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School Attendance at Basic Education in West Africa

by

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ABSTRACT

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The proportion of children entering primary school at the stipulated age in 2010 in Sub-Saharan Africa was 57%. For the same year, the net attendance ratios for primary and lower secondary education were 76% and 47% respectively. These figures are correlated in that delayed school enrolment increases the risk of dropout which in turn shortens the school life expectancy for children. These observations are the motivation behind this research. By writing this thesis, three substantive research questions have been explored: (1) what is Sierra Leone's progress towards achieving universal basic education (2) what are the determinants of school attendance at basic education in West Africa and (3) does living in a community with more educated mothers enhance children's school attendance at basic education. Three countries have been used: Sierra Leone, Liberia, and Ghana. Sierra Leone and Liberia have been used to reflect poor and post-conflict states with transitional and premature education systems respectively. Ghana is representative of middle income and politically stable countries with more advanced education systems in the region. The most recent Demographic and Health Survey for the three countries are used for analysis.

Four empirical chapters are presented. The first chapter addresses research question 1. It applies simple statistical analyses to United Nations indicators for evaluating progress towards universal education. The second and third chapters answer the second research question and the final chapter answers the third research question. These three chapters employ multilevel statistical techniques to model the determinants of primary and junior secondary school attendance. The second empirical chapter focuses on the interaction between household and community poverty with the aim of investigating whether the attendance of poor children suffers more than affluent children by residing in a poor community. The third empirical chapter explores the determinants of junior secondary school attendance with the aim of deducing whether there are significant differences between post-conflict countries and more stable countries. The final chapter focuses on the relationship between mothers' education and school attendance at basic education, arguing that living in a community with a high proportion of more educated mothers enhances the likelihood that a child will attend school, irrespective of the child's background.

The results from the first chapter show that the realisation of UBE is distant in Sierra Leone. There has been a decline in the number of children entering primary education; junior secondary education has however doubled although it remains low at 21%. Children from the poorest households are the most excluded from school followed by rural children and girls. The results from the second empirical chapter showed that there is a significant interaction between household and community poverty where poor children living in poor communities experience a greater depreciation in their probability of attending school than more affluent children who live in the same deprived environment in Sierra Leone. No such interaction was found in Liberia or Ghana. In the third empirical chapter, the sex of the child, agricultural livelihood within a community, household wealth and area of residence were significant in Sierra Leone and Liberia. In Ghana, sex of the household head and maternal orphanhood were significant. The hypothesis of the relationship between mothers' community education and children's school attendance for the final empirical chapter was confirmed.

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Declaration of Authorship

I, Mamusu Kamanda, declare that this thesis, 'School Attendance at Basic Education in West Africa', and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;

3. Where I have consulted the published work of others, this is always clearly attributed;

4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;

5. I have acknowledged all main sources of help;

6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;

7. None of this work has been published before submission

Signed:

Date: 15/05/2014

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Definitions and Abbreviations

AGSP	Ambassadors Girls' scholarship program
BECE	Basic Education Certificate Examination
CREPS	Complementary Rapid Education for Primary Schools
DHS	Demographic and Health Survey
EA	Enumeration Area
EFA	Education for All
FCUBE	Free Compulsory Universal Basic Education Policy
FSS	Female Secondary Stipend
GAR	Gross Attendance Rate
GER	Gross Enrolment Rate
GhDHS	Ghana Demographic and Health Survey
GnDHS	Guinea Demographic and Health Survey
GoGh	Government of Ghana
GoL	Government of Sierra Leone
GoSL	Government of Liberia
GPI	Gender Party Index
IHS	Integrated Household Survey
JSS	Junior Secondary School
JSS1	Junior secondary school grade one
JSS3	Junior secondary school grade three
LDHS	Liberia Demographic and Health Survey
MDG	Millennium Development Goal
MQL	Marginal quasi-likelihood approximation
MRR	Mano River Region
NAR	Net Attendance Rate
NDHS	Nigeria Demographic and Health Survey
NEMP	National Education Master Plan

NER	Net Enrolment Rate
NPSE	National Primary School Examination
P1	Primary school grade one
P6	Primary school grade six
PSU	Primary Sampling Units
PQL	Penalized quasi-likelihood
SfCG	Search for Common Ground
SLDHS	Sierra Leone Demographic and Health Survey
SLIHS	Sierra Leone Integrated Household Survey
SSS	Senior Secondary Schools
UBE	Universal Basic Education
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education
WASSCE	West Africa Senior School Certificate Examination
WHO	World Health Organisation

1. Introduction

1.1. Statement of the problem

In the year 2000 at the World Education Forum in Dakar, Senegal, the international community pledged to make primary education accessible to all children irrespective of the child's attributes, position in life or area of location by the year 2015 (United Nations Educational Scientific and Cultural Organisation (UNESCO) 2000). This promise was championed in the United Nations Education, Science, and Cultural Organisation's (UNESCO) commitment to the second Millennium Development Goal (MDG), Education for All (EFA). The EFA framework defines six goals relating specifically to: early and childhood care (goal 1), universal primary education (UPE, goal 2), youth and adult learning (goal 3), literacy (goal 4), gender parity and equality in education (goal 5), and education quality (goal 6) (UNESCO 2000). Among these, three have received paramount attention both in scholarly research and by the international community: UPE, equal gender parity, and education quality. Since 2000, governments across the developing world have demonstrated their support for EFA by implementing UPE policies such as compulsory and free basic education, pro-poor and gender friendly policies like cash transfer schemes, scholarship programs, school feeding programs and girls' only scholarships (World Bank 2009; World Bank 2004a). These policies have expanded access to primary education and, in some cases, have improved secondary school participation (World Bank 2010a; World Bank 2008a). Through expansion, social groups that were marginalised from entering the education system pre-EFA, particularly girls, have now gained wider access to school (Grant and Behrman 2010; Knodel and Jones 1996). In spite of these developments, education remains inaccessible to many children especially those in West Africa (refer to Figure 1-1). In this region at least, the ambition of EFA will not materialise by the year 2015.

Figure 1-1: Net attendance rates for countries in Sub-Saharan Africa, 2008
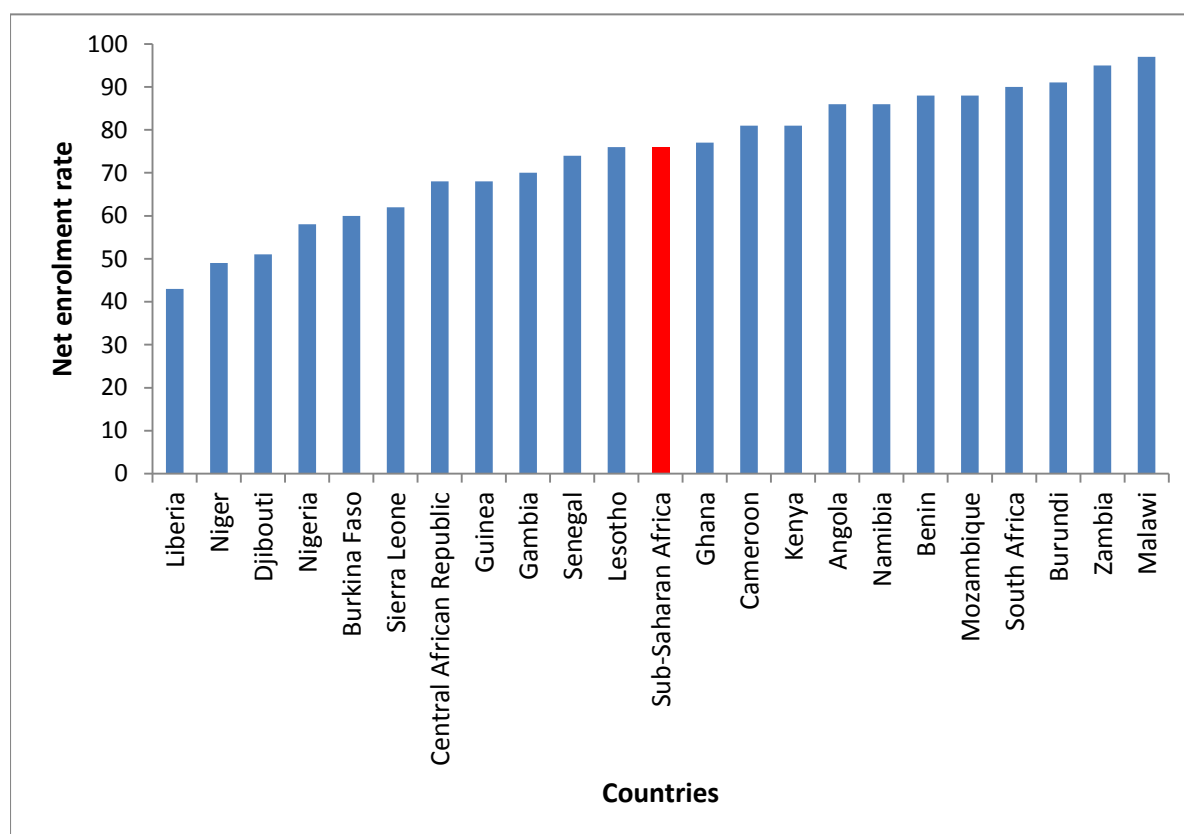
Source: UNESCO Institute of Statistics 2008

Education is widely recognised as a fundamental human right. Low levels of education have been shown to be correlated with high levels of mortality, fertility, and poverty at both household and national levels (UNESCO 2010a; Tilak 2007; Caldwell 1980). Educated women are commonly found to be more likely to delay child bearing and have fewer children than uneducated women (Almeida and Aquino 2009; Martin 1995). This means that women with higher levels of education are more likely to have better health and are more likely to provide better care for their children. Further, evidence suggests that children with educated household heads, and in particular educated mothers, are significantly less likely to reside in a poor household, thus have better health, and are more likely to have attended school and have higher learning outcomes (UNESCO 2011a: 34-36; Glick and Sahn 2000). Education, therefore, is an area worthy of study because of its central role in human, social, and economic development.

The research presented in this thesis investigates the level of school attendance and the determinants of attending school at basic education among children of official school going age in West Africa. Three substantive questions are explored:

1. What is the progress towards achieving Universal Basic Education in Sierra Leone?
2. What are the determinants of school attendance at basic education in West Africa?
3. Does living in a community with more educated mothers enhance children's school attendance at basic education?

The motivation for this research is three-fold. Firstly, in spite of many efforts to expand access to basic education, countries in West Africa are unlikely to achieve universal education by 2015 (UNESCO 2011a). In Sierra Leone, no research has investigated the country's progress towards universal basic education. Little is also known about the patterns of attendance among children of official school going age. As the deadline for EFA draws closer, it is important to have an understanding of levels and patterns of attendance. Such an understanding may help to identify those areas which are in most need of attention and thus inform future policy intervention.

Secondly, there is a scarcity of research on the determinants of school attendance in West Africa. In Sierra Leone and Liberia especially, there is a lack of evidence as to how the household and community environments affect decisions to invest in a child's education. The possible interaction of factors between these two levels has also been rarely explored. While supply side determinants like school availability, quality of schools and access to learning materials might influence whether a child is sent to school, research from Sub-Saharan Africa has shown that the contribution of demand side factors are much stronger predictors of school attendance (Kazeem et al 2010; Lloyd and Hewett 2009; Okumu et al 2008). Therefore, in West Africa, where the decision to enrol a child in school is likely to be predominantly undertaken by the household, it is important to understand the factors which have the strongest association with school attendance. In doing so, it is also of interest to expand the current scope of educational studies in West Africa by exploring the relationship between community environment and school attendance.

The final motivation for this research is the theoretical underpinning of the strong correlation between education and development. Educational attainment has often been accorded a significant position in determining personal and national development. Specifically, as noted above, it is positively associated with economic progress and increase in wellbeing; hence, education is inversely associated with poverty at the household, community and national levels. Therefore, it is to be expected that higher levels of educational attainment will see the gradual erosion of poverty, another aim of the MDGs. Countries in West Africa, particularly post-conflict states like Sierra Leone and Liberia, have consistently featured at the bottom of the human development index (United Nations Development Programme (UNDP) 2011). These countries have high levels of fertility, mortality, poverty, and illiteracy. Since education is inversely associated with these indicators, it is plausible to assume that improving current levels of educational attainment will result in the long-term to the enhancement of these indicators. In order to improve educational attainment, it is imperative to not only have knowledge of the state of the education system but also to have some awareness of the correlates of school attendance. The undertaking of the research presented in this thesis is guided by these considerations.

1.2. What is the progress towards achieving universal basic education in Sierra Leone?

Universal basic education (UBE) aims to ensure that all children have access to a complete free and compulsory education of good quality. The realisation of this goal remains distant in Sierra Leone. There are many reasons for this. Firstly, few children enter school at the stipulated school entry age (Government of Sierra Leone (GoSL) 2010; GoSL 2006a). Research has shown that delayed entry to school undermines the process of UBE through high attrition rates whereby children exit prematurely from school without acquiring durable literacy and numeracy skills to enable them to engage in gainful employment (UNESCO 2011a). Where children leave school with minimal skills, they are more likely to relapse into a state of illiteracy and thus are more likely to become or remain poor (King et al 2007; Wedgwood 2007). Hence, net intake in the first grade of primary education is important if UBE is to be realised. Secondly, the proportion of children of official school going age attending primary school is far from being universal and has shown worrying signs of deterioration to date (World Bank 2007). Results from survey data reveals that net primary

school attendance declined from 75% to 61% between 2004 and 2008 in the country (GoSL 2009; GoSL 2007a). This suggests that more children who are of the required age are now out of school than in the past. Thirdly, wide inequalities between regions and between social groups are persistent in the country's education system meaning that education remains inaccessible to many children (World Bank 2007). The state of education in Sierra Leone therefore does not lead one to conclude that UBE will be easily met. Assessing the patterns of school attendance with a primary focus on disparities in access may prove useful in identifying those groups and regions that continue to be excluded from the country's education system.

This first research question aims to assess Sierra Leone progress towards universal basic education in Sierra Leone. Progress is not evaluated in this thesis through the use of longitudinal data as there is no educational data in this form in the country. Rather, two cross-sectional sources of survey data – 2003/04 Sierra Leone Integrated Household Survey and 2008 Sierra Leone Household and Demographic Survey – are used to enable a comparison of attendance ratios for the period before and after the introduction of free primary education in the country. No study of this design has been undertaken in the country. An earlier research by the World Bank (2007) provided the most detailed account of the education system in Sierra Leone in the post-war era. The study focused disproportionately on supply side factors such as government educational policy, institutional structures, human resource qualification and capacity, infrastructural capacity, and systems of governance and management. The study also presented basic statistics on patterns of school enrolment and attendance at the national level as well as by area of residence, by household wealth, and by sex.

The World Bank's study differs to the present research in many respects. Firstly, the current study is an analysis of school attendance in Sierra Leone using the EFA policy as a framework. The World Bank's research, although it presented data on attendance ratio, was concerned with documenting the supply side structure of the education system. Further, the study was not an assessment of the country's progress towards UBE as is the case in the current study. Secondly, in its analysis of net attendance ratios, the World Bank's research presented a country specific study on Sierra Leone and did not perform a comparative

analysis with other West African countries. The present study, however, does undertake this analysis. Finally, the World Bank research did not explore the relative disparities between sexes, household wealth quintile groups and area of residence in net attendance ratio. The study instead presented gross enrolment ratios by sex, region and household wealth without highlighting the relevance of these findings to the UBE policy.

1.3. What are the determinants of school attendance at basic education in West Africa?

In West Africa (as in other developing regions) many children do not attend primary school, and even greater proportions are found not to attend secondary school (UNESCO 2011a; Gibbons et al 2003). To the extent that the level of education is positively associated with personal development, greater wellbeing and acquisition of advanced training, the state of education in West Africa suggests that children in this region are more likely to live in poorer households and communities with higher levels of deprivation (UNICEF 2011; Tuwor and Sossou 2008). The conditions present in such settings (poor infrastructure, prevalence of traditional cultural values, fewer opportunities of gainful employment, higher mortality and fertility levels, farming and agricultural livelihoods) create an environment in which the opportunity costs of education as well as the direct/indirect costs of education far exceed the perceived benefits of schooling (Grimm 2011; Admassie 2002; Glick and Sahn 2000). These factors depress the demand for children's schooling so that: (1) households do not ever send their children to school (2) households postpone sending their children to school and (3) households send their children to school but remove them before, upon or shortly after completing primary school instruction (UNESCO 2011a; Lewin 2009). It follows that the environment in which a child lives has a significant bearing on his/her prospect of attending school and thus enjoying the right to an education.

The second research question addressed in this thesis aims to investigate the determinants of school attendance at basic education with a focus on household and community environment. An understanding of the contextual demand side factors which affect school attendance with reference to the West African region is important for two principal reasons. To begin with, the region has yet to attain universal education. Since the onset of the EFA policy, there has

been some increase in primary school enrolments (World Bank 2009). However, this increment has been the result of over-age enrolment whereby older children have started to attend school while few children of the stipulated age have entered school (Lewin and Sabates 2012). At the secondary school level, few children, particularly those of the official attending age, attend school. This is not unexpected because secondary education in this region is, in practice, not compulsory or free meaning greater competition for admission (World Bank 2008a).

Against this background of low school participation, the second motive for investigating the contextual factors which affect school attendance is that the decision to educate a child is primarily determined by household and community level environment. In developing countries, the decision to enrol a child in school is not solely dependent on the child's individual characteristics. Rather, as studies have demonstrated, the choice is undertaken by the household (Moyi 2010; Mukherjee and Das 2008; Guimbert et al 2008). If conditions in the household are not conducive to investment in schooling or parents are not convinced of the value of education, the decision to enrol a child may be less likely. Research has commonly found that households that are large (Baschieri and Falkingham 2009; Knodel and Wongsith 1991), have little disposal income (Chudgar and Shafiq 2010; Huebler 2008), are located in rural/farming settings (Roby et al 2009), and have lower educational attainment (Greenberg 2011; Huisman and Smits 2009), are significantly less likely to sponsor a child's schooling. Notwithstanding, even where households can afford and do wish to educate their children, the community in which they live may lack the infrastructure or normative values to enable them to do so. For instance, the likelihood of a child from a large poor household attending school may be improved by residing in a community where there is high educational attainment or where there is greater access to quality schools (UNESCO 2004a; Handa 2002). By the same token, a child from a small household with educated parents may have a lower probability of attending school by living in a community which lacks access to school or in which infrastructure is poorly developed (Huang 2010; Hazarika 2001). Therefore, the context in which children reside can have a significant bearing on whether they attend school or not.

In analysing the household and community determinants of school attendance, this research focuses on two specific questions:

1. Does living in poor communities disadvantage poor children more than affluent in attending primary school?
2. What are the determinants of junior secondary school attendance in post-conflict and non-post-conflict countries in West Africa?

Many studies have highlighted the negative relationship between poverty and school attendance (Lloyd and Hewett 2009; Filmer and Pritchett 1999). However, there is a lack of understanding as to whether there is an interaction between household and community poverty where children from poor households experience a greater disadvantage than more affluent children who live in the same poor community. This question is important because household poverty has often been found to be a leading cause of educational exclusion and as such pro-poor education policies have often tried to relieve households from the cost of sending a child to school. If, however, it can be shown that the community in which a child lives has a stronger association with his/her chances of receiving an education, it would indicate that irrespective of individual and household characteristics, a child's likelihood of attending school is significantly reduced by living in a community that is poor and resource deprived. This would imply further that community programs and development, rather than interventions directed to the household, will have a more pronounced impact on school attendance (Hossain 2010; Cueto and Chinen 2008).

Sierra Leone, Liberia, and Ghana are used as case studies for these analyses. In Liberia and Sierra Leone, there has been little research on education among which there has been a limited focus on the demand side factors which affect school participation (Boas and Hatloy 2008). For instance, in Sierra Leone, a study by Chapman and Mushlin (2008) provided evidence to suggest that schooling costs were associated with school attendance. The study presented an appraisal of the impact of the Ambassadors Girls' Scholarship Program (AGSP) on girls' school attendance. It showed that the scholarship 'contributed to improved attendance, motivated girls to attend school the following year, and allowed parents of the older children to put off early marriage for some daughters' (Chapman and Mushlin 2008:

465). The World Bank (2007: 120) study cited above also showed that school attendance was positively associated with household expenditure quintile such that children in the poorest quintile had the lowest attendance ratios compared to those in richer quintiles. These two studies provide a useful indication of some of the factors, such as household wealth, which affect school attendance. However, they differ markedly to the ambitions of the present research. Notably, the reviewed research does not investigate the association between school attendance and household or community context. Rather, they present basic statistics to show the distribution of attendance ratios by household wealth (in the case of the World Bank) and draw inferences from the impact of a scholarship program as to the possible impact of poverty on school attendance (as done by Chapman and Mushlin). There continues to be, therefore, a limited understanding of the association between demand side factors and school participation in Sierra Leone with particular emphasis on household and community context.

Relative to Liberia and Sierra Leone, a number of studies have been conducted on the Ghanaian education system especially since the launch of EFA (Ampiah and Adu-Yeboah 2009; Rolleston 2009; Yamada and Ampiah 2009). To illustrate, Yamada and Ampiah (2009) showed that in spite of a strong household and community desire to support children's educational participation, access to secondary school (especially those of high quality) was determined mainly by the level of affluence in the context that a child lived. This meant that children from poor households could not afford to attend secondary school or, if they were able to attend, were more likely to attend those with poorer facilities and lower levels of achievement. Other recent studies commenting on the EFA policy have argued that, even in the aftermath of compulsory and free primary education, children from poor backgrounds and rural settings continue to be marginalised in the Ghanaian education system: 'the primary school attendance deficit continues to be concentrated among children from the poorest households' (Akyeampong 2009a: 182). Notwithstanding, in Ghana, as in Sierra Leone and Liberia, little empirical research has been done to study the contextual determinants of education.

1.4. Does living in a community with more educated mothers enhance children's school attendance?

There is an intergenerational effect of education on children's schooling (Magnuson et al 2009; Ferjan et al 2008). Using longitudinal sources of data, studies in developed countries have demonstrated that parents' educational attainment is positively associated with children's schooling (Morrison 2009; Kim and Schneider 2005; Ramey and Ramey 2004). This relationship is not unexpected for a number of reasons. To begin with, education is highly correlated with income so that parents with higher educational attainment are more likely to have higher incomes relative to those with lower educational attainment (Haveman and Smeeding 2006). Educated parents are therefore more able to invest in their children's schooling because they have the resources to afford the costs of education. Also, the opportunity costs of sending a child to school such as foregoing a child's economic contribution to the household are lower among this group than among those of lower levels of education because they are less dependent on children's labour for meeting subsistence. Secondly, educated parents are more likely to place a greater value on educational success and as such will have higher expectations of their children than their counterparts (Oketch et al 2012; Sewell and Shah 1968). Thirdly, education enhances social networks, cognitive skills and awareness of the operation of the school system (Augustine et al 2009; Ganzach 2000). This means that educated parents are better placed to draw on their acquired social and human capital to ensure that their children are enrolled in school. Also, because they are more likely to be aware of the structure and policies of the school system, educated parents are less likely to delay their children's entry to school.

The relationship between parents' education and children's education has also been observed in developing regions signalling that there may also be a significant relationship between parents' education and children's school attendance in poorer countries (Guimbert et al 2008; Mukherjee and Das 2008). In Guinea, for instance, a study by Glick and Sahn (2000) investigated the household factors which are associated with attending school. The study found a significant positive correlation between school attendance and parents' educational attainment. In Glick and Shan's study, as in other studies in developing contexts, parents' education has been used as a control for household socio-economic status rather than being the primary focus of investigation as has been the case in research in developed

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countries (Nishimura et al 2008). Further, these studies have not considered whether the relationship observed at the household level between parents' education and children's school attendance operates at the community level.

The analysis for this research question investigates whether living in communities with more educated parents', specifically mothers', enhances the likelihood that a child attends school. It is assumed here that the relationship between mothers' community education and children's school attendance operates mainly through the knowledge acquired through formal education. This hypothesis argues that formal education improves women's knowledge and attitudes and so the higher the level of attainment, the greater the acquisition of knowledge and the more receptive women are to progressive modern behaviour. Women who have been formally educated are more likely to have access to information that enables them to ensure that their children are sent to school at the correct age and progress through the school system accordingly. It follows that children who have educated mothers are significantly more likely than those whose mothers have lower educational attainment to attend and remain in school (Huisman and Smits 2009; Glick and Sahn 2000). This relationship may operate at the community level where children who live in a community with more educated mothers, and whose mothers may not be educated to a high level, will benefit from the positive attributes of more educated mothers discussed above (Weir 2007; World Bank 2005; Bommier and Lambert 2000). The statistical significance of this relationship would suggest that the attributes associated with educated mothers prevail at the community level. This would imply further that irrespective of a child's individual level characteristics or the level of education of his/her parents, his/her likelihood of being educated is significantly improved by residing in a community in which there is a high level of educated mothers relative to if he/she lived in a community with a low level of maternal education.

Studies which have looked at the relationship between children's schooling and parents' education have often noted that fathers' education has a stronger relationship with children's educational attainment and school outcomes (Kazeem et al 2010; Nguyen 2006; Brown and Park 2002). The decision to focus on mothers' education in this thesis does not dispute that this difference between maternal and paternal education might exist. Rather, it is argued

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here that in Sierra Leone, as is the case in many African societies, fathers' level of education is strongly associated with household income and so more educated fathers will have higher incomes meaning they have more resources to invest in education. The relationship between children's school attendance and fathers' education is mainly an economic one because it is fathers who primarily finance children's participation in school (Weir 2007; Case and Ardington 2006). To the extent more educated men are more likely to marry more educated women; the omission of fathers' education may lead to an upward bias in the estimate of the relationship between school attendance and mothers' education (Sen and Clemente 2010). To reduce this likelihood, household wealth – which is strongly related to fathers' education – is controlled for in the analyses for this final research question.

Mothers' education, though also related to employment and income, is unlikely to displace the strong economic role of the father in African households. The relationship between mothers' education and children's schooling in such settings may operate through a normative channel where more educated mothers transmit the knowledge which they have acquired through formal education to their children. Assuming this position, it could be argued that mothers' education could operate beyond the household level as the values and knowledge of more educated mothers can be diffused through interaction processes between mothers living in the same community.

Sierra Leone has low literacy levels with a small proportion of the population being able to fluently read and write (World Bank 2007; GoSL 2006a). The poor levels of literacy are directly related to low educational attainments which, in turn, have been adversely affected by a decade long civil war, a slow post-war reconstruction process, insufficient infrastructural and institutional schooling supplies, and pervasive levels of poverty (GoSL 2010). The intergenerational relationship between parents' education and children's schooling described above suggests that not only do children of educated parents remain in school for longer periods and have higher achievement levels, but also that the offspring of these children will follow similar successful educational trajectories. This transmission of educational advantage among the educated means that subsequent generations of children belonging to this class will be schooled thereby increasing the level of education of the populace in the future. Against this background, understanding the ways in which children's

school attendance is affected by parents' education may prove useful in promoting the demand for primary and secondary education in Sierra Leone. To date, no research of this design has been conducted in the country.

1.5. Structure of thesis

The thesis is divided into nine chapters including four empirical chapters. The present chapter has introduced the reader to the focus of the thesis and the research questions that will frame the subsequent analyses. The next chapter provides a nuanced review of literature in educational research with the aim of highlighting areas for further research and to introduce the reader to wider research in the field of international education. The chapter that follows describes the data sources that are used for the research, and the chapter which succeeds that is the first empirical chapter. Chapter 4 explores Sierra Leone's progress towards universal basic. In chapter 5, the relationship between household and community poverty and its association with primary school attendance is explored. In chapter 6, the determinants of junior secondary education are studied with the task of highlighting differences between post-conflict and more stable countries in West Africa. The final empirical chapter focuses on the association between children's school attendance and the level of mothers' community education. Chapter 8 discusses the results from the four empirical chapters and the findings are situated in previous educational research. The final chapter presents a brief summary of the key findings from the thesis.

2. Literature review

This chapter is structured into four sections. The first section reviews research into the implementation of the Education for All policy. The findings and methods applied in these studies are discussed with specific focus on the indicators which are used to assess UPE. The second section reviews literature on the determinants of school attendance using an analytical framework of the demand and supply side factors which affect school participation. Particular attention is placed on demand side factors at the household and community levels. The third section reviews educational research on parents' education.

2.1. Assessing Education for All

Education for All is a policy framework developed in 1990 in Jomtien, Thailand, by member states of UNESCO. The policy was reaffirmed in 2000 at the World Education Forum in Dakar, Senegal. It aimed to expand access to education for all social groups. Six goals are outlined in the framework to be achieved by the year 2015 including: early and childhood care (goal 1), universal primary education (UPE, goal 2), youth and adult learning (goal 3), literacy (goal 4), gender parity and equality in education (goal 5), and education quality (goal 6) (UNESCO 2000). EFA goal 2 has taken centre stage on the agenda for educational development. This emphasis has been followed by a resilient effort to achieve equal gender parity in educational participation as well as educational attainment. Commitment to these two goals has, for some duration, diverted attention and therefore investment into ensuring that the expansion in education has been concomitant with sustained quality in education. In recent years, research has highlighted the deficit in educational quality, a failure which threatens to undermine the developmental prism upon which the EFA goals are based. The most recent EFA Global Monitoring Report publication vehemently makes clear: 'the world is not on track to achieve Education for All targets set for 2015' (UNESCO 2011a: 1). The statement is unsurprising for it is in resonance with findings from previous Monitoring Reports and is consistent with evidence in scholarly research.

Studies into the EFA policy have often focused on the impact of UPE policies on expanding access. Thematically, such research have assessed patterns in total enrolment, changes in female participation rates relative to male participation rates, and the impact of increases in enrolment rates on educational quality. The indicators used to measure progress towards the EFA goals are many and varied. Table 3-1 provides a summary of the indicators which are commonly used in research to assess the impact of EFA policies.

A number of indicators have been used to assess the effect of UPE policies on school participation rates. The most commonly used indicators are the gross enrolment/attendance ratio and the net enrolment/attendance ratio. Enrolment ratios refer to the number of children who are enrolled in school. Estimates of this indicator are commonly computed using national administrative data as a count of children of school going age, and the total number of children enrolled on school registers is required to produce the estimate. Survey data can also be used to compute the indicator by asking questions about enrolment and age. Attendance ratios, by comparison, refer not to the number of children enrolled but to the number of children attending school. The distinction is important because the two indicators can give very diverse implications of school participation. This is because in developing countries, it is not uncommon to have higher enrolment rates than attendance rates. The reason being that parents may enrol a child but that child may have infrequent attendance or indeed may not attend school at all meaning that participation rates may be inflated by enrolment rates. This problem is compounded by poor qualities of data collection and management systems in many developing countries. To minimise unreliability, the United Nations and the World Bank who commonly use enrolment rates as measures of access, employ both administrative data and survey data. The use of survey data is crucial in these contexts not simply because they provide estimates of enrolment/attendance but, for those countries that do not have a census, it gives an estimate of the number children in the population.

Table 2-1: Summary of indicators used to measure progress towards Education for All goals 2, 5, and 6

Education for All goals 2, 5, and 6	Aim of goal	Indicators commonly used to measure goal
Universal Primary Education: Goal 2	Ensure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to, and complete, free and compulsory primary education of good quality	1. Gross enrolment rate 2. Gross attendance rate 3. Net intake rate 4. Net enrolment rate 5. Net attendance rate 6. Participation rates by gender, household wealth, and area of residence 7. Survival rate to end of primary school 8. Completion rate
Equal gender participation in education: Goal 5	Eliminating gender disparities in primary and secondary education by 2005, and achieve gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality	1. Gender parity index 2. Participation rates by gender 3. Achievement rates by gender
Improve the quality of education: Goal 6	Improve all aspects of the quality of education and ensure excellence of all so that recognised and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills	1. Learning outcomes • Achievement in school examinations and tests 2. School capacity • Pupil (qualified) teacher ratio • Pupil classroom ratio • Pupil section ratio • Pupil desk ratio 3. Student flow • Cohort survival rates from grade 1 • Repetition rate • Dropout rate • Progression rate from primary to secondary education

Source: UNESCO 2009

There are two distinct types of enrolment and attendance rates: gross and net. Gross estimates are those which have an unbounded age specification as a numerator meaning they represent the number of children in school as a fraction of children of school-going age. Net estimates have a bounded age category: they represent the proportion of children of a particular age-group who are enrolled/attending school out of the same population the numerator refers. To exemplify, in countries where the stipulated primary school going age is 6-11 years, the gross estimate gives a ratio of all children in primary school divided by children aged 6-11 years old. The net estimate, on the other hand, will be the number of 6-11 year olds who are enrolled/attending primary school divided by all children of that age. The net estimate is arguably a better measure of assessing progress towards UPE because it takes into account the age-structure of enrolment/attendance and therefore is an indication of over-age or under-age enrolment/attendance. Notwithstanding, estimates of net enrolment/attendance do not reveal the grade in which children are enrolled/attending; they simply show the level of education in which a child is enrolled/attending. This means that a child of age 10, for instance, who should be attending grade 5 using the example above, could in fact be attending grade 1 or 2. The net attendance ratio does not reveal such instances of overage enrolment because the age of the child falls between the specified age-bound of 6-11 years. Other measures have therefore been used to complement this indicator.

In addition to the gross/net enrolment/attendance ratios, other indicators have been used to assess the impact of UPE on school participation. These include, for example, the net intake ratio which estimates the proportion of children of school entry age who are correctly enrolled/attending grade 1 of primary school, survival rates which indicate the proportion of children surviving to a particular grade as a fraction of those in the first grade of primary or secondary school, and completion rates which are a measure of the proportion of children completing primary or secondary education.

The next sets of indicators are those used to measure EFA goal 5. The most frequently used indicator is the GPI which measures the ratio of females to males enrolled/attending a particular level of education. As it is a ratio, the GPI can also be used to show the number of females to males dropping out, repeating a grade, completing a level of education or, entering

primary or secondary education. The percentage distribution of females and males by the different indicators can also be presented as a way to illustrate gender balance in participation.

The final sets of indicators are those used to measure EFA goal 6, quality of education. These fall into three categories (learning outcomes, school capacity, and student flow) and are an extension of those used to measure UPE. They simply indicate the efficiency of how students transit from grade-to-grade in the education system. Therefore, in addition to net intake, survival, and completion rates, the rate of grade repetition, attrition, progression from one grade to another, and transition from primary to secondary education are commonly used. Further to student flow, learning outcomes and the capacity of the school infrastructure to accommodate students can also be used to measure progress towards the quality of education. What follows in this section is a discussion of the findings from research conducted on EFA looking at enrolment rates, quality in education and, gender representation in education.

2.1.1. Universal Primary Education

In the developing world, research has demonstrated that policies relating to UPE have had an immediate and drastic impact on enrolment and school attendance. The abolition of school fees and introduction of capitation grants have especially been successful in stimulating high levels of enrolment. In many Sub-Saharan African countries, school enrolment at the primary level escalated in the immediate aftermath of the abolition of school fees: enrolment rates soared by 68% in Uganda, 23% in Ethiopia, 51% in Malawi, and 18% in Kenya (World Bank 2009: 4). In Ghana, capitation grants were introduced in 2004/05 to subsidise tuition fees at Kindergarten, primary and lower secondary school. Between 2004/05 and 2006/07 net enrolment increased by 17.3%, 19.5%, and 19.1% at kindergarten, primary school, and lower secondary school respectively in the country (World Bank 2009: 97). In Tanzania, net enrolment increased from 59% in 2000 to 95% in 2005 (Wedgwood 2007: 387). These figures suggest that UPE policies have contributed substantially to increasing the level of school participation. In spite of these developments, however, studies in general are in consensus that UPE has led to the depreciation of quality in education. Further, it is argued that the UPE campaign has not eliminated economic barriers to educational participation meaning that many poor and rural children remain excluded from access to school.

The quality of education offered to students has, in some instances, become deteriorated in the face of unprepared dramatic increases in education systems (Lewin 2009). The experience of many developing countries provides evidence to this effect. For instance, following the introduction of free primary education in Ethiopia, the pupil section ratio worsened from 63:1 in 1994/95 to 78.1 in 2004/05, and the pupil teacher ratio deteriorated from 33:1 in 1994/95 to 51:1 in 2004/05 (World Bank 2009: 57/8). Also, despite the huge surge in enrolment, 22.4% of grade 1 entrants did not proceed to grade 2 in the subsequent academic year in the country (World Bank 2009: 60). In Uganda, Nishimura et al (2008: 161) found that persistent problems of 'low internal efficiency and unequal quality of education' are prominent realities in the era of post-universal primary education. Testimony to this is the observation that more than 50% of students have repeated at least one grade in primary school, and just fewer than 25% of such students have repeated at least two primary school grades (2008: 161). Looking at Ghana, Rolleston (2009: 197) comments that in spite of the quantitative gains made in the country between 1991 and 2006, 'rates of progress through the system as well as rates of dropout showed no such improvements'. The author shows that over 25% of Ghanaian children fail to complete primary school and at least 50% do not attain a full junior secondary education (2009: 210). These failings in educational standards have been recorded in other countries including Nigeria (Sunal et al 2003), Malawi (Chimombo 2009), and Tanzania (Wedgwood 2007).

