child will attend school, and among those attending schools, on the odds of being behind or on track in grade progression. Hence, the dependent variables in these logistic models are binary responses, which state that the odds of 1) currently attending school and 2) being behind in grade progression among children who are currently attending school.

As grade progression is observed only among those children currently attending schools, we use a Heckman maximum likelihood logistic regression with sample selection to estimate unbiased parameters for grade progression. Heckman maximum likelihood logistic models with sample selection are constructed in various stages. A logistic model is applied to model the odds of progressing from one grade to the next among children in the sample whose outcome is observed, that is, to children who are currently attending school. The selection logistic model is applied to model the odds of current attendance. This is also the odds of grade progression. The Heckman logistic with sample selection calculates the Mills ratio to adjust the odds of grade progression, controlling for the odds of currently attending school.

Definitions of variables and descriptive statistics for all variables are given in appendix Tables 1 and 2.

## **Findings**

### **School Attendance**

Results in Table 1 indicate that there is a gender gap in current school attendance among Nigerian children. The odds ratios and logit coefficients for the sex of the child

show that male children are consistently and significantly more likely to be currently attending school. The odds ratios on the gender variable across all five models show that male children are more likely to be currently attending school regardless of other variables in the model. This finding holds controlling for the children's place of residence, parental education, time to nearest school, socio-economic status, sibling composition, religion, and parent/guardian's attitude. This indicates that Nigerian boys have greater odds of currently attending school than Nigerian girls. Model five shows that boys are 89 percent more likely than girls to be currently attending school.

In addition, model one also includes variables for residence, mother's and father's education, and for travel time to the nearest primary and secondary school. The parameter estimates for all of these variables are in the expected direction and all are statistically significant. The results indicate that urban children are 76 percent more likely than rural children to be currently attending school. Children whose mothers have at least some primary education are significantly more likely to be attending schooling 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 13 times more likely to be attending school than those whose mothers have no education. Father's education shows similar if 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 is more important than father's education in influencing children's current school attendance.

Results in model one also indicate that living twenty or more minutes from the nearest primary school reduces school attendance by 26 percent compared to children

who live closer. In the case of the distance to the nearest secondary school, living twenty or minutes away reduces the odds of school attendance by 51 percent.

Model two adds the household wealth index. Household wealth is included into the analysis because it is possible that the effects of parental education and rural residence are explained by children's household economic status. The odds ratios show that household wealth has a large positive and significant effect on children's current school attendance. Nigerian children in the richest quintile of households are seven times more likely to be 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 Knodel and Jones' (1996) who conclude that socioeconomic disparities have a greater influence on children's educational attainment than gender disparities in many regions of the world.

Upon the inclusion of the household wealth index, the odds ratio for the residence variable becomes statistically insignificant, suggesting that the deprivation of rural families has much to do with the lower prevalence of school attendance among their children. The inclusion of the wealth variable also led to attenuation in the association between school attendance and mother's education. For example, the odds ratio for mother's with secondary or higher education (compared to none at all), decline from 13.4 to 8.2 when the wealth variable is included in model two. This decrease suggests that some of the influence of mother's education is mediated by a wealth effect. Declines among women with lower levels of education are not as sizeable as the case for mothers with the highest level of schooling.

The inclusion of sibling composition and the total number of children in the household in model three had little impact on the estimates for the variables already in the model. The total number of children in the household had no significant impact on children's current school attendance. However, the results for sibling composition show that having at least one brother or two or more older sisters increases the odds that children would be currently attending school. The impact of having an older brother is stronger statistically when the number of older brothers is two or more. Children who have two or more older brothers are 38 percent more likely to be attending school than children who have no older brothers. Similarly, children who have two or more older sisters are 39 percent more likely to be currently attending school than those who do not have any older sisters. The odds ratios on the older sibling variables imply that children benefit from having older siblings who contribute to their education.