In the Tanzanian context, Wedgwood (2007: 387) argues that UPE has become synonymous with low quality education rather than universalization. The success of the policy in raising enrolment rates, he writes, translated into the over-crowding of classrooms, a large deficit in learning resources and school infrastructure, and a noticeable decline in teaching qualifications. The product of these adverse conditions were that contact hours of instruction decreased by 50%, double shift teaching became widespread, transition rates declined to deplorable standards, and repetition and attrition rates soared. Further, of students who complete primary school, only 20% now pass the final national examinations (2007: 386). Against this background, Wedgwood (2007: 386) notes that 'the fall in the quality of education caused parents to lose faith in the value of sending their children to school and made the initial progress towards achieving universal primary education unsustainable'.

The decline in the quality of education has also been echoed in studies looking at learning outcomes and the deliverance of teaching materials to students in the classroom. For learning outcomes, a study in South Africa analysed Grade 6 Systemic Numeracy and Literacy test data for 2007. The study found low overall pass rates and wide disparities between socio-economic groups: 1.7% of children from the poorest households passed the test compared to 34.8% of children from the least poor households (Gilmour and Soudien 2009: 286). Another study in northern Mozambique by McCowan (2010) records a decline in assessment results and in the level of interaction between instructors and students. The research showed that students spend 'the vast majority of their time listening without comprehension, copying without comprehension, and simply waiting' (2010: 513). The conclusion drawn from these studies is that although many children have gained physical access to a school environment, they do not acquire satisfactory training to master the intended curriculum; children's competence and achievement therefore remains low.

One of the approaches commonly adopted by developing countries as part of UPE is tuition free admission. This policy is based on the premise that removing or lowering the cost of schooling reduces the wealth bias that characterises access to primary education, and in particular, relieves economic constrains to school enrolment. Evidence suggests, however, that education could still remain a reserve for the rich from which poor children are excluded (Oketch et al 2010; Akyeampong 2009a). This is so because education opportunities for the poor continue to be limited because of credit constraints. In many countries, free primary education policies only subsidise tuition fees meaning that parents are still expected to bear the remaining direct and indirect costs of schooling. These remaining costs inhibit the participation of some groups (particularly poor households) in the education system and thus act as impediments to enrolment and equality in the quality of education received by different social groups. Another factor which depresses enrolment rates among poor households is that the quality of education accessible to this group is of such low standards that parents feel little inclination to make the sacrifice of foregoing their child's time or contributions to the household. This has been the case Sub-Saharan Africa.

In Ghana, Akyeampong (2009a: 181) shows that after the introduction of free basic education, schools introduced school levies to compensate for the lost revenue resulting from the abolition

of tuition fees. Under this new system, parents and communities became responsible for sponsoring their children's admission to school as well as the standard of education offered to their children. The result was that the adequacy of teaching facilities and quality of education offered to students became dependent 'on the wealth of surrounding communities' thus deepening inequalities in the education system (2009a: 181/82). Therefore, between 1998/99 and 2005, the difference in enrolment between the top and bottom quintiles widened from 21% to 32% (2009a: 183). Among girls aged 6-8 in rural areas, the gap in enrolment increased from 6% in 1998 to 26% in 2005 between the richest and the poorest households (2009a: 192).

The Ghanaian case is not an exception. In Kenya, research has shown that the abolition of fees did not translate into increased enrolment among the urban poor. Oketch et al's (2010) study on education in the slums of Nairobi shows that wealthy parents living in non-slum communities are choosing to enrol their children in high quality private schools as a result of the decline in state schooling resulting from the introduction of free education. The use of private schools among slum households is, then, involuntary; it has resulted from an exclusion from state schooling because of a lack of supply (2010: 31). A similar occurrence has been observed in Uganda. Penny et al's (2008) research in the country demonstrates that the UPE policy caused many poor parents to abandon state schools in favour of private schooling in order to access better quality education and better prospects for educational achievement for their children (2008: 275-81). Parents who could not afford to fund private education either withdrew their children or postponed the entry of those children who had yet to be enrolled.

The above case studies provide supportive evidence to suggest that poor households continue to be disadvantaged in education systems. To the extent that poor households are more likely to be located in rural and undeveloped areas, it has been the case that children from deprived areas and rural localities have also been marginalised in school participation. To illustrate, a study by the World Bank (2004a: 70) found that in Cote d'Ivoire, the completion rate for rural boys compared to rural girls was 48% and 17% respectively. Another study by the World Bank showed that on average in Ethiopia, 90% of urban children enrol in grade 1 compared to 45% of rural children (World Bank 2005: xxxviii). The urban and rural discrepancy is not confined to Sub-Saharan Africa. In Sri Lanka, a study by Ranasinghe and Hartog (2002: 628) found that living in an urban area relative to a rural area also increased a child's length of schooling.

Evidence, therefore, is in agreement that UPE policies have yet to succeed in expanding access to all children.

One of the objectives of UPE and goal 5 of the EFA policy is to eliminate gender disparities in education. The success of UPE in expanding access to primary education has, in many countries, led to increased participation of girls in education. Such progress has led some researchers like Knodel and Jones (1996) to argue that differences between sexes no longer warrant urgent policy attention because indices which measure the ratio of female to male enrolment are close to 1 in many developing countries. The authors argue that education policies informed by the 'gender gap' have become less necessary in the context of achieving UPE while other more pressing inequalities, such as that between socio-economic groups and areas of residence, have been more persistent. The supposition that educational inequalities between sexes is in decline and to a level of almost irrelevance has been reported by other researchers. For example, Grant and Behrman (2010) show that in almost all regions, except from West/Central Africa, the level of enrolment among girls is equal or similar to that for boys. This is because, despite a higher rate of ever-enrolment among boys, girls on average progress through primary school either at the same pace or faster than boys (2010: 85/86).

The argument proposed by Knodel and Jones as well as Grant and Behrman has some basis. In general, girls and boys do now have similar access rates and completion rates for primary education in developing countries (World Bank 2004a). Such progress should not however been taken to mean that girls and boys share similar experiences in schools. In some countries girls achieve far less than boys particularly at the secondary school level. In Tanzania, for example, Woods (2008: 429) shows that in spite of narrowing gaps in participation rates, the difference between sexes in examination performance has increased since 2001: in 2001, 87% of boys passed the new Form examination compared to 73% of girls, and by 2004, the gap had widened to 76% of boys and 57% of girls. Outside the Sub-Saharan context, research in rural Vietnam (Nguyen 2006) and rural China (Brown and Park 2002) have shown that boys are significantly more likely to progress through school than girls even when they perform poorly in assessments. The case for continued investment in female education can therefore still be made. Notwithstanding, this emphasis should not overshadow the graver inequalities which continue to exclude poor and rural children from schooling.

The current research adds to studies in the field of EFA by proposing to investigate the progress towards achieving universal basic education in post-conflict Sierra Leone. Much of the research cited above has focused on UPE, an attention rightly justified by the central significance of the policy in the EFA and wider Millennium Development Goal framework. In the case of Sierra Leone, two studies have been conducted which are relevant to the present discussion. The first is by the World Bank (2007) and the second is by Nishimuko (2007).

The World Bank study uses survey and administrative data to provide an overview of different aspects of the education system in the country including: educational coverage, quality of education, policy and delivery of educational services. To demonstrate the level of school participation, indicators such as the gross enrolment ratio, age-specific enrolment rates, and the net enrolment rate are used in the study. The quality of education is measured by looking at the learning environment, learning outcomes, and student flow. Student learning outcomes, as measured by the National Primary School Examination (NPSE), Basic Education Certificate Examination (BECE), and the West Africa Senior School Certificate Examination (WASSCE), are also presented. Further, estimates of student flow (rates of survival, transition, and completion) are calculated. Nishimuko's research uses qualitative methods – observation of schools and interviews – to investigative the impact of EFA on school quality. Questionnaires were also distributed to parents, pupils, and teachers. The study argues that the introduction of UPE without concomitant investment in the education sector has translated into a decline in teaching standards and learning outcomes.

The findings from these studies suggest that school attendance has improved in Sierra Leone but that this improvement in physical access has not translated to quality education. In 2004, enrolment ratios at the primary school level were as high as 75% according to the country's Integrated and Household Survey (IHS) although, as highlighted by the World Bank's study, this figure is widely discrepant from the figure of 64% recorded in the 2004 population and housing census. This difference is the product of older children enrolling in primary school as evident in the high gross enrolment and attendance figures compared with low net attendance ratios. The demand for primary education has not been met equally by the provision of schools

and the quality of instruction has been poor. The World Bank's (2007: 68) study showed that at least 60% of primary schools and 40% of secondary schools were still in need of major rehabilitation and reconstruction by 2004. Problems of the physical incapacity of schools was compounded by overcrowding to the extent that many pupils 'often resorted to sitting on stones or standing' whilst receiving instruction (World Bank 2007: 68). In schools, the quality of teaching that was offered to students was of a substandard level: 'all primary schools … had many difficulties in meeting the minimal conditions that schools need to provide for quality education' (Nishimuko 2007: 26). This was evident not only in the inadequate supply of teaching materials, and double shift system in which children are exposed to only four hours of instruction per weekday, but also to the number of unqualified as well as demotivated teaching staff (Nishimuko 2007; World Bank 2007).

Nishimuko's and the World Bank's research provide a useful insight into the state of education in Sierra Leone. In so doing, however, they fail to address what has been the country's progress towards universal basic education (UBE) since the cessation of the war. The policy of UBE is an extension of UPE in that it extends the rights which are granted under UPE to include junior secondary education. In Sierra Leone, there is a wide margin of difference between primary and secondary school attendance. To the extent that social and economic development is positively associated with educational attainment, it is important that studies explore beyond primary school attendance as post-primary education is more likely to equip children with more productive and specialised knowledge and skills than the primary level which tends to offer basic literacy and numeracy skills. In poor post-conflicts states such as Sierra Leone which have incurred great human casualties and infrastructural destruction during conflict, the education system is likely to be inadequate and educational attainment is likely to be extremely low. Whilst UPE is relevant in exposing populations to mass education, this policy must be seen as providing a foundation upon which developments should be made rather than being seen as an end product. That is, research should try to understand not only the extent to which UPE has expanded access but it should also try to understand the level of transition to higher levels of education. The first objective of this research therefore investigates Sierra Leone's progress towards universal basic education.

2.2. Determinants of children's school attendance

The factors that determine whether a child is enrolled in school and whether the child subsequently attends school are many and varied. Principally, they can be identified into two sections: demand and supply. Demand side factors are those which are related to the opportunity costs of education. These can operate at different analytical levels including the individual, household and community levels. The regional or district of location is also associated with school attendance although these tend to be reflected in community level environment. By comparison, supply side determinants refer to factors which relate to educational provision and deliverance. Each of these umbrella terms can be further separated into sub-sections which detail the levels at which the determining factors operate. Figure 2-1 provides an analytical framework for analysing the determinants of school attendance.

Figure 2-1: Analytical framework for analysing determinants of school attendance
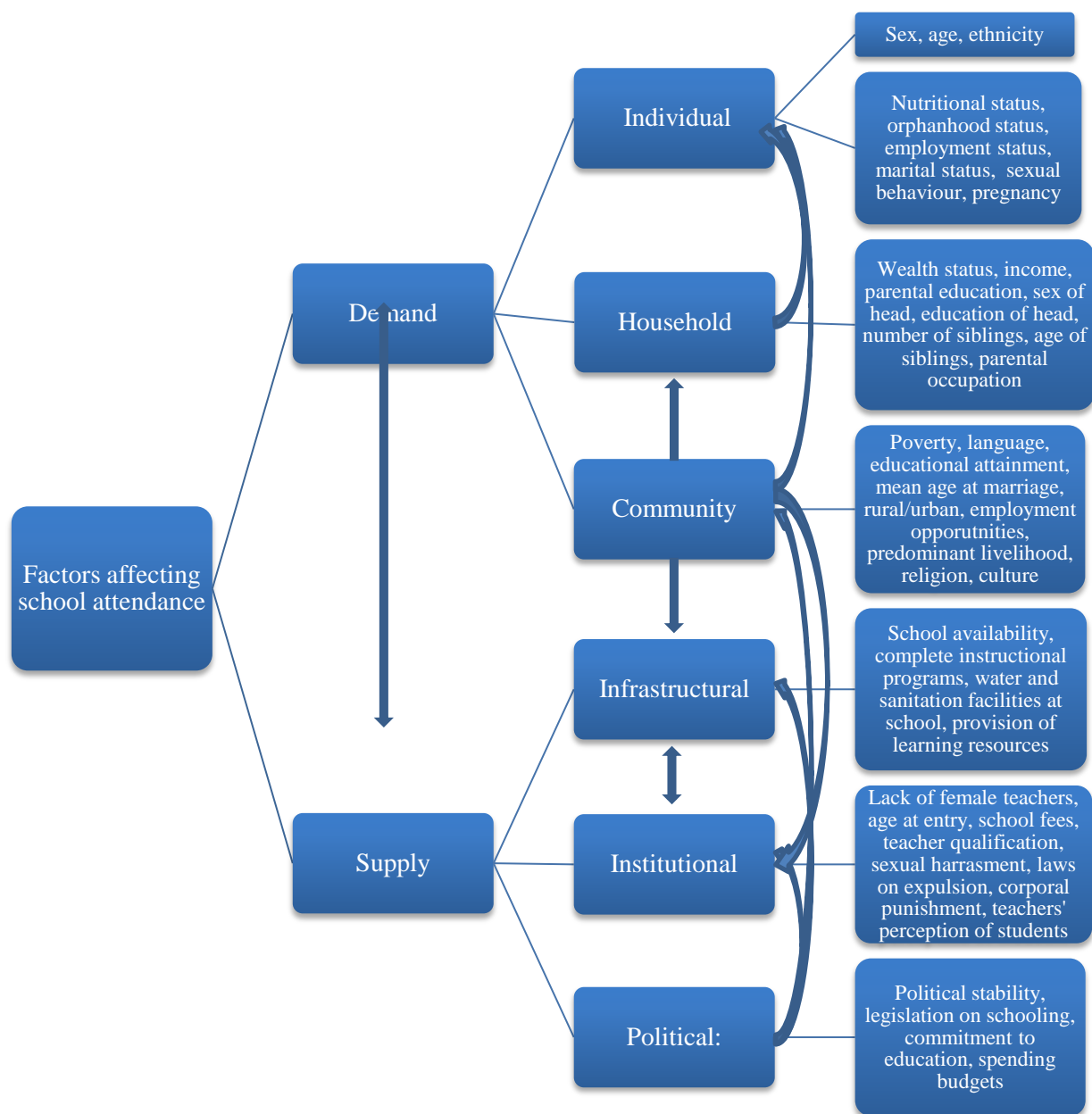
Note: Framework was designed by author based on review of literature

The remaining of this section presents a detailed analysis of findings from research on children's schooling using the above analytical framework. The review is not restricted to research in which the dependent variable of analysis is school attendance; research looking at delayed enrolment, school dropout and school enrolment are all considered as they inform the aim to understand the factors which determine whether a child is in school or not. Using the

framework presented above, the discussion is structured into demand and supply side factors with the various levels of analysis. To avoid repetition, the political factors affecting school attendance are not discussed as they simply represent policies on school attendance like UPE and equal gender representation in education which have already been discussed at some length above. Also, not all factors from the above diagram are discussed; only those which have consistently been found to have an effect on attendance are presented. Note that although the factors are discussed separately, their effects are not necessarily independent of each other, and that the strength of association between the outcome and any predictor is dependent on country context.

2.2.1. Demand side

2.2.1.1. Individual

Individual level characteristics are those which define the personal attributes of the child such as age and sex. These are attributes which cannot be manipulated. There are other characteristics which are not intrinsic to the child but are instead inflicted by circumstance − these include, for instance, orphan-hood status, employment status, or the nutritional status of the child. The noted factors are those which can affect school attendance among all children of school going age. There are other factors, however, which are more likely to directly affect older children, particularly girls: sexual activity, use of contraception at last intercourse, pregnancy, or matrimony.

Individual level factors have a significant effect on school enrolment. A child's age is one characteristic which affects households' decision to send a child to school. In developing countries, the observed relationship between age and school enrolment is that households delay enrolment and put their children into school between ages 8 and 9. Enrolment is highest between ages 11 and 12 after which it declines sharply with few children being able to complete primary school or indeed progress to the secondary school level (Shimamura and Lastarria-Cornhiel 2010: 575; Saqib 2004: 42). It is therefore unsurprising to find lower enrolment rates among younger children and higher enrolment rates among older children. In Zanzibar, for example, Montresor et al (2001) found that 41% of children under the age of 9

were found to be in school compared to 91% of children older than 12. Similar patterns of enrolment are observable in Asia and other Sub-Saharan African countries.

The sex of a child also affects whether he/she is enrolled. As a result of UPE policies, the effect of sex on primary school enrolment is inconclusive as it varies widely between countries. That is, in some countries, strong disparity exists whereby boys are significantly more likely to attend school than girls (Sanjuka and Claire 2009: 26; Huebler 2008: 16; Hazarika 2001: 240-41). In Afghanistan, for example, controlling for other factors, boys were almost 40% more likely to enrol in school than girls (Guimbert et al 2008: 430). Also, in rural Vietnam, net of individual, household and village characteristics, girls were 40% less likely to be enrolled than boys (Nguyen 2006: 168). Girls' lower enrolment rate in this context was attributable to their unequal access to schools. The study found that girls who stayed in school beyond the primary level were high achievers whereas boys were more likely to be in school even if they under-performed in tests (Nguyen 2006: 153-62). The female disadvantage is also observable in the African context. In Mozambique, for example, girls were found to be significantly less likely to attend school for reasons of being kept at home to care for their younger siblings, perform domestic chores, or for early marriage (Roby et al 2009: 347).

The above evidence presents case studies which show a gender imbalance in favour of boys in school participation. In other countries like Lesotho, Tanzania, and Malawi, boys are significantly less likely to be in primary school than girls (Gibbons et al 2003: 15). Also, in Bangladesh, girls are significantly more likely to attend primary and secondary school with the difference being exacerbated at higher educational levels. Studies by Hossain (2010) and Asadullah and Chaudhury (2009) show that the educational advantage enjoyed by girls is due to the country's Female Secondary Stipend (FSS) policy, a conditional cash transfer scheme, which has succeeded in removing some of the opportunity costs of female education. In addition to having an advantage in accessing schools, other studies have shown that girls also have a smoother transition in the education system once they enter school. To illustrate, in Greater Johannesburg in South Africa, Fleisch and Shindler (2009) show that girls have significantly lower repetition rates and higher grade completion rates than boys. That is, boys composed 68% of repeaters, and by age 15 (the official age of entry into grade 10) only 22% of boys had progressed to grade 10 compared to 36% of girls (2009: 273). The authors note that

this pattern of enrolment and progression in the study context is not unexpected as boys have significantly higher levels of later enrolment than girls, particularly among poor rural neighbourhoods (2009: 265). From this, it could be argued that the gender effect is not uni-directional but depends on the context within individual countries.

Health is another factor which affects decisions to enrol a child in school. Studies have found that malnourished children are significantly less likely to enrol and if they do enrol, they have shorter schooling years than children who are not malnourished. The association between nutritional status and school attendance is interrelated to household wealth in that it is poorer households that are likely to have access to inadequate food supplies and thus are less likely to provide food for their children. A study by Cueto and Chinen (2008) on the impact of a school feeding program in rural Peru found that providing food for children had a negative impact on school dropout (especially among the poor) but did not significantly improve enrolment rates. Another study by Alderman et al (2001) into child nutritional status in rural Pakistan found a large significant positive association between age for z-scores and the probability of school enrolment; the association was larger among girls than boys. Also in Tanzania, a significant difference was found between the nutritional status and physical appearance of children in school and those out of school: 'non-enrolled children were significantly more stunted and wasted than enrolled children, and they also tended to be anaemic …' (Beasley et al 2000: 223).

Whether a child works or not affects his/her probability of attending school (Sanjuka and Claire 2009; Huebler 2008). The relationship is not uni-directional but is dependent on household wealth and area of residence. The reason being, due to a scarcity of financial resources and otherwise, poor parents are more likely to encourage their children to undertake paid work to supplement or indeed provide the main source of income so as to meet subsistence level (Morrow 2010). Further, to the extent that poorer households are more likely to be situated in rural, agricultural and farming communities, it is to be expected that children's labour is disproportionately relied upon in these settings than would be the case in non-poor and non-agricultural communities (Admassie 2003). The effect is that children from these backgrounds are significantly less likely to attend school or, if they do attend school, they are likely to have lower achievement levels because of the incompatible demands of work and

studying. This has been the observation in Yemen (Dyer 2007), Peru and Pakistan (Ray 2000; Nath and Hadi 2000), and in Sub-Saharan Africa (Gibbons et al 2003).

The relationship between child labour and school attendance is also conditioned by whether the work is undertaken within the household (intra-household) or outside the household (extra-household). In Ethiopia, research in subsistence rural communities found a strong association between intra-household work and school attendance (Admassie 2003). In this study, children's role in household economics is seen as a natural and necessary part of their upbringing and so their contribution to the functioning of the household through chores is either given priority or the same weighting as their schooling. Admassie's study shows that many children start working at an early age and by the age of 7, the point at which they should be enrolling in school, at least 80% would have started to perform menial tasks (2003: 178). Girls were significantly more likely to work than boys and were significantly less represented in school (2003: 175). Similar conditions were found in South Africa where children's daily household chores were 'viewed as a function of their roles as members of a household and family … and as an opportunity to learn skills required in adulthood' (Bray 2003: 95). These case studies suggest that, for girls especially, intra-household activities are unaffected by schooling costs because it forms part of their training to become future wives and home-makers. Therefore, perception of intra-household labour and the traditional values placed upon girls work means that they are significantly more likely to be confined to the domestic sphere where they are schooled on how to cook, clean, and care for their younger siblings at the expense of receiving formal education.

The loss of a parent can have serious consequences for a child's schooling (Ainsworth and Filmer 2002). The implications are many: it may mean a reduction in earnings in which case a household will have fewer resources to invest in children's schooling. The demand for children's time may also increase at home with more domestic duties to be undertaken or a child may be required to find work in order to augment household income. The loss of a parent, thus, can modify the opportunity cost of schooling and the value placed on children's leisure time. The effect of this can be negative on schooling: children's attendance may deteriorate to the extent that they may be withdrawn from school completely; young children may enter school later than the conventional age or may not enrol at all. As with the other predictors

discussed above, the relationship between orphan-hood status and school attendance is not unilateral but varies significantly with household wealth, type of parental death, and household living arrangement.

Children from poor households are significantly more likely to be adversely affected by the death of parent (Kasirye and Hisali 2010; Ainsworth and Filmer 2006). A global study by Ainsworth and Filmer (2006) found that, on average, orphans who live in poor households are disproportionately less likely to attend school – this lower probability is however due to the credit constrain on poor households rather than to the attribute of being an orphan. Nyambedha and Aagaard-Hansen (2010) found a combined effect of poverty and orphan-hood on schooling in western Kenya where the majority of orphans had withdrawn from school because of a failure to pay school fees. Among 7-14 year olds in north-western Tanzania, Ainsworth et al (2005: 428) found that only in poor households were children's entry into school postponed as a result of an adult death; the enrolment of children in non-poor households was unaffected (Ainsworth et al 2005). The effect of being an orphan on school attendance, therefore, appears to be conditioned by the wealth of a household.

The relationship between orphanhood status and school attendance also varies according to the type of orphanhood (paternal or maternal). For instance, a study by Case and Ardington (2006: 402) found that paternal death was associated with household poverty in that children who had lost their fathers were significantly more likely to live in poor households. This is unsurprising as fathers are commonly the main (and in some cases the only) breadwinner. The death of a father therefore signifies the loss of income meaning that there are fewer resources to invest in education. The result is that children are either not enrolled or they are withdrawn from school. Maternal orphans, however, were significantly less likely to be in school and were 15-20% less likely to receive educational investment relative to other children (2006: 410). Another research by Gertler et al (2003) in Indonesia and Mexico found that paternal orphans were twice as likely to withdraw from school compared to non-orphaned children suggesting, again, that the loss of a father's income diminishes the continued investment capabilities of the household on children's education; maternal orphans were less likely to drop out. Concerning school enrolment, however, children were unaffected by a paternal death while the probability of school enrolment was reduced by 30% for maternal orphans (Gertler et al 2003: 20).

Although the above studies demonstrate a relationship between parental death and schooling, some studies have shown that the directional influence of the occurrence on children's schooling is dependent on the subsequent care the child receives and the closeness of the relative who delivers the care (Parker and Short 2009; Case et al 2004; Zimmerman 2003). To illustrate, a study by Case et al (2004) shows that the relationship between an orphaned child and the household head is a much stronger determinant of enrolment than the actual death of a parent (2004: 16). The study found that orphans were significantly less likely to be in school than non-orphans because of the 'greater tendency of orphans to live with distant relatives or unrelated caregivers' (Case et al 2004: 485). Children whose household head was a non-relative were the least likely to attend school followed by those whose household was headed by a non-parental relative; children living in a household whose parent is the head were comparatively the most likely to be in school. The authors contend therefore that irrespective of orphanhood status, 'the probability of school enrolment is inversely proportional to the degree of relatedness of the child to the household head' (2004: 505). Findings from another research in South Africa support the conclusions reached by Case et al. Zimmerman (2003: 579) found that relative to children who live with their biological parents, foster children who live with distant relatives or non-kin are significantly less likely to attend school.

On the basis of the above evidence, it may be said that the association between orphan-hood and school attendance is not direct but is mitigated by many factors. That is to say, the death of a parent should not be assumed to have an adverse effect on school attendance because the direction of the association or indeed the statistical significance of the association varies according to the type of parental death, the wealth of a household, the age composition of the household, and the living arrangement as well as the care that is provided to the child after the loss of a parent.

The preceding discussion focuses on factors that have been found to affect the likelihood of school attendance among children of primary and secondary school going age. There are some individual level characteristics, however, which are significantly more likely to affect older children, specifically older girls. These factors include marital status, sexual activity, and

pregnancy. The association between school attendance and these factors is not necessarily independent because, for instance, girls who enter matrimony are more likely to become sexually active and fall pregnant. The combined effect of this presents a drastic hindrance to female educational attainment. Research from Sub-Saharan Africa provides evidence to this effect (Biddlecom et al 2008; Tuwor and Sossou 2008; Eloundou-Enyegue 2004).

In West Africa, Tuwor and Sossou (2008) found that girls' propensity to receive education was diminished by common practices of early marriage and childbearing. In northern Nigeria, for example, the study found that 55% of girls between the ages of 15 and 19 years were either pregnant or were already mothers (Tuwor and Sossou 2008: 368). In Togo, it was found that 27% of girls of the same age had been forced into early marriage. The practice of early marriage is defined not only by the patriarchal customs which prevail at the community level but they are also a reflection of wider societal beliefs. Testimony to this is the difference in the legal age requirement for matrimony between boy and girls. In Togo, for instance, the legal age of marriage is 17 for girls and 21 for boys. Therefore, in such contexts, girls, being enrolled into schools much later than boys, are taken out shortly after in order to participate in traditional ceremonial initiatives and prepare for marriage (Tuwor and Sossou 2008: 364). This indicates that they have lower average years of schooling than boys, a failing which perpetuates gender inequalities in these societies.

Research into early sexual debut and teenage pregnancy has shown similar depressing effects on girls' education. In Burkina Faso, Ghana, Malawi, and Uganda, Biddlecom et al (2008) found that sexually active students were significantly more likely to drop out of school than those who were sexually inactive; the association was greater among girls than boys. Also, looking at the effect of pregnancy, Were's (2007) study in Kenya found a significant relationship between level of education and teenage pregnancy such that girls with lower levels of education were more likely to become pregnant than those with secondary education. This is because students who progressed to upper secondary education were more likely to be better informed about premarital sex and contraceptive technologies (2007: 335). The results suggest that the risk of early pregnancies and teenage childbearing are perpetuated by an absence of educational access and opportunities: this is borne out by high rates of pregnancy among the

out-of-school population and those with primary or no education than those with secondary or higher education (2007: 336-37).

The strength of the correlation between sexual activity and pregnancy and school attendance may be conditioned by other factors namely the school history of the child (regarding frequency of attendance and level of achievement prior to engaging in sex and/or getting pregnant) as well as the household support network. To illustrate this, research in South Africa has shown that the probability of a girl permanently dropping out of school as a result of pregnancy was dependent on her progress in school prior to her getting pregnant and whether she had access to childcare after giving birth (Marteleto et al 2008; Grant and Hallman 2008; Grant and Hallman 2006). It follows that girls who were high achievers were significantly more likely to return to school than poor achievers, and girls who had help with childcare were also more likely to continue with their studies than those who were solely responsible for their children. Further, delayed enrolment, repetition, and inconsistent school attendance all increased the likelihood of getting pregnant and dropping out of school and reduced the likelihood of returning to school after dropping out. A mitigating factor of returning to school included the structure of the household in which the dropout resided: girls who lived in a household in which there was an adult woman had a higher probability of returning to school (Grant and Hallman 2006: 15).

2.2.1.2. Household

Household level factors for analytical purposes can be disaggregated into demographic and socio-economic predictors. Research has found that the socio-economic status of a household has a greater impact on decisions to enrol a child than the demographic characteristics of a household. The effects of demographic factors in any case do not operate independently of household economic condition. Variables that have been used to measure the economic status of the household include wealth indices composed of the number of assets in a household, income, education of household head, education of parents, occupation of parent, and the dominant livelihood of a household. Demographic characteristics of a household refer to the composition of the household structure: sex or age of the household head, number of adult women living in the household, number and age of siblings. The household is an important unit of analysis when studying school attendance because it is at this level that decisions are

typically made to educate a child. The characteristics which define this environment, let it be through the values which prevail in the household or the economic capability of the household, can thus have a significant impact on the probability of school attendance.

Poverty has commonly been identified as being the single largest household level factor which prevents full participation in education because the costs of education are higher among this group (Huebler 2008; World Bank 2004a; Ranasinghe and Hartog 2002). The cost of education to households can be both direct and indirect. Direct costs include school fees, levies, community contributions (for school construction and maintenance), learning materials, and uniforms. Indirect costs include transportation, food, clothing, and special tutoring. There are also opportunity costs to education such as the loss of potential income of the child as a result of attending school; the use of household resources to sponsor education rather than saving such resources or using them for other investments; delaying girls' marriage and thus increasing expenses of the household. The costs to education are a greater constraint to household resources for the poor than for the non-poor. This is so because the costs of education are significantly increased through monetary demands, and because the costs consume a disproportionate share of household per capita income. Following this logic, it is expected that children from poorer households are more likely to have lower attendance rates, although this effect may vary according to the sex of the child as in Turkey (Smits and Hosgor 2006) and Afghanistan (Glick and Sahn 2000), or community norms as in rural Pakistan (Hou 2010).

The general consensus in the literature is that household poverty reduces the probability of school attendance for reasons earlier discussed. As an example, a study in Ghana found that the cost of secondary education is borne mainly by households and so the likelihood of attending secondary education in the country is dependent on household budgets (Yamada and Ampiah 2009: 65). Yamada and Ampiah show that wide inequalities exist between children from poor and non-poor households not only in accessing school but also in the quality of education that they receive. This is because poor households struggle to educate their children beyond the primary level and, when they do manage to send their children to secondary school, the schools that they can afford are of poor standards offering low quality education. Another study by Chudgar and Shafiq's (2010) in South Asia found that educational outcomes are

significantly better among higher income families because they can afford the direct costs of education and are not dependent on their children's labour. In Bangladesh, the authors find that poverty is the primary reason preventing children from enrolling and causing children to repeat grades and dropout from school (Chudgar and Shafiq 2010). In Sri Lanka, they find that poverty acts as an impediment to post-primary educational attainment. Household poverty therefore exerts a depressing effect on the probability of school attendance.

The education of the household head is another factor which has been shown to have a strong correlation with school attendance. Educated households are typically more likely to understand the long term benefits of education and thus are more likely to enrol their children in school. By the same token, households with no or low levels of education may not attach high importance to schooling as they may not fully appreciate the benefits which it confers to their children and so are less likely to enrol their children into school. Further, to the extent that households with lower educational attainment are likely to be poor, large, and in rural areas, the probability of school attendance is further depreciated when one considers the cultural values which are likely to prevail in such settings. That is to say, in the context of an uneducated poor rural household, the immediate concerns of daily survival is likely to almost displace education as a foremost priority. Also, in such traditional settings, formal education may be a novelty and so 'may not be viewed as the only source of wisdom and useful knowledge' (Roby et al 2009: 346). It may also not represent a means to securing the predominant livelihood in a locality. Therefore, levels of school attendance are likely to be low among uneducated households because: (1) the cost of education greatly outweighs the perceived benefits and (2) the understanding and value placed on education is insufficient to overcome traditional normative values. The expected relationship between the level of education of the headship and children's attendance is therefore positive.

Research has demonstrated the positive association between household heads' educational attainment and school attendance. Huebler's (2008: 14) analysis of the Multiple Indicator Cluster Survey and Demographic and Health Survey data showed that, among 6-14 year olds, relative to children who lived in a household where the head had no formal education, children whose head had primary, secondary, and higher education were 13%, 18% and 22% more likely to be in school respectively. Also, in Mozambique, Roby et al (2009: 348) found that

education of the caregiver had the largest effect on children's schooling. In Malawi, Moyi (2010) shows a significant negative relationship between education of the head and delayed enrolment suggesting that children living in a household with educated heads are more likely to enrol in school at a younger age. These cases studies demonstrate a clear association between education of a household head and children's school attendance. It remains to be noted, however, that this relationship is not uniform and has been observed to vary by the individual level characteristics of the child, namely sex. Researches in Burkina Faso (Grimm 2011: 744) and in the northern province of South Africa (Townsend et al 2002: 220) have shown evidence of this differential impact.

The educational levels of parents also have an impact on the decision to send a child to school. Educated parents are more likely to be informed about the benefits of education and so they will tend to place more value on educating their children. Education equips parents with the skills to interact academically with their children and provide a home environment that is conducive to learning thereby increasing the likelihood of achievement in school. The effect of parental education differs according to the sex of the parent. Specifically, research has shown that mothers' education has great implications for a child's schooling particularly for girls (Greenberg 2011: 1050; Handa 2002: 12; Bommier and Lambert 2000: 199).

The relationship between mothers' education and children's schooling can be explained as follows. Educated women are better placed to gain employment and so have a higher earning power and thus bargaining power in the household (Augustine et al 2009). This control of resources increases their independence and the extent to which they can influence decisions in the household on matters such as children's schooling. Women with higher educational attainments are more likely to encourage their children to pursue education meaning that they will be more disposed to investing in their children's' education. By contrast, women with little or no education are unlikely to be aware of the economic rewards to education as well as the potential of independence and higher status-hood which it confers onto women (Smits and Hosgor 2006: 548). Such ignorance means that they are likely to attach lower significance to the value of education relative to other concerns such as matrimony and motherhood (Guimbert et al 2008: 431). They are also less likely to have the resources or bargaining power to educate their children even if such a desire is present. In addition, to the extent that educational

attainment is positively correlated with household wealth, uneducated women are more likely to belong to poorer households. This implies that the opportunity costs of investing in children's education among women with low educational attainment are likely to be much higher than among educated women. The association between maternal education and children's school attendance is then as follows: children with educated mothers are expected to have higher levels of enrolment (Glick and Sahn 2000: 68). Research from developing countries provides supporting evidence of this hypothesis.

Research in Sub-Saharan Africa has found that mothers' education is a strong determinant of school attendance (Gibbons et al 2003). Controlling for other factors, Gibbons et al found that the probability of school attendance is increased by 17% if a child has an educated mother (2003: 12-3). In Pakistan, maternal education was also found to have a large positive effect on the probability of sending a child to school; the effect was more pronounced for girls than for boys (Hamid and Siddiqui 2001; Hazarika 2001). Similar findings have been made in rural Vietnam (Nguyen 2006: 166), rural China (Zhao and Glewwe 2010: 451), and in Turkey (Tansel 2002). In the Turkish context, Tansel found that although both mothers' and fathers' years of schooling have a significant positive correlation with the probability of children's educational attainment, the effect of mother's education is larger among girls particularly among older girls. This suggests that in Turkey, girls' likelihood of enrolling in school and achieving highly are amplified in households where the mother is educated; the effect increases with age meaning that girls with educated mothers are significantly more likely to attend and excel in secondary schools than their counterparts (2002: 464).

The probability of children attending school is also affected by the occupation of parents, particularly the occupation of the father, as this typically defines the main source of livelihood in the household. The effect of fathers' occupation is not independent of paternal education. The reason being, occupational status (and thus household earnings) is strongly correlated with educational attainment so that fathers with higher levels of education are expected to work in professional employment which tends to pay more and rely less on children's labour. Evidence suggests that households where fathers are in agricultural occupation are more likely to depend on children's labour contributions not only to assist with agricultural work but also to generate income. Against this background, it is not unexpected that much scholarly research has shown

a distinct educational disadvantage among children living in households where the main source of livelihood is agriculture. In India (Morrow 2010: 306), rural Bangladesh (Nath and Hadi 2000: 309-10), and Ghana (Canagarah and Coulombe 1997), research has shown that children living in households where the main source of livelihood is farming or agriculture are significantly less likely to enrol in school because of the demand placed on their time for labour. Similarly, in Sri Lanka, Ranasinghe and Hartog (2002) find that the relationship between fathers' occupation and school attendance was such that children whose father had a high occupational status were more likely to attend school than those whose fathers' were employed in lowly manual occupations. There appears, then, to be a significant relationship between father's occupation and children's school attendance.

The preceding section discussed the relationship between school attendance and socio-economic characteristics of a household. The following section reviews evidence on the association between socio-demographic household characteristics, namely family size, and school attendance. It has been argued that large family sizes with many school aged children have a negative relationship with school enrolment. The theory, as posited by the resource dilution perspective, is that having large numbers of children reduces the per head expenditure of each child through the dilution of household resources. That is, if one takes the household as an economic unit which decides educational opportunities of children, households with fewer children are more able to enrol and invest in their children because there are more resources to be allocated to fewer persons. By contrast, large households are unlikely to present such opportunities to their children because the more children there are, the greater the budget constraints and the fewer resources there are to invest or allocate to individual children. As with other predictors, the association between family size and schooling is not uni-directional but varies according to other factors like area of residence, age structure of the household, and sex of the child.

According to the theory of resource dilution, children in rural areas are more likely not to enrol in school. This is so because rural children tend to belong to larger households than their urban counterparts. Further, rural household budgets tend to be much more constrained and so parents are more likely to be selective about which children to enrol. This decision can be influenced by cultural and community norms, the local opportunity cost of schooling, and the

personal academic ability of the individual child. A study in Thailand showed that family size had only a modest relationship with secondary school enrolment among the poorest rural households (Knodel and Wongsith 1991). This is because the cost of secondary education is considerably higher than primary education in these settings (1991: 123-25). The limited pool of income and insufficient economic resources available to poor rural households means they are unable to educate their children beyond the primary level, irrespective of household size. In urban areas, however, there were higher levels of school attendance because households had wider access to schools and were more affluent meaning that, even with many children, they could afford to send their children to post-primary school (1991: 127).

The association between family size and school attendance is also dependent on the age structure of the household as well as the sex of the child. It has been found that the number of younger siblings or children in a household is expected to have a negative association with school attendance because it increases the burden of household duties in terms of providing child care (Baschieri and Falkingham 2009: 215; Arunatilake 2006: 148). The relationship is likely to vary by sex as girls typically assume a disproportionate share of domestic responsibilities (Roby et al 2009: 346-47; Hazarika and Bedi 2004: 53). This negative impact of younger siblings on children's ability to acquire an education, however, may be offset by the presence of adult women in the household who may assist in performing household chores and child care thereby reducing the demand on children's time, particularly for girls (Hamid and Siddiqui 2001: 1086; Glick and Sahn 2000: 81). As Eloundou-Enyegue and Williams (2006: 29) explain, in contexts where extended family or communal child rearing norms prevails, the impact of the dilution of resources is likely to be limited as these social networks and support mechanisms protect against the prescribed adverse effects of having a large number of siblings.

Other research has also suggested that the relationship between family size and school attendance may not be wholly negative on school attendance. A study in Kenya, for instance, found that having a large family does not impinge on household resources so as to limit enrol opportunities. On the contrary, the number of siblings in a household has a significant positive association with educational attainment (Gomes 1984: 652). This is because parents in this context invest in the education of their older children who in turn, after completing secondary education and securing employment, invest in their younger siblings using their income.

Therefore, an increase in completed family size positively affects educational attainment (Gomes 1984: 648).

2.2.1.3. Community

Although household characteristics in essence have a great bearing on the probability of school attendance, the context in which a household is situated can have some influence on schooling decisions. The reason being, households are likely to conform to dominant norms and values which prevail in their area of residence. Therefore, the preferences, cultural tastes, and behaviour of a household will be shaped to reflect the ideals of its local surroundings. This hypothesis carries a powerful message for it suggests, for instance, that the positive impact that is commonly ascribed to high educational attainment could potentially operate at a higher analytical level meaning that the probability of school attendance for children from poor or uneducated households are elevated by virtue of residing in a highly literate community than if they lived in an illiterate community. To date, little research has been undertaken which fully explores the correlation between community predictors and school attendance. Evidence, however, suggests that community level characteristics such as poverty, education, school availability, employment opportunities and regional returns to education, and livelihood all have an impact (Urwick 2011; Zhao and Glewwe 2010). Other features such as the language and cultural norms of a locality also are associated with school attendance.

The propensity of education within a locality is one factor that has a significant association with school attendance. The effect of the determinant operates in the same way as at the household. If one takes the premise that individual and household behaviour are shaped by wider norms which prevail at a community or regional level, it follows that localities with higher educational attainments will have higher enrolment rates because the dominant beliefs and values regarding children's education are formed at a higher level. This means, for instance, that children living in poor households or who have less educated parents will nonetheless have a higher probability of attending school because they live in a community in which the norm is to educate a child. This positive association between community level education and children' school attendance has been borne out by empirical research. In Ethiopia, for example, a study by the World Bank (2005: xliv) reported that the effect of parental literacy diminishes after controlling for the percentage of household heads in a community who are literate. This

suggests that the relationship between adult education and children's schooling operates over and above the household level meaning beliefs as to the value of education may be formed at the community level.

The level of development in a vicinity is another factor which has been found to affect children's school attendance. The relationship is similar to that observed between household poverty and school attendance. That is, living in an area which lacks basic amenities and is characterised by some degree of deprivation, particularly in regard to school provision, can have a large negative impact on households' decision to send a child to school irrespective of the sexual orientation, age, or any of the individual level factors discussed above. By contrast, living in a community where there is wide access to quality schooling, low levels of deprivation, and where there is clear presence of functioning sanitation, water and electricity systems will elevate the probability of school attendance. To exemplify, in Pakistan and Peru, Ray (2000) found that infrastructural development was positively associated with school attendance. In both countries, improved water storage was associated with increased enrolments in school. In Peru, the presence of electricity was associated with school attendance whilst in Pakistan having an improved sewage disposal system in a community elevated children's probability of school attendance (Ray 2000: 14).

The urban or rural residence of a child has been found to have a bearing on the probability of school attendance. The observed relationship is that children living in urban areas have an advantage over rural children. The relationship is not unexpected as there are lower regional returns as well as fewer benefits to education in rural localities. Further, there is likely to be fewer provisions of schools in such areas and where they are provided, they tend to have a smaller capacity to accommodate students and have fewer resources to impart quality education. To illustrate, Okumu et al's (2008: 12-13) study in Uganda found that children living in urban areas had significantly longer years of schooling than those in rural areas. The reason being that there was greater access to school in urban areas; this increased the probability of enrolment, and decreased the likelihood of dropout once children were in school. Other studies have highlighted regional differences in education. In Lesotho, school attendance varies significantly by area of residence. Urwick's (2010) study found that children in the highlands have significantly lower enrolment rates than children living in the lowlands. This is

due to the fact that there were fewer schools in the highlands, and these schools were of lower quality and had fewer educational resources than in the lowlands (2010: 236). In Ghana, Ampiah and Adu-Yeboah (2009) found that children living in the northern region (a more deprived rural area) of the country had lower access to education relative to children in other parts of the country. The area in which a child lives therefore has an impact on whether he/she attends school or not although the relationship cannot strictly be said to be that all urban children have higher probabilities of attendance than rural children.

Other studies, such as that by Mugisha (2006), have provided contradictory evidence to the urban advantage. The study compares school enrolment levels between urban non-slum communities, urban slum settlements, and rural communities in Kenya. It finds that, over the years, enrolment in rural Kenya has surpassed enrolment levels found in urban slum areas (Mugisha 2006). Mugisha finds that the conditions of schools in Nairobi's slums are a disincentive to households to enrol their children because they were 'characterised by shortage of staff, congested classrooms and lack of scholastic materials' (2006: 472-73). This case study vindicates the community level effect of poverty on school attendance. Put another way, it is not simply the urban or rural location which affects school attendance. Rather, school attendance is shaped by the level of development in a community. In the age of urbanisation where there appears to be formations of informal settlements in cities, the assumption that all urban children have a greater educational advantage than rural children is no longer tenable. It is important to consider the level of development and standard of living in the surrounding communities.

The regional return to high educational attainment is another significant correlate of school attendance. Chamarbagwala's (2008) study in India found a significant positive relationship between school attendance and higher regional returns to primary education. This association however was found to vary by household wealth in that only children living in households in the top three wealth quintiles were affected by regional economic benefits to education; the enrolment of children from poor households was unchanged (2008: 233). Another study in rural India by Kochar (2004) showed that households' decision to enrol their children was affected not only by prospects of gaining employment in local labour markets but more importantly by the potential to secure urban employment. This relationship was conditioned on

the type of household in which the child lived: the schooling of children from landless household was positively affected by higher urban rates of return while children from land-owning households were less affected (2004: 131). Also, in Tanzania, Wedgwood (2007) finds that parents, witnessing the lower returns to education and limited opportunities for post-primary education after the introduction of UPE, were less inclined to send their children to school. This pattern was especially prevalent among poorer communities. It follows that depending on the wealth of a household and area of residence, parents may or may not respond to the regional returns to education. Particularly, in poor rural households, it must be perceived that the returns to education outweigh its costs before the household can commit to investing in a child's education.

A community's attitude to girls' education has also been found to have a relationship with school attendance. The likelihood of school attendance has been found to be lower in communities which attach little significance to female education. Such communities, as research has demonstrated, are likely to be those which are highly illiterate, poor, rural and traditional in their outlook on gender roles. In Andhra Pradesh, India, Morrow (2010: 306) found that traditional communal attitudes did not favour girls' higher education or indeed the notion of girls' travelling afar unsupervised. Thus girls consistently showed lower levels of education attainment than boys. Hou's (2010) study in Pakistan also found that communities in which girls' education was unfavourably viewed had lower levels of female school participation. In rural Pakistan, he found that girls education was heavily stigmatised therefore overriding any desire of households to enrol their daughters in school (2010: 440). Another research in rural Ethiopia showed that there is a prevalence of gender bias on the perceived returns to education, placing a great disadvantage on the likelihood of investing in girls' education. A study by Admassie (2003: 178) in this setting found that households preferred to invest in boys' rather than girls' education because they perceived the returns to male schooling to be greater as sons stayed at home after marriage whilst daughters were expected to join their husband's family meaning a loss of investment to the immediate family. Community gender norms which place females as subordinated therefore impinge on girls' participation in school.

2.2.2. Supply side determinants

Supply side factors are distinct from demand factors. They refer to the laws and policies which define how the education system is organised and how educational instruction is dispensed. They also govern educational conduct for human resources and the type of pedagogic experience that children are exposed to when they attend school. As with demand side predictors, supply side determinants are tiered: political, institutional, and infrastructural. The first analytical level is the political and it refers to national commitments to education as evidenced in school policies such as UPE. The political stability of the country also shapes how education is supplied as more stable countries will more likely have a structured and continuum of educational deliverance whereas conflict or post conflict states will struggle to adequately deliver education to their school population. The other two analytical levels are infrastructural and institutional which are discussed below.

2.2.2.1. Infrastructural

Infrastructural factors refer to the capacity of the school system to accommodate the school population. They also refer to the quality of such accommodation. The most commonly used indicator to assess the impact of infrastructure on children's schooling is the availability of schools within a community as measured by distance to the nearest school. This variable usually measures the extent to which children's school absence are due to lack of provision. To complement this variable, studies have also used proxies to measure the quality of education that is available to children. Such proxies have included: the presence of learning materials in schools, the qualification and competence of teachers, completeness of instructional programs that are offered in schools, and the water and sanitation provision within the school.

School availability as measured by distance to school is one factor which has been shown to have a strong association with school attendance. The observed relationship is negative in that the farther the distance to the nearest primary school (Zhao and Glewwe 2010: 458-9; Arunatilake 2006: 149) or the nearest secondary school (Lavy 1996: 303; Deolalikar 1993: 929) the more likely parents are to defer entry until a child is old enough to journey safely or indeed not enrol the child at all. To illustrate, in Zanzibar, Montresor et al (2001) found that inaccessibility to school was the largest constraint to school enrolment. It was found that despite parental willingness to enrol their children, the insufficient number of school places

either meant that children were enrolled late or were not enrolled at all (2001: 230). Similarly, in Sri Lanka, distance was found to have an inverse relationship with the probability of school attendance, particularly on younger children whose enrolment was delayed until they were old enough to travel long distances (Arunatilake 2006).

As with other determinants, the association between school attendance and school availability is not uniform but varies by sex and area of residence. To illustrate the variation by sex, Handa's (2002: 114) study in rural Mozambique found a large positive effect of school availability on enrolment probability: reducing travel time to the nearest school by 30 minutes increased the probability of enrolling by 20% for boys and 17% for girls. Also in Pakistan, part of the reason why boys continue to have higher enrolment rates is because they have greater access to school. Hazarika's (2001: 241) study in rural parts of the country found that the average distance to the nearest boys-only or co-educational primary school was .314 kilometres compared to an average distance of .954 kilometres to the nearest girls-only or co-educational school for girls. Differential access to school can therefore perpetuate gender inequalities in school participation.

Regarding differences by area of residence, evidence suggests that rural children are at a greater disadvantage for school supply than urban children. In Ethiopia 47.4% of urban children live in a community with a primary school, and 45.3% live within 1-2km from the nearest primary school (World Bank 2005). By contrast, only 15.4% of children living in rural areas are in close proximity to a school, and 28.1% have to travel 1-2km to access a primary school. Over 30% of children in rural areas have to travel more than 5km to their nearest school compared to 11% in urban areas (World Bank 2005). Multivariate analysis showed that, net of household factors, a reduction in school distance from 10km to 0 within a neighbourhood could increase registration rates by 20-30 percentage points. This suggests that in Ethiopia, access to school is a significant correlate of school enrolment although demand side factors may play a greater role in determining whether a child attends school especially in rural areas.

Access to secondary education is restricted in many developing countries. In addition to academic ability, access is usually determined by availability of schools. Urban areas are more likely to have higher secondary enrolment rate because access to this level of education is more available. Richer households are also more likely to have higher enrolment because they are more likely to independently finance or supplement state provision of secondary education. Wedgwood's study in Tanzania (2007: 389) found that in 2000/01 urban enrolment for lower secondary school was seven times higher than rural enrolment; at upper secondary school urban children were 10 times as likely to enrol. Similar disparities are found between the richest and poorest children. In addition to residence and wealth, the poor quality of school attended by rural children diminishes their prospects of attending secondary education (2007: 390).

In spite of evidence in favour of the effect of school availability on attendance, a study by Filmer (2007: 907) on school enrolment in poor countries found that 'distance to the nearest school is only weakly associated with enrolment'. The author found that building a school in every community in Mali, Chad, and Central African Republic increased enrolment rates by only 8.6, 6.8 and 4.4 percentage points respectively (2007: 907). Other studies have shown that making schools available can have little effect on increasing school participation if the schools which are provided do not offer complete instructional programs. That is to say, where schools do not provide a full instructional course, children either 'dropout sooner than desired or they repeat the highest grade offered simply because they have nowhere else to go in the system' (World Bank 2005: xli). In Ethiopia, for example, primary school composes of 8 grades. However, only 20% of government schools offer a full primary instruction (grades 1-8) while 31% offer to grade 6 and 34% offer up to grade 4 (World Bank 2005: xli).

The quality of school is an equally important determinant of school attendance. Providing more schools to communities will bear little effect on school enrolment if the schools are of poor quality (Bedi and Marshall 2002: 150). The impact of school quality on school attendance and indeed the duration of schooling can be simply stated. Schools which are equipped with better learning resources, have functioning electricity and sanitation facilities, and are facilitated by qualified personnel are more likely to increase student learning and have higher levels of achievement thereby increasing the returns to education (Guimbert et al 2008: 430; Aturupane

et al 2007: 29-33; Bedi and Marshall 2002: 149-50). Where parents believe that the returns to education outweigh its costs, they will be more persuaded to enrol their children (Baschieri and Falkingham 2009: 205). In Ghana, Glewwe and Jacoby (1994) show that households are significantly less likely to postpone enrolment if the schools available to them are of good quality. The study found that children who lived in communities with schools that were resourced with better trained teachers, desks, and suitably sized classrooms were significantly more likely to enrol than children who did not have access to these facilities (1994: 164). Zhao and Glewwe's (2010) study in rural China vindicated these findings. They showed that having a science lab in lower secondary school extended schooling years by 1.8 years; teacher experience also had a positive association with school attainment (2010: 451).

The quality of education offered to children varies greatly by the affluence of the local surroundings (Engin-Demir 2009: 20; Filmer and Pritchett 1999: 86). Particularly, research has demonstrated that children living in poor areas have limited access to good quality education which, using the argument presented in preceding sections, greatly reduces their likelihood of school attendance. Huang's (2010) research in the Philippines found that children from poor households were significantly more likely to attend schools with no functioning electricity and have lower teacher qualification. These schools in turn had lower achievement in mathematics and English reading tests. Huisman and Smits' (2009) study in developing countries found that the probability of school enrolment was significantly reduced 'when children have to travel longer distances, when there are fewer teachers available per 1,000 children, and when the average class size is larger' (2009: 190). Similarly, in urban India, Mukherjee and Das (2008) found that access to quality schools was a huge determinant of school attendance, particularly among the urban poor. They observed that many poor children were forced into employment not simply to meet subsistence but because 'many schools serving the poor are of such abysmal quality, or chances of improved upward mobility for graduates are so slim, that the expected return is not equal to the sacrifice made' (2008: 306). In light of such evidence, it could be argued that the quality of education that is accessible within communities has a significant positive relationship with school attendance. This association varies according to location and wealth.

2.2.2.2. Institutional

Institutional factors refer to policies which directly affect the interaction and professional conduct within the pedagogical context. They also determine the degree of accessibility to school that is afforded by households. For instance, policies such as school entry age, tuition fees, and recruitment of female teachers all affect household decisions to send a child to school. Other policies which define interaction between pupil and teacher, particularly those relating to corporal punishment and non-student focused teaching, may not directly affect household decision to enrol a child but may affect the educational experience of a child once in school and so affect the number of years that is spent in school.

School policy on pregnancy and parenthood is an institutional factor which can affect school attendance, mainly for girls. Pregnant girls and mothers are often barred from attending school as is the case in countries like Botswana (Meekers and Ahmed 1999). In other countries like the Gambia and Malawi, girls can be readmitted to school after child birth. However, girls who become pregnant in these countries are still excluded from education either because the policy is inadequately communicated through the school system or, when it is conveyed, communities prefer to uphold their own prevailing cultural beliefs (World Bank 2004a: 71). Even in Burkina Faso where pregnant girls or mothers are not barred from school, young mothers have lower educational attainments not only because they find it difficult to balance parenthood and the demands of school but also because the policy on school-girl pregnancy is not universally enforced (Gorgen et al 1993). School policy on pregnancy may therefore be considered an institutional barrier to girls' education.

Another institutional factor that has been found to affect school attendance, albeit indirectly, is the interaction between pupil and teacher. A study in Kenya found that girls 'suffer from negative attitudes and discrimination behaviour' in schools (Mensch and Lloyd 1998: 182). Teachers held lower expectations of girls' academic ability, upheld traditional assumptions about gender roles, and displayed sexual double standards. Another study in Uganda made similar discoveries (Muhanguzi 2011). Muhanguzi's study finds that social and discursive gendered practices create a schooling environment in which girls are positioned as vulnerable subordinates. The effect of these interactions for girls is that they withdraw into a silent space where they eventually exclude themselves from classroom based learning. This negatively

affects their learning outcomes and, to the extent that low achievement increases likelihood of school dropout, many girls in these contexts withdraw from school without having achieved their full potential.

The present research aims to contribute to studies which explore the determinants of school attendance by: (1) investigating the interaction between household and community poverty with the goal of establishing whether poor children living in poor neighbourhoods are more disadvantaged in attending primary school than children from more affluent households who live in similar poor communities and (2) exploring the determinants of junior secondary school attendance in West Africa with the goal of identifying differences between post-conflict and more politically stable countries in the region.

The West African region has shown the slowest progress to date on achieving universal primary education among the different regions in the world. Low attendance, delayed enrolment, and poor transition rates are commonplace in the region. A common feature in the region is poverty although this varies in gradation between countries. The region has also experienced many civil conflicts particularly among countries in the Mano River Area. The combination of high poverty, low levels of development and unstable political histories has meant that many countries in the region suffer from a lack of access to schools with the problem becoming more acute for post-primary education. Typically, because of poor state resources and inability to enforce compulsory education policies, households have been the primary unit for deciding whether a child attends school. Under these conditions, poor children have had relatively limited access to primary education suggesting that tuition free education has not succeeded in removing the economic barriers to school attendance. This continuing exclusion is due in part to persisting indirect and opportunity costs of education which have a greater impact on poor households. Also, it is not uncommon to have a larger concentration of poor households in poor communities; areas in which there are typically less access to educational facilities and lower levels development. This proposition is plausible given the strong correlation between community poverty and supply of schools as well as access to quality education. Following this line of argument, the present thesis offers two hypotheses regarding the relationship between household and community poverty: (1) living in a poor community reduces the likelihood of attending school irrespective of a child's socio-economic

background and (2) where there is an interaction between household and community poverty, poor children will be more disadvantaged relative to more affluent children who live in the same poor environment.

Another question that has yet to be answered in scholarly research is whether the determinants of junior secondary school attendance differ between post-conflict and more politically stable countries in West Africa. As the review in section 2.2 indicates, the determinants of school attendance have been widely researched. However, much of the research in this field has not specifically focused on junior secondary education and has not provided a comparative analysis of post-conflict and non-post-conflict states. It is important to investigate the correlates of junior secondary attendance because the level of participation is extremely deplorable at this educational level both in relative and absolute terms in West Africa. Further, although there has been a recent extension of UPE policies to the UBE policy, many countries still treat primary and junior secondary as separate due to a multiplicity of reasons including limited resources and capabilities to expand school infrastructure and train/recruit teachers at the junior secondary school level. A study which explores the determinants of junior secondary school attendance is therefore relevant in the present study context in order to identify the strongest significant predictors of school attendance and how this varies by context. The findings from such a study may help to identity areas for future investment and intervention.

2.3. School attendance and mothers' education

This section reviews literature on the relationship between parents' education and children's school attendance. It draws on research from developing and developed countries. Since developed countries have long had a tradition of mass education, research from these countries has focused less on school attendance and more on educational attainment, achievement, and enrolment at post-secondary education. The theories offered in these studies are however relevant to developing countries and are useful in illustrating the various paths through which children's school attendance and educational performance is affected by the attainment of their parents. In developing countries, research into maternal education has explored how this variable is associated with early childhood development and school achievement. Those which have used the predictor as a control for socio-economic variable have sought to understand how it is related to children's school attendance. The key distinction between research from

developed and developing countries is that those from developed countries have often aimed to demonstrate a causal relationship between parents' education and children's schooling outcomes using longitudinal data sources and instrumental variables whereas those from developing countries have often relied on cross-sectional datasets to demonstrate an association between parents' education and children's school attendance conditional on controlling for other factors.

Studies in educational research have demonstrated an intergenerational relationship between parents' educational attainment and children's schooling. Parents' educational attainment has a positive relationship with whether a child attends school, a child's level of achievement and educational attainment. A number of approaches have been used to explain this relationship. One such theory is the 'nature' theory which argues that intergenerational transmission of educational attainment occurs through a process of genetic inheritance. That is, more educated parents are more likely to be academically able and so achieve highly in school. These qualities are transmitted to their children who as a result demonstrate higher academic ability. Also, more educated women have a higher likelihood of marrying more educated men. Following the 'nature' argument, this means that children from such parents will likely display greater levels of engagement and performance because they have inherited such abilities from their parents. Various studies have tried to demonstrate the plausibility of this theory (Black et al 2005; Plug 2004; Behrman and Rosenzweig 2002).

Though the biological explanation of the intergenerational relationship between children's schooling and their parents' educational background is a useful one, it is not simply through inheritance that children with more educated parents come to have higher levels of education (Haveman and Wolfe 1996). The environment provided by more educated parents may also be more conducive to learning and places a higher value on school achievement than that offered by less educated parents (Sacerdote 2002; Fehrman et al 1987; Murnane 1981). That is, more educated parents may provide more meaningful interactions with their children so as to help them develop and provide more stimulating environment for their children to learn. In providing this nurturing environment, the education of the mother may be more important than the father's, notable in the formative years of the child's development, because mothers are the primary caregivers. Further, because education is strongly correlated with household income,

more educated parents will have more financial resources to invest in their child's education not simply by being able to afford the best schools but also by purchasing materials and equipment which can aid studying at home (Paxton and Schady 2007). More affluent households are also better able to afford the opportunity costs that are involved in extended educational careers and so children from such backgrounds are better able to remain in school for longer periods.

The theory of cultural capital offers another explanation for the intergenerational relationship between parents' education and their children's attainment (Lareau 1987; DiMaggio 1982). The theory was first developed by Bourdieu but has since been adapted to enable empirical research (Tramonte and Willms 2010; De Graaf et al 2000). A recent study by Tramonte and Willms (2010) operationalizes two states of cultural capital – static and relational – in order to analyse the relationship between cultural capital and education outcomes using data from the Programme for International Student Assessment. Static cultural capital resembles Bourdieu's definition of cultural capital; it includes the embodiment of high-class culture and signals which is characteristics of more educated parents. It also refers to the 'possession of high culture goods such as art works, musical instruments, and classical music and highbrow activities such as going to museums or the ballet or theatre' (Tramonte and Willms 2010: 203). From an early age, children who have more educated parents are exposed to this exclusive culture and so as they grow older they become more familiar and accustomed to these tastes and lifestyles. By comparison, relational cultural capital is the 'cultural resources and activities that are expressed in the relationship between parents and children' (Tramonte and Willms 2010: 203). This state of cultural capital is closer to the environment argument presented above in that it is descriptive of a continuing active interaction and exchanges between parent and child where parents transmits their cultural mores and tastes as well as educational values onto their children (Tramonte and Willms 2010: 203).

A final approach to understanding the relationship between children's schooling and parents' education lies in parents' attitudes, expectations and beliefs about their children's schooling experience and prospects (Sewell and Shah 1968). More educated parents are more likely than less educated parents to have higher aspirations for their children and attach higher value to educational success. The reasons for this are not dissimilar to those presented above.

Specifically, because they have achieved highly they would also want and expect that their children would achieve similar levels of high educational attainment. In addition, more educated parents have access to cultural capital and financial resources to make such high expectations into a reality. Less educated parents will have lower aspirations for their children relative to that aspired by more educated parents. Even where less educated parents do aspire for their children to achieve higher levels of education, they may lack the necessary investment capacity as well as the skills to provide a nurturing home environment for their children to realise this aspiration.

Much empirical work has been conducted to assess the validity of these theories. In general, the findings are in agreement that an intergenerational relationship exists between parents' educational outcomes and children's school attendance and educational outcomes. The nature of these relationships with regard to the difference between maternal and paternal education, interactions between either parents' education and the sex or age of the child, and household income is however inconsistent.

Tsou et al's (2012) study used the data from the Taiwanese household register along with information from the national birth certificate birth record data for 1978-84 to examine the causal effect of parental schooling on children's schooling. The study used adoptees so as to demonstrate that the relationship which exists between parents' education and their children's education is not simply due to inheritance of genetic trait as proposed by the nature theory. The findings confirmed that children who had been adopted by more educated parents had higher educational attainments and higher a probability of university graduation (Tsou et al 2012: 134). The education of the adoptive father was found to have a stronger relationship with sons' educational attainment whilst the education of mothers had a stronger relationship with the daughters' educational attainment. Further, the results showed that although biological and adoptive parents education was significantly associated with children's educational attainment, the associations with adoptive parents' education was stronger than those with biological parents' education, especially for university attendance (Tsou et al 2012: 136). Tsou et al's study provides supportive evidence of the nurture theory by demonstrating that family environment is an important source of intergenerational transmission of education.

Mothers' education, her parenting style, and her ability to provide a stimulating environment for her child have a significant positive impact on learning (De Graaf et al 2000; Beyer 1995; Leibowitz 1977). A recent study by Andrabi et al (2012) used a panel study in rural Pakistan to illustrate the relationship between maternal educational outcomes. The study focused specifically on the home environment, observing the allocation of mothers' time towards educational activities as well as her interaction with her child. The result showed a positive relationship between mothers' educational attainment and the number of hours spent at home doing school work: children whose mothers had some education spent 72 more minutes per day on educational activities at home (Andrabi et al 2012: 873). In addition, in households where the mother is the primary caregiver, educated mothers spend an extra 40 minutes a day with children on schoolwork (Andrabi et al 2012: 874). These hours of academic engagement meant that children with more educated mothers had higher scores by .23-.35 standard deviations relative to those with less educated parents. Another study by Estelle using data from the Early Childhood Longitudinal Survey in America found that fulltime post-secondary enrolment by mothers increases the reading proficiency of children in kindergarten (Estelle 2011). This relationship was found to be more pronounced among children who lived in the same household as their father and whose mothers were married (Estelle 2011: 353). Similar findings showing a positive effect of mothers involvement with their children's schooling have been found in other countries like the UK (Sabates and Duckworth 2010), and Mexico (Schaller et al 2007).

The relationship between mothers' education and children's learning has not always been found to be straightforward. That is, some studies have found that high levels of mothers' education has a negative effect on children's schooling (Abuya et al 2012; Behrman and Rosenzweig 2002). In Kenya, for instance, it has been found that mother's education is inversely associated with children's mean IRT score in maths across (Abuya et al 2012: 11). The research suggests that this unexpected relationship may be explained by the fact that mothers' with lower levels of education may spend more time at home because of their lower levels of paid employment outside the home. By staying at home, these mothers have more time to spend with their children during which they may provide the quality home environment needed for performing well in maths (Abuya et al 2012: 11). The lower test scores among

children with more educated mothers are then due to the absence of such mothers from the home and therefore the lack of time the mother is able to invest in the child. Notwithstanding, this inverse relationship is offset when both parents have secondary or higher education because both parents are able to provide adequate educational materials and a stimulating environment for learning for their children (Abuya et al 2012: 12). Another study using evidence from the National Longitudinal Surveys of Labour Market Experience in America, however, found that 'a mother continuing her schooling after giving birth does not impede the intellectual development of the child and, because it results in higher schooling levels, has positive benefits for her subsequent children' (Rosenzweig and Wolpin 1994: 686).

Parents' expectation and aspiration for their children also has a large significant effect on children's educational success. Faas et al's study looked at how parents' investment during their children's adolescent years affected their education and careers in young adulthood using the National Longitudinal Study of Adolescent Health in America. The findings showed that parents' commitment of socio-economic resources during their children's adolescence had a direct effect on education outcomes (Faas et al 2013: 151). This relationship, they found, was partially mediated by family success expectations suggesting that expectations held by parents are an important predictor of education outcomes. Another study in Kenya provided a comparison of parental aspirations for children's educational attainment between slums and non-slum communities using parents' education as a key variable (Oketch et al 2012). The results from the study showed that (1) more educated parents held higher expectations for their children's educational outcomes than less educated parents (2) more educated parents living in non-slum communities had significantly higher expectations for their children relative to more educated parents in slum communities. The findings from Oketch et al's research shows that whilst there is a strong association between parents' education and their expectation for their children, these beliefs are in part mediated by their surroundings and how they perceive that the services available in their environment affects the opportunities available to their children. Other studies have also reported a positive relationship between parents' expectation and children's schooling (Kan and Tsai 2005).

The impact on children's schooling has been shown to differ for mother's and father's education. Fathers' education has typically been found to stronger effect on children's

schooling than mothers' education. To illustrate, Sen and Clemente's study in Canada (2010: 152) showed that fathers' post-secondary school attainment, especially tertiary education attainment, is 'a key determinant of educational attainment and hence capital accumulation by the subsequent generation'. Using data from the Wisonsin Longitudinal Survey, Plug (2004) shows that maternal education does not have a significant effect on adoptees college educational outcome but that father's education has a large positive effect. Another study using data from 30 developing countries found that parental education exerted a large significant effect on school enrolment among 8-11 year olds (Huisman and Smits 2009: 190). The effect of fathers' education on both sexes was substantially larger than mother's education: having a father who had attained secondary education or beyond increased enrolment probability by 300%; the corresponding increment for maternal education was just above 50% (2009: 190). Other studies in Turkey (Smits and Hosgor 2006: 545), in rural China (Brown and Park 2000: 538), and in Guinea (Glick and Sahn 2000: 80) have reached similar conclusions.

Notwithstanding the above, some studies have shown a stronger effect of mother's education. For instance, Daouli et al's (2010) research on the intergenerational transmission of parental education on daughters' schooling found that, between 1981 and 2001, girls educational outcomes has become less dependent on fathers' education. However, mothers' education continues to be a significant determinant of daughters' educational attainment. Other studies have found no difference between the two. De Haan's (2011) research which looked at the effect of parents schooling on children's schooling using a nonparametric bound analysis found that the effect of fathers' education was marginally higher than mothers' education. However, this difference was insufficient to provide conclusive evidence that fathers educated mattered more than mothers' education for the schooling outcomes of their child (de Haan 2001: 889).

The contribution of the present research to educational studies is to investigate the relationship between school attendance and mother's community education. Specifically, I investigate whether living in a community with more educated mothers enhances children's school attendance at basic education using Sierra Leone as a case study.

Section 2.3 above has discussed the association between parents' educational attainment and school attendance as well as the intergenerational effect of parents' education on children's attainment and achievement. If one takes the premise that educated parents are more likely to educate their children than those who are uneducated, it follows that children from these households will have higher educational attainments and they, upon entering parenthood themselves, will want to educate their children and will therefore make the necessary investment to achieve this goal. This intergenerational effect means that the value of education is transmitted from one generation to the next meaning that more children in a populace will become educated in the future. This incremental effect of parental education may be amplified by living in a community where there is a high proportion of educated mothers. The characteristics which are associated with educated women – lower fertility, gainful employment, autonomy, progressive values regarding female empowerment, abandonment of traditional values – may prevail in a community level which hosts many educated women. To the extent that households are likely to conform to the norms which define their surrounding environment, it is expected that mothers with low levels of education will be more likely to send their children to school even if they may initially refute such an investment because they reside in a community which recognises or reward high educational attainment. The expected relationship then is the living in a community with a high proportion of more educated mothers will increase school participation.

3. Data

This chapter provides a description of the different datasets that are used in this thesis. The chapter first discusses the sample design and sizes of the different surveys. This is followed by a discussion of the study population for the different empirical chapters. The third section presents the response variables and the fourth section describes the different explanatory variables that were used to answer each research objective. The concluding section is a discussion of the limitations of the data.

In undertaking this study, comprehensive data on school attendance, school provision, and level of poverty within communities is required on the different countries to ensure that the objectives of the study are adequately addressed. Typically, information on school attendance is available at the school level or at a Local Education Authority which oversees education matters for compulsory education at a municipal or regional level. These institutions often provide data on the number of children of school going age, the number of children enrolled in school and the number of children actually attending school. Information from population censuses may also be used to give an indication of the school population and the level of school attendance in a country. Data on the level of development within communities can often be accessed at planning departments at different administrative levels. If available and accurately measured, this data can be used in conjunction with Geographic Information Systems data to map the structure of communities, access to roads, position of schools within communities, and the facilities and services available within communities.