Results for the impact of religion (model four) suggest that Christian children are six times more likely to be currently attending school than Muslim children. The odds ratio for traditional and other religions indicates that children whose religion is traditional or other are twice as likely to be currently attending school than Muslim children, though the result is significant only at 0.10 level. The inclusion of this variable led to further reduction in the odds ratios for mother's and father's education. The largest reduction observed is in the odds ratios for mother's who completed secondary and higher education. In model three the odds ratio on this variable is 8.81 and it is halved to 4.16. The reduction in the odds ratio on mother's higher education from model three to model four implies that some of the effect of mother's secondary and higher education on

children's current attendance is due to the fact that educated mothers are more likely to be Christian, which has a positive effect on attendance.

In the fifth and final model, the parent's (or guardian's) attitude is added. Children of parents who agree that children can be kept home for work or help if necessary are 23 percent less likely to be attending school compared to those with parents who do not agree. Similarly, children of parents who agree that boys schooling is more important are 46 percent less likely to be currently attending school. It is interesting that of the two attitudinal items, gender bias has a stronger apparent association with school attendance than attitudes about the labor contributions of children. The inclusion of this variable led to a minor reduction in the odds ratio on the various dummy variables on mother's education, father's education, wealth index, and religion.

## **Grade Progression**

The results in Table 2 on grade progression are limited to children who are currently attending school. Because the group of children who are attending school differ systematically from those who do not, we correct for sample selectivity in models of grade progression through the estimation of Heckman selection models. We also estimated these models without correcting for sample selectivity. These results are available upon request. The results in Table 2 show that across the five models, boys have slightly lower odds of being behind in grade progression than girls. However, none of the coefficients are statistically significant. This indicates that while boys are more likely to attend school in the first place, among attendees there is no gender difference in grade progression.

Model 1 also includes variables for urban residence, mother's and father's education, and travel time to the nearest primary and secondary school. Urban residence and mother's incomplete primary education led to higher odds that children are behind in grade progression. However, the impact of urban residence is not statistically significant at any conventional level. The pattern of coefficients for categories of mother's education suggests an effect that is not linear. Compared to attendees who have mothers who never went to school, those with mothers who went to but did not complete primary schooling were 5 percent more likely to be behind in school. The impact declines thereafter, with those with the best educated mothers having 9 percent lower odds of being behind, compared to mothers with no schooling at all. In contrast, father's education is unrelated to grade progression except at the highest level of education. This finding suggests that mother's education and father's education at the highest levels have a more important

impact in keeping children on-track than mother's and father's education at levels below secondary education.

We omitted the household wealth index from the list of applicable variables in the grade progression analysis to allow for the estimation of the Heckman selection model.

We assume that household wealth is likely to influence whether or not children are currently attending school, but may have little impact on their grade progression, except through purchase of other academic services, such as tutoring. Indeed, in the multivariate analysis without the sample selection correction (not shown) the household wealth does not show a significant impact on grade progression.

In Model 2, measures for sibling composition and total number of children in the household were added. The sibling composition dummy variables for two or more younger brothers and two or more younger sisters show that having more than one younger brother or sister leads to greater odds that children would be behind in grade progression. The effect of having two or more younger brothers on grade progression is slightly greater than the effect of having two or more younger sisters. That is, children who have more than one younger brother face a greater likelihood of being behind in grade progression than their counterparts who have more than one younger sister. Basically, having more than one younger sibling is significantly correlated with being behind in grade progression, and this effect is even more pronounced when children have two or more younger brothers. It is possible that children who have younger siblings are behind in grade progression because their parents or households may be using them as child care helpers. The implication is that the hours that older siblings spend taking care of younger siblings could have been devoted to school work.

In the third model, religion is added. The results suggest no significant difference between Christian and Muslim children in the likelihood of being behind in school. Interestingly, there is a distinct Muslim advantage in the models without the sample correction (result not shown, available on request). That is, in those models, Muslim children appear much less likely than their Christian counterparts to be behind. However, underscoring the importance of correction for sample selection, it is likely that Muslim children who are attending school are a unique and perhaps unusually committed group. Indeed as noted, once correcting for sample selection, Muslim children do not differ from their Christian counterparts in their likelihood of being behind with respect to grade for age.