Sierra Leone and Liberia have a low capacity to accurately gather and store data on children's school attendance at the administrative level. The administrative data that is available in these countries may be unreliable as they are likely to be erroneous and incomplete. A school census however has been conducted in both countries which provide comprehensive data on the education system; Liberia 2008/09 and Sierra Leone 2010/11. Information collected in the census included the school population, the number of schools and rooms within schools, facilities and teaching resources available within schools, members of staff and teaching qualification of staff. In Ghana also, the country's education service has released a detailed

document containing a count of the school population, the count of public and private schools, and information on the learning resources and facilities available within schools by administrative region (Ghana Education Management Information System (EMIS) 2012). In addition to the above, all three countries have recent population censuses: Sierra Leone 2003/04, Liberia 2008, and Ghana 2010. The 2008 Liberia census for instance collected information on the time to the nearest primary school as well as the level of school attendance. Sierra Leone's 2004 census did not collect specific information on school infrastructure. However, among children attending school, data was collected on distance to school in the country's 2003/04 Integrated Household Survey (IHS) and 2007 Core Welfare Indicator Survey (CWIQ). The information from these school and population censuses for the three countries is used to aid the interpretation of the results observed from the analyses in this thesis. This is necessary because the main dataset used for analyses (Demographic and Health Survey) does not collect information on school specific variables and so supply side factors cannot directly be controlled for in the regression analyses in chapters 5, 6, and 7.

3.1. Demographic and Health Surveys

The Demographic and Health Survey (DHS) is the main data source used in this thesis. As Sierra Leone is the focal case study, the country's 2008 DHS (SLDHS) is the primary dataset in each empirical chapter. The most recent DHS for Guinea (2005), Liberia (2007), Ghana (2008), and Nigeria (2008) are also used for comparative purposes. The Nigeria and Guinea surveys are used in chapter 5, and the Liberia and Ghana surveys are used in chapters 5 and 6. The DHS is a cross-sectional survey that is conducted in many developing countries. It is a highly reputable survey, sponsored by multilateral organisations, that has long provided indicators for monitoring and evaluation in poor developing countries. The 2008 SLDHS is the first to be conducted in the country; the 2008 Ghana DHS is the fifth to be conducted in the country and the Liberia 2007 DHS is the third to be conducted. The DHS collects data for an array of topics in the areas of population, education, and health such as: household and respondent characteristics, school attendance and educational attainment, family planning, fertility and fertility preference, child and maternal health. As the DHS is standardised, the sample design for each survey is similar. For the five DHSs used in this thesis, the samples are intended to be representative of urban and rural areas and for each administrative region in the different countries.

A two stage stratified cluster sampling design is used for the DHS. In the first stage, clusters are selected by urban and rural residence from each administrative region. During the second stage, households are systematically selected from each cluster. To account for the complex survey design, sample weights provided in the household members' dataset for each country are used to estimate univariate and bivariate statistics in all empirical chapters (see Government of Ghana (GoGh) 2009; Government of Liberia (GoL) 2008; and GoSL 2009 for discussion on sampling weights). For the statistical models developed in chapters 5, 6 and 7, multilevel modelling techniques (random effect models) were applied in MLwiN to account for the clustering of cases. Also, variables that form part of the survey design like rural/urban residence and administrative region are controlled for in each regression model.

The DHS administers three questionnaires for household members, women, and men. The household questionnaire is the main dataset used for the analysis in this thesis. It contains information on school attendance, household characteristics, individual background and information on mothers' background. The men's and women's datasets are used in chapters 5, 6, and 7 to derive community level predictors. These datasets collect information on female education, access to family planning services, reproductive behaviour, and employment and earnings. All women aged 15-49 and all men aged 15-59 who were either permanent residents of the households or visitors present in the household on the night of the survey were eligible to be interviewed for the women and men questionnaire respectively. The household members' survey was administered to the household head or the next most senior member of the household if the head was absent.

The DHS yields a high response rate. The response rate for all surveys used here is over 90% (Refer to Table 3-1). Note that for all surveys, non-response was due principally to failure to find individuals at home despite repeated visits to households (GoGh 2009: 8 GoSL 2009: 11). For Sierra Leone, the response rate for the household questionnaire was 98%, for women it was 94% and for men it was 93% (GoSL 2009: 10). Ninety-nine percent of households in Guinea and Ghana responded to the household questionnaire; the figures for Liberia and Nigeria were 97% and 98% respectively. These results show that the surveys are likely to be representative

of their respective countries, and so they likely reflect data on school attendance and household characteristics that can be inferred to the national population. This advantage of the DHS is useful as it allows the detailed investigation of the research questions posited in the current thesis at a national level.

Table 3-1: Demographic and Health Survey (DHS) response rates for Sierra Leone (2008), Guinea (2005), Liberia (2007), Ghana (2008), Nigeria (2008) for household, women, and men in percentage

Survey	DHS (year)				
	Sierra Leone (2008)	Guinea (2005)	Liberia (2007)	Ghana (2008)	Nigeria (2008)
Household	98	99	97	99	98
Women	94	97	95	97	97
Men	93	95	93	96	93

The sample sizes for each DHS survey is presented in Table 3-2. In the Sierra Leone DHS dataset, there are in total 41,985 individual household members, 7,758 households and 353 clusters in the household members file. The total number of cases in the Guinea household member's dataset was 38,182 individuals, 7,500 households, and 296 clusters. For Ghana, there are 46,536 individual household members, 12,323 households and 411 clusters. The corresponding figures for Nigeria and Liberia are: Nigeria – 156,809 individuals, 36,800 households, and 888 clusters; Liberia – 34,670 individual, 7,471 households, and 300 clusters. The women's and men's DHS datasets are only used for Sierra Leone, Liberia and Ghana. There were in sum 7,374 women in the Sierra Leone women's dataset and 3,280 men in the men's dataset. For the Ghana women and men datasets, there were 4,916 and 4,568 individual cases respectively. The corresponding figures from Liberia are: 7,092 and 6,009.

Table 3-2: Sample sizes for Sierra Leone (2008), Guinea (2005), Liberia (2007), Ghana (2008), Nigeria (2008) household, women, and men Demographic and Health Surveys

Survey	DHS (year)				
	Sierra Leone (2008)	Guinea (2005)	Liberia (2007)	Ghana (2008)	Nigeria (2008)
Household					
Individuals	41,985	38,182	34,670	46,536	156,809
Households	7,758	7,500	7,471	12,323	36,800
Clusters	353	296	300	411	888
Women					
Individuals	7,374	na	7,092	4,916	na
Households	5,519	na	5,096	3,768	na
Clusters	353	na	300	411	na
Men					
Individuals	3,280	na	6,009	4,568	na
Households	2,572	na	4,490	3,713	na
Clusters	353	na	300	411	na

Note: na means not applicable

To check the quality of the DHS data, results from simple tabulations and cross-tabulations were compared to results from the population and housing censuses for the different countries; the results suggest that the DHS closely resemble that from the census. A discussion is shown below for Sierra Leone and Liberia to illustrate. Results from Sierra Leone's 2004 population and housing census were compared to the country's 2008 DHS. Comparisons were made of the population by sex, region, district, and children aged 0-14. The results show similarities in population distribution between the two surveys. For instance, 49% of the population in 2004 were male; the 2008 DHS showed the same percentage of males in the population (GoSL 2006b: 43). In 2004, 35% of the population lived in the Northern region, 22% in Southern region, and 24% and 19% in the Eastern and Western regions respectively (GoSL 2006b: 3). The comparative figures in 2008 were 33%, 23%, 24% and 20% respectively. The population distribution by district is also very similar between surveys with the difference in all but one district not exceeding 2 percentage points; in the Western Area Rural district the population had increased from 3% to 6% between the two surveys. The proportion of children aged 0-14 years increased from 42% to 47% between 2004 and 2008.

For Liberia, comparisons were made of the population by sex, county, sex and net attendance ratio. The distribution by sex and county in the 2008 census resembles that in 2007 DHS. Fifty percent of the country's population were female in 2008; the proportion enumerated in 2007 was 49% (GoL 2009a: a1-3). By district, the difference in percentage point did not exceed three between the surveys; the largest change was found in Nimba, Lofa and Montserrado counties. In Nimba (from 13.3% to 16.3%) and Lofa (from 8.0% to 10.0%) counties, the population showed an increase; in Montserrado county (from 32.2% to 30.6%) the population declined (GoL 2009a: 12-15). The proportion of children aged 6-11 year old in the population was 16.5% in 2007 and 18.7% in 2008. Lofa (from 8.4% and 10.4%) and Nimba (from 13.6% to 17.0%) showed the largest increase among this age-group (GoL 2008: a4-53-a4-68). The changes in population in Nimba and Lofa counties may be due to the resettlement of displaced populations (GoL 2009a: a1-20). In Lofa, for instance, almost 78.9% of the population had been displaced by the war; among this group 91.9% had been resettled at the time of the census (GoL 2009a: a1-22). The net attendance ratio between the two surveys for primary education was almost identical: 29.4% in 2008 compared with 29.8% in 2007; for junior secondary education the ratios were 6.3% in 2008 and 7.9% in 2007.

3.2. Integrated and Household Survey

In conjunction with the Demographic and Health Survey, the 2003/04 Sierra Leone Integrated and Household Survey (SLIHS) was used in chapter 4 to assess changes in net attendance ratio in the country between 2003/04 and 2008. As with the DHS, the Integrated Household Survey is an international survey sponsored by multilateral organisations; its focus however is on poverty and living standards. The sample for the SLIHS was selected using a similar sample design to the SLDHS whereby households were systematically selected after being stratified by urban and rural residence and administrative region in the country. In sum, 3,720 households were successfully interviewed from 226 clusters. There were 8,081 children aged 6-17. The SLIHS is also intended to be representative of the national population (GoSL 2007a). The exercise described for checking data quality above was repeated for the SLIHS; the results from the survey were close to those found in the 2004 census.

3.3. Study population

The study population for all empirical chapters are children of school going age for basic education. That is, in Sierra Leone, Ghana, Liberia, and Nigeria, children aged 6-14 years who are attending the correct level of education: 6-11 for primary school, and 12-14 for junior secondary school. The corresponding age-groups for school attendance in Guinea are: 7-12 for primary education, and 13-16 for junior secondary education. The sample size of children aged 6-14 in the Sierra Leone DHS was 12,403. The number of children of the same age-group recorded in the Ghana and Liberia DHSs was: 11,593 and 9,189 respectively.

In chapter 7, children aged 6-14 whose mothers were alive were the study population. The Sierra Leone DHS household members' dataset was used for this analysis. The data used to identify this sample was taken from two questions aimed at gathering information on orphanhood status among 0-17 year olds: (1) 'is (Name)'s natural mother alive?' and, (2) 'does (Name)'s natural mother usually live in this household or was she a guest last night? If yes: record mother's line number'. The first question was used to filter the dataset identifying only those children whose mother was alive. The total number of 6-14 year olds in the Sierra Leone DHS was 12,403 of whom 11,557 had mothers alive. However, some of these children were excluded from the analysis because their mothers could not be identified. The DHS is structured by unique identifiers that allow individuals to be located within a particular household and cluster for the different datasets. The second question presented above was asked to establish whether a mother lived in the same household as the child; only those mothers who lived in the same household as their children were given a line number for this particular question. Therefore, although there were 11,557 children aged 6-14 whose mothers were alive in the dataset, 4,431 of these children were not residing in the same household as their mothers at the time of the survey and so a line number was not provided for them. These cases were excluded from the analysis because without a line for the mother, a child could not be matched to her mother and so the education of his/her mother could not been identified.

The final sample size for the analyses in chapter 7 was 7,126. This final sample size is much smaller than the original sample of children whose mothers were alive (11,557). To check that the reduced sample had similar characteristics as the full sample, simple statistics were estimated and compared between samples. All analyses were conducted in STATA; the

complex survey design for the DHS was taken into account by using the *svy* command. This command was created using pweights and the DHS primary sampling units as strata. Table 3-3 shows the results for this exercise for the two samples described above as well as the sample with paternal orphans. There was no statistical difference in the net primary or junior school attendance ratio between children who lived in the same household as their mother and those who did not live in the same household as the mother. There was, however, a significantly higher rural residence among children who lived in the same household as their mother than those who did not: 70.9% compared with 61.6% (p<.05). Also, children living in the same household as their mother were significantly poorer than those who did not live in the same household as their mother (p<.05). Similarly, among the sample of children who had both parents alive (n=10,458), children living in a household with both parents (n=5,621) were significantly more likely to reside in rural areas (73.8%) and in poorer households (39.6%) than those children whose parents were alive but did not reside in the same household (n=4,837) (p<.05). These results suggest that whilst the whole sample of household members' in the DHS may likely be nationally representative, the sample on which the current analysis is performed may be biased with children whose mothers are present within the same household being over-represented in rural households. This is a significant limitation of the SLDHS. The results from the analyses will therefore need to be cautiously interpreted; the results may be compared to the results from the full sample of children aged 6-14 in chapters 5 and 6 since similar models are fitted to assess whether there are significant differences in the relationship between common predictors and the children's school attendance.

Table 3-3: Orphanhood status and living arrangement of children aged 6-14 years by net primary and junior secondary school (JSS) attendance, rural residence and household poverty in Sierra Leone

Orphan status by living arrangement	Net primary	Net JSS	Rural	Poor	n
Mother alive	62.2	21.2	67.4	38.0	11,557
Lives in same household as mother	62.0	20.2	70.9	39.8	7,126
Does not live same household as mother	61.0	21.7	61.6	36.2	4,431
Both parents alive	62.7	21.1	67.9	37.7	10,458
Lives in same household as both parents	62.0	18.9	73.8	39.6	5,621
Does not live in same household as both parents	61.9	23.1	61.8	36.8	4,837

3.4. Response variables

The response variable in all empirical chapters is the same: the number of children aged 6-14 who attended the correct level of education in the survey year against those who did not. In all the DHS datasets, the head of the household or a senior member of the household where the head was absent were asked to provide information on current/previous school attendance for household members' age 3-24 years. The following questions were asked to collect these data:

1. Did (Name) attend school at any time during the (survey year) school year?
2. During this/that school year, what level and grade [is/was] (Name) attending?
3. Did (Name) attend school at any time during the previous school year, that is, (year prior to the survey)?
4. During this/that school year, what level and grade did [Name] attend?

The first of these questions establishes whether a child attended school at any time during the survey year. Among those who answered yes to this question, the second question was posed to record the grade and level of education the child was attending. Using these information and data on age, it was possible to estimate the number of children who were, at any time, attending

the correct level of education. To create this response, age was classified into two categories: 6-11 years and 12-14 years. To create the first response variable, all children in the lower age-group in each country were coded as 1 if they were attending primary education in the year of the survey. Children aged 6-11 years who did not attend school or attended a level of education other than primary education were coded as 0. Similarly, children aged 12-14 years who attended junior secondary school in the year of the surveys were coded as 1; children in this age-range that were either not in school or were attending a lower level of education than junior secondary were coded as 0.

3.5. Explanatory variables

Four variables are used in every empirical chapter: the age and sex of a child, household wealth and area of residence. The age variable is used to demarcate the different levels of education namely primary and junior secondary education. More importantly, it is used to assess whether there is a significant difference in school attendance between the different educational levels. It is also of interest to observe the relationship between school attendance and individual, household, and community predictors for the different levels of education; this will help to identify how different predictors are related to attendance at different levels of the school system. Further, and in line with recent debates about equal gender parity in education, the sex variable is used to assess the relationship between sex and schooling in West Africa; this variable is binary in all datasets: male and female.

Household wealth is another common variable used in this research. It is measured using the DHS standardised composite index score which is created using the SPSS factor analysis procedure (Rutstein and Johnson 2004: 9). The variable is based on 'household assets, services and amenities' collected from the household questionnaire (Rutstein 2008: 1). Some of the assets and services included in the index are: the type of material used to construct a house, ownership of agricultural land, electricity, television, radio, and access to water and sanitation facilities. The construction of the index assumes that the possession of observable assets and access to services and amenities is a mark of economic affluence. The index is constructed into five quintiles ranging from poorest to richest. The cut point to form the quintiles is based on a weighted frequency distribution of households, 'the weight is the product of the number of de jure members of the household and the sampling weight of the household' (Rutstein and

Johnson 2004: 9). The quintiles are thus based on the distribution of the household population where each member is given the wealth index score of his/her household. Household members are ordered by the score; this distribution is divided into five 20% sections forming quintiles (Rutstein and Johnson 2004: 9).

The DHS quintiles are biased in favour of urban areas with the overwhelming majority of households classified as poor being located in rural areas (Rutstein 2008: 4). Table 3-4 shows the distribution of the household wealth index variable by area of residence in the SLDHS. To overcome the problem of unequal distribution, a remedy proposed by Rutstein is used whereby quintiles are classified by urban and rural areas separately (and then subsequently merged); the quintiles are created using the original wealth index factor score. In the SLDHS, 67.1% of household members lived in rural areas. Using Rutstein's method of classifying the wealth index factor score by area of residence separately, the proportion of people represented in each quintile in the total sample should equal 67.1% for rural areas (Refer to Table 3-4). This method is applied to the other Demographic and Health Surveys used in this thesis.

Table 3-4: Percentage distribution of original and revised household quintiles by rural and urban residence in the Sierra Leone 2008 Demographic and Health Survey

Quintile	Original wealth index		Revised wealth index	
	Urban %	Rural %	Urban %	Rural %
Poorest	3.3	96.7	32.9	67.1
Poorer	7.3	92.7	32.9	67.1
Middle	15.1	84.9	32.9	67.1
Richer	46.7	53.3	32.9	67.1
Richest	92.3	7.7	32.9	67.1
Total (n)	14,198	28,921	14,198	28,921

The revised wealth index is used for all analyses presented in chapters 4-7 of this thesis. In chapter 4, the poorest and richest quintiles are used to create a parity index which compares school attendance for poorest/richest households. In chapters 5-7, the quintiles are recoded to take a binary format (poor vs non-poor households) to enable a simple comparison of school attendance between children living in poor households and those living in non-poor households. To do this, households coded as poorest and poorer are recoded as poor and those coded as

middle, richer and richest were recoded as non-poor. The decision to recode the quintile groups was based on results from multiple logistic regression analyses which showed that the likelihood of school attendance among children in poorest and poorer households were significantly lower than among children in the other quintiles; there was however no difference between children in the poorest and poorer quintiles.

Area of residence is the final variable used in all the empirical chapters. This variable is binary: rural and urban. In all countries, the areas classified as rural greatly outnumbered those classified as urban. The urban areas are those which are the most (relatively) developed in the different countries. In Sierra Leone, for instance, the urban areas included the capital city (Freetown) in the Western region and four other major cities within the remaining three regions: Bo and Bonthe cities from the Southern region, Kenema and Koidu cities from Eastern, and Makeni from the Northern region (GoSL 2009). Controlling for rural and urban residence is important because the variable forms a key part of the sample design of the DHS and so helps to define the structure of the dataset. Also, on the basis of previous research, it has a large and significant association with school attendance (Okumu et al 2008).

Chapter 4 assesses Sierra Leone's progress towards universal basic education. This analysis is developed in the subsequent chapters by focusing on predictors at the individual, household and community levels. The variables used in chapters 5 and 6 are the same. Chapter 5 develops a model for predicting the determinants of primary school attendance with a particular interest in the interaction between household and community poverty using the DHS for Sierra Leone, Liberia, and Ghana. Chapter 6 also studies the determinants of school attendance but at junior secondary education. In these chapters, in addition to the sex and age of the child, household wealth and area of residence, education of the household head, maternal and paternal orphanhood status, number of children aged 0-5 and 12-17 years living in a household, and sex of the household head were used. Also, the proportion of poor households in a community, the proportion of women with secondary or higher education in a community, the proportion of people engaged in agriculture or self-employment, the proportion of people in paid employment, and the average female age at marriage were also used.

Chapter 7 used similar variables as in chapters 5 and 6. Since mothers' education is of focus in this chapter maternal education is used rather than education of the household head. For individual level variables, in addition to age and sex of the child, the work status of the child was also controlled for using three variables: household chores, paid or unpaid work, and working on family owned farm. Household wealth was again controlled for along with all the community variables explored in chapters 5 and 6.

The DHS does not collect information on community environment. Therefore, the cluster is taken to represent a community, a neighbourhood in which norms and values are shared commonly among individuals who live in that vicinity. Since questions on cluster surroundings were not administered, individual level and household level information is aggregated to the cluster level, by extracting averages and proportions, so as to estimate the relationship between community factors and school attendance. The variable for both community poverty and mothers' community education were created using the household members' dataset. The community poverty variable was based on the total sample size of the survey whereas that for mothers' community education was created using information on all children aged 0-17 years that lived in the same household as their mother. In the case of Sierra Leone, there were 41,985 individuals in the total sample and 13,850 children who lived in the same household as their mother.

The aggregation of individual and household level data to estimate community level characteristic possesses some limitations such as measurement error and the potential of bias in predicted beta coefficients. These problems can be minimised by using national administrative data which are representative of the population and capture the context within the country or, in survey data, by having sufficient number of cases in the clusters from which the aggregation is made. The sample size on which the variable for community poverty is created is large and, as the quality checks with the census for the different countries suggest, the sample is likely representative of the national population. Measurement error in this variable is then minimised using the household sample. For mothers' community education, although the sample size is also relatively large, the higher rural percentage of children living in the same household as their mother likely biases the estimate of the relationship between this predictor and school attendance. However, for the purposes of this analysis, the approach of aggregating data to the

cluster level presented the best way of estimating community level variables as there is a dearth of community contextual information on the country case studies. At the time of this study, the school Census in Sierra Leone was incomplete meaning data could not be extracted from this source to use as contextual information. Liberia had a school census but this information, due to the country's poor infrastructure, is difficult to store, manage and transfer in soft copy. Administrative data which informs about infrastructure was also inaccessible in soft copy in both post-conflict countries. It is because of these difficulties that the approach of aggregating household level information to community level was adopted in this research.

3.6. Limitations of data

The data quality of any survey data is of crucial importance. A limitation of the DHS is the way in which current school attendance is defined. The question for school attendance asks whether children have attended school 'at any time' during the current school year. Children who are coded as 'yes' therefore include all children who had attended school in the survey year, irrespective of whether a child was no longer in school at the time of the survey. There is no question in the household questionnaire that allows the differentiation of children by whether they are still in school and for what duration they had/have attended school in the survey year. Therefore, data from this question may lead to an over-estimation of the numbers of children who are actually in school thereby producing higher net attendance ratios than may have actually been the case. Estimates from this data therefore refer to attendance during the survey year rather than at the time of the survey.

Another limitation of the DHS which may affect estimates of attendance is that questions on school attendance are administered to the household head or a senior member of a household. This might lead to bias in estimates of school attendance if, for instance: (1) respondents do not wish to admit that a child is not in school and so respond yes to questions on attendance (2) respondents are unaware of the attendance status of a child and so simply respond yes/no or fail to respond at all (Groves et al 2009: 240-41). The latter of these scenarios is less likely to occur because in many developing countries, it is the household head that determines and essentially funds the education of children and so s/he is likely to be aware of the attendance status of each child. The first scenario, however, may occur thus leading to an over-estimate of school attendance. There is little that can be done to correct for this limitation and, needless to say, it

is one that is common to many DHSs and other surveys which collect information from guardians about children's educational participation in developing countries. It remains to be said that the DHS is widely used to document educational participation rates and so it presents the best available data source for the current analysis.

The previous chapter, the literature review, discussed the various factors which have been found to be related to school attendance. Two camps of determinants were identified: demand and supply (refer to section 3.2 above). Although the DHS collects information on school attendance and educational attainment, the survey is designed principally to collect information on health related matters. Therefore, factors which are specific to studying education are not collected in the survey. Given the significant relationship between school availability and school characteristics observed in educational studies, the exclusion of supply side factors presents a problem of omitted variable bias. Unfortunately, the magnitude of this bias is unknown and cannot be studied in the present thesis but certainly presents an area for future research when data becomes available. The analyses presented in chapters 5-7 are therefore unable to directly control for school-specific variables. To reduce the impact of this omission on coefficients in the regression model, two approaches are used.

The first approach was to control for variables that are significantly related to supply side factors like school availability. These variables include, for instance, rural/urban residence, community poverty, and administrative region (Cameron 2011; Oketch et al 2010). The plausibility of this approach is confirmed by data from the 2008 and 2004 population and housing census for Liberia and Sierra Leone respectively and data from EMIS in Ghana. In Liberia, for instance, 64% of households in urban areas lived less than 20 minutes away from the nearest primary school compared with 48% in rural areas (GoL 2009a: 287-90). The counties with the highest proportion of households living 20 minutes away from the nearest primary school were Montserrado (66.5%), Grand Kru (65.8) and Nimba (65.2%); Grand Bassa (41.2%) Bong (30.6%) and Rivercess (26.9%) had poor access with over 25% of households in these counties living more than an hour away from the nearest primary school (GoL 2009a: 287-90). In Sierra Leone also the distribution of schools varied significantly by district with districts in the Northern region having the least access (access is defined as taking less than 30 minutes to reach the nearest school in the survey report) and the Western region

having the most access. In the Northern region, 71% of children aged 6-17 years reported to having access to primary school and 25.3% reported to having access to secondary school; the comparative figures for the Western region are 87.8% and 53.8% respectively (GoSL 2007b: 91-92). In Ghana, data shows differences in the supply of school, especially private schools by region. The Greater Accra region has the highest supply of private school for both primary (54.4%) and junior secondary school (54.2%) and the Upper East region has the least access to private education at both primary (6.2%) and junior secondary school (2.3%) (Ghana EMIS 2012). By controlling for administrative region and area of residence, therefore, some of the variation in school availability is captured.

The second indirect approach used to assess the relationship between school availability and school attendance was to fit a separate model where clusters that had no child attending school were excluded. This approach is especially relevant for Liberia because access to post-primary education is largely undeveloped in the country and so even if there is a desire to attend school this desire is severely restricted because of limited availability of schools (2008/09 Liberia National School Census Report cited in Search for Common Ground (SfCG) 2012: 30). Among 6-11 year olds, 7.7% of the 298 clusters in the Liberia DHS, 0.6% of the 353 clusters in the SLDHS and 1.7% of the clusters in Ghana's DHS did not have any child attending school; these clusters were deleted and the model fitted on the complete sample was applied to this reduced sample. If a variable is significant in the full sample but insignificant in the reduced sample, it would indicate that this variable is not independent of school availability. Among 12-14 year olds, 68.8% of clusters in Liberia did not have any child attending school; the corresponding figure was 28.3% in Sierra Leone and 13.4% in Ghana. This approach of fitting a separate model for clusters in which there is no child attending school presents one way of assessing the relationship between school availability and school attendance on the assumption that clusters in which no child was attending school are those in which there is no access to school. Since the degree of omitted variable bias is unknown, this approach may only minimally address any bias in coefficients that may emerge through the omission of directly controlling for supply side factors. It nonetheless presents a way of coping with the exclusion of supply side variables in the analyses.

A final limitation of the DHS is the way in which mother's line number is coded. Recall from section 3.3 above that a variable is available for children whose mothers are alive in order to identify the mother of each child. The coding of this variable however only allows children who are living in the same household as their mothers to be identified. Therefore, children whose mothers are alive but do not reside in the same household as the mother are given a code of 0 meaning they cannot be matched to their mother. For the analyses presented in chapter 7, this limitation led to the exclusion of 4,431 cases reducing the study population to 7,126. The reduced sample was biased with children living in the same household as their mother being significantly more likely to reside in rural areas and poor households. For this same limitation also, it was not possible to study the relationship between paternal education in conjunction with maternal education in chapter 7.

4. What is the progress towards achieving universal basic education in Sierra Leone?

This chapter has analysed levels of primary and junior secondary school attendance between 2003/04 and 2008 with the aim of evaluating the country's progress towards achieving its policy of universal basic education. Simple statistical analyses have been applied to the country's 2008 Demographic and Health Survey and 2003/04 Integrated and Household Survey to understand the changes in primary and junior secondary school attendance ratios and how these attendance ratios vary by the sex of a child, area of residence and socio-economic status. The results show a general decline in educational participation. The proportion of children aged 6-11 years old who have ever attended school declined by 13.9% between 2003/04 and 2008. Among the same age-group, the proportion attending primary education declined by 17.4% (from 74.6% to 61.1%). The proportion of children aged 12-14 year olds entering the education system has also declined although the proportion enrolled in junior secondary education has increased significantly by 73.6% (from 12.1% to 21%). For both tiers of education, children from the poorest households and in rural areas were the most excluded from the education system. There was no difference between sexes at primary education but at junior secondary education girls had a lower attendance.

In recent years, much interest has been expressed in school attendance. Such interest has derived principally from the international communities' commitment to Education for All (EFA), a policy which not only recognises the right to education but also promises all children access to schools by the year 2015 (UNESCO 2000). Since the onset of the EFA policy, education policies in Sierra Leone have been targeted towards achieving this goal. Emphasis has been placed particularly on universal primary education (UPE) and universal primary completion (UPC) as well as universal basic education (UBE) (GoSL 2007a: 22; GoSL 2004). The goals of UPE and UPC have been defined by a number of objectives including: (1) to ensure that all children enter primary school at the age of 6 years (2) to improve the access of girls to primary education and (3) to improve the quality of education nationwide (GoSL 2007c: 22). Universal basic education extended the UPE policy to include junior secondary education as a measure to encourage post-primary school attendance. The analysis presented in this chapter aims to evaluate Sierra Leone's progress towards achieving UBE by focusing on school attendance.

A study of school attendance is important because schools provide a space in which formal education can be delivered. The function of formal education is manifold yet its core functions can be readily summarised as socialisation and economic development (UNESCO 2011a). Children who attend school are exposed to socialisation; they are nurtured into the cultural mores and values which define the society to which they belong. Further, schools enable children to be educated by imparting knowledge, skills, and training which are necessary for productive economic engagement. Such education intensifies and becomes more specialised as children progress through the school system meaning that the longer the number of schooling years, the more economically productive the future workforce will be as more knowledge and skills would have been acquired. It follows that children who are out of school do not receive the socialisation which is core to their development. More fundamentally, children out of school, especially those who have never attended school, are unlikely to receive the training that will equip them with the skills needed to contribute to the advancement of their national economies (UNESCO 2011a). It is against this background that the EFA agenda, with a leading focus on equal and universal access to primary education, is predicated.

EFA policies have contributed significantly to expanding access to primary education through policies such as compulsory and free education. Between 1999 and 2008, the out-of-school population decreased from 106 to 67 million worldwide (UNESCO 2011a: 5). In the same period, total primary enrolment increased from 104% to 112%; Sub-Saharan Africa recorded the greatest gain (from 91% to 116%), followed by South and West Asia (from 114% to 126%), and the Arab states (from 87% to 99%) (UNESCO 2011a: 300). Enrolment rates at secondary education have also shown impressive improvements. Globally, total secondary enrolment improved from 59% to 67% between 1999 and 2008 (UNESCO 2011a: 325). As with primary education, countries in the Sub-Saharan context have shown the most improvement (from 24% to 34%). These figures are testimony to the quantitative impact of UPE. The expansion generated by the policy has, however, not translated into equal and universal access to education. The 2010 EFA Global Monitoring Report revealed that the net enrolment rate (NER) for the world was only 87% suggesting that over 10% of the world's children of school going age were not attending school (UNESCO 2010b: 62). The problem was greatest in Sub-Saharan Africa where about 30% of children of the relevant schooling age were out of school.

One of the reasons why UPE has not been attained is because some children still do not have access to the education system. Girls, rural residents, the poor, and ethnic minorities suffer the greatest exclusion (UNESCO 2010b). Yet, in promoting UPE, emphasis has been disproportionately placed on ensuring equal access between sexes so that there is an equal representation of girls and boys in school irrespective of social background. The effect of such a campaign has been a remarkable development in female education since the inception of the EFA agenda. Global and regional estimates show that the gender parity index (GPI) for primary education, a measure of equal access to school between sexes, is either approaching 1 or is equal to 1 meaning that inequalities between sexes are narrowing (UNESCO 2011a: 73). This progress has prompted some scholars to contend that gender differences in access to school are no longer an issue and so does not warrant further intervention (Grant and Behrman 2010; Knodel and Jones 1996). It is argued instead that other inequalities, namely those found between the poorest and richest households as well as between rural and urban residents, are much wider and continue to hinder efforts to achieve UPE than differences observed between sexes.

Research has shown that the discrepancies which exist between urban and rural children in school attendance as well as that between children from the richest and poorest households are more polarised than that found between sexes (World Bank 2005; 2004b). Country specific studies by the World Bank in Ethiopia and in Rwanda, for example, provide evidence to this effect. In spite of this, global and regional estimates suggest that there remains an overall disadvantage among girls in school attendance. In the Sub-Saharan context, the female to male GPI for gross enrolment at primary education was 0.91 in 2008 indicating that more boys than girls were attending this level of education; the corresponding figure for secondary education was much worse (0.79) (UNESCO 2011a: 73). This continuing relationship between sex and school attendance is compounded by area of residence and poverty so that girls in poor rural residence are more likely to be out of school than boys in a similar position (World Bank 2008a; 2004b). Evidence from lowland Eritrea and Guinea, for instance, demonstrate that cultural values and endemic poverty combine to exclude girls from education. Even in countries like Ghana where there has been remarkable progress toward UPE, girls in the Northern and Upper West regions of the country form a larger proportion of the out of school

population as a result of poverty and traditional practices (World Bank 2008a; Tuwor and Sossou 2008). The continued marginalisation of girls as well as poor and rural children hampers progress to UPE. Understanding the magnitude of such inequalities may be useful in directing policy initiatives.

This chapter assesses the progress towards UBE in Sierra Leone. Sierra Leone forms a suitable context for this research for a number of reasons. Firstly, there is limited up-to-date information on primary and secondary school attendance in the country. The most recent account of the country's education system is a study by the World Bank (2007) which used the 2003/04 Integrated and Household Survey and 2004 population census to analyse the education system. Secondly, since 2000, there has been a consistent decline in the country's net attendance ratio (NAR) meaning that fewer children of the relevant age are attending the correct level of education. This deterioration is alarming because it has been concomitant with extensive efforts by the national government to stimulate school attendance. Lastly, and in relation to the former point, a decline in net attendance has meant that more children have been marginalised in the education system. The study by the World Bank showed pronounced inequalities between districts, rural and urban residence, socio-economic groups, and sexes. The current study differs to the World Bank's in that it focuses solely on basic education and the progress that has been achieved in improving attendance since the introduction of Free Primary Education among children of official school age in Sierra Leone. Further, this study adds to the World Bank's through its comparison with other West African countries, particularly with post-conflict Liberia. The methodological approach, though is similar in its use of UNESCO indicators, differs in its application of statistical analyses and use of the indicators. That is, the present study uses simple statistical tests to assess the relationship between children's background characteristics and whether they attend the correct grade; this analysis is repeated for a between country-comparison with other West African countries. The present study more closely examines the net attendance ratio whereas the World Bank's, being largely a generic study for low income countries, uses mainly the gross enrolment rate and administrative data to show the overall levels of enrolment.

A detailed analysis of school attendance in Sierra Leone is thus necessary in order to: (1) understand current levels of school attendance in the country (2) explore the magnitude of the

discrepancies which exist between social groups in access to schools. Such a focus is necessitated by a desire to provide an up-to-date monitoring report on the country's progress toward UBE. The research questions are as follows:

1. Have primary and junior secondary school attendance ratios changed significantly since the introduction of universal basic education?
2. Are the differences in school attendance ratios between rural/urban areas and poorest/richest households more pronounced than the difference between girls/boys?
3. How do net attendance ratios for primary and junior secondary school in Sierra Leone compare with other West African countries?

4.1. Basic education policies and the state of basic education in Sierra Leone

The policy of basic education was first introduced in Sierra Leone in 1993 through the restructuring of the education system. The old structure of schooling had assigned six years to primary education and five years to secondary education (GoSL 1997: 3). The new system was 6-3-3-4: six years of primary school, three years of junior secondary school (JSS), three years of senior secondary school (SSS) and four years of tertiary education. JSS was to be amalgamated with primary schooling to constitute basic education. The official age at which children should attend primary school is between 6-11 years and for JSS it is 12-14 years. There were six grades to primary education (P1-P6) and three grades to JSS (JSS1-JSS3). At the end of P6 all children were required to take the National Primary School Examination (NPSE) in order to gain admission to JSS (GoSL 2004: 9). The Basic Education Certificate Examination (BECE) was to be taken at the end of JSS; students who perform well in this exam could be admitted to SSS conditional on whether they could afford the costs and had access to this tier of education (GoSL 2004: 10). In 1994, the National Commission for Basic Education was set up to oversee activities related to the transition to basic education. The programme for this transition was outlined in the country's National Education Master Plan (NEMP) 1997-2006.

The NEMP outlined a series of short, medium and long term goals for basic education. For primary education, a short term goal was set to achieve attendance of 30% among 6-11 year

olds by 1998; by 2000, it was planned that attendance among this age group would increase to 40% (GoSL 1997: 49-50). Additional targets included the construction and equipping of primary schools to accommodate and facilitate the learning of new entrants. Medium and long term plans were also proposed to increase the number of qualified teachers in primary schools to 70% by the year 2000 and to 90% by 2005 (GoSL 1997: 50). For junior secondary education, the targets set were more concerned with restructuring this tier of education than with achieving quantitative expansion in school enrolment and infrastructure. There are two main reasons for this. Firstly, until 1993, secondary education had existed as a single tier of education. The policy of basic education meant that secondary education was not only divided into two tiers but that the lower tier was to be aligned with primary education. Existing infrastructure and curriculum were therefore to undergo major revisions to meet the goals of this new reform. Secondly, the organisation and delivery of secondary education was inadequately regulated with no specific administration overseeing the functioning of schools (GoSL 1997: 57). Pre-1993, junior secondary education was offered in three types of schools including: (1) standalone junior secondary schools, (2) technical/vocational colleges and (3) junior/senior secondary schools. One of the short term goals for JSS was to ensure the effective administration and management of all these different schools (GoSL 1997: 58). The medium and long term goals aimed to replace temporary school structures with permanent schools and equip the new schools with equipment and supplies, no specific quantitative figures were cited as part of these targets (GoSL 1997: 59).

The policies described above created a foundation to form the structural changes and identified goals to achieve basic education. The education policies introduced in the noughties, especially towards the end and in the aftermath of the civil war (1991-2001) went beyond structural adjustment to creating opportunities for children to access the education system. Although the concept of basic education had been introduced, primary and junior secondary schools were still treated as separate tiers with much policy attention and investment being directed towards the expansion of primary education (World Bank 2007). The first universal education policy was introduced through the 2001 Free Primary Education policy. This policy abolished schools fees for children attending primary schools, removed costs to take the NPSE and promised to provide free textbooks and learning materials for primary schools. In 2004, all education policies since 1993 for basic education were consolidated in the Education Act of that year which made it mandatory for all children aged 6-14 to attend and complete basic education

(GoSL 2004). Although it became a legal requirement to attend JSS, access was not free for all children; only girls in the Northern and Eastern regions could attend JSS without paying fees. In addition to these developments, the government established the Complementary Rapid Education for Primary Schools (CREPS) which enabled young people to complete the primary school curriculum within a three year period. The CREPS was designed for children older than the primary school going age who had been excluded from the school system during the civil conflict.

To aid compulsory enrolment, post-war reconstruction efforts invested vastly in expanding the infrastructure of schools. Between 2000 and 2004, expenditure on pre-primary and primary education accounted for between 44% and 51% of the total education budget (World Bank 2007: 180). The expenditure on junior secondary education over the same period averaged around 20% of the education budget (World Bank 2007: 180). Much of the expenditure on both tiers of education was invested in building schools. The World Bank and African Development Bank reconstructed and rehabilitated 600 primary and junior secondary schools within a five year period through the Sababu project (Maclure and Denov 2009: 614). Within a three year period, the United Nations Children's Fund's Community Movement for Education also sponsored the construction of more than 1000 schools which provided space for 375,000 children. In 2007, 74.8% of children aged 6-17 lived within thirty minutes to the nearest primary school compared to 32.9% for secondary education (Gosl 2007b: 91-2). Kenema town had the best access to school with 99% and 88.4% of children living within thirty minutes to the nearest primary and junior secondary schools respectively (GoSL 2007b: 91-2). Of the four regions, the Western region had the best access to schools: 87.8% and 53.8% lived thirty minutes away from the nearest primary and secondary schools respectively; the Northern region had the least access (GoSL 2007b: 91-2). As of 2010/11, there were 5,931 primary schools and 888 junior secondary schools in the country (GoSL 2012: 5). The distribution of primary schools by region was: East (1,353), North (2,233), South (1,513), and West (832) (GoSL 2012: 5). The corresponding distribution for junior secondary schools was: East (153), North (313), South (175), and West (247) (GoSL 2012: 5).

The current state of educational provision in Sierra Leone is inadequate and substandard. The Education Sector Plan for 2007-2015 and the Education Sector Capacity Development Strategy

for 2011-2015 from the country's Ministry of Education conveys an abysmal state of school infrastructure, the quality of learning environment, the provision of teaching facilities and, the competence of teachers. There is widespread use of multiple classes and double shifts for teaching. Both systems of teaching are indicative of a decline in standards. In multiple classes, large numbers of children attend classes in very confined spaces with no writing space making meaningful learning difficult (UNESCO 2004b: 2). The double shift system reduces the number of children per lesson; this system however considerably reduces the hours of instruction that children are exposed to (GoSL 2007c: 41). In schools, particularly in rural areas, it is commonplace to find children sitting on 'stone or concrete blocks of various kinds or planks of wood or simply stand' during lessons (UNESCO 2004b: 2). In such environments, learning is difficult as there is no proper surface to lean on for writing. Many schools do not have access to a library and, when such a facility is available, it is ill-equipped and lacks up-to-date books and reference materials (GoSL 2007c: 23). In 2011, the Ministry of Education expressed that: the 'provision at all levels of the education sector is inadequate, leaving pupils and teachers without access to sufficient numbers of textbooks, teachers guides and supplies of paper, pencils, science equipment and materials …' (GoSL 2011: 40). These inadequacies are compounded by poor teaching standards with approximately 40% of primary school teachers and 10% of secondary school teachers unqualified (GoSL 2007c: 69).

4.2. Data

4.2.1. Demographic and Health Surveys

To undertake this study, two types of surveys are used: the country's 2008 Demographic and Health Survey (SLDHS) and 2003/04 Integrated and Household Survey (SLIHS) are used (refer to section 3.1 in previous chapter for characteristics of surveys). The SLDHS is the most recent survey to be conducted in the country and so contains the most up-to-date information on the demography of the national population. In addition to the SLDHS, four other Demographic and Health Survey (DHS) (Ghana, Guinea, Liberia, and Nigeria,) are used in order to compare school attendance between Sierra Leone and other West African countries. The DHS is suitable for a comparative analysis because it is standardised using similar survey instruments to collect information on individuals and households. The total sample size for each country is: 46,536 in Ghana, 38,182 in Guinea, 34,670 in Liberia, 156,809 in Nigeria, and 41,985 in Sierra Leone.

The study population for this research are children of official school going age for basic education (primary and junior secondary education). At the time the above surveys were collected, the education structure for primary and junior secondary education was the same in Liberia, Ghana and Nigeria. That is, the official age for attending primary education was 6-11 years and for JSS it was 12-14 years. The age-groups for Guinea are different: 7-12 for primary education and 13-16 for junior secondary education. The final sample size for the study population for each survey is presented in Table 4-1. The table also shows the distribution of the population by the key study variables used in the analysis. The sample size for Sierra Leone was 8,074 children aged 6-11 years and 4,329 children aged 12-14 years.

Table 4-1: Distribution of sample in the Demographic and Health Survey for Sierra Leone (SLDHS 2008), Ghana (GhDHS 2008), Nigeria (NDHS 2008), Liberia (LDHS 2007), Guinea (GnDHS 2005)

Sample size	2008 SLDHS	2008 GhDHS	2008 NDHS	2007 LDHS	2005 GnDHS
Children of primary school going age					
Girl	3,948	3,818	13,802	3,189	3,825
Boy	4,126	4,015	14,277	3,286	3,846
Urban	3,018	2,673	7,451	2,596	2,074
Rural	5,056	5,160	20,632	3,879	5,597
Poorest	1,712	1,801	6,212	1,274	1,569
Richest	1,464	1,322	4,812	1,331	1,565
Total	8,074	7,833	28,083	6,475	7,671
Children of junior secondary school going age					
Girl	2,219	1,853	5,440	1,299	1,707
Boy	2,110	1,907	5,725	1,415	1,743
Urban	1,993	1,432	3,201	1,286	1,217
Rural	2,336	2,328	7,964	1,428	2,233
Poorest	832	769	2,221	476	644
Richest	976	744	2,203	679	772
Total	4,329	3,760	11,165	2,714	3,450

Note: the school system in Liberia, Ghana, and Nigeria was the same as in Sierra Leone at the date of each survey. The school structure in Guinea was, however, different to the above – the official age at the time of the survey for primary school was 7-12 years, and for junior secondary school it was 13-16.

Recall from section 3.1 in chapter 3 that the DHS administers three questionnaires. Information from the household questionnaire is used for analysis in this chapter as it contains information on school attendance and background characteristics such as age, sex, area of residence and household wealth. Information on grade attending and ever attendance were also used. The focus in this chapter is on the NAR, the proportion of children attending school commensurate to their age (UNESCO 2011a: 360-62). The NAR for primary education was the proportion of children aged 6-11 years attending primary school; for JSS it was the proportion of children aged 12-14 years attending JSS. To create the primary NAR, all children of primary school going age were coded as 0, those within this age-group attending grades P1-P6 were coded as 1. For JSS, all children of JSS going age were coded as 0, those attending grades JSS1-JSS3 were coded as 1. In addition to the NAR, a number of other indicators were used including ever attendance and age in grade enrolment. The DHS contains a variable on ever school attendance which was used here; the age-in-grade enrolment was calculated by cross-tabulating the age variable with the variable for grade attending which showed the level of attendance by grade within age-groups. The age-in-grade enrolment indicator is a useful way of assessing efficiency in school entry and position of children within the school cycle. This is important because although the NAR is widely used as a measure of progress towards universal education, the indicator merely informs whether a child is attending the correct level of education (Lewin 2009). In a country like Sierra Leone where delayed enrolment is commonplace, the NAR may provide an incomplete account of school access because it fails to indicate where children are in the school cycle. For instance, it may be that some children aged 10 or 11 are in fact still only in the early grades of primary school – this detail is not captured by the NAR. Looking at the proportion of children who are in the correct grade of school could overcome this problem.

Three independent variables are used in this analysis: sex of the child, area of residence, and household wealth quintile. The sex of the child is used to measure the GPI as a way of illustrating the degree of equality in access between girls/boys school attendance (UNESCO 2011a: 360-62). A GPI above 1 suggests that more girls than boys are attending school, and a GPI lower than 1 indicates that fewer girls than boys are in school. Parity indexes were also constructed for net attendance by area of residence and household wealth. The index for area of residence shows the ratio of rural to urban children attending the correct level of education. A ratio of 1 indicates equal net attendance between rural/urban residence; a ratio above or below

1 indicates a disparity in favour of rural children and urban children respectively. Lastly, the index for household wealth is a ratio of children in the poorest to richest households. The ratio is to be interpreted as: 1 indicates equal net attendance between the poorest and richest children; a ratio above or below 1 indicates a disparity in favour of the poorest and richest children respectively. The revised household wealth quintile which takes rural/urban residence into account is used in the analysis (refer to section 3.5 in chapter 3). Note that for all variables discussed above, there were no missing cases.

4.2.2. Integrated Household Survey

The 2003/04 SLIHS is the most recent nationally representative survey to be conducted in the country before the 2004 Education Act. The 2003/04 SLIHS was selected using a similar sample design to the SLDHS whereby households were systematically selected after being stratified evenly by urban and rural residence, all administrative regions, districts, and chiefdoms in the country. The data has 226 primary sampling units, 3,720 households, and 23,022 household members. Of the 23,022 household members, 4,645 were aged 6-11 years and 1,846 were 12-14 years old. As with the DHS, the survey collects information on school attendance and age. The following variables were used from this survey: age, ever attendance, and current level of education attending. There were no missing cases for these variables.

4.3. Analysis

Simple statistical techniques are used to answer the research questions in this chapter. Univariate analysis was first performed to produce frequencies for ever attendance and the NAR. Bivariate analyses in the form of two/three-way cross-tabulations and chi-square tests were performed. Cross-tabulations were used to understand the distribution of net attendance by sex, area of residence and household wealth; Pearson's chi-squared test was then used to test the statistical significance of these relationships. The null hypothesis for the chi-squared test contends that there is no independence between two variables. The test is defined as

$$\chi^2 = \sum \frac{(n_{ij} - \mu_{ij})^2}{\mu_{ij}}$$ where χ^2 is the chi-square statistic, n_{ij} represents an observed

frequency, and μ_{ij} represents an expected frequency. Where the observed and expected frequencies are close in each cell, it can be concluded that H_0 is tenable meaning that there is

not a statistically significant association between the variables under study. Alternatively, the larger the differences between $(n_{ij} - \mu_{ij})$ the stronger the evidence against H_0. Pearson's chi-squared test is a commonly used measure of assessing associations between categorical variables and so serves well for the objectives of this research. All analyses were performed using STATA version 11. Sample weights were applied to all calculations in order to account for the complex sample design of the data sources. The *svy* command was used for all calculations in STATA. This command fits statistical models for complex survey data. The command was created using pweights; the strata were defined by the primary sampling units (i.e. clusters) used for the DHS sampling. Note that because the *svy* command was used to derive the final estimates, the formula presented above was adjusted using the Rao-Scott adjustment to chi-squared tests for contingency tables when the estimated cell proportions are derived from survey data.

4.4. Results

4.4.1. Have primary and junior secondary school attendance increased significantly since the introduction of universal basic education?

Table 4-2 shows the levels of school attendance among children of official school going age between 2003/04 and 2008 in Sierra Leone. Ever attendance at school has deteriorated for children aged 6-11 years and 12-14 years. According to the 2003/04 SLIHS, 76.8% of 6-11 year olds and 79% of 12-14 year olds had ever attended school. By 2008, the level of participation among these age-groups had declined significantly to 66.1% and 74.6% respectively. Between these years, net attendance for primary education experienced a non-negligible decline (from 74.6% to 61.6%); the NAR for JSS almost doubled however from 12.1% in 2003/04 to 21% in 2008.

Table 4-2: Levels (%) of school attendance among children of official school going age in 2003/04 and 2008, Sierra Leone

Variable	2003/04 %	2003/04 n	2008 %	2008 n
Ever attend school				
6-11 years old	76.8 (75.6, 78.0)	4,645	66.1 (65.1, 67.1)	8,074
12-14 years old	79.0 (77.1, 80.9)	1,846	74.6 (73.3, 75.9)	4,329
Net attendance				
Primary school	74.6 (73.3, 75.9)	4,645	61.6 (60.5, 62.7)	8,074
Junior secondary school	12.1 (10.6, 13.6)	1,846	21.0 (19.8, 22.2)	4,329

Note: Figures presented in parenthesis represent 95% confidence intervals

The above results suggest that the goal of UBE remains a challenge in Sierra Leone with just over 60% of children of the relevant age attending primary education and a little over 20% of children of the official age attending JSS. In 2008, of 12-14 year olds attending school, 68% were enrolled in primary education, 30% were enrolled in JSS, and 2% were enrolled in SSS. Table 4-3 shows the levels of school attendance by age and primary grade among 6-11 year olds. The proportion of children enrolled in the correct grade decreases with age from 27.5% among 6 year olds in P1 to 10.1% among 11 year olds in P6. At the age of 6, which is the legislated age for school admission, over 50% of children of this age were out of school. These figures show a huge problem of over-age enrolment. Table 4-3 also shows children attending a grade that is above their age; this appears most pronounced among 6 year olds among whom 12.8% are enrolled in grade 2.

Table 4-3: Levels (%) of school attendance by age and primary grade (P1-P6) among 6-11 year olds in 2008, Sierra Leone

Age	P1 %	P2 %	P3 %	P4 %	P5 %	P6 %	n
6	**27.5**	12.8	0.0	0.0	0.0	0.0	1802
7	21.3	**22.2**	1.0	0.0	0.0	0.0	1510
8	13.2	26.8	**16.9**	5.3	0.0	0.0	1487
9	7.0	18.5	24.4	**13.5**	5.5	0.0	1215
10	3.3	13.9	18.8	17.7	**11.7**	4.5	1545
11	1.8	7.8	17.7	21.4	15.6	**10.1**	884

4.4.2. Are the differences in school attendance ratios between rural/urban areas as well as the poorest/richest households more pronounced than the difference between girls/ boys?

The following section discusses correlates of net school attendance focusing mainly on area of residence, household wealth and sex of the child. Research has shown that school attendance varies greatly by children's socio-demographic background and location (UNESCO 2011a; 2010; World Bank 2010b). The World Bank's (2007) research in Sierra Leone showed that a child's sex, household wealth, and area of residence had a significant relationship with school attendance. In other words, not controlling for any other factors, girls, children living in rural areas and in the poorest households are significantly less likely to attend school than their counterparts. Other country specific studies conducted by the World Bank such as that in Malawi (2010b), Ethiopia (2005), and Rwanda (2004b) have reported similar findings. The results presented in this section are not dissimilar to these studies.

Table 4-4 shows the distribution of net attendance by background characteristics for primary and junior secondary education. At all levels of education, there are significant differences in attendance between urban and rural residence and the poorest and richest households ($p<.05$). Also, on all background characteristics, differences between comparative groups become more polarised with an increase in level of education. Looking at the comparison between sexes, there is no significant difference between sexes at primary education. Once at JSS, the net attendance for girls reduces to 81% of that found among boys ($p<.05$). Overall, children in rural areas and children living in the poorest households are consistently less likely to be attending the correct level of education; the disadvantage suffered by children from the poorest households is the most severe relative to those experienced by girls and rural children. At primary education, the ratio of rural to urban attendance is 0.73 while that for the poorest to richest household is 0.54. School attendance varies between sexes by area of residence at junior secondary education but not at primary education (refer to Table 4-5). At JSS, boys have a higher net attendance than girls in rural areas ($p<.05$): the female to male ratio in rural areas is 0.67.

Table 4-4: Percentage distribution of school attendance by age and background characteristics, Sierra Leone 2008

Background characteristics	Age 6-11 (%)	Age 6-11 n	Age 12-14 (%)	Age 12-14 n
All	61.6 (60.5, 62.7)	8,074	21.0 (19.8, 22.2)	4,329
Sex			*	
Male	60.4 (58.9, 61.9)	4,126	23.2 (21.4, 25.0)	2,110
Female	62.9 (61.4, 64.4)	3,948	18.8 (17.2, 20.4)	2,219
Difference	2.5		4.4	
Parity index (female/male)	1.04		0.81	
Area of residence	*		*	
Urban	76.0 (74.5, 77.5)	3,018	33.8 (30.9, 35.1)	1,993
Rural	55.3 (53.9, 56.7)	5,056	13.0 (11.6, 14.4)	2,336
Difference	20.7		20.8	
Parity index (rural/urban)	0.73		0.38	
Household wealth	*		*	
Poorest	43.4 (41.1, 45.7)	1,712	8.2 (6.3, 10.1)	832
Richest	79.8 (77.7, 81.9)	1,464	39.1 (36.0, 42.2)	976
Difference	36.4		30.9	
Parity index (poorest/richest)	0.54		0.21	

Note: $*p<.01$, $**p<.05$; Figures presented in parenthesis represent 95% confidence intervals

Table 4-5: Difference in net attendance between sexes within household wealth and area of residence among children of official school going age, Sierra Leone 2008

Characteristic by sex	Primary	Age 6-11 n	JSS	Age 12-14 n
Rural			*	
Male	54.2 (52.3, 56.0)	2,657	15.6 (13.5, 17.7)	1,152
Female	56.6 (54.6, 58.6)	2,399	10.5 (8.7, 12.2)	1,184
Difference	2.4		5.1	
Parity index (female/male)	1.04		0.67	
Urban				
Male	75.7 (73.5, 77.9)	1,469	35.6 (32.6, 38.6)	958
Female	76.3 (74.2, 78.4)	1,549	32.1 (29.3, 34.9)	1,035
Difference	0.6		3.5	
Parity index (female/male)	1.01		0.90	
Poorest household				
Male	43.4 (40.2, 46.6)	910	9.9 (7.1, 12.7)	438
Female	43.3 (39.8, 46.7)	802	6.4 (4.0, 8.8)	394
Difference	0.1		3.5	
Parity index (female/male)	1.01		0.65	
Richest household				
Male	79.2 (76.2, 82.2)	713	43.0 (38.4, 47.4)	456
Female	80.4 (77.6, 83.2)	751	35.5 (31.4, 39.6)	520
Difference	1.2		7.5	
Parity index (female/male)	1.02		0.83	

Note: $*p<.01$, $**p<.05$; Figures presented in parenthesis represent 95% confidence intervals.

The analysis presented in this section is in agreement with earlier research, that there are greater inequalities between urban and rural areas and between poor and affluent children than between boys and girls. In Sierra Leone, children from the poorest households are the least likely to attend school followed by rural children, this is true for both primary and junior secondary school attendance. This discrepancy between groups worsens as children get older. Note that this analysis looks at simple bivariate relationships and so the preceding interpretations of the relationship between school attendance and area of residence, household wealth, and sex of the child are unconditional.

4.4.3. How do net attendance ratios for primary and junior secondary school in Sierra Leone compare with other West African countries?

This final section presents a cross country comparison of net attendance at primary and junior secondary education. The results are indicative of the relative progress towards UBE in Sierra Leone. Table 4-6 shows the NAR for primary education for Sierra Leone and four other

countries: Ghana, Guinea, Liberia, and Nigeria. Also presented in the Table are correlates of net primary school attendance with the associated parity indexes. The cross country comparison for junior secondary education is presented in Table 4-7. Figure 4-1 summarises the information in Table 4-6 in a graphical format for clarity of interpretation.

Overall, school attendance in Sierra Leone is moderate when compared to that found in the comparative countries. At all levels of education, Sierra Leone's NAR is higher than in neighbouring Guinea and Liberia. The NAR for primary education in Sierra Leone is 61.6% compared to 50.6% in Guinea and 30% in Liberia. The corresponding figures at JSS are 21%, 15.2%, and 7.9% respectively. The NARs in Ghana and Nigeria are, however, higher than in Sierra Leone. Ghana's NAR is significantly higher than in Sierra Leone at both primary and secondary education. In Nigeria, only the NAR at junior secondary education is higher; Sierra Leone's NAR for primary education is marginally higher than in Nigeria. Despite the cross country differences conveyed in Table 4-7, the patterns observed in access to school are consistent with that presented throughout this chapter. That is, in all countries under study fewer children of the official school going age are represented at the correct level of education as they get older.

The cross country comparison shows a mixed result for girls' education. At primary education, only in Ghana and Sierra Leone is there no significant difference between the male and female NAR (refer to Figure 4-1). In the other countries, however, girls are significantly less likely to be attending school: in Liberia the female to male parity index is 0.90, in Guinea it is 0.87, and in Nigeria it is 0.91, (p<.05). At JSS, all countries but Guinea show a lack of statistical significance between sexes (refer to Table 4-7). From these results, it would appear that Sierra Leone has made remarkable progress in attaining the goal of equal gender parity in primary education seeing that, relative to the other countries (except in Ghana), there is no statistical significance between sexes.

Table 4-6: Net attendance ratios for primary education in Sierra Leone (2008), Ghana (2008), Nigeria (2008), Liberia (2007), and Guinea (2005)

Background characteristics	% attending primary school of official age (95% CI)				
	Sierra Leone	**Liberia**	**Guinea**	**Nigeria**	**Ghana**
All	61.6 (60.5, 62.7)	30.0 (28.9, 31.1)	50.6 (49.5, 51.7)	59.6 (59.0, 60.2)	73.7 (72.7, 74.7)
Sex		**	*	*	
Male	60.4 (58.9, 61.9)	31.3 (29.8, 32.9)	54.1 (52.5, 55.7)	62.4 (61.7, 63.2)	73.3 (71.9, 74.7)
Female	62.9 (61.4, 64.4)	28.2 (26.6, 29.7)	47.0 (45.4, 48.6)	56.8 (56.0, 57.6)	74.1 (72.7, 75.5)
Parity index (female/male)	1.04	0.90	0.87	0.91	1.01
Residence	*	*	*	*	*
Urban	76.0 (74.5, 77.5)	45.4 (43.5, 47.3)	76.1 (74.3, 77.9)	72.9 (71.9, 73.9)	80.0 (78.5, 81.5)
Rural	55.3 (53.9, 56.7)	20.5 (19.2, 21.8)	40.9 (39.6, 42.2)	54.0 (53.3, 54.7)	69.8 (68.5, 71.1)
Parity index (rural/urban)	0.73	0.45	0.54	0.74	0.87
Wealth quintile	*	*	*	*	*
Poorest	43.4 (41.1, 45.7)	15.9 (13.9, 17.9)	35.9 (33.5, 38.3)	29.9 (28.8, 31.0)	59.2 (56.9, 61.5)
Richest	79.8 (77.7, 81.9)	55.8 (53.1, 58.5)	81.2 (79.3, 83.1)	81.1 (80.0, 82.2)	85.5 (83.6, 87.4)
Parity index (poorest/richest)	0.54	0.28	0.44	0.37	0.69

Note: $*p<.01$, $**p<.05$; Figures presented in brackets represent 95% confidence intervals.

The results for urban and rural differences as well as the poorest and richest households are presented in Figure 4-1. As in Sierra Leone, children living in rural areas and in the poorest households are significantly less likely to attend school at the official age relative to their counterparts – the disadvantage experienced by such children is exacerbated at older ages as indicated by a worsening of the parity indexes. Relative to Sierra Leone, children living in rural areas have significantly lower access to primary school and JSS in Guinea and Liberia while those in Ghana and Nigeria have higher access (refer to Table 4-7 and Table 4-8).

Figure 4-1: Comparison of parity indexes for sex, residence, and household wealth for net primary school attendance between Guinea, Liberia, Ghana, Nigeria, and Sierra Leone
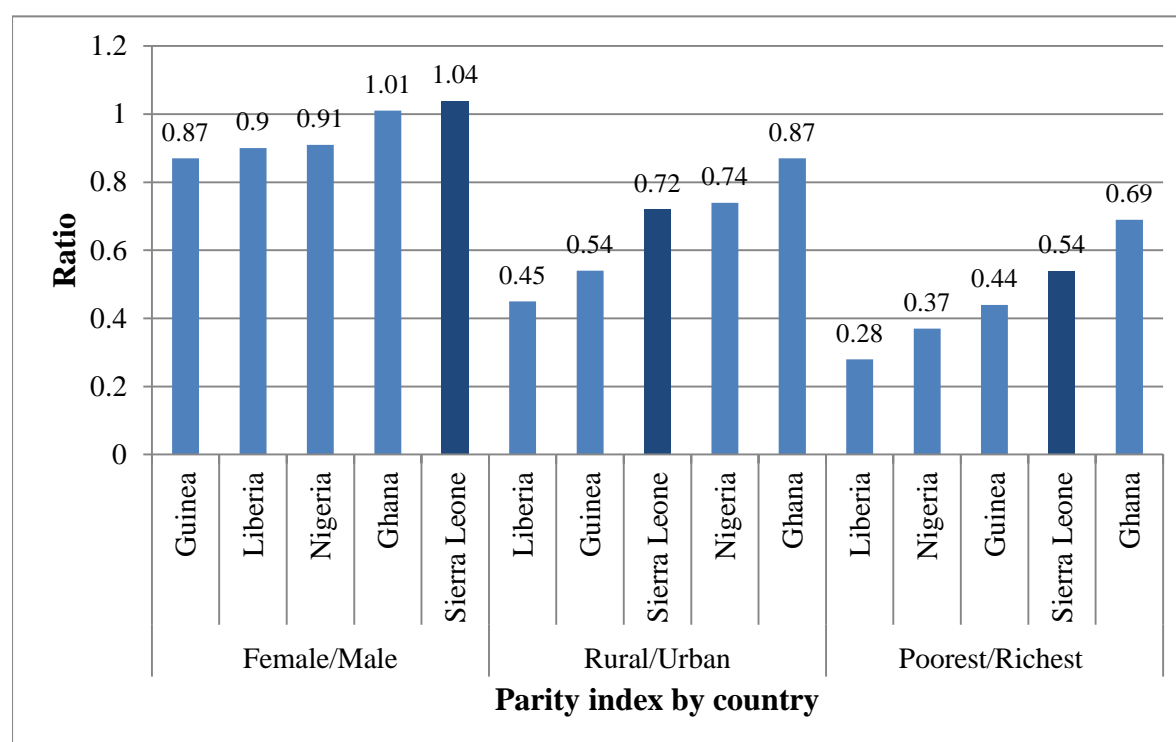
The discrepancy in access between the poorest and richest households is common to all the countries under study. The magnitude of such discrepancy however differs between countries. At primary education, only Ghana has a higher poorest to richest parity index than Sierra Leone: 0.69 compared to 0.54 (p<.05). Liberia has the worst ratio (0.28) compared to the other countries. At JSS, Ghana again has the highest poorest/richest parity index (0.23) followed by Sierra Leone (0.21); Liberia has the lowest (0.03).

Table 4-7: Net attendance ratios for junior secondary school in Ghana (2008), Nigeria (2008), Liberia (2007), and Guinea (2005)

	% attending secondary school of official age (95% CI)				
	Sierra Leone	**Liberia**	**Guinea**	**Nigeria**	**Ghana**
All	21.0 (19.8, 22.2)	7.9 (6.9, 8.9)	15.2 (14.0, 16.4)	27.9 (27.1, 28.7)	32.2 (30.7, 33.7)
Sex	*		**		
Male	23.2 (21.4, 25.0)	8.4 (7.0, 9.8)	16.9 (15.1, 18.7)	27.9 (26.7, 29.1)	31.6 (29.5, 33.7)
Female	18.8 (17.2, 20.4)	7.5 (6.1, 8.9)	13.5 (11.9, 15.1)	28.0 (26.8, 29.2)	32.7 (30.5, 34.8)
Female/male	0.81	0.89	0.80	1.00	1.03
Residence	*	*	*	*	*
Urban	33.8 (30.9, 35.1)	13.3 (11.4, 15.1)	29.7 (27.1, 32.3)	41.7 (40.0, 43.4)	44.5 (41.9, 47.1)
Rural	13.0 (11.6, 14.4)	3.3 (2.4, 4.2)	7.0 (5.9, 8.1)	21.4 (20.5, 22.3)	22.8 (21.1, 24.5)
Rural/urban	0.38	0.25	0.24	0.51	0.51
Wealth quintile	*	*	*	*	*
Poorest	8.2 (6.3, 10.1)	0.6 (0.0, 1.3)	3.8 (2.3, 5.3)	5.8 (4.8, 6.8)	13.6 (11.2, 16.0)
Richest	39.1 (36.0, 42.2)	17.6 (14.7, 20.5)	34.9 (31.5, 38.3)	53.6 (51.5, 55.7)	56.9 (53.3, 60.5)
Poorest/richest	0.21	0.03	0.11	0.11	0.23

Note: *p<.01, **p<.05; Figures presented in brackets represent 95% confidence intervals.

4.5. Discussion

The results from the analyses have shown that Sierra Leone is unlikely to achieve UBE. Ever attendance among 6-11 year olds and the primary school NAR has declined significantly between 2003/04 and 2008. One of the reasons for this decline is that fewer children are entering the education system at the stipulated age of 6. In 2008, 56% of 6 year olds were still out of school and 27% were in grade 1 of primary school. Delayed enrolment means that fewer children progress through the education system according to their age; by the age of 12 at which children should be enrolled in JSS1, only 5.7% of children in this age-group were enrolled in this grade. The NAR for JSS, although have increased in the study period (from 12% to 21%), remains substantially lower than the primary NAR: 21% compared to 61.6%. For both primary and junior secondary schools the most excluded children are those from poor and rural households; there is no significant different between boys and girls at primary education but girls are significantly less likely to attending school than boys at JSS.

The Education Act of 2004 saw the consolidation of over a decade of education policies geared towards UBE. During this period, as section 4.1 details, investment was directed disproportionately towards primary education with expenditure at this tier of education more than double that spent on JSS (World Bank 2007: 180). Policies such as tuition-free education, scholarships, and free school meals were implemented at the primary school level. In addition, the construction and rehabilitation of school infrastructure was mainly for the primary level. Policies to expand JSS were few with only girls in the Northern and Eastern regions being granted free access to this tier of education. The imbalance in investment is reflected in the supply of schools around the country. Results from the country's 2007 Core Welfare Indicator Cluster Survey showed different levels of access for primary and secondary schools. In the Survey Report (GoSL 2007b: 14) access was defined as children who reported to being able to reach school in 30 minutes: seventy five percent of children had access to a primary school compared with 33% who had access to secondary education. The Western region had the highest level of access to both primary (88%) and secondary schools (56%); the least access was found in the Northern region where 71% had access to primary schools and 25.3% to secondary schools (GoSL 2007b: 91-2). Children living in poor rural households were found to have the lowest access to schools nationally (68% for primary schools and 18% for secondary

schools); the comparative figures for the urban poor were 90% for primary school and 56% for secondary education (GoSL 2007b: 91-2). These figures suggest that basic education policies have not succeeded in creating a uniform system of schooling for primary and junior secondary education; this disjuncture in part explains the relatively low levels of attendance at JSS. For primary education there is significantly wider provision of schools yet almost 40% of children aged 6-11 years remain out of school. One of the underlying reasons for this exclusion is household poverty.

The cost of education deters children from attending school (Lloyd and Hewett 2009; Filmer and Pritchett 1999). As late as 2007, 34% of children aged 6-17 who had dropped out of school cited the expense of education as a reason for dropping out (GoSL 2007b: 94). Although government policy stipulates that primary education is tuition-free and junior secondary education is free for girls in the Northern and Eastern regions, schools still charge fees for admission. Evidence from the country's 2003/04 Integrated and Household Survey show that among 6-11 year olds attending primary school, the average cost of registration fees was Le 5,112 (conversion: Le 1=£.00014 as of August 2013); 56% did not pay any registration fees, 43% paid between Le 1-100,000 and 1% paid over Le 100,000 (GoSL 2007a). The average cost of attending JSS is over five times higher than at primary education: Le 26,532. Compared to 56% of 6-11 year olds who did not pay registration fees for attending primary schools, only 8% of children aged 12-14 years responded to not paying school fees to attend JSS (GoSL 2007a). In addition to paying for registration, households have to pay for other costs such as school uniforms, books, transportation and food. Looking at the case of uniforms, for instance, 6% of children attending primary school did not pay for school uniform compared to 0.4% who were attending JSS. For JSS, 55% of children paid Le 1-25,000 for uniforms, 34% paid Le 25,001-50,000 and 10.6% paid over Le 50,001 (GoSL 2007a). By comparison, just under 90% of children attending primary school paid less than Le 25,000 for school uniforms. These figures give credence to the argument that basic education policies have done insufficiently to remove the economic barriers to school participation.

One area in which Sierra Leone has succeeded is to remove the gap between sexes in school attendance. This success however is limited to primary education as boys remain significantly more likely to attend JSS than girls. The framework for improving girls' education has since

1997 been part of basic education policies. Some of the strategies outlined in the 1997-2006 NEMP were to promote advocacy and social mobilisation for girls' education so as to raise awareness of the economic and social rewards of educating girls as well as to diffuse traditional attitudes towards women. In the aftermath of the war, in addition to the introduction of free primary education, the government extended financial assistance to girls in poor regions in the country. These efforts were met with additional financial bursaries and the establishment of all-girl schools for girls who were unable to attend state primary schools by women's associations, churches and non-governmental organisations (NGOs) (Maclure and Denov 2009: 614). Nishimuko's (2009: 289) study on the role of NGO and faith based organisations in achieving EFA provides evidence of the sensitisation of girls' education in communities within Moyamba district by Plan Sierra Leone, CADO and FAWE. These efforts, though have helped to enhance girls' participation in the education system, have not been able to remove the long standing patriarchal advantage in Sierra Leone (Maclure and Denov 2009). Whilst women's disempowerment may be less relevant to young girls' (hence higher attendance at primary education), it becomes increasingly relevant as girls grow older. The significance of dominant cultural traditional values which assign women to domesticity in limiting girls' access and progression in the education system was recognised in the 1997-2006 NEMP (GoSL 1997: 131). As late as, 9% and 7% of girls cited pregnancy and marriage as a reason for dropping out of school (GoSL 2007b: 94).

The findings from this research are in agreement with other studies which have looked at the impact of UPE policies on school enrolment (Grant and Behrman 2010; Akyeampong 2009a). In Ghana, Akyeampong's (2009a) study for instance reviewed the inadequacies of Ghana's Free and Compulsory Universal Basic Education (FCUBE) arguing that the policy did not do sufficiently to remove the costs of education which impinge on the chances of the poor to enter and remain in school. The marginalisation of the poor in Ghana's education system has also been highlighted by Rolleston (2009) and Akaguri (2013). Although evidence is critical of the pro-poor nature of FCUBE, Ghana has one of the highest ratios of attendance in West Africa at both primary and junior secondary education. The expansion of school infrastructure including the proliferation of low fee private schools, has contributed to meeting a growing demand for education in the country (Ghana EMIS 2012). Attendance ratios in Ghana are higher than in Sierra Leone; Sierra Leone's attendance ratios are however better than its neighbours Guinea and Liberia. In Liberia, the low net attendance ratios is due to a war affected education system

in which the school infrastructure underserves the school age population and in which the culture of mass education weaker (GoL 2009b).