### **Discussion**

Our analysis confirms that there is a gender gap in school attendance in Nigeria. All estimated models suggest that Nigerian boys are more likely to be currently attending school than are Nigerian girls. At every level of parental education, mother's education has a greater influence on children's school attendance than father's education. This finding suggests that any policy attempt to increase the school attendance of children needs to promote the formal education of women and girls as an important household factor at reaching this goal. An equally important variable in predicting children's attendance as mother's education is household wealth.

Consistently in the models, household wealth has a positive and significant effect on children's school attendance. When household wealth is introduced into models two to five, the significant effect of urban residence on attendance disappears. This finding implies that wealth is a mediating variable between urban residence and children's school

attendance. It also is fair to conclude that in Nigeria, household wealth is a more important predictor of children's current school attendance than the sex of the child. In the case of Nigeria, socio-economic disparities are important than gender bias in structuring opportunities for and barriers to school attendance among children. This finding supports Knodel and Jones (1996), and suggests that policies to reduce economic inequality might well carry the advantage of boosting the school attendance of both boys and girls.

Religion and parent/guardian's attitude are also very important in predicting whether children attend school. Children have greater odds of going to school if they are Christians. Furthermore, in Nigeria, children have lower odds of attending school if their parents hold a gender bias perspective than if their parents believe that children should be kept at home for work/help when necessary. Clearly the policy implications here are more delicate, as they relate to matters of value differences. At the very least, strategies will need to be culturally sensitive.

The results for grade progression were far less dramatic, probably because the analysis was restricted to those already attending school. Here we do not find a gender gap in grade progression. The results show that mother's education and father's education at the highest level reduces the odds that children would be behind in school. Sibling composition, specifically for children who have two or more older brothers or sisters greatly reduces the odds that children will be behind in school. In addition, we cannot conclude that Christianity increases the chances that children will be behind in grade progression than Islam.

### **Conclusions**

Children's schooling is central to the social and economic development of developing 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. This paper examined two dimensions of children's schooling in Nigeria—school attendance and grade progression. Factors hypothesized to affect school attendance and grade progression were found to exert stronger and more consistent effects on school attendance than on grade progression. The fundamental question we addressed was: Is gender or socioeconomic status more important to children's schooling in Nigeria?

Our findings demonstrate that both gender and parental socioeconomic status have significant impacts on school attendance. Male children are significantly more likely to be attending school than female children and this finding holds regardless of other factors included in the analysis. Boys are almost twice as likely to be enrolled as girls even with controls for residence, mother's and father's education, household wealth, propinquity to primary and/or secondary schools, sibship size and composition, religion and selected parental attitudes. 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, the answer to the basic question posed in this paper as to whether gender or socioeconomic status is more important is quite clear:

socioeconomic disparities in school attendance are several times larger than those by gender. These findings are consonant with those of Knodel and Jones (1996).

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 (Eloundou-Enyegue and Calves, 2006; Ersado, 2005; Lloyd, Kaufman, and Hewett, 2000). Our findings suggest that, at least in Nigeria, the residential difference 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 offering jobs at higher income. 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 added to the analysis. 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 (Buchmann, 2000; Csapo, 1981) 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, taken to tap cultural factors influencing school attendance, both had significant effects. 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.

Findings with regard to grade progression were much harder to interpret. Very few of the factors found to be important determinants of school attendance had any effect on grade progression. Neither gender nor residence was significantly related to progress in school among those who were currently enrolled. Girls who were enrolled in school were no more likely than boys to be behind in grade. Similarly, mother's and father's education at levels below secondary school, and distance to primary school were unrelated to grade progression. Mother's education had inconsistent effects. Children of women who had failed to complete primary school were more likely to be behind than children whose mother had no formal schooling. A possible explanation is that children whose mothers did not complete primary school may not think that are disadvantaged. Children whose mothers did not complete primary school have the basic numeracy and literacy skills. That is, they can count and identify the alphabet. If they are successful in trading, they may not see why higher education is a priority. On the other hand, children whose mothers do not have any education may be aware of how disadvantaged they are in the social strata. They may become motivated to see that their children avoid the disadvantages that they faced. At the other extreme, children whose mothers had completed secondary or more schooling were less than half as likely to be behind as those whose mother's had no education.

Children who lived farther away from a secondary school were more likely to be behind than children who lived closer. While sibship size was not related to grade progression, sex composition of the sibling set was important. Children with two or more younger brothers and/or two or more younger sisters were the most likely to be behind in school. Christian children are not more likely to be behind in grade progression than Muslim children.

The measure of grade progression is more likely to contain greater measurement error than the measure of school attendance. The latter variable represents a simple yes or no to the question as to whether or not a child is currently enrolled in school. The grade progression measure is restricted to those children currently enrolled in school and is based upon the age at which a child first enrolled in school, their current age and their current grade in school.

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 groupings in 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 parts 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.

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

Variable	Model				
	(1)	(2)	(3)	(4)	(5)
<b>Sex</b>					
Male	1.77*** (0.57)	1.81*** (0.59)	1.79*** (0.58)	1.86*** (0.62)	1.89*** (0.63)
Female (Ref.)					
<b>Place of Residence</b>					
Urban	1.76*** (0.56)	1.00 (.005)	0.99 (-.003)	1.11 (0.10)	1.10 (0.09)
Rural (Ref.)					
<b>Mother's Education</b>					
Zero education (Ref.)					
Incomplete Primary	2.35*** (0.85)	2.57*** (0.94)	2.47*** (0.90)	1.22 (0.20)	1.26 (0.23)
Complete Primary	2.98*** (1.09)	2.60*** (0.95)	2.67*** (0.98)	1.29 (0.25)	1.23 (0.20)
Incomplete Secondary	5.23*** (1.65)	4.04*** (1.39)	4.10*** (1.41)	1.84* (0.61)	1.77* (0.57)
Complete Secondary or Higher	13.37*** (2.59)	8.22*** (2.10)	8.81*** (2.17)	4.16** (1.42)	3.98** (1.38)
<b>Father's Education</b>					
Zero education (Ref.)					
Incomplete Primary	1.92*** (0.65)	1.80*** (0.58)	1.84*** (0.61)	1.37! (0.31)	1.36* (0.31)
Complete Primary	2.66*** (0.97)	2.19*** (0.78)	2.44*** (0.89)	1.57** (0.45)	1.50** (0.40)
Incomplete Secondary	3.26*** (1.18)	2.95*** (1.08)	3.21*** (1.16)	2.41*** (0.88)	2.19*** (0.78)
Complete Secondary & Higher	4.33***	2.91***	3.27***	2.68***	2.33***