4.6. Conclusion

This chapter has investigated Sierra Leone's progress towards its policy of UBE. The results show that few children attending school are enrolled at the correct level of education. Only 61.6% of children aged 6-11 are in primary education; the NAR is 21% at JSS. These figures are particularly worrying because they suggest that the objective of UBE will not materialise by the 2015 deadline. More concerning perhaps is the fact that, in spite of government efforts to promote school attendance, the proportion of young children attending school has declined significantly by almost 10 percentage points since 2003/04. The level of access to school in the country can at best be described as moderate when compared to other West African nations. Overall, Sierra Leone's NARs are higher than its neighbours (Guinea and Liberia) but lower than in more developed countries in the West African region (Nigeria and Ghana).

While Sierra Leone is unlikely to attain UPE and is far from attaining UBE, it has succeeded in reaching a GPI of 1 at primary education. Fewer girls than boys however attend junior secondary education. Therefore, although equal gender parity has been obtained at primary education, such access has not guaranteed that girls enjoy the same educational experience and achievements as boys. The exclusion of girls from school is a contributing factor as to why universal access has yet to be attained in Sierra Leone. Another reason is the continuing marginalisation of rural and poor children from education. There are wide inequalities in school attendance between children living in urban and rural areas and between children from the poorest and richest households. As observed in other countries, these differences are more pronounced than that found between sexes.

The current research has only focused on access to school. While school access is a necessary prerequisite for UBE, it is not the sole component. One of the conditions for the policy is that children complete primary education at the correct age. Therefore, understanding children's trajectory through school by looking at the dropout, repetition, and completion rates could add further benefit to this study. The findings presented in this chapter suggest that future policy

should aim to: (1) improve the net intake rate so that children enter primary school at the required age of 6 years; (2) remove tuition fees for both primary and junior secondary education as well as subsidise costs for books and uniforms; (3) advance campaigns to promote post-primary education among girls.

5. Does living in poor communities disadvantage poor children more than affluent children in attending primary school?

West Africa has low school attendance with children from poor households having the worst attendance ratios. Unclear however is whether the disadvantage experienced by poor children is exacerbated by living in a poor community and whether living in the same poor environment reduces the advantage that is commonly attributed to more affluent children in accessing school? Also unclear is whether there is an interaction between household and community poverty where the attendance of poor children suffers more than that experienced by more affluent children who live in poor communities. This chapter employs multilevel statistical models to analyse these questions using the Demographic and Health Surveys for Ghana, Liberia, and Sierra Leone. The findings show that in Liberia and Sierra Leone, irrespective of the level of household wealth, living in a poor community lowers the likelihood of a child attending school. In Sierra Leone but not in Liberia, children from poor households who live in poor areas have a much lower likelihood of attending school than children from affluent households who live in the same area. In both countries, the lower attendance among children in poor communities is due to an inadequate supply of schools in these communities. In Ghana, the level of poverty within a community is not significantly associated with school attendance; children from poor households are however significantly less likely to attend school than those from affluent households.

5.1. Introduction

West Africa has historically displayed low levels of educational attainment (UNESCO 2011a; Gibbons et al 2003). That is, specifically, the age at which children enter school is not commensurate to that stipulated in national education policies. Late school enrolment, in turn, increases the risk of early dropout and retards primary school completion rates (Lewin 2009). The international policy of Universal Primary Education (UPE), first introduced in 1990 and reaffirmed in 2000 through the second Millennium Development Goal, Education for All (EFA), has to an extent succeeded in expanding access to education (UNESCO 2000; 1990). In West Africa, this success has been evident in the number of children entering school in the immediate aftermath of the introduction of the policy in various countries. This increase in enrolment has, however, proved unsustainable with primary net attendance ratios (NAR) in many countries either subsequently stagnating or declining (UNESCO 2011). To date, the proportion of children attending primary schools who are of the official school age is far from

universal. The most excluded children are those from poor households (Grant and Behrman 2010; Knodel and Jones 1996).

Household poverty is a strong predictor of children's school attendance in Sub-Saharan Africa (Rolleston 2009; Filmer and Prichett 1999). Children from poor households and those from households with low incomes have been found to have a significantly lower likelihood of attending school than their more affluent counterparts. Whilst this relationship between household poverty and primary school attendance is a common observation in the Sub-Saharan context, less well researched is whether living in a poorly developed community reduces the level of school attendance among children irrespective of their household wealth and if so, whether the attendance of children from poorer households is depreciated more than children from affluent households who live in the same community. This question has received little attention in scholarly research but is one which is important when placed in the current study context.

West Africa is a region with widespread poverty, low levels of development, and a history of non-international armed conflict (UNDP 2011; UNESCO 2011a). In less economically developed post-conflict states, access to facilities and services within communities is likely to be scarce (Poirier 2012). Access to roads and school infrastructure may also be limited in these settings. Further, because of the conflict and lack of economic capacity, these countries will have lower educational attainment due to poor investment in the education sector (World Bank 2008b). By comparison, countries which have not been devastated by civil conflict and have higher levels of development are more likely to have greater access to services and facilities including wider access to schools. The hypothesis presented in this chapter is that children living in less developed communities will have a lower likelihood of attending primary education irrespective of household wealth. The reason being that community development is likely to be strongly related to school supply in West Africa. Children are therefore unlikely to attend school, regardless of their socio-economic status, if they live in a community in which there is no or inadequate supply of school. An interaction between community poverty and household poverty may arise where there are nearby schools between communities. In this circumstance, children from more affluent households are likely to have higher levels of school attendance because even though they live in a poorly developed community, they may be able

to travel to a nearby community to attend school. The option of funding the additional costs of travelling out of their immediate communities to attend school is less available to poor children. It is this difference in the ability to afford the additional costs of travelling to another community to attend school which is expected to impinge more on the attendance of poor children than on more affluent children.

Household poverty has long been seen as the leading correlate of school attendance. Policy emphasis has often focused on measures to alleviate the cost of schooling incurred by households including, for instance, policies like free and compulsory education, capitation grants, free school meals and girls' scholarships. If, however, it can be demonstrated that the level of development within a community in which a child lives is a stronger predictor of school attendance, it would mean that community development programs rather than programs directed at assisting household budgets would be more effective in increasing school attendance for the poor. The research question answered in this chapter then is:

1. Does living in a poor community disadvantage poor children more than affluent children in accessing primary school in West Africa?

5.2. Country contexts

West Africa is poor with low levels of economic development and educational attainment. Few countries in the region have a medium development index (UNDP 2011). The majority of countries in the region have experienced non-international armed conflict in recent decades or have politically unstable regimes making it difficult to invest in social services and human welfare. The choice of countries in this study is intended to represent this regional context whilst simultaneously enabling comparisons to be made between the selected countries. Three countries are studied: Ghana, Liberia, and Sierra Leone. Ghana is intended to represent more politically stable and middle income countries in the region which also have relatively higher levels of school attendance. Liberia and Sierra Leone are representative of post-war countries in the region which have recovering education systems with improved access to primary education (in the case of Sierra Leone) and weak education systems (in the case of Liberia).

Sierra Leone (1991-2001) and Liberia (1989-2003) have experienced internal conflicts in recent times. The two countries also have a low human development index: out of 187 countries listed in the 2011 Human Development Index Report, Sierra Leone featured at number 180 and Liberia at 182. The proportion of the population living in multidimensional poverty is 77% in Sierra Leone and 83.9% in Liberia; the corresponding figures for the population living in severe poverty are 53.2% and 57.5% respectively (UNDP 2011). The Gross National Income per capita for the two countries is: 737 for Sierra Leone and 265 for Liberia. In spite of their similar levels of poverty and unstable political histories, the level of education is different between the two countries.

Sierra Leone has higher attendance than Liberia: the NAR for primary education in Sierra Leone is 61.6% compared with 30% in Liberia. These differences are due in part to the duration and intensity of the civil wars as well as the educational histories of the two countries. Firstly, Liberia had a longer period of civil conflict that was more intense and which affected each county in the country meaning a greater destruction to community life and investment in social services (GoL 2009b). By comparison, the civil conflict in Sierra Leone was shorter in duration and was more concentrated and destructive in particular districts. The cessation of the Sierra Leonean civil war saw a huge investment in social services particularly in the education sector which helped to expand access to schools; this investment has been reflected in the surge in primary school enrolment rates (World Bank 2007). There were also great efforts in Liberia's post-war period to rebuild the country's education system. As in Sierra Leone, these efforts have helped to expand both the supply of schools and the school population (SfCG 2012). Secondly, Sierra Leone has a stronger tradition of education than Liberia. This is important because it means that Sierra Leone has a wider provision of primary schools than Liberia in which the culture of mass education is fairly new. Prior to the war in each country, access to education in Liberia was mainly available in Monrovia, the capital city, whereas in Sierra Leone schools were available in at least every district headquarter (GoSL 1997). The post-war investments have then simply expanded, through rehabilitation and building new structures, pre-war education infrastructure in the country.

Ghana is different to the other two countries in three important respects. Firstly, it has not experienced recent episodes of civil internal conflicts meaning that children's schooling career

have not been interrupted and schooling infrastructure as well as institutional educational systems have experienced a longer continuum of peace and so are able to function better than in the comparative countries. Secondly, Ghana is a middle income country with a medium human development index indicating higher levels of affluence; the country's Gross National Income per capita is 1966 (UNDP 2011). Thirdly, the level of school attendance in this country is significantly higher than in the comparative countries. The NAR for primary education is 73.7%. Ghana's higher attendance ratio is in part due to its better supply of school infrastructure. There are 19,833 primary schools in the country with the Ashanti (3,621) and Eastern (2,439) regions having the largest distribution (Ghana EMIS 2012). By Comparison, there are 5,931 primary schools in Sierra Leone (GoSL 2012: xxiv). Freetown (584), Port Loko (519), Tonkolili (498), and Bombali (460) districts have the largest supply of schools; Bonthe (194) and Western Area Rural (248) districts had the least supply of schools (GoSL 2012: xxiv). Liberia had less than half the number of schools in Sierra Leone. Data from the 2008/09 National School Census (cited in SfCG 2012: 30) shows 2,289 primary schools in the country. Nimba (368), Bong (237), Lofa (235) and Montserrado (184) counties had the most number of schools; Bomi (70) and Margibi (82) counties had the least school supply (SfCG 2012: 30).

The three countries share the same education structure for primary education, enabling analysis and comparisons to be made. They have six years of primary education (P1-P6). The official age at which children should attend primary school is between 6-11 years. Primary education forms part of formal basic education. Basic education is tuition-free and compulsory in public/government schools. All countries have also introduced universal primary and universal basic education although the stage of implementation varies between countries. In Ghana there have been capitation grants, school feeding programs, and free school uniform policy to aid the progression of the 2004/05 Free Compulsory Universal Basic Education Policy (FCUBE). The FCUBE and in particular the capitation grant (first introduced in 1995/6) have succeeded in creating a more inclusive education system although inequalities remain between regions. UPE policies in Sierra Leone have been exemplified by the 2001 Free Education Act which made primary education free for all children aged 6-11 years in state schools. An additional effort to increase access to primary school in these two countries has been to develop new infrastructure to accommodate the eligible school population. In Liberia too primary education is free and compulsory (2001 Liberian Education Law) but serious challenges remain in implementing this policy.

5.3. Data

The most recent Demographic and Health Surveys (DHS) for the three countries are analysed: the 2007 DHS for Liberia and the 2008 DHSs for Sierra Leone and Ghana. Each survey is nationally representative and contains information on current level of school attendance as well as information on household environment. The DHS is used because it is a standardised survey which uses the same surveys to collect information on different national populations. It is therefore easier to make comparison between countries as the same instrument is used to collect data. DHS samples are selected via a representative probability sample of households. Households in a survey area are stratified according to urban or rural areas and then divided by administrative or geographical regions. Using a two-stage sample design, primary sampling units (PSUs) are subsequently selected from a complete list of enumeration areas (EAs) before selecting households from a complete list of households in each PSU. Individuals are then selected from each household. Three standardised questionnaires are administered for the DHS: household, women's, and men's questionnaire. The household members' dataset is used as the main dataset for analysis.

5.3.1. Study population

The original samples of the DHSs are presented in Figure 5-1 along with the count of the study population. The population under study are children aged 6-11 years since this is the age for formal primary education in the three countries. In Sierra Leone, the study population consists of 8,074 children, 4,538 households and 353 clusters. The corresponding figures for Liberia are: 6,475 children, 3,878 households and 298 clusters. In Ghana, there are 7,833 children, 4,925 households, and 411 clusters. The original sample for the SLDHS included 41,985 individuals, 7,758 households and 353 clusters. In Liberia, there were originally 34,670 individuals, 7,471 households and 298 clusters. In Ghana, the initial sample was 46,536 individuals, 12,323 households, and 411 clusters. The average number of children in a household was 2 in Sierra Leone with a range of 1-10. In Liberia and Ghana the corresponding figures were: 2 for mean with a range of 1-9 in Liberia and a mean of 2 children per household with a range of 1-9 in Ghana. Sierra Leone had an average of 28 children per cluster; Ghana and Liberia had a mean of 21 and 24 children per cluster respectively.

Figure 5-1: Count of cases from the Demographic and Health Survey household members' dataset, Sierra Leone (2008), Liberia (2007), Ghana (2008)
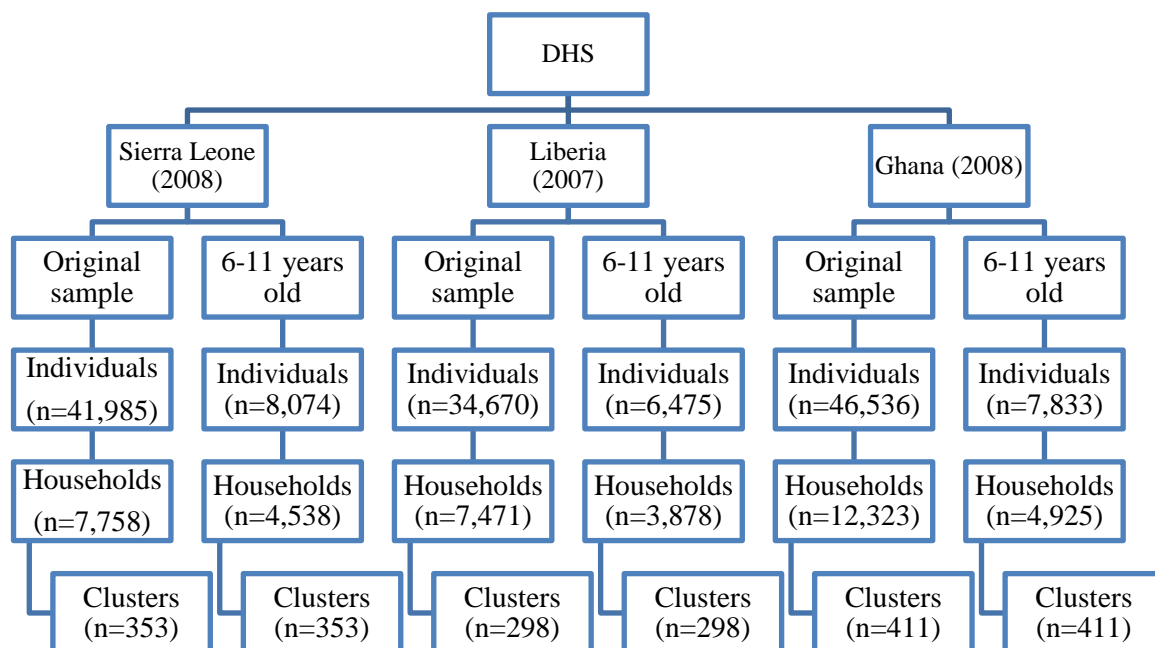
5.3.2. Missing cases

Missing cases in the explanatory variables were initially included in the analysis as dummy variables. The dummies however were not statistically different to the reference categories of their respective variables; they were subsequently deleted from the analysis. The exclusion of these missing dummies did not impact the results of the analysis. Three of the variables used in the analysis had missing data: household head, maternal orphan, and paternal orphan. In Sierra Leone there were 130 missing cases for household head, 79 for maternal orphan, and 91 for paternal orphan. The Liberia DHS had 56 missing cases for household head, 30 and 29 for maternal and paternal orphans respectively. Ghana had fewer missing cases: household head (n=18), maternal orphan (n=18), and paternal orphan (n=17). There were no missing cases in the outcome variable.

5.3.3. Study variables

The outcome variable was attending primary school. To create this variable, all children in the datasets aged 6-11 who responded to attending or having attended primary education in the

survey year were coded as 1; all other children within this age-group who responded otherwise were coded as zero.

The two main explanatory variables under study are household poverty and community poverty (low level of community development). As already mentioned above, the DHS survey does collect information on household wealth but does not collect information on community environment. The wealth index generated by the DHS survey is used in this chapter as an indicator of household wealth (see section 3.5 in chapter 3). The cluster in which a child lives is taken to represent a community in this study. The cluster forms part of the hierachical structre of the DHS (individuals are grouped within households which in turn are grouped within clusters). It designates a census enumeration area which is often representative of villages or small groupings of households. In the case of Sierra Leone, for instance, the enumeration areas used in the SLDHS were obtained from the country's 2004 population and housing census. There were 353 clusters in the 2008 SLDHS. Children living in the same community are assumed to have access to the same facilities and services. The re-coded wealth index constructed for households is aggregated to the community level as an indicator of the level of poverty and development within a community. Recall that the wealth index is calculated on the basis of asset ownership such as the possession of electricity, telephone, and radio in a household. The source of drinking water and toilet facility in the household as well as the material that is used to build the house is also accounted for in the index. When this data is aggregated to the community level, it reflects the level of development within a community as it is indicative of access to facilities and the level of affluence in a community. The mean proportion of poverty in a community was .37 in Sierra Leone with a range of 0-1 and a standard deviation of .29. The corresponding figures were: .38, 0-1 and .37 for Liberia, and .41, 0-1, and .39 for Ghana.

The approach of estimating community level variables by aggregating household level data may carry some limitations like measurement error and the potential of bias in predicted beta coefficients. These problems can be minimised by using national administrative data that are representative of the population and capture the context within the country or, in survey data, by having sufficient number of cases in the clusters from which the aggregation is made. The household members' dataset was used to derive the community poverty variable. The large

sample sizes of this survey and its design to be nationally representative helps to minimise the problem of measurement error in the variable. Also, other variables which carry great contextual information such as rural or urban residence and administrative level were included in the analysis. In all three countries, levels of development and access to primary education vary by administrative level. Controlling for administrative level therefore captures some of the contextual information on development and the educational infrastructure which cannot be directly estimated in the present analysis due to data limitations. Area of residence and administrative region are also used in order to control for the complex survey design.

A number of other variables are controlled for in the modelling process to enable the assessment of the relationship between school attendance and household and community poverty whilst controlling for other correlates of school attendance (refer to Table 5-1). The choice of variables was informed by previous research and so variables which have been shown to be correlated with school attendance have been included in the analysis. Table 5-1 lists the variables which were considered during the analysis. Some of these variables included sex of the child, the education of the household head, composition of children in the household, the level of women's education within a community, community livelihood, and the mean age at marriage for women in a community.

Table 5-1: Definition of study variables

Variable name	Operational definition	Categories	Coding
Sex	Sex of child	Boy, Girl	Boy (0), Girl (1)
Mother alive	Child is not a maternal orphan	No, Yes, Don't know, Missing	No (0), Yes (1), Don't know (2), Missing (3)
Father alive	Child is not a paternal orphan	No, Yes, Don't know, Missing	No (0), Yes (1), Don't know (2), Missing (3)
Poor household	Child lives in poor household, created from the wealth index	No, Yes	No (0), Yes (1)
Head's education	Education of household head	None, Primary, Secondary, Higher, Missing	None (0), Primary (1), Secondary (2), Higher (3), Missing (4)
Head's sex	Sex of household head	Male, Female	Male (0), Female (1)
Number of young children in household	Number of 0-5 year olds living in household	-	-
Number of 6-11 year olds living in household	Number of 6-11 year olds living in household	-	-
Number of older children in household	Number of 12-17 year olds living in household	-	-
Poor community	Proportion of people living in a poor household in a cluster	-	-
More educated women's community	Proportion of women who have attained secondary or higher education in a cluster	-	-
Agricultural livelihood in community	Proportion of people working in agriculture or are self-employed in cluster	-	-
Paid employment in community	Proportion of people in paid employment in cluster	-	-
Women's mean age at marriage	Average age at marriage for women in cluster	-	-
Lives in a rural area	Type of place of residence	No, Yes	No (0), Yes (1)
Administrative region	Administrative region	Sierra Leone (District); Liberia (County); Ghana (Region)	-

5.4. Analysis

Multilevel statistical models were developed to estimate the relationship between the probability of attending primary school and household and community poverty. This method was used because individual cases were found to be not independent but were clustered within households which were in turn clustered within communities. Children living in the same household are therefore likely to share similar characteristics, and households located within the same communities are likely to have similar access to facilities and will be exposed to similar normative values. The use of multilevel analysis helped to account for the lack of independence between cases and, standard errors were not underestimated which means that the significance of variables were not overestimated. Logistic models were developed because of the binary nature of the outcome. Since the objective of the paper is to explore whether household and community poverty is associated with school attendance net of other factors, multiple logistic regression models were developed. Regression analysis was used as an analytical tool as this allows relationships to be explored between two variables whilst controlling for additional variables.

To fit the models, preliminary analysis was first conducted to understand the distribution of the data by estimating univariate and bivariate statistics. The bivariate analysis helped to identify simple relationships between primary school attendance and the different predictors. After the preliminary analysis was conducted, the statistical models were developed. Sampling weights were used to account for the complex sample design. The same variables were controlled for in the models for the different countries to enable comparisons to be made. To fit parsimonious models, however, variables which did not make a significant contribution to explaining the variation in the outcome in all three countries were excluded from the analysis. These variables included: the proportion of people in a community engaged in paid employment, community female mean age at marriage, and the number of children aged 6-11 living in a household.

The model was built in five steps. These steps included: (1) add all individual and household level variables including household poverty whilst controlling for a random intercept at the household and community levels (2) add community poverty (3) add interaction between household and community poverty (4) add all other community level variables (5) add area of residence and administrative region. The model developed in step one observed the

relationship between household poverty and school attendance whilst controlling for individual and other household level factors. Adding community poverty in the second step enabled me to observe any changes in the relationship noted in step one between household poverty and school attendance. The interaction term added in the third step, without controlling for other community and regional contextual variables, was intended to observe whether the interaction between household and community poverty was significantly robust rather than being mediated by other contextual factors at the community or regional levels. By adding the other community and the regional variables separately, I was able to observe any modification in the main effects for household and community poverty as well as the interaction between these two variables.

Table 5-2 shows the results from the modelling process. The interaction between household and community poverty was only significant in Sierra Leone. This interaction remained significant even after controlling for other community variables, area of residence and administrative region. In Ghana and Liberia, the interaction term was not significant. However, in both countries, household poverty was significantly associated with primary school attendance. The coefficients presented in Table 5-2 show that household poverty loses significance in step three when the interaction terms is added to the model. In the final model presented in Table 5-4 in the results section below it can be seen that household poverty does have a consistent inverse relationship with school attendance in these two countries; the interaction term between household and community poverty was removed from this model as the analysis here shows that it does not significantly predict school attendance. When the interaction term is removed from the model, community poverty becomes significant in Liberia but not in Ghana.

Table 5-2: Estimated beta coefficients for the relationship between school attendance and household/community poverty

Country and variables	Step 1 $\hat{\beta}$	Step 2 $\hat{\beta}$	Step 3 $\hat{\beta}$	Step 4 $\hat{\beta}$	Step 5 $\hat{\beta}$
Sierra Leone					
Poor household					
Yes	-.769*	-.687*	-.337**	-.080	-.055
Poor community	na	-.684*	-.375	.251	-.372
Poor household* poor community	na	na	-.751**	-.887*	-.830*
Liberia					
Poor household					
Yes	-.698*	-.380*	-.264	-.152	-.305
Poor community	na	-.922*	-.841*	.028	-.515*
Poor household* poor community	na	na	-.220	-.387	-.163
Ghana					
Poor household					
Yes	-.526*	-.366*	-.146	-.260	-.137
Poor community	na	-.502*	-.291	.411	.557
Poor household* poor community	na	na	-.438	-.197	-.434

Note: *p<.01, **p<.05, na=not applicable

The final part of the analysis for this chapter was to fit a separate model where all clusters in which there were no children aged 6-11 years attending primary school were excluded. The hypothesis in this chapter is that children living in poor communities have a lower likelihood of attending school because poor communities will likely have low access to schools. The DHS does not collect data on school supply. An approach to test the current hypothesis is by removing clusters in which there are no children attending school on the assumption that these clusters are those in which there is limited access to schools. This is a reasonable assumption to make, particularly in Liberia where only 56% of households live within 20 minutes away from the nearest primary school and in Sierra Leone where 25% of children aged 6-17 live more than 30 minutes away from a primary school (GoL 2009a; GoSL 2007b). The results from this reduced sample are compared to the results from the full sample; if the community poverty coefficient is significant in both samples, this would indicate that factors beyond poor school supply explain the lower levels of school participation among children in these communities. If however the coefficient is significant in the full sample but not significant in the reduced

sample, this would give credence to the current hypothesis. For this analysis, 0.6%, 1.7% and 7.7% of clusters were deleted from the DHS dataset for Ghana, Sierra Leone and Liberia respectively. When these clusters with no child attending school are removed the sample size for the study population reduces to: Ghana (n=7,673), Liberia (n=6,154) and, Sierra Leone (n=8,035).

All parameters were first estimated using the default in MLwiN, namely the first order and Marginal quasi-likelihood approximation (MQL). The MQL tends to underestimate the values of both the fixed and random parameters; thus the second order PQL method was used as it provides a more robust estimation in multilevel logistic modelling. The final estimates presented in the Tables of results below were therefore obtained by applying the second order PQL method for all countries.

This formula for the final model (without interaction) is:

$$log\left(\frac{\pi_{ijk}}{1 - \pi_{ijk}}\right)$$
$$= \beta_{0jk} + \beta_1 x_{1ijk} + \beta_2 x_{2ijk} + \dots + \beta_f x_{fijk} + \gamma_1 z + \gamma_2 z_{2jk} \dots + \gamma_m z_{mjk}$$
$$+ \lambda_1 h_{1k} + \lambda_2 h_{2k} + \dots + \lambda_r h_{rk}$$

$$\beta_{0jk} = \beta_0 + v_{0k} + u_{0jk}$$

Child level variables: $x_1, x_2, \dots x_f$

Household level variables: $z_1, z_2, \dots z_m$

Community level variables: $h_1, h_2, \dots h_r$

Children are represented by i $(1 \dots i)$. Households are shown by j $(1 \dots j)$ and clusters are indicated by k $(1 \dots k)$. The response $log\left(\frac{\pi_{ijk}}{1 - \pi_{ijk}}\right)$ is for child i in household j in cluster k. x represent a child level predictor and β is the associated unstandardized coefficient for this predictor. z is a household level predictor and γ shows the corresponding coefficient for that predictor. h is a community level variable and λ is the associated coefficient. u_{0jk} shows the variability of attending school between households within a cluster; v_{0k} is the random intercept

for the cluster level showing the degree of variation in school attendance at this level. It is assumed that u_{0jk} has a normal distribution with zero mean and variance σ_0^2: $u_{0jk} \sim N(0, \sigma_{u0}^2)$. v_{0k} also has a normal distribution with zero mean and variance σ_0^2: $v_{0k} \sim N(0, \sigma_{v0}^2)$. In multilevel logistic regression the variance is not estimated for level-1 since this is constrained to be 3.29.

Residual analysis was performed on all models. To check for normality, standardised residuals were calculated using a standard deviation of 1.96 and plotted in a histogram. For normality to exist, the distribution of the histogram should follow a bell shape curve. To check for constant variance, standardised residuals were plotted against the standardised predicted values of the outcome. Here, a random distribution of the points on a scatter graph would indicate acceptable constant variance. Luke (2004: 38-9) has suggested that caterpillar plots can be produced to determine if the residuals are centred at 0 and that the variances are constant across groups. Therefore, a caterpillar plot with confidence intervals around each residual estimate at the cluster level was also produced in MLwiN. If a confidence interval did not include a value of zero, it would be concluded that the effect of that cluster is significantly different from the overall mean of 0 at p<.05. The residuals for the analyses were tenable suggesting that the assumptions for the multilevel logistic regression were not violated.

5.5. Results

5.5.1. Preliminary analysis

Table 5-3 shows primary school attendance ratios by background characteristics in the three countries. Liberia has the lowest net attendance ratio (30%) and Ghana has the highest net attendance ratio (73.7%). The proportion of children from poor households who are attending school in Liberia is 21.2%; the figures for Ghana and Sierra Leone are 66.1% and 54.8% respectively. In Sierra Leone (62.9% compared with 60.4%) and Ghana (74.1% compared with 73.4%), girls have a higher attendance ratio than boys although this difference is not significant (p>.05); the opposite is true in Liberia (28.2% compared with 31.1%). Children living in rural areas have a significantly lower attendance than those in urban areas in all countries. Also, in all countries, children living in households headed by women have higher attendance ratios than children living in households headed by men. Primary school attendance is positively associated with education of the household head such that children whose heads have no

education have the lowest attendance ratios and those whose heads have attained higher education have the highest attendance ratios.

Table 5-3: Percentage distribution of attending primary education among children aged 6-11 by socio-demographic background in Sierra Leone (2008), Liberia (2007), and Ghana (2008)

Variables	Sierra Leone % (n)	Liberia % (n)	Ghana % (n)
Net attendance ratio	61.6 (8,074)	30.0 (6,475)	73.7% (7,833)
Sex			
Boy	60.4 (4,126)	31.3 (3,286)	73.4 (4,015)
Girl	62.9 (3,948)	28.2 (3,189)	74.1 (3,818)
Mother alive			
No	56.4 (355)	22.8 (201)	69.1 (210)
Yes	62.2 (7,623)	30.1 (6,238)	73.9 (7,605)
Father alive			
No	56.2 (690)	29.3 (338)	74.9 (442)
Yes	62.4 (7,269)	30.0 (6,094)	73.8 (7,374)
Head's education			
None	56.1 (5,408)	22.2 (2,285)	63.2 (3,147)
Primary	69.0 (741)	22.8 (1,332)	72.1 (1,088)
Secondary	78.9 (1,362)	37.5 (2,382)	80.5 (3,226)
Higher	83.8 (433)	54.7 (417)	88.4 (354)
Head's sex			
Male	60.7 (6,240)	28.5 (4,494)	72.1 (5,673)
Female	64.7 (1,834)	32.6 (1,981)	77.6 (2,160)
Poor household			
Yes	54.8 (3,379)	21.2 (2,551)	66.1 (3,430)
No	66.2 (4,695)	34.1 (3,924)	78.3 (4,403)
Rural residence			
Yes	55.3 (5,056)	20.5 (3,879)	69.9 (5,160)
No	76.0 (3,018)	45.4 (2,596)	80.0 (2,673)

5.5.2. Does living in a poor community disadvantage poor children more than affluent children in accessing primary school in West Africa?

Table 5-4 presents the results from the regression analysis for the full sample. The Table shows the estimated beta coefficients and their associated standard errors for fixed effects. Mean predicted probabilities are used for interpretation. The probabilities are calculated in MLwiN

using the command for customised predictions. This command averages over simulated values of the community variance estimate from the fitted model to estimate mean predicted probabilities for a combination of variables from the fitted model (Steele 2009: 25).

Among the three countries, only in Sierra Leone are children from poor households who live in less developed areas significantly less likely to attend primary school relative to children from more affluent households who live in the same communities. The predicted probabilities of attending school by community and household poverty are shown in Table 5-5 and Figure 5-2. The observed range in the proportion of people living in poor households in a community is 0-1. Conditional on controlling for administrative region and the predictors presented in Table 5-4, when there are no poor people in a community, the predicted probability of attending school is .708 for poor children and .711 for more affluent children. If the proportion of poor people in a community is increased by 10%, the probability of attending school for poor children is reduced by 2.5% (from .708 to .690) compared to .7% for more affluent children (from .711 to .706). For a 50% increase in the proportion of poor people in a community, the probability of school attendance attenuates by 13.1% for poor children relative to a lower decrease of 3.9% for more affluent children. This inverse relationship between primary school attendance, household and community poverty suggests that: (1) living in a poorly developed community depreciates the likelihood that a child will attend school and (2) children from poor households who live in poorly developed communities are more disadvantaged in accessing primary school than more affluent children who live in the same communities. The results from the reduced sample suggest that the lower level of school attendance in poor communities is related to an inadequate supply of schools in these communities. That is, once communities in which there are no children attending school are excluded from the analysis, the coefficient for the interaction loses significance ($\hat{\beta} = -.544$, SE = .372; p>.05).

Table 5-4: Fixed effects estimated beta coefficients and standard errors (se) for attending primary education among 6-11 year olds in Sierra Leone (2008), Liberia (2007), and Ghana (2008)

Predictors	Sierra Leone $\hat{\beta}(se)$	Liberia $\hat{\beta}(se)$	Ghana $\hat{\beta}(se)$
Fixed effects			
Poverty			
Poor household			
Yes	-.055 (.174)	-.392 (.102)*	-.353 (.113)*
Poor community	-.372 (.317)	-.570 (.233)	.361 (.369)
Poor household*poor community	-.830 (.348)**	ns	ns
Other predictors			
Sex			
Girl	.058 (.066)	-.233 (.063)*	.048 (.063)
Mother alive			
Yes	.445 (.173)*	-.037 (.195)	-.041 (.200)
Father alive			
Yes	.322 (.131)**	-.095 (.152)	-.096 (.146)
Head's sex			
Female	.232 (.102)**	.142 (.079)	.139 (.088)
Number of young children in household	.015 (.036)	-.090 (.030)*	-.081 (.032)**
Number of older children in household	-.006 (.037)	.107 (.033)*	.049 (.033)
Head's education			
Primary	.411 (.141)*	.222 (.100)**	.166 (.105)
Secondary	.929 (.130)*	.557 (.088)*	.557 (.094)*
Higher	1.152 (.238)*	1.022 (.147)*	1.157 (.228)*
More educated women's community	1.090 (.530)**	1.875 (.353)*	1.132 (.337)*
Agricultural livelihood in community	-.041 (.283)	-.022 (.285)	-.231 (.400)
Rural residence			
Yes	-.720 (.233)*	.005 (.131)	-.106 (.195)

Note: *p<.01, **p<.05, ns=not significant; All models control for administrative region (districts in Sierra Leone, counties in Liberia and regions in Ghana); Missing cases are not included in the regression.

Table 5-5: Predicted probabilities of attending primary school among 6-11 year olds by proportion of people living in poor households in a community, Sierra Leone (2008)

Proportion of people living in poor households in a community	Predicted probabilities – poor	Predicted probabilities – not poor
0	.708	.711
.1	.690	.706
.2	.672	.700
.3	.653	.694
.4	.634	.689
.5	.615	.683
.6	.595	.677
.7	.575	.671
.8	.555	.665
.9	.534	.659
1	.508	.651

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 5-4; the values to which the controls are set for the estimation is the reference categories as shown in Table 5-4

Figure 5-2: Predicted probabilities of attending primary school among 6-11 year olds by proportion of people living in poor households in a community and household wealth in Sierra Leone, 2008

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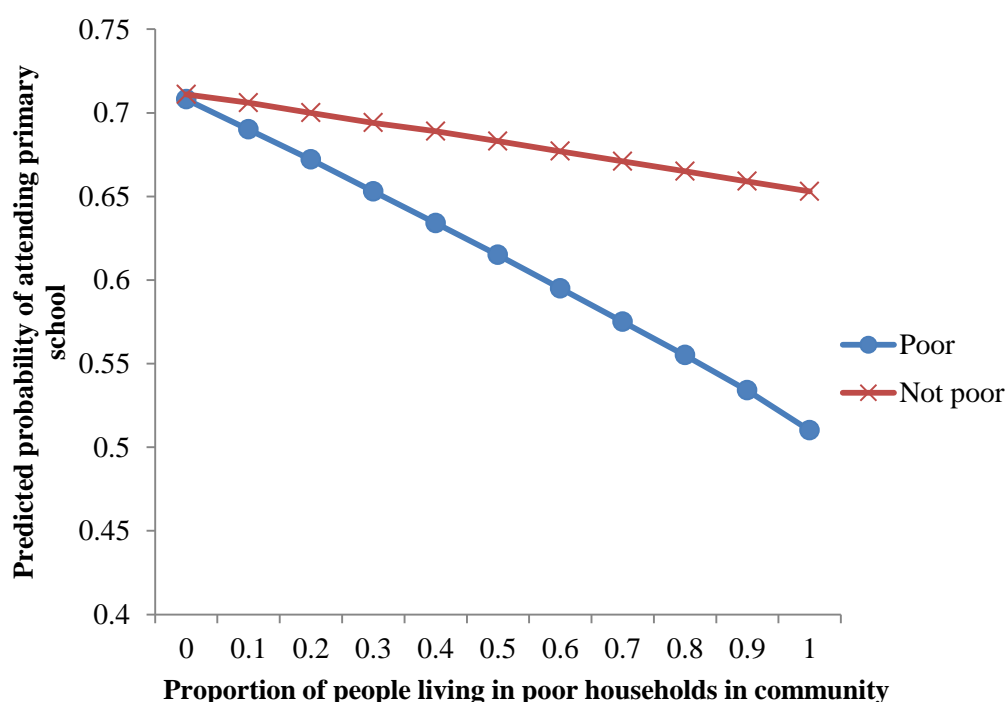
The level of poverty in a community is also associated with school attendance in Liberia but no interaction was found with household poverty. In Liberia, living in a community that is not developed is expected to depreciate the odds of attending primary school irrespective of the wealth of a household (refer to Table 5-6 for predicted probabilities). As in Sierra Leone, the range in the proportion of people living in poor households in a community is 0-1 in Liberia. Conditional on other factors, the predicted probability of attending school for children living in a community in which there are no poor households is .328. This probability reduces by 3% when the proportion of poor people is increased by 10% and by 16% when the proportion of poor people is increased by 50%. The relationship between school attendance and community poverty is not independent of school availability. In the reduced sample of children, the coefficient for community poverty is insignificant ($\hat{\beta} = -.351$, SE = .223; p>.05) suggesting that children living in poor communities are less likely to attend school because they have limited access to school infrastructure.