	(1.46)	(1.06)	(1.18)	(0.98)	(0.84)
Time to the nearest primary school in community					
< twenty minutes (Ref.)					
>=twenty minutes	0.74**	0.81*	0.83*	0.72**	0.75**
	(-0.29)	(-0.20)	(-0.18)	(-0.32)	(-0.27)
Time to the nearest secondary school in community					
< twenty minutes (Ref.)					
>=twenty minutes	0.49***	0.62***	0.61***	0.65**	0.68**
	(-0.71)	(-0.47)	(-0.48)	(-0.42)	(-0.37)
Wealth Index					
Poorest (Ref.)					
Poorer		1.33**	1.37**	1.66***	1.64***
		(0.29)	(0.31)	(0.51)	(0.49)
Middle		2.02***	2.03***	2.43***	2.28***
		(0.70)	(0.71)	(0.89)	(0.82)
Richer		3.60***	3.48***	5.02***	4.37***
		(1.28)	(1.24)	(1.61)	(1.47)
Richest		7.42***	7.61***	9.57***	8.26***
		(2.00)	(2.03)	(2.25)	(2.11)
Sibling Composition					
Zero Older Brothers (Ref.)					
One Older Brother			1.25*	1.17	1.14
			(0.22)	(0.16)	(0.13)
Two Older Brothers			1.38**	1.15	1.05
			(0.32)	(0.14)	(0.05)
Zero Younger Brothers (Ref.)					
One Younger Brother			1.26!	1.38*	1.33*
			(0.23)	(0.32)	(0.29)
Two Younger Brothers			1.40**	1.56***	1.51**
			(0.34)	(0.44)	(0.41)
Zero Older Sisters (Ref.)					
One Older Sister			1.04	0.98	0.99
			(0.04)	(-0.01)	(-0.007)
Two Older Sisters			1.39**	1.26*	1.26*
			(0.33)	(0.23)	(0.23)
Zero Younger Sisters (Ref.)					
One Younger Sister			0.95	1.05	1.05
			(-0.04)	(0.05)	(0.05)

Two Younger Sisters			1.10 (0.10)	1.22! (0.20)	1.23! (0.21)
Total number of kids in a household			0.99 (-0.007)	0.99 (-0.005)	0.99 (-0.002)
Religion					
Muslim (Ref.)					
Christianity				6.45*** (1.86)	5.11*** (1.63)
Traditional & Other				2.34! (0.85)	1.65 (0.50)
Parent/Guardian's Attitude					
agrees children can be kept home for work/help, if necessary					0.77* (-0.25)
disagrees (Ref.)					
agrees boys schooling more important					0.54*** (-0.61)
disagrees (Ref.)					
-2 log likelihood	4788.07	4648.68	4598.01	4298.17	4225.60
Model chi-square	523.09	550.13	559.62	568.91	634.11
Pseudo R2	0.2148	0.2377	0.2460	0.2952	0.3071
N	4851	4851	4851	4851	4851

!p=<0.10; \*p=<0.05; \*\*p=<0.01; \*\*\*p=<0.001. Ref.=reference group.

Logit coefficients in parentheses

Source: Nigeria Demographic and Health Survey EdData Survey 2004.

Table 2. Odds Ratios and Logit Coefficients from Logistic Regression Analysis with Sample Selection Correction of Grade Progression of Nigerian Children, Aged 4-16 on Selected Independent Variables, 2003-2004

Variable	(1)	(2)	(3)	(4)
<b>Sex</b>				
Male	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.01)
Female (Ref.)				
<b>Place of Residence</b>				
Urban	1.02 (0.02)	1.03* (0.03)	1.03! (0.03)	1.03* (0.03)
Rural (Ref.)				
<b>Mother's Education</b>				
Zero education (Ref.)				
Incomplete Primary	1.05* (0.05)	1.06* (0.06)	1.05** (0.05)	1.05* (0.05)
Complete Primary	0.97 (-0.03)	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.01)
Incomplete Secondary	0.96 (-0.04)	0.98 (-0.02)	0.98 (-0.02)	0.98 (-0.02)
Complete Secondary or Higher	0.91*** (-0.09)	0.93** (-0.07)	0.93** (-0.07)	0.93* (-0.07)
<b>Father's Education</b>				
Zero education (Ref.)				
Incomplete Primary	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.001)
Complete Primary	0.96 (-0.04)	0.98 (-0.02)	0.98 (-0.02)	0.99 (-0.01)

Incomplete Secondary	0.97 (-0.03)	0.99 (-0.01)	0.99 (-0.01)	0.99 (-0.01)
Complete Secondary & Higher	0.94** (-0.06)	0.95* (-0.05)	0.95! (-0.05)	0.96! (-0.04)
Time to the nearest primary school in community				
< twenty minutes (Ref.)				
>=twenty minutes	1.06* (0.03)	1.03* (0.03)	(0.03*)	1.03! (0.03)
Time to the nearest secondary school in community				
< twenty minutes (Ref.)				
>=twenty minutes	0.98 (-0.02)	0.98! (-0.02)	0.98! (-0.02)	0.97! (-0.03)
Sibling Composition				
Zero Older Brothers (Ref.)				
One Older Brother		1.02 (0.02)	1.02 (0.02)	1.01 (0.01)
Two Older Brothers		1.01 (0.01)	1.01 (0.01)	1.01 (0.01)
Zero Younger Brothers (Ref.)				
One Younger Brother		1.02 (0.02)	1.02 (0.02)	1.02 (0.02)
Two Younger Brothers		1.10*** (0.10)	1.09*** (0.09)	1.10*** (0.10)
Zero Older Sisters (Ref.)				
One Older Sister		0.99 (-0.002)	0.99 (- 0.003)	0.99 (-0.002)
Two Older Sisters		1.00 (0.002)	1.00 (0.003)	1.01 (0.01)
Zero Younger Sisters (Ref.)				
One Younger Sister		1.01 (0.01)	1.01 (0.01)	1.01 (0.01)

Two Younger Sisters	1.07*** (0.07)	1.07*** (0.07)	1.07*** (0.07)	
Total number of children in a household	0.99** (-0.01)	0.99** (-0.01)	0.99** (-0.01)	
Religion				
Muslim (Ref.)				
Christianity		1.01 (0.007)	1.01 (0.01)	
Traditional & Other		1.24** (0.22)	1.23** (0.21)	
Parent/Guardian's Attitude				
agrees children can be kept home for work/help, if necessary				1.01 (0.01)
disagrees (Ref.)				
agrees boys schooling more important				0.97 (-0.03)
disagrees (Ref.)				
Model chi-square	241.57	319.02	707.48	989.75
Exp (Mills Lambda)	0.870	0.892	0.899	0.93
Total N	4851	4851	4851	4851
Censored N	1501	1501	1501	1501
Uncensored N	3350	3350	3350	3350

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!p<0.10; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001. Ref.=reference group.  
 Logit coefficients in parentheses  
 Source:Nigeria Demographic and Health Survey EdData Survey  
 2004.

**Appendix Table 1.** Definitions of variables

Variable name	Definition
<i>Individual characteristics</i>	
Male	Indicator variable taking the value one if the child is male
Urban	Indicator variable taking the value one if the child lives in a urban area
<i>Household characteristics</i>	
Mother's Education	
Incomplete Primary	Indicator variable taking the value one if the child's mother has not completed primary school
Complete Primary	Indicator variable taking the value one if the child's mother has completed primary school education
Incomplete Secondary	Indicator variable taking the value one if the child's mother has not completed secondary school
Complete Secondary	Indicator variable taking the value one if the child's mother has completed secondary school
Father's Education	
Incomplete Primary	Indicator variable taking the value one if the child's father has not completed primary school
Complete Primary	Indicator variable taking the value one if the child's father has completed primary school education
Incomplete Secondary	Indicator variable taking the value one if the child's father has not completed secondary school
Complete Secondary	Indicator variable taking the value one if the child's father has completed secondary school
<i>Wealth index</i>	
Poorer	Indicator variable taking the value one if the child lives in a household ranked in the second quintile of wealth
Middle	Indicator variable taking the value one if the child lives in a household ranked in the three quintile of wealth
Richer	Indicator variable taking the value one if the child lives in a household in the fourth quintile of wealth
Richest	Indicator variable taking the value one if the child lives in a household in the fifth quintile of wealth
<i>Distance to School</i>	

Time to the nearest primary school in community	
>=twenty minutes	Indicator variable taking the value one if the child lives more at least twenty minutes or more from the nearest primary school
Time to the nearest secondary school in community	
>=twenty minutes	Indicator variable taking the value one if the child lives more at least twenty minutes or more from the nearest secondary school

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**Appendix Table 1** (continued)