Table 5-6: Predicted probabilities of attending primary school at age 6-11 years by proportion of people living in poor households in a community, Liberia (2007)

Proportion of people living in poor households in a community	Predicted probabilities
0	.328
.1	.317
.2	.306
.3	.295
.4	.285
.5	.275
.6	.265
.7	.255
.8	.245
.9	.236
1	.227

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 5-4; the values to which the controls are set for the estimation is the reference categories as shown in Table 5-4

The relationship between primary school attendance and community poverty was not statistically significant having controlled for other household and community factors in Ghana

(in both the full and reduced samples) indicating that, in this country, the wealth of a household is a stronger predictor of school attendance than the level of development within a community. Having controlled for the factors in Table 5-4 above, the probability of attending school for children from more affluent households (.773) is 9% higher than that for children from poor households (.712).

These results confirm part of the hypothesis presented in this paper. That is, children living in less developed communities have a lower likelihood of attending school than children living in more developed communities. This relationship has been shown to be significant in Sierra Leone and Liberia but not in Ghana. In Sierra Leone and Liberia, the level of development within communities strongly reflects differences in administrative regions and the effects of the civil wars (GoL 2008; GoSL 2003). In these countries, administrative regions which have urbanised district capitals are more likely to have more developed communities in which there better provision of schools (GoL 2009b). Therefore, although the wealth of a household is a significant factor in the decision to send a child to school, this decision is also affected by the facilities which are available within a community, particularly school infrastructure. This means that a child from a poor household who lives in a poorly developed community will have a lower probability of attending school than a child of a similar background that lives in a community that is better developed. This relationship may be similar in Liberia because there is little variation in the supply of primary schools between communities given the general low levels of infrastructural development and poor access to basic services and facilities across the country (SfCG 2012: 30).

In Sierra Leone, children from poor households who live in poorly developed areas are predicted to be more disadvantaged in attending school than children from more affluent households who live in the same area. This is because although the level of national poverty is high, there is less disparity in levels of development between communities caused by: (1) a concentration of education and infrastructural development in main district capitals – Kenema in the Eastern region, Bo in the Southern region, Freetown in the Western region, and Makeni in the Northern region – where there are wider provision of primary schools; and (2) post-war reconstruction efforts, namely educational development projects, which extended the provision of primary education to communities that previously did not have access (GoSL 2003; GoSL

1997). In this context, children living in less developed communities, which also tend to have poor access to school, will have a reduced probability of attending school. However, unlike in Liberia where this relationship is uniform, it is unlikely to be uniform in Sierra Leone because there is a greater provision of primary schools and so a child who lives in a poor community that does not have a primary school can opt to travel to a neighbouring community or a nearby community to attend school. The cost of travelling to another locality presents an additional barrier to children from poor households; more affluent households may be more able to afford this additional cost if they perceive that the quality of education is worthy of investment. It is this difference in ability to sponsor education in a community beyond that in which a child is resident which, I predict, creates a significant interaction between household and community poverty in Sierra Leone.

In Ghana, household poverty has been predicted to be a stronger determinant of primary school attendance than community poverty. This result may be due to a number of reasons. Firstly, mass education, as exemplified by the policy of FCUBE, is not a novelty in Ghana as it is in the other two countries. This means that Ghana has had a longer period to develop its educational institutions and expand the provision of schooling to accommodate students within communities. There is therefore a lower variability of schools between communities; the differences in school provision are found at the regional level particularly between the north and south than between communities (Ghana EMIS 2012; Ampiah and Adu-Yeboah 2009). Secondly, Ghana has not experienced episodes of internal conflict meaning that it has had a longer continuum of peace to invest in and develop its education infrastructure than in the other two countries. Lastly, and related to the former point, the success of the FCUBE policy has increased the demand for education leading to the proliferation of private school, a development which has created a hierarchy of opportunities in accessing primary education in the country (Ghana EMIS 2012). In this new system, children who are unable to enrol in state schools can opt to enrol in private schools rather than defer entry. Poorer children are disadvantaged in this new system because they are less able to afford the costs of private schooling. Unlike in Sierra Leone and Liberia, therefore, it is the type and quality of school in Ghana which is limiting the participation of the poor children at primary education rather than the level of development within a community or the distribution of schools between communities.

The FCUBE policy in Ghana has succeeded in expanding the school population in state schools. This has led to a greater demand for primary as well as post-primary education which in turn has inadvertently resulted in two outcomes: a greater competition for state school admission and a surge in private schools. The number of available places in the education system declines with an increase in educational level. In 2010-2011, the number of primary schools in Ghana was 14,431 compared to 8,462 junior secondary schools and 509 senior high schools (Ghana EMIS 2012). This decline in the number of schools translates to a retraction of students from the education cycle because of a shortage of places and a greater competition to access available places. Whilst poorer children are more likely to suffer from dwindling opportunities in accessing school, more affluent children have the option of gaining admission to private schools. Data from Ghana's Education Management Information Service shows that the number of children enrolled in public schools has declined by 1.1% (from 3,198,520 to 3,164,830) between 2010 and 2012 while it has increased for private schools by 17.4% (from 764,259 to 897,196) in the same period (Ghana EMIS 2012: 9). The proportion of children enrolling in primary grade one declined in public schools by 3.5% between 2010/11 and 2011/12 but increased in private schools by 17.1% in the same period (Ghana EMIS 2012: 11). The significant relationship between household poverty and primary school attendance in Ghana may therefore be explained by the surge in private schooling which is more likely to disproportionately enhance the participation of richer children particularly when public school places have become more competitive.

The variance for the household and community levels for the models shown in Table 5-4 above are shown in Table 5-7 below. After fitting a conditional model, there is unexplained variation between communities and households in primary school attendance in all countries. These results suggest a significant homogeneity within communities and heterogeneity between communities in the probability of attending school. This suggests further that whilst the probability of attending school is similar for children living in the same household, there is a large variability between households so that children from different households have different access to primary education, controlling for the covariates in the final model. The significance of the community variance estimates were tested in MLwiN using the Wald Test. The hypothesis was to the following effect: $H_0 : \sigma_0^2 = 0$. The alternative hypothesis for the test is

one-sided since the variance can only assume a positive value. A rejection of the null hypothesis meant that a random effect contributed significantly to the prediction of the outcome. All random effects for the models presented in Table 5-4 above were found to be significant at p<.05 (Refer to Table 5-7).

The community variance in Sierra Leone is .523, in Liberia it is .118 and in Ghana it is .786. Using the significant coefficients for household poverty, community poverty and the interaction term for these two variables in Table 5-4 as well as the community variance estimates in Table 5-7, the predicted probability of attending primary school for an average community with $v_k = 0$ can be estimated (see Steele 2009: 6-8). Under the assumption that v_k is normally distributed, we expect the probability of attending school for poor children living in communities with an average proportion of poor people to lie between 0.12 and 0.71 in 95% of communities for Sierra Leone. The corresponding coverage interval for Liberia is 0.09 and 0.29. In Ghana, the coverage interval for the predicted probability for poor children living in an average community with 0 mean is 0.21 and 0.89.

Table 5-7: Household and community variance for models in Table 5-4 for attending primary education among 6-11 year olds in Sierra Leone (2008), Liberia (2007), and Ghana (2008)

Random intercepts	Sierra Leone $\sigma_0^2, (se)$	Liberia $\sigma_0^2, (se)$	Ghana $\sigma_0^2, (se)$
Household level	1.954 (.133)*	.520 (.087)*	.562 (.092)*
Community level	.523 (.082)*	.118 (.036)*	.786 (.093)*

5.6. Conclusion

This paper has researched the relationship between household and community poverty and school attendance in West Africa. The research question explored in this chapter inquired whether children from poor households living in less developed communities were more disadvantaged than children from more affluent households. It has been argued that the level of development within a community in which a child lives is associated with school attendance especially where the level of development is related to school availability. Some households located in poor conditions may opt to send their children to school in another community in which there is better provision of school. The difference in household budgets to meet the

additional cost of sending a child to school in another community creates a significant interaction effect where poor children experience an additional barrier to accessing school.

The findings in this paper have confirmed this hypothesis but the relationship between school attendance and community poverty and the interaction with household poverty differs between countries in West Africa. In Sierra Leone and Liberia, children's access, transition and retention in the education system is greatly retarded in poor contexts because of low school provision, a hypothesis which is confirmed by the analysis in this chapter. Children from poor households in Sierra Leone are however more disadvantaged than those from more affluent households who live in similar poorly developed communities. The relationship between household poverty and school attendance observed in Sierra Leone and Liberia is related to school supply; this is supported by the fact that once communities in which there is no access to school are excluded from the analysis, the relationship between community and school attendance loses significance in Liberia and becomes marginally significant at $p<.05$ in Sierra Leone. The level of community poverty in Ghana is not significantly associated with primary school attendance. Children from poor households do however have significantly lower likelihoods of attending school than children who are not from poor households. Future policies should seek to expand school provision in Liberia and Sierra Leone in poor communities. In Ghana, efforts should be made to improve access to poor households.

6. What are the determinants of attending junior secondary school in post-conflict and non-post-conflict countries in West Africa?

The level of attendance at junior secondary school (JSS) in West Africa is significantly lower than that at primary education in spite of universal basic education (UBE) policies which recognise these two tiers of education as one. The contextual differences between countries, specifically relating to political and educational history, create wide disparities in the proportion of children of official school going age who are able to access JSS. This chapter analyses the differences in the determinants of attending JSS between post-conflict and politically stable countries in West Africa. Multilevel random effect models are applied to data from the Demographic and Health Surveys for Sierra Leone, Liberia, and Ghana. The findings show that in Sierra Leone and Liberia girls, poor and rural children are significantly less likely to attend school than boys, more affluent children and children living in urban areas. At the community level, agricultural livelihood reduces the likelihood that a child will attend school in both countries. In Ghana, among children who have access to school, living in a poor community depreciates the likelihood of attending school. In all countries, living in a community with a high level of educated women increases the likelihood of attending school; living in a community with low school supply reduces attendance. The strength of these relationships was significantly more pronounced in Liberia.

6.1. Introduction

In 1990 the international community introduced a policy of Universal Primary Education (UPE) which granted all children the right to free and compulsory primary schooling. Since the introduction of this policy, a number of countries in the developing world have made strides in developing their primary education systems, efforts which have been reflected in increases in primary school attendance ratios. The expansion of primary education through universal education policies has, however, not had a resultant effect on post-primary education. Put another way, the proportion of children attending secondary education in West Africa is markedly lower than the proportion attending primary education (UNESCO 2011a). In recent years the scope of the UPE policy has been extended to lower secondary education through a policy of UBE. This policy has extended the compulsory and tuition-free principles of UPE to JSS in order to encourage school attendance beyond primary education. In spite of now being governed by the same policy, the wide margin of difference in level of participation between primary and junior secondary education suggests that the factors which are associated with school attendance at these two educational levels may be dissimilar and that factors beyond the

institutional level may be affecting household decisions to enrol children in junior secondary education.

The focus in this chapter is on understanding the difference in the determinants of JSS attendance between post-conflict (Liberia and Sierra Leone) and more stable countries (Ghana) in West Africa (see section 5.2 for discussion on choice of countries). In all three countries, junior secondary education is considered as the upper tier of basic education. Basic education was first introduced in 1993 in Sierra Leone and subsequently reaffirmed in the 1997-2006 National Education Master Plan (NEMP) which outlined strategic aims for the restructuring of the school system. The goals outlined for expansion were however based predominantly on primary education. Subsequent education policies like the 2001 Free Primary Education Policy and 2004 Education Act have therefore sought to achieve UPE and so little investment has been directed towards the sustained expansion of junior secondary education (World Bank 2007). In Liberia, the principles for free and compulsory education were first established in the 2001 Liberian Education Law. The implementation of this policy however did not start until 2005 when tuition fees for government primary schools were abolished and that for secondary schools reduced (UNESCO 2011b). Following the international community's 1990 Education for All (EFA) agenda, Ghana introduced its policy of Free Compulsory and Universal Basic Education (FCUBE) in 1995/96 and reaffirmed it in 2004/05 after it failed to achieve its target of UBE by the 2005 deadline. Although basic education policies are present in all countries, the state of JSS significantly differs between them. One way in which these differences are evident is in school provision. There are 11,138 junior secondary schools in Ghana compared with 888 in Sierra Leone and 472 in Liberia (SfCG 2012; Ghana EMIS 2012; GoSL 2012). The net attendance ratio (NAR) reflects the level of school supply with Ghana having the highest ratio (32.2%) followed by Sierra Leone (21%) and Liberia (7.9%).

The rationale behind this research is that there is a dearth of knowledge as to the determinants of attending JSS in West Africa. Also unknown is whether there are differences between countries in the factors which are related to school attendance. Studies in Ghana have found that household poverty, limited access to middle and senior secondary schools in a community, poor quality of resources in schools, and child labour depresses the likelihood that a child will attend school (Ampiah and Adu-Yeboah 2009; Rolleston 2009; Lavy 1996). The majority of

countries in West Africa however are post-conflict; they have poorer levels of school participation as well as poor provision and delivery of post-primary education services than more politically stable and more developed countries like Ghana. The determinants of school attendance in Ghana may therefore not apply to the wider region. In the case of Liberia, for instance, the backward state of post-primary education is due both to the prolonged civil conflict and the unfamiliarity to mass education. Prior to the onset of the war, education was largely a reserve for the urban elite in Montserrado and Nimba counties (GoL 2009b). The effects of the war retarded the limited school infrastructure in the country by completely destroying 30% of public schools and 24% of community schools; a further 16% of public and community schools were severely damaged (GoL 2009b). In Sierra Leone, although the civil conflict also had a debilitating effect on school infrastructure, there were recognised junior secondary schools in the country in almost every major city in the country's thirteen districts before the war; in 1992 there were 167 secondary schools nationwide (GoSL 1997: iii). Sierra Leone therefore had a history of post-primary education upon which it could develop in the post-war period; the absence of a culture of post-primary education in Liberia makes it more challenging to expand access at JSS.

In addition to the differences in the supply of junior secondary schools and the economic differences cited in section 5.2 in the preceding chapter, the three countries also differ in their cultural attitude towards education. In Liberia, for instance, results from the 2010 Labour Force Survey showed that 44.3% of people aged five and above who had never attended school responded 'family did not allow schooling' as a reason for not having attended school (GoL 2011: 18). In Sierra Leone, 12.6% of children aged 6-17 who had dropped out school responded that their motive for doing so was that they found it 'useless' (GoSL 2007b). The differences in political, economic, educational history and cultural attitude which are present between the post-conflict countries and Ghana is a justification for undertaking this research because these contextual differences may demand different policy intervention beyond the standard policy of free and compulsory education to truly achieve a sustainable expansion of junior secondary education. Another policy implication of this research is that education has been argued to be important as part of a peace building process (UNESCO 2011a). Given that the majority of countries in the West African region have been affected by internal conflicts, the findings from this research may be useful for promoting peace in the region. The main research question answered here is:

1. What are the determinants of junior secondary school attendance in West Africa? Do the determinants differ between post-conflict and stable countries in the region?

6.2. Data

6.2.1. Study population

The most recent Demographic and Health Surveys (DHS) for the three countries are analysed: the 2008 DHSs for Sierra Leone and Ghana, and the 2007 DHS for Liberia (see section 3.1 in chapter 3 for discussion of survey characteristics). Each survey is nationally representative and contains information on current level of school attendance as well as information on household environment. The original samples of the DHSs are presented in Figure 6-1 along with the count of the study population. The population under study are children aged 12-14 years since this is the age for junior secondary education in the different countries. In Sierra Leone, the study population consists of 4,329 children. The corresponding figure for Liberia and Ghana are 2,714 and 3,760 children respectively.

Figure 6-1: Count of cases from the Demographic and Health Survey household members' dataset, Sierra Leone (2008), Ghana (2008), Liberia (2007)
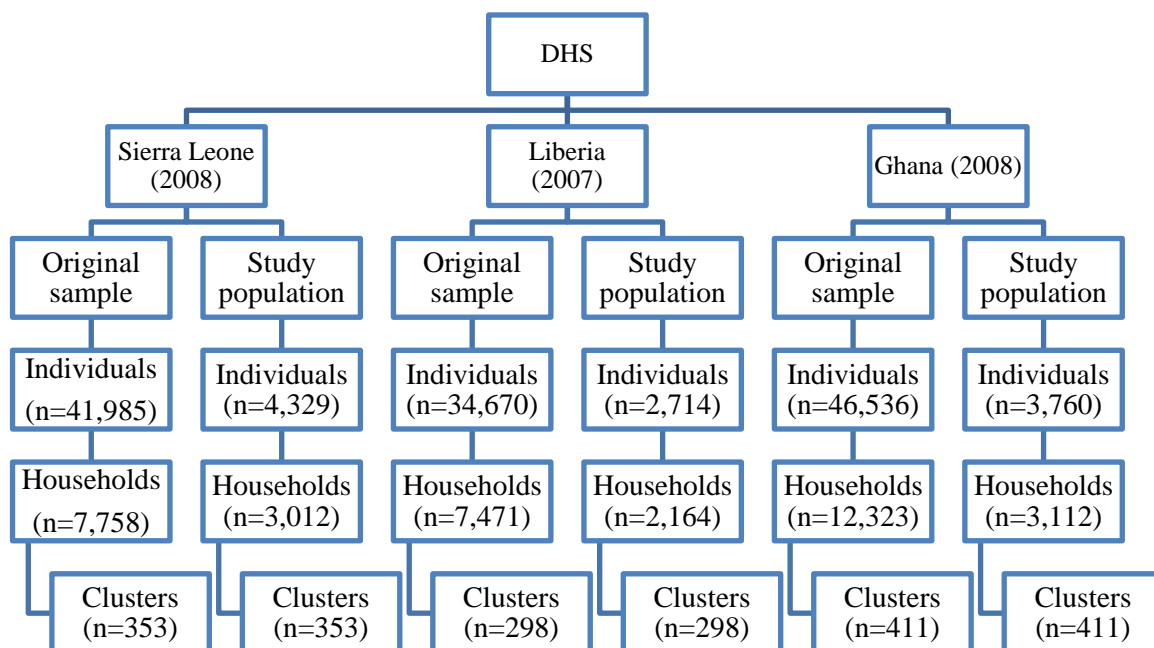
6.2.2. Missing cases

Three of the variables used in the analysis had missing data: household head, maternal orphan, and paternal orphan. In Sierra Leone there were 58 missing cases for household head, 84 for maternal orphan, and 88 for paternal orphan. The Liberia DHS had 30 missing cases for household head, 19 and 21 missing cases for maternal and paternal orphans respectively. Ghana had fewer missing cases: household head (n=15), maternal orphan (n=8), and paternal orphan (n=8). Missing cases were first included in the analysis as dummy variables. None of these dummies were significantly different from the reference categories of their respective variables; the missing cases were therefore deleted.

6.2.3. Study variables

Individual, household, and community level variables were used in this research (Refer to Table 6-1). The outcome was attending junior secondary school (1) versus those attending another level of education or who were out of school (0). The explanatory variables used in the analysis were informed by previous research, namely those discussed in the introductory part of this chapter and in chapter 2, section 2.2. The main focus is on household and community level variables since the environment is assumed to have a stronger association with the decision to send a child to school. Individual level variables are also considered. In sum, three individual level variables were used: sex, maternal orphanhood, and paternal orphanhood. Sex was a binary variable: boy and girl with the former category acting as the reference. Maternal and paternal orphanhood were also controlled for; non-orphans were the reference for both variables.

At the household level, sex of the household head, numbers of children aged 0-5 years, 6-11 years, and 12-17 years living in a household were included in the analysis. Controlling for the number of children aged 0-5 living in a household enabled the assessment of whether having younger children in the household has a significant correlation to school attendance, especially for girls, as it may mean a greater demand on their time for childcare. Likewise, controlling for the number of children of official school age permitted the exploration of whether the resource dilution theory was significantly in operation in West African households. In addition to these variables, household poverty and education of the headship were also used.

Table 6-1: Definition of study variables

Variable name	Operational definition	Categories	Coding
Sex	Sex of child	Boy, Girl	Boy (0), Girl (1)
Mother alive	Child is not a maternal orphan	No, Yes, Don't know, Missing	No (0), Yes (1), Don't know (2), Missing (3)
Father alive	Child is not a paternal orphan	No, Yes, Don't know, Missing	No (0), Yes (1), Don't know (2), Missing (3)
Poor household	Child lives in poor household, created from the wealth index	No, Yes	No (0), Yes (1)
Head's education	Education of household head	None, Primary, Secondary, Higher, Missing	None (0), Primary (1), Secondary (2), Higher (3), Missing (4)
Head's sex	Sex of household head	Male, Female	Male (0), Female (1)
Number of young children in household	Number of 0-5 year olds living in household	-	-
Number of 6-11 year olds living in household	Number of 6-11 year olds living in household	-	-
Number of older children in household	Number of 12-17 year olds living in household	-	-
Poor community	Proportion of people living in a poor household in a cluster	-	-
More educated women's community	Proportion of women who have attained secondary or higher education in a cluster	-	-
Agricultural livelihood in community	Proportion of people working in agriculture or are self-employed (community livelihood)	-	-
Paid employment in community	Proportion of people in paid employment	-	-
Women's mean age at marriage	Average age at marriage for women in community	-	-
Lives in a rural area	Type of place of residence	No, Yes	No (0), Yes (1)
Administrative region	Administrative region	Sierra Leone (District); Liberia (County); Ghana (Region)	-

Household poverty was measured using the DHS variable for wealth index which is constructed by applying factor analysis to household assets, services and amenities. The scores from this analysis are then ranked into 5 quintiles: poorest, poorer, middle, richer, and richest. For the purposes of this analysis, the index is recoded to take a binary form where the two lowest categories are coded as poor and the remaining indices are coded as non-poor (see section 3.5 in chapter 3). The variable was recoded after initial analysis confirmed that there was no difference between the poorest and poorer households in school attendance; children in these two types of households however had significantly lower attendance ratios relative to those in the upper three wealth quintiles. A comparison of the two groups enabled an exploration into whether children from poor households are significantly different in their probability of school attendance than those from non-poor households.

The community level variables used in this chapter are the same as those used in the previous chapter and as such the variables were created using the same procedure as explained in section 5.3.3 of chapter 5. By controlling for community level variables, it is hypothesised that the decision to send a child to school is associated with communal behaviour and tastes as well as the level of development in the area that a child lives. Since questions on cluster surroundings were not administered in the DHS, individual level and household level information is aggregated to the cluster level so as to estimate the relationship between community factors and school attendance. This procedure involves extracting averages and proportions from lower analytical levels and presenting them at the community level.

Some of the correlates of school attendance discussed in the literature review could not directly be controlled for in the current research because they were not collected by the DHS. These factors include school availability and school quality in the community as well as infrastructural development in the community although the latter of these predictors can be indirectly measured by aggregating the household wealth index to the cluster level. School availability is also indirectly controlled for by fitting a separate regression model in which communities in which children were not attending school were excluded from the analysis. This approach is based on the assumption that communities with no school attendance are those in which a school is not in reachable distance to the community. Another way in which the omission of these variables is mitigated is by controlling for administrative region. Survey

data from the countries under study shows that school resources and infrastructure vary by region and so controlling for this variable helps to account for differences in education service provision that cannot be directly measured in the current analysis (Ghana EMIS 2012; GoSL 2012). Controlling for region also helps to account for the stratification used in the sampling design for the DHS.

The community level variables used in the analysis included: poor community, more educated women's community, agricultural livelihood in community, paid employment in community, and women's mean age at marriage. Table 6-2 shows the summary statistics for these variables. In Sierra Leone, the mean proportion of people living in poor households in a community is .37; the relative figures for Liberia and Ghana are .38 and .41 respectively. The level of female education was low with a mean cluster proportion of .19 for women who have attained secondary or higher education in Sierra Leone; in Ghana it was .55. The mean level of paid employment in a cluster was again relatively low in Sierra Leone at .15 with a range of .00 and .73. The average for community agricultural or self-employment livelihood was .47 with a range of .00 and .97; in Liberia the mean was .36 and in Ghana it was .32.

Table 6-2: Summary statistics for community variables

Variables	Sierra Leone Mean (sd); range	Liberia Mean (sd), range	Ghana Mean (sd), range
Poor community	.37 (.29); 0,1	.38 (.37); 0, 1	.41 (.39); 0, 1
More educated women's community	.19 (.22); 0, .95	.25 (.22); 0, .86	.55 (.29); 0, 1
Agricultural livelihood in community	.47 (.35); 0, .97	.36 (.36); 0, 1	.32 (.29); 0, .97
Paid employment in community	.16 (.17); 0, .73	.26 (.19); 0, .88	.49 (.21); 0, 1
Women's mean age at marriage	17.2 (1.7); 13.6, 26.8	18.2 (1.8); 14.9, 29.5	19.1 (2.02); 14.1, 26.3

6.3. Analysis

Multiple logistic regression was employed to estimate the probability of school attendance given the binary outcome. Multilevel modelling techniques were applied to the DHS datasets because of the hierarchical structure of the data with individuals forming level one units,

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households level two units and clusters level three unit. This hierarchical structure of the DHS means that individual cases are not independent but are clustered within households which are in turn clustered within communities. Children living in the same household are therefore likely to share similar characteristics, and households located within the same communities are likely to have similar access to facilities and will be exposed to similar norms. The use of multilevel analysis accounts for the lack of independence between cases. Also standard errors are not underestimated which means that the significance of variables is not overestimated. Multiple logistic regression models were developed for each sample in order to assess the relative impact of each predictor. By controlling for individual, household and community level variables simultaneously, it was possible to observe which variables had the strongest and weakest association with school attendance. The use of regression modelling enabled me to control for multiple predictors and assess the contribution and relative strength of the association between independent variables and the outcome.

Univariate and bivariate statistics were first obtained to understand the distribution of the data for each survey. Sampling weights were used as a measure of adjusting for the sampling design throughout the preliminary analyses. Significance testing at the 5% level was performed using a number of statistical tests: t-tests and chi-squared test. These tests were performed in order to identify statistically significant predictors of the outcome. During the model specification in the multilevel modelling, t-tests were performed to assess the contribution of individual binary covariates; the Wald test was used to ascertain the joint impact of group variables as well as the contribution of random and contextual effects. For group variables, the test assessed whether $\hat{\beta}$ for a particular predictor was significantly different from zero; if the coefficient was significantly different from zero, it was assumed that the predictor made a significant contribution to the prediction of the outcome. For the random intercept, the hypothesis was to the following effect: $H_0 : \sigma_0^2 = 0$. The alternative hypothesis for the test is one-sided since the variance can only assume a positive value. A rejection of the null hypothesis meant that a random effect contributed significantly to the prediction of the outcome.

Since this was a comparative study, it was important that the same model was fitted for all three countries. Therefore, variables which did not have a significant association with school

attendance in all three countries were excluded from the modelling process so that a parsimonious model could be fitted. These variables included: father alive, number of children age 6-11 years old living in household, paid employment in community, and women's mean age at marriage.

A number of interactions were explored during the analysis to assess whether the relationship between an independent variable and the outcome was dependent on another predictor variable. More educated women's community was interacted with sex of the child, household poverty, and rural residence. These interactions were to explore whether living in a community with a high proportion of more educated women would have additional positive effect on household decision to send girls, poor children, and rural children to school. If such a relationship was observed, it would imply that expanding access for women could have a wide reaching impact on children's schooling at JSS. By the same logic, interaction terms were also explored with community poverty and community agricultural livelihood. Interaction terms with community poverty, for instance, was intended to assess whether living in a deprived environment led to a further deterioration of school attendance among girls and rural children. Such an exploration is important because previous research have shown that children living in rural areas, particularly girls, are marginalised from accessing schools (Tuwor and Sossou 2008; Admassie 2003). None of the interactions tried were significant in Ghana and Liberia. Sierra Leone had two significant interactions. More educated women's community significantly interacted with the sex of the child, and poor community interacted with rural residence. The model with the interaction between more educated women's community and sex of the child is presented in the results section below for interpretation.

Table 6-3: Results from interactions between community level variables and household and individual level variables at p<.05

Interaction terms	Sierra Leone	Liberia	Ghana
More educated women's community*sex	Yes	No	No
More educated women's community*rural residence	No	No	No
More educated women's community*poor household	No	No	No
Poor community*sex	No	No	No
Poor community*rural residence	Yes	No	No
Agricultural livelihood in community*poor household	No	No	No
Agricultural livelihood in community*sex	No	No	No
Agricultural livelihood in community*rural residence	No	No	No

Note: results are at p<.05 whilst controlling for sex, mother alive, number of young children in household, number of older children in household, head's sex, head's education, poor household, poor community, more educated women's community, agricultural livelihood in community, rural residence, administrative region

The regression analyses did not control directly for school availability. This is a limitation because the supply of junior secondary schools in the countries under study is low (particularly for Liberia and Sierra Leone) suggesting that this variable may be a significant correlate of school attendance. If there are no schools available for children to attend, irrespective of demand side factors, children will be unable to attend school. As discussed in section 3.6 in the chapter 3, this omission may bias the results insofar as some variables related to school supply (i.e. community poverty) may carry some of the effect of school availability. This is a strong likelihood in Liberia where there is an inadequate supply of schools. The country has 472 junior secondary schools with some counties having less than 20 schools serving the school population: Rivercess (5), Bomi (6), Grand Bassa (13), Gharpolu (14), Grand Cape Mount (16), and River Gee (16) (SfCG 2012: 30). This poor supply of schools is reflected in the number of clusters in the 2007 LDHS which did not have any child aged 12-14 attending school (68.8% of 298 clusters). In Sierra Leone, school availability is also likely to be a significant correlate of schools attendance. This is because only 32.9% of children aged 6-17 years live within 30 minutes to the nearest secondary school; Kono (7.3%), Kenema (13%), and Bonthe (13.7%) had the least access to secondary schools (GoSL 2007b). In the 2008 SLDHS, 28.3% of the 353 clusters had no children aged 12-14 attending school. The significance of school

availability is also likely to be a significant correlate in Ghana in spite of the relatively wider provision of schools in the country; 13.5% of clusters in the country's 2008 DHS did not have any child of the study population attending JSS.

The approach described in section 3.6 in chapter 3 of omitting clusters in which there are no children attending school is used here to indirectly assess the significance of school supply as a predictor of school attendance in a separate regression model. When the clusters with no child attending school are removed the sample size for the study population reduces to: Ghana (3,233), Liberia (n=1,103) and, Sierra Leone (n=3,492).

All parameters were first estimated using the default in MLwiN, namely the first order and Marginal quasi-likelihood approximation (MQL). This estimation procedure however tends to underestimate the values of both the fixed and random parameters; thus the second order Penalised Quasi Likelihood (PQL) method is proposed as the most appropriate method of estimation in multilevel logistic modelling. The final estimates presented in the results section below were therefore obtained by applying the second order PQL method to the Sierra Leone and Ghana dataset; the Liberia dataset would not convert the estimates and so the first order MQL estimates were taken as the final results. Residual analysis was performed in the same way as in the previous chapter (see section 5.4) by checking for normality and constant variance at the household and cluster levels. The residuals for the analysis were tenable suggesting that the assumptions for the multilevel logistic regression were not violated.

The formula for the final model (with no interaction) is:

$$log\left(\frac{\pi_{ijk}}{1-\pi_{ijk}}\right)$$

$$= \beta_{0jk} + \beta_1 x_{1ijk} + \beta_2 x_{2ijk} + \dots + \beta_f x_{fijk} + \gamma_1 z + \gamma_2 z_{2jk} \dots + \gamma_m z_{mjk}$$

$$+ \lambda_1 h_{1k} + \lambda_2 h_{2k} + \dots + \lambda_r h_{rk}$$

$$\beta_{0jk} = \beta_0 + v_{0k} + u_{0jk}$$

Child level variables: $x_1, x_2, \dots x_f$

Household level variables: $z_1, z_2, \dots z_m$

Community level variables: $h_1, h_2, \dots h_r$

Children are represented by i $(1 \dots i)$. Households are shown by j $(1 \dots j)$ and clusters are indicated by k $(1 \dots k)$. The response $log\left(\frac{\pi_{ijk}}{1-\pi_{ijk}}\right)$ is for child i in household j in cluster k. x represent a child level predictor and β is the associated unstandardized coefficient for this predictor. z is a household level predictor and γ shows the corresponding coefficient for that predictor. h is a community level variable and λ is the associated coefficient. u_{0jk} shows the variability of attending school between households within a community; v_{0k} is the random intercept for the cluster level showing the degree of variation in school attendance at this level. It is assumed that u_{0jk} has a normal distribution with zero mean and variance σ_0^2 : $u_{0jk} \sim N(0, \sigma_{u0}^2)$. v_{0k} also has a normal distribution with zero mean and variance σ_0^2 : $v_{0k} \sim N(0, \sigma_{v0}^2)$. In multilevel logistic regression, however, the variance is not estimated for level-1 variance since this is constrained to be 3.29.

6.4. Results

6.4.1. Preliminary results

Table 6-4 presents univariate statistics which show the distribution of the DHS data for the three countries under study. Liberia has the lowest net attendance ratio (7.9%) and Ghana has the highest net attendance ratio (32.3%). There were more girls than boys in Sierra Leone and Ghana; the opposite was true in Liberia. Sierra Leone had the highest proportion of maternal orphans (7%) compared to the other countries. Sierra Leone had the highest percentage of children in poor households (37.2%); the comparative figures Ghana for and Liberia were 35.5% and 28.6% respectively. Sixty two percent of children lived in rural households in Sierra Leone compared to 54.1% in Liberia and 56.9% in Ghana. Sierra Leone had the lowest level of

education among household heads: 66.2% of heads had no formal education and 17.3% had secondary education. This is compared to 33.7% of household heads who reported to having no education in Ghana and 46.4% who had secondary education.

Table 6-4: Percentage distribution of children aged 12-14 years by background characteristics and country

Variables	Sierra Leone % (n)	Liberia % (n)	Ghana % (n)
Sex			
Boy	49.2 (2,110)	50.9 (1,415)	49.7 (1,907)
Girl	50.8 (2,219)	49.1 (1,299)	50.3 (1,853)
Mother alive			
No	7.0 (301)	4.8 (146)	3.7 (148)
Yes	90.8 (3,934)	94.5 (2,546)	96.1 (3,603)
Don't know	0.2 (10)	0.1 (3)	0.0 (1)
Missing	2.0 (84)	0.6 (19)	0.2 (8)
Head's education			
None	66.2 (2,712)	34.4 (883)	33.7 (1,213)
Primary	8.4 (383)	16.2 (489)	12.6 (453)
Secondary	17.3 (847)	39.2 (1,086)	46.4 (1,671)
Higher	6.2 (329)	8.7 (226)	7.0 (252)
Missing	1.8 (108)	1.5 (30)	0.3 (10)
Head's sex			
Male	76.6 (3,306)	66.7 (1,833)	66.4 (2,620)
Female	23.4 (1,027)	33.3 (881)	33.6 (1,140)
Poor			
Yes	37.2 (1,668)	28.6 (960)	35.5 (1,555)
No	62.8 (2,661)	71.4 (1,754)	65.5 (2,205)
Rural residence			
Yes	61.9 (2,336)	54.1 (1,428)	56.9 (2,328)
No	38.1 (1,993)	45.9 (1,286)	43.1 (1,432)

Table 6-5 shows the percentage distribution of junior secondary school attendance ratios by background characteristics. The proportion of children from poor households who are attending school in Liberia is 4.3%; the figures for Ghana and Sierra Leone are 22.1% and 15.0% respectively. In Sierra Leone (23.2% compared with 18.8%) and Liberia (8.3% compared with 7.4%), boys have a higher attendance ratio than girls; the opposite is true in Ghana (31.8% compared with 32.7%). Children living in rural areas have a significantly lower attendance

than those in urban areas in all countries. Also, in all countries, children whose heads have no education have the lowest attendance ratios and those whose heads have attained higher education have the highest attendance ratios.

Table 6-5: Percentage distribution of attending junior secondary school among 12-14 year olds by background characteristics by country

Variables	Sierra Leone % (n)	Liberia % (n)	Ghana % (n)
Net attendance ratio	21.0 (4,329)	7.9 (2,714)	32.3 (3,760)
Sex			
Boy	23.2 (2,110)	8.3 (1,415)	31.8 (1,907)
Girl	18.8 (2,219)	7.4 (1,299)	32.7 (1,853)
Mother alive			
No	21.0 (301)	7.0 (146)	21.6 (148)
Yes	21.2 (3,934)	8.0 (2,546)	32.7 (3,603)
Head's education			
None	16.2 (2,712)	4.3 (883)	19.2 (1,213)
Primary	21.1 (383)	5.5 (489)	24.1 (453)
Secondary	31.6 (847)	9.7 (1,086)	39.3 (1,671)
Higher	41.7 (329)	19.4 (226)	62.9 (252)
Head's sex			
Male	20.7 (3,306)	8.0 (1,833)	29.7 (2,620)
Female	21.9 (1,027)	7.6 (881)	37.2 (1,140)
Poor			
Yes	15.0 (1,668)	4.3 (960)	22.1 (1,555)
No	24.5 (2,661)	9.3 (1,754)	37.7 (2,205)
Rural residence			
Yes	13.0 (2,336)	3.3 (1,428)	22.9 (2,328)
No	33.8 (1,993)	13.3 (1,286)	44.6 (1,432)

6.4.2. What are the determinants of junior secondary school attendance in West Africa? Do the determinants differ between countries?

The final results from the analysis for the full sample are presented in Table 6-6 below which shows the estimated beta coefficients for attending JSS among 12-14 year olds in the three countries. Mean predicted probabilities are used for interpretation (see section 5.5.2 in chapter

5). Note that the interpretations of the results are conditional on controlling for the various predictors in the models being discussed at any given point.

Girls are significantly less likely to attend JSS than boys in Liberia and Sierra Leone. In Liberia, girls' probability of attending school is 40.5% lower than boys (.037 compared with .052). In Sierra Leone but not in Liberia, the disadvantage confronted by girls can be alleviated if they live in a community with a high proportion of women with secondary or higher education (refer to Table 6-7). Referring to the calculations in Table 6-7 the probability of attending school is .125 for girls and .192 for boys when there are no women with secondary or higher education in a community. When the proportion of more educated women is increased by 20% (from 0 to .2), the probability of attending school is enhanced by 35.2% (from .125 to .169) for girls compared to 16.1% for boys (from .192 to .223). A 50% increase in the proportion of more educated women in a community increases girls' probability of attending JSS by 103.4% (from .125 to .254) and boys' probability by 44.3% (from .192 to .277).

The above results suggest that the disadvantage which is experienced by girls in attending JSS in Sierra Leone can be overcome by improving levels of female education within communities. To the extent that communities with more educated women are likely to have nearby access to post-primary education, these results suggest that improving conditions within communities and expanding the provision of JSS may have positive results for girls. In the reduced sample (where clusters with no children attending schools are omitted), the interaction ($\hat{\beta} = 1.133$, SE=.385) and main ($\hat{\beta} = -.668$, SE=.158) coefficient for girls remains significant (p<.05) suggesting that girls' lower likelihood of attending school is not due necessarily to school availability. Consistent with literature on girls' education in Sub-Saharan Africa (Moyi 2010; Roby et al 2009; Tuwor and Sossou 2008), girls may be less likely to attend school because of 'prevailing attitudes and practices as to the traditional roles of women in society' in Sierra Leone (GoSL 1997: 131). In Liberia too these cultural beliefs impinge on girls' education so that preference is given to educating boys. However, relative to Sierra Leone, girls are also

disadvantaged in Liberia because of the short supply of schools as the coefficient for the sex variable loses significance in the reduced sample ($\hat{\beta} = -.287$, SE $= .169$; p>.05).

Table 6-6: Estimated beta coefficients for attending junior secondary education among 12-14 year olds in Sierra Leone (2008), Liberia (2007), Ghana (2008)

Predictors	Sierra Leone $\hat{\beta}(se)$	Liberia $\hat{\beta}(se)$	Ghana $\hat{\beta}(se)$
Fixed effects			
Sex			
Female	-.644 (.177)*	-.365 (.165)*	-.014 (.085)
Mother alive			
Yes	.042 (.197)	.453 (.401)	.795 (.244)*
Head's sex			
Female	.121 (.128)	.132 (.187)	.201 (.097)**
Number of young children in household	-.119 (.051)**	-.190 (.090)**	-.205 (.05)*
Number of older children in household	.135 (.046)*	-.045 (.086)	.013 (.047)
Head's education			
Primary	.145 (.192)	-.108 (.316)	.143 (.151)
Secondary	.224 (.142)	.278 (.236)	.605 (.199)*
Higher	.895 (.187)*	.749 (.297)**	1.507 (.194)*
Household poverty			
Yes	-.437 (.184)**	-.603 (.356)	-.138 (.139)
More educated women's community	1.232 (.573)**	3.910 (.660)*	1.331 (.287)*
Poor community	.065 (.343)	.095 (.408)	-.494 (.300)
Agricultural livelihood community	-1.047 (.362)*	-1.813 (.794)*	-.167 (.347)
Rural residence			
Yes	-.219 (.142)	.983 (.291)*	-.048 (.156)
More educated women's community*sex	.981 (.425)**	ns	ns
Random effects			
Household level variance	1.503 (.187)*	.384 (.313)	.448 (.136)*
Community level variance	.309 (.095)*	.029 (.113)	.176 (.064)*

Note: *p<.01, **p<.05, ns=not significant; Missing cases are excluded from analysis; All results are conditional on controlling for administrative region in each country (district in Sierra Leone, county in Liberia, and region in Ghana).

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Table 6-7: Predicted probabilities of attending junior secondary education at age 12-14 years by proportion of women with secondary or higher education in a community by sex, Sierra Leone (2008)

Proportion of women with secondary or higher education in a community	Mean predicted probabilities – girls	Mean predicted probabilities – boys
0	.125	.192
.1	.146	.207
.2	.169	.223
.3	.195	.240
.4	.223	.258
.5	.254	.277
.6	.288	.296
.7	.324	.316
.8	.361	.337
.9	.400	.359

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 6-6 the values to which the controls are set for the estimation is the reference categories as shown in Table 6-6

In Ghana, there is no significant difference between sexes in both the reduced and full models. A likely explanation for this difference between countries is in the implementation of UBE. Ghana has implemented its UBE policies for a longer period placing significant emphasis on equal gender parity through its 1995/96 and 2004/05 FCUBE policy. This longer duration of policy implementation has meant a longer period of community engagement and sensitisation of girls' schooling. There has also been scholarship and school feeding programmes which help to reduce the cost of attending school and which evidence suggests benefits girls' attendance significantly (Asadullah and Chaudhury 2009; Chapman and Mushlin 2008). By comparison, because of the civil conflicts, Sierra Leone and Liberia were unable to implement any universal education policy until the noughties and even so much of the effort has been at the primary school level. In addition, the lower levels of school supply in these countries disadvantages girls more than boys. Findings from other research have shown that girls are less likely to attend school when there is limited access to school with the relationship being more pronounced in poor and rural communities (Moyi 2012; Hou 2010; Kazeem et al 2010).

Women's community education is also significant in Liberia and Ghana. The strength of the association is however substantially stronger in Liberia than in Sierra Leone and Ghana. In Ghana, increasing the proportion of women with secondary or higher education in a community by 10% (from 0 to .1) is predicted to enhance the probability of attending school by 10% (from .168 to .185). This probability increases by 59% (from .168 to .267) when the level of women's community education is increased by 50% and by 88% (from .168 to .315) when the proportion is increased by 70%. The range of women's community education is 0-.86 in the 2007 Liberia DHS. This figure was rounded for interpretation and so a 10% increase in the proportion of more educated women in a community would mean a change from 0 to .09 in proportion. Conditional on controlling for the predictors in Table 6-6, a 10% increase in the proportion of more educated women in a community is predicted to enhance the probability of attending JSS by 41%.

Women's education has often been accorded an economic interpretation. That is, countries with higher female educational attainments are more economically developed. Empirical evidence supports the supposition and so in countries where there are high proportions of more educated women, there are higher levels of development (UNDP 2011). If this national level relationship is applied to the community level, it would indicate that communities with higher levels of female education are those in which there are also greater levels of development. Development in the study context may mean access to roads, electricity, school infrastructure and other services and amenities. Whilst not disputing the relationship between women's education and community development, the models fitted in this chapter suggest that the relationship between school attendance and women's level of education within a community may also be due to other reasons. This is because for all countries, the relationship between women's community education is significantly associated with school attendance in both the full and reduced samples. One plausible explanation is that communities with more educated women have more progressive attitudes to education and are those in which the culture of education is stronger. Households living in such communities may be persuaded to send their children to school even if they do not believe in educating their children and even if they struggle to meet the costs because they are influenced by the behaviour of other households. This relationship between community education and children's schooling has been noted in Ethiopia (Weir 2007) and Tanzania (Bommier and Lambert 2000).

The contextual differences between the countries under study mean that the nature of the relationship between school attendance and the level of women's community education varies between countries. Liberia has the strongest relationship because of its premature system of post-primary education, its unfamiliarity with mass education, and its lower levels of development. These factors coupled with the higher prevalence of unfavourable attitude towards education mean that children who live in communities with more educated women will have a more pronounced increase in their likelihood of attending school especially given the poor level of school attendance in the country. Expanding access to primary and post-primary education for girls and boys as well as investing in community infrastructure may reduce the strength of the observed relationship although it may remain significant as in Ghana and Sierra Leone.

In Sierra Leone and Liberia, children who live in a community with a higher proportion of people working in agriculture or self-employment are significantly less likely to attend JSS. In Sierra Leone, conditional on controlling for the predictors in Table 6-6 above, the probability of attending school is .253 and .074 in Liberia when there are no people working in agriculture or self-employment in a community. When the proportion of agricultural and self-employment increases by 10% (from 0 to .1), the probability of attending school decreases by 5.9% (from .253 to .238) in Sierra Leone and by 16.2% in Liberia (from .074 to .062). The predicted probabilities reduces further by 27.7% (from .253 to .183) in Sierra Leone and by 56.8% in Liberia when the proportion of agricultural or self-employment livelihood is increased by 50% in a community.

There is a significant relationship between community livelihood and school attendance in Liberia and Sierra Leone because the two countries still have predominantly agrarian economies which rely on human input for production. In these settings the labour of older children is valuable to increase output; children may therefore be called upon to assist with subsistence farming or other family businesses. The relationship may be stronger in Liberia than Sierra Leone because of higher opportunity costs of sending an older child to school. Further, because opportunities to pursue higher education is so limited in Liberia, households

may opt to keep a child at home to help with agricultural production than forgo the child's contributions especially where there is scarce evidence of the returns to education. In Ghana, the proportion of people engaged in agriculture or self-employment in a community has not been found to be associated with school attendance. This may be because the country has higher levels of development which means fewer households are reliant on agriculture for subsistence than in the other two countries. Notwithstanding, other studies in the country have noted an association between child labour and school attendance especially in the poor northern region (Akaguri 2013; Hilson 2010). Other studies have also shown evidence of the results found in Liberia and Sierra Leone (Admassie 2003; Admassie 2002).

The supply of schools differs between countries, a point previously made in the introductory and analysis section of this chapter. This difference is reflected in variations in the JSS net attendance ratios. The previous chapter argued that children living in poor communities were significantly less likely to attend school because there was a poor supply of school infrastructure in these communities. In Sierra Leone and Liberia, the results confirmed this hypothesis. For JSS, however, the findings from the current chapter has found that living in a poor community does not significantly predict school attendance in Sierra Leone or in Liberia; the results are consistent in both the full and reduced samples. The results from the countries school censuses show that although there is some variation between administrative regions, the overall supply of schools is inadequate. The total population of children aged 12-14 years in Liberia is 242,692 (GoL 2009a: a4-53); the number of schools serving this population is 472 (SfCG 2012: 30). Only two counties out of fifteen in the country have more than fifty schools (Montserrado=67, Nimba=108) meaning that the majority of the school population does not have access to school. The inadequate supply of school infrastructure means there is little variation in school availability and hence in school attendance; school availability at JSS is then not dependent on community poverty as in the case of primary education. The variance estimates shown in Table 6-6 support this explanation as both household and community estimates are not significant (p>.05) having conditioned on other factors.

In Sierra Leone, school availability is also significantly associated with school attendance although the relationship between community poverty and school supply is not as strong as at the primary level. This may be due to the fact that, because school availability is much scarcer,

many communities (even those which have higher levels of development) have lower access to JSS. Notwithstanding, there is significant variation between communities in school supply; this is reflected in the distribution of schools between districts. To illustrate, out of the major cities in the four regions, only in one (Kenema, 88.5%) did over 80% of children respond to living within 30 minutes to the nearest secondary school (GoSL 2007b: 91-2). The corresponding figures were: 58.1% in Makeni, 59.4% in Bo, and 53.3% in Freetown. The level of access, using the 30 minutes distance definition, within each district did not exceed 40% except in the Western Area where 53.3% of children lived within 30 minutes of a secondary school (GoSL 2007b: 91-2). The results from the analysis in this chapter lend support to the significant contribution of school availability within communities in explaining the variation in JSS attendance in Sierra Leone. This is so because the significant variance reported in Table 6-6 for the full sample becomes insignificant in the reduced sample suggesting that once school availability is taken into account, the variation in school attendance becomes insignificant at the community level conditional on other factors.

School availability was also found to be a significant correlate of school attendance in Ghana. This is indicated by the non-significance of the community variance in the reduced sample relative to the significant variance at this level in the full sample shown in Table 6-6. Ghana, however, differs to the other countries in that although community poverty is not significant in the full sample, this variable becomes significant in the reduced sample ($\hat{\beta}$ = -.544, SE = .259; p<.05). This result suggests that in communities in which there are schools within reachable distance, the level of development within a community is significantly related to whether a child attends school. One explanation for this is that poor communities in Ghana have poorer access to quality education. The costs of attending post-primary education are much higher than primary education and so parents are unlikely to invest in education if they do not perceive the quality to be of worthy standard. This relationship between community development and access to quality education has been reported in other studies on Ghana (Akaguri 2013; Akyeampong 2009a) and in other countries (Cameron 2011; Harma 2009; Wedgwood 2007). The relationship between school availability and secondary school attendance has also been noted in other studies (Guimbert et al 2008; Handa 2002; Tansel 2002).

6.5. Conclusion

This chapter has explored the differences in the determinants of attending JSS among children aged 12-14 years in West Africa. Three countries have been studied including two post-conflict countries (Liberia and Sierra Leone) with similar levels of low development but which have different levels of school attendance and, a more economically developed country which has not experienced recent episodes of civil conflict and which has higher levels of school attendance (Ghana). These countries are intended to reflect the variation in political and economic context in the region and enable comparisons to be made between education systems which have different levels of development. The hypothesis in this chapter has been that there are likely to be differences in the correlates of school attendance between countries because of differences in political history, cultural attitudes to schooling and history of education.

The findings in this chapter have shown that there are notable differences between post-conflict and more politically stable countries in West Africa. In Sierra Leone and Liberia, girls are significantly less likely to attend school although this disadvantage can be mitigated by living in a community with more educated women in Sierra Leone. Community livelihood is also significant in the two countries but not in Ghana with children living in communities with a high proportion of agricultural and self-employment livelihoods being less likely to attend schools. In all countries, the level of women's education in a community and school availability is significantly related to attending JSS. These relationships are however significantly more pronounced in Liberia. In Liberia, school infrastructure for JSS is extremely poor and there is little variation in school attendance with only 7.9% of children in the country attending JSS. This poor supply of schools coupled with unfavourable attitudes to schooling creates a condition in which the effect of living in a community with more educated women is more amplified than that which is witnessed in Sierra Leone and Ghana. In Ghana, but not in the post-conflict countries, living in a poor community reduces the likelihood of attending JSS. This relationship however is only significant among children who have access to school suggesting that the quality of schools varies according to the wealth of a community, a finding which corroborates earlier studies on Ghana.

The policy implication from this research is the recognition of contextual differences between countries for the implementation of UBE. While the idea of UBE should be commended for its

ambition to expand education to excluded populations, the implementation of the policy must try to give equal recognition to both components (primary and JSS) as well as to understand the specific needs of countries. In all countries, there is a wide disparity between the supply of primary and junior secondary schools. A first recommendation is that school infrastructure should be developed. This is an especially imminent task in Liberia where less than 10% of children of school going-age are attending school. In Ghana, in addition to improving access, efforts should be made to improve quality standards among the existing school infrastructure. Another recommendation is the sensitisation and promotion of girls' education in Sierra Leone and Liberia where girls continue to be less likely to attend school.

7. Does living in a community with more educated mothers enhance children's school attendance at basic education?

In Sierra Leone girls are 23.4% less likely to attend secondary education than boys. This difference between sexes increases the gender gap in educational attainment and also affects development since mothers' educational attainment is positively associated with children's educational wellbeing. This chapter investigates the relationship between children's school attendance and mothers' education at the community level in Sierra Leone using multilevel statistical modelling techniques and the country's 2008 Demographic and Health Survey (DHSS). The findings suggest that, regardless of a child's own mother's education, increasing the proportion of mothers with secondary or higher education in a community by 10% improves the probability of attending junior secondary school (JSS) significantly by 8%; a 50% increase in mothers' community education improves the likelihood of attending school by 45%. There was no significant relationship between mothers' community education and primary school attendance. However, relative to children whose mothers had no formal education, children whose mothers had attained primary, secondary or higher education were 7%, 14% and 22% more likely to attend primary school respectively. Future policies should seek to promote girls' education at post-primary education and develop community based programs to enable the diffusion and transmission of educational messages.

7.1. Introduction

The association between school attendance and women's education in low income countries is one which has been rarely explored. In Sub-Saharan Africa especially, there is a scarcity of studies that have engaged with the idea that women's education can have a profound effect on children's school participation. Yet the impact of women's education on other outcomes such as child and maternal health as well as on individual and household poverty has been widely demonstrated (Abuya et al 2011; Frost et al 2005). Further, studies have shown the importance of equal gender parity in education and high educational attainment among women for national and personal development (Lutz and Samir 2011; Klasen and Lamanna 2009; Benavot 1989). Lacking in current educational research is an investigation of how women's education affects children's school attendance in West Africa. Using the case of a post-conflict state, Sierra Leone, this chapter aims to critically evaluate the role of female education in primary and secondary school attendance.

Women's education has long been a point of discussion. This attention has not been without a basis. Based on an economic and population prism, the international community pledged to make education accessible to all children in 1990 through the Education for All (EFA) agenda (UNESCO 1990). The EFA placed, through a unique policy of universal primary education (UPE), an emphasis on girls' education. The equal gender principles championed in the EFA agenda were reaffirmed in 1994 at the International Conference on Population and Development and in 2000 at the World Education Forum. Since 1990, therefore, there has been a remarkable increase in the number of girls participating in education (UNESCO 2011a; Knodel and Jones 1996). In spite of these developments, many countries, particularly those in West and Central Africa, continue to have low gender parity ratios suggesting that there is an under-representation of girls in the education system (Grant and Behrman 2010; Kazeem et al 2010). This means that, in these countries, girls and women continue to be excluded from the benefits which are commonly associated with high female educational attainment.

Education confers onto women many advantages not least that which they are subsequently able to transmit to their offspring. The most commonly cited advantage is purely economic: to the extent that education is closely linked to occupation and earnings, women with higher levels of education are significantly more likely than less educated women to have a higher earning power (Sanchez et al 1999). With this advantage, they are able to enhance their own well-being through better health and nutrition, for instance (Lindelow 2008; Barrett and Browne 1996). A higher earning power also increases women's economic independence and henceforth autonomy within the household which, in turn, enhances their capacity to undertake or participate in household decisions (Woldemicael and Tenkorang 2010; Heaton et al 2005). This increase in autonomy introduces another advantage of education: when women are no longer restricted by their dependence on male leadership, they are better placed to pursue their own ambitions and control their own lives. Arguably, a more pervasive influence of education is in a cultural shift in traditional values (such as early marriage and childbearing as well as female exclusion from public life) and the positioning of the child in the family (the intergenerational flow of wealth) (Caldwell 1980).

There is reason to believe that the advantages which are conferred onto women through educational achievement can be transmitted to their children (Kraaykamp and van Eijck 2010;

Morrison 2009). That is to say, children who have educated mothers are expected to be significantly more likely than those whose mothers are not educated to: (1) attend school (2) have longer years of schooling and (3) have higher levels of educational achievements (Huang 2010; Huisman and Smits 2009; Kim and Schneider 2005). The paths through which educated mothers can affect their children's school attendance can be summarised under three headings: economic, knowledge and values, and autonomy.

Education can be costly. There are the direct costs of education (school fees), indirect costs (feeding, travel, learning materials, uniforms, and school equipment), and opportunity costs (foregoing a child's labour, loss of potential household savings, delaying marriage of girls which may bring income to household through bridal price). Educated mothers are better able to meet these costs because they are more likely to have more resources at their disposal (Torche and Spilerman 2009; Kalmijn 1994). They are also better able to provide nutrition and good health to their children; factors which improve learning at school and extend the number of years of schooling (Gakidou et al 2010; Themane et al 2003). By contrast, women with lower educational attainments, who are more likely to live in poorer households, will struggle to meet these costs. Such women are more likely to be dependent on their child's labour to assist with household economics; they are also less likely to be able to afford school fees or indeed the indirect costs to send their children to school (Huebler 2008). In addition, children of less educated mothers, particularly girls, may be more likely to have fewer years of schooling because they are encouraged to enter matrimony at a young age, a practice which further impinges on their educational career (Roby et al 2009). Children with more educated mothers are therefore expected to be significantly more likely to attend school.

Mothers' education can also affect child schooling through the knowledge and values that is acquired through education (Jaeger 2009). For instance, having been schooled in a formal education system, more educated mothers are not only better socialised to value and respect educational achievement, they are also more aware of the long-term fruits of educational investment (Haveman and Smeeding 2006; Ganzach 2000). Mothers with higher levels of education are therefore more likely to send their children to school and to encourage their children to remain in school and achieve highly. Another way in which mothers' education can affect children's schooling is through independence and autonomy. These qualities can be

important for children's schooling in circumstances where there are differing opinions on education in a household. Being more independent and autonomous, women with higher levels of education will have a greater ability to: (1) argue in favour of sending a child to school and (2) invest in a child's education independently of their partners' or household contribution, thereby overcoming any barriers to children's educational participation. Women with lower attainments are unlikely to possess these qualities which enable them to challenge household opposition to education; they are also less likely to have access to the resources that would enable them to sponsor schooling even if they did have a desire to make such an investment.

The idea that mothers' education affects children's schooling is not novel in educational research. In developed countries, studies have demonstrated the significant effect of mother's education on early childhood cognitive development (Magnuson et al 2009), choice in early childhood care (Greenberg 2011; Augustine et al 2009), and learning outcomes (Ferjan et al 2008). In developing countries also, there is general consensus that having more educated mothers, net of individual and other household factors, is correlated with children's school participation (Moyi 2012; Huisman and Smits 2009). However, studies in developing contexts have typically used maternal education as a proxy for socio-economic status. This approach assumes that mothers' education affects children's schooling purely through economic contributions. Indeed, while level of education is associated with level of wealth and household earnings, it is not simply through being able to afford the costs of education that more educated mothers can influence the educational trajectories of their children.

The relevance of the economic interpretation of high educational attainment in the Sub-Saharan context is arguably more applicable to paternal education. This is because in such societies it is still commonplace to have male headed households who are the primary breadwinners. Therefore, even when children have educated mothers, the predominant economic investment to education comes from the father (Timaeus and Boler 2007; Booth 2003). Studies on orphanhood have confirmed this observation such that paternal orphanhood is closely related to reduced household earnings and household poverty, which in turn results either in the postponement of school enrolment or the withdrawal of children from school (Case and Ardington 2006; Gertler et al 2003). Further, in Sierra Leone, evidence from the 2003/04 Integrated Household Survey showed that, among children attending school, 53.8% said that

their fathers paid for education expenses compared to 11.8% who said their mothers paid for education expenses. Such evidence is not intended to contravene the argument that maternal education does not have an economic influence on children's schooling. Rather, it is to highlight that the economic interpretation accorded to maternal education in educational studies may hold a lower tenability in the African setting and, in fact, it is through the values, knowledge, and modern ethics imparted through formal education that mothers' education affects children's school attendance in less resource developed contexts. If this position is assumed, as is the case in the present chapter, the relationship between mothers' education and children's school attendance may be conceptualised as also operating at the community level so that the knowledge, favourable attitudes and progressive behaviours of mothers who have been educated do not simply benefit the offspring of these mothers but also benefits children who live in close proximity.

This paper argues that children who live among many educated mothers are likely to have a higher probability of attending school than those living in communities with a low level of mother's education. This relationship can be conceptualised as operating through a process of social learning and influence, a theory adapted from health research (McNay 2003; Moursund and Kravdal 2003). Through this process, women with low levels of education are able to observe and learn the tastes and preferences of more educated women. They are able to acquire information and knowledge, for instance, about the school entry age, the benefits of education or the structure and policies of the education system from more educated women. Through this process of interaction and observation, mothers who may not have attended school or have incomplete schooling years are exposed to increased awareness of education structures and benefits which may encourage them to send their children to school. The result is that children who live in close proximity to more educated mothers will have an enhanced probability of attending school even when their own mothers have low levels of education. Based on this research hypothesis, the following research question is explored in this chapter:

1. Does living in a community with more educated mothers enhance children's school attendance at basic education?

Sierra Leone is used as a case study for this research. The country is in West Africa and has a small population of less than five million. It has a low human development index (out of 187 countries in the Human Development Human Development Index Report 2011, Sierra Leone featured at 180). Just over 50% of the population lives in severe poverty whilst 77% live in multidimensional poverty. The country also has a poor health record (WHO 2010; UNDP 2011).

The rationale behind the choice in case study is twofold. Firstly, the country has a low level of female educational attainment (GoSL 2009: 2). The median completed years of education among the female household population aged 6 years and above is zero years (GoSL 2009: 19). Among the same population, 58% have no education, 25.2% have some primary education, 3.1% have completed primary education, 9.7% have some secondary education, 1% have completed senior secondary education, and 1.4% have more than secondary education (GoSL 2009: 19). The implications of having an educated female population are significant for the Sierra Leonean populace given the country's low human development and poor maternal and child health. A thorough investigation into the ways in which mothers' education is related to school attendance may be useful in helping to guide future investments and policy interventions which aim to stimulate demand for female education.

A second rationale is that the country has poor levels of educational participation but there is no research on the determinants of school attendance on the country. Sierra Leone is a poor and undeveloped post-conflict state (1991-2002) with poor educational infrastructure and low human resource (World Bank 2007; Francis 2001). The cessation of the war in 2002 saw massive investments in primary education with secondary education being largely neglected. These investments were made in conjunction with advocacy campaigns for universal primary education. As a result, the net attendance ratio for primary education (61.6%) is disproportionately higher than for junior secondary (21%) and senior secondary education (7%). The lack of secondary school supply restricts the likelihood of attendance at this level of education. This drawback may however be mitigated in communities where there is a large proportion of mothers with secondary or higher education through the processes described above. This is especially important for secondary education because the country has had few campaigns or publicity of post-primary education and so the interaction between mothers

within communities can be important in diffusing positive knowledge and attitude towards post-primary educational investment in the present study context (Education for Change 2011).

7.2. Data

The 2008 Sierra Leone Demographic and Health Survey was used for analysis (SLDHS, refer to chapter 3 for description of survey characteristics). Three questionnaires were administered for the survey: women's, men's and household members. The response rate for the household questionnaire was 98%; the corresponding figure for men and women was 94% and 93% respectively (GoSL 2009: 10). Information from all of these questionnaires is used in the analysis for this chapter but the household dataset is the main dataset used. This survey collected data on school attendance, mother's education, and household characteristics.

7.2.1. Selection of study population

The study population for the analysis was children aged 6-14 years (since this is the age for attending basic education) whose mothers were alive at the time of the survey. To identify household members whose mothers were alive, the variable 'mother alive' was used. Those who responded yes to this question were selected. Secondly, the variable 'mother's line number' was used to match a child to his or her mother. The Demographic and Health Survey (DHS) only assigns a line number to a mother if the mother lives in the same household as the child. Therefore, children who lived in separate households to their mothers were excluded from the analysis as there was no way to identify the living mothers. The total number of cases in the SLDHS household members' dataset was 41,985. Of this number, 20,284 responded yes to their mother's being alive but only 13,850 lived in the same household as their mother of whom 7,126 were aged 6-14 years. The sample sizes for the study population was therefore 7,126; 4,931 were aged 6-11 years and 2,195 were aged 12-14 years (refer to Figure 7-1).

Figure 7-1: Selection and sample size of children aged 6-14 years from the 2008 Sierra Leone Demographic and Health Survey
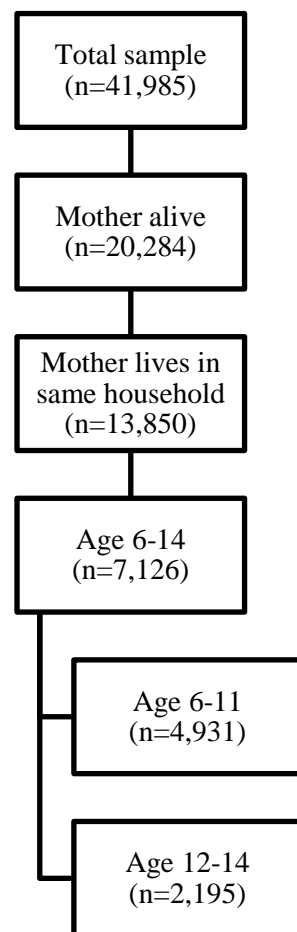
7.2.2. Missing cases

Among the variables used in the analysis, few had missing cases. Four variables had missing cases: household chores (n=340), work (n=331), work in family business or farm (n=357), and maternal education (n=94). The missing cases for all of these variables were not deleted but were included in the analysis as dummy variables. For the maternal education variable, however, children in the missing category were combined with those whose mother's had no education. This was done because, as the main point of interest, it was important to compare the impact of different educational levels of school attendance without there being a category for missing cases. Results from an initial regression analysis showed that there was no significant difference in school attendance between children who had missing data and those whose mothers had no education; the two categories could then be combined without losing essential information or without biasing the results from the analysis. Information for all other study variables was complete.

7.2.3. Study variables

A number of variables were used in the study including individual, household and community level predictors (refer to Table 7-1). The dependent variable was attending the correct level of education. To create this variable, age was categorised into two categories: children aged 6-11 and 12-14 years. Children aged 6-11 years who were attending primary school at the time of the survey were coded as 1 and the other children within this same age-group who were either not attending school or were attending a lower/higher educational level were coded as 0. The same was done for children aged 12-14 years; among this age-group children attending JSS were coded as 1 and those out of school or attending a lower/higher educational level were coded as 0.

The variable of interest was mothers' community education, the proportion of mothers with secondary or higher education in a community. In this study a cluster in the SLDHS is taken to mean a community. The cluster forms part of the hierachical structure of the SLDHS. It designates a census enumeration area which is often representative of villages or small groupings of households. The enumeration areas used in the SLDHS were obtained from the country's 2004 population and housing census; the sampling frame used for the 2008 SLDHS was representative of the whole country as there was no difference in the population distribution by adminsitrative area between the 2008 and 2004 sampling frames (GoSL 2009: 275). There were 353 clusters in the 2008 SLDHS.

The variable for mothers' community education was created by binary coding mothers education (none/primary=0, secondary/higher=1) and aggregating this information to the community level. Often this approach has the potential of introducing measurement error and biased estimates in the aggregated variable when there are insufficient cases within each cluster to derive a reliable estimate. This limitation is reduced in the present study because of the large sample size of women from which the mothers community education variable was created. Recall from section 7.2.1. that 13,850 mothers lived in the same household as their children; information on the highest level of education of all these mothers was used. The mean number of mothers per cluster was 46 with a standard deviation of 15; the minimum and

maximum number of mothers per cluster was 10 and 81 respectively. Two percent of mothers lived in clusters of 0-19 mothers; 17% of mothers lived in clusters where there were 60-81 other mothers. Forty percent and 41% of mothers lived in clusters with 20-39 and 40-59 other mothers respectively.

Table 7-1 lists the other variables which were included in the analysis. The choice of variables was informed by previous research and so variables which have been shown to be correlated with school attendance have been explored. Five individual level variables were considered for the analysis: age of the child, sex of the child, household chores, work in last week, and work in family business or farm. At the household level, wealth, maternal education, and sex of the household head were used. Maternal education had four categories: none, primary, secondary, and higher. The household wealth variable was the same as that used in chapters 5 and 6.

The community level variables used here are much the same as those used in chapters 5 and 6 (see section 6.2.3 in chapter 6 for summary statistics of these variables). The type of place of residence and administrative region are also used. School attendance in Sierra Leone has long been demarcated by region (GoSL 1997). The Western Area in which the capital is located has traditionally taken the lead in educational attainment followed closely by the South where the next major city, Bo, is located. The Northern region, by contrast, has consistently displayed low levels of school attendance. While the principal emphasis of the chapter is on maternal education and mothers' community education, it is also of interest to understand the ways in which school attendance is correlated with regional location and how this association varies by other covariates. Controlling for administrative region helps to capture some of these differences in school supply between regions. It is also important to control for this variable and area of residence because these variables form part of the stratification of the SLDHS; controlling for them therefore accounts for this stratification in the analysis.

Table 7-1: Definition of study variables

Variable name	Operational definition	Categories	Coding
Sex	Sex of child	Boy, Girl	Boy (0), Girl (1)
Work	Child works in paid/unpaid employment outside the home in last week	No, Yes, Missing	No (0), Yes (1), Missing (3)
Chores	Child does household chores	No, Yes, Missing	No (0), Yes (1), Missing (2)
Farm	Child works in family business or farm	No, Yes, Missing	No (0), Yes (1), Missing (2)
Poor household	Child lives in poor household, created from the wealth index	No, Yes	No (0), Yes (1)
Mother's education	Child's mother's educational attainment	None, Primary, Secondary, Higher	None (0), Primary (1), Secondary (2), Higher (3)
Head's sex	Sex of household head	Male, Female	Male (0), Female (1)
Poor community	Proportion of people living in a poor household in a cluster	-	-
Mothers' community education	Proportion of mothers who have attained secondary or higher education in a cluster	-	-
Agricultural livelihood in community	Proportion of people working in agriculture or are self-employed (community livelihood)	-	-
Visiting health facility	Proportion of women who visited a health facility in the last 12 months for family planning	-	-
Women's mean age at marriage	Average age at marriage for women in community	-	-
Lives in a rural area	Type of place of residence	No, Yes	No (0), Yes (1)
Administrative region	Administrative region	Northern, Eastern, Southern, Western	Northern (0), Eastern (1), Southern (2), Western (3)

7.3. Analysis

Regression analysis is performed because this approach allows me to measure the relationship between mothers' education and school attendance whilst conditioning on other factors. A multilevel logistic model was used to estimate the probability of attending the correct level of education among children aged 6-14 years. This type of regression was employed because the

outcome was binary: yes for those who were attending a level of education which corresponded to their age, and no for those who were attending a level of education that did not correspond to their age or were not in school. Multilevel model was suited for this analysis as the SLDHS has a hierarchical structure (refer to section 3.1. in chapter 3); the method accounts for the lack of independence between cases and standard errors are not underestimated.

The regression analysis was performed on two separate samples: children aged 6-11 and 12-14 years. The reason being that the net attendance ratios for primary (61.6%) and