Variable Name	Definition
<i>Sibling Composition</i>	
One Older Brother	Indicator variable taking the value one if the child has one older brother
Two Older Brothers	Indicator variable taking the value one if the child has two or more older brother
One Older Sister	Indicator variable taking the value one if the child has one older sister
Two Older Sisters	Indicator variable taking the value one if the child has two or more older sister
Total number of kids in a household	Number of individuals in the household who were below age eighteen.
<i>Religion</i>	
Christianity	Indicator variable taking the value one if the child's religion is Christianity
Traditional & Other	Indicator variable taking the value one if the child's religion is traditional and other
<i>Parent/Guardian's Attitude</i>	
Agrees children can be kept home for work/help, if necessary	Indicator variable taking the value one if the parent or guardian of a child agree that children should be kept home for work or housework, whenever necessary
Agrees boys schooling more important	Indicator variable taking the value one if the parent or guardian of a child agree that it is more important for a boy to attend school than a girl

Appendix Table 2 - Means, Standard Deviations and Ranges for all Variables

Variables		Min	Max
Male	0.52 (0.49)	0	1
Female (Ref.)	0.48 (0.49)	0	1
Urban	0.31 (0.46)	0	1
Rural (Ref.)	0.69 (0.46)	0	1
Mother's Education Zero education (Ref.)	0.58 (0.49)	0	1
Incomplete Primary	0.08 (0.27)	0	1
Complete Primary	0.15 (0.35)	0	1
Incomplete Secondary	0.10 (0.30)	0	1
Complete Secondary & Higher	0.08 (0.28)	0	1
Father's Education Zero education (Ref.)	0.44 (0.49)	0	1
Incomplete Primary	0.12 (0.32)	0	1
Complete Primary	0.14 (0.34)	0	1
Incomplete Secondary	0.12 (0.32)	0	1
Complete Secondary & Higher	0.15 (0.36)	0	1
Time to the nearest primary school in community < twenty minutes (Ref.)	0.76	0	1

	(0.42)		
>=twenty minutes	0.23 (0.42)	0	1
Time to the nearest secondary school in community < twenty minutes (Ref.)	0.29 (0.45)	0	1
>=twenty minutes	0.71 (0.45)	0	1
Wealth Index Poorest (Ref.)	0.23 (0.42)	0	1
Poorer	0.22 (0.41)	0	1
Middle	0.20 (0.40)	0	1
Richer	0.18 (0.38)	0	1
Richest	0.16 (0.36)	0	1
Sibling Composition zero older brothers (Ref.)	0.41 (0.49)	0	1
one older brother	0.29 (0.45)	0	1
two older brothers	0.30 (0.45)	0	1
zero younger brothers (Ref.)	0.21 (0.40)	0	1
one younger brother	0.32 (0.46)	0	1
two younger brothers	0.47 (0.49)	0	1
zero older sisters (Ref.)	0.41 (0.49)	0	1

one older sister	0.28 (0.45)	0	1
two older sisters	0.30 (0.45)	0	1
zero younger sisters (Ref.)	0.23 (0.42)	0	1
one younger sister	0.31 (0.46)	0	1
two younger sisters	0.45 (0.49)	0	1
Total number of children in household	5.25 (2.14)	1	10
Religion			
Muslim (Ref.)	0.62 (0.48)	0	1
Christianity	0.37 (0.48)	0	1
Traditional & Other	0.003 (0.05)	0	1
Parent/Guardian's Attitude			
agrees children can be kept home for work/help, if necessary	0.25 (0.43)	0	1
disagrees (Ref.)	0.75 (0.43)	0	1
agrees boys schooling more important	0.40 (0.49)	0	1
disagree (Ref.)	0.60 (0.49)	0	1
Dependent Variable			
answered yes- currently attending school	0.67 (0.46)	0	1
grade progression -coded "1" if behind (N=3350)	0.18 (0.38)	0	1

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Note: N=4851. Standard deviations are in parentheses.

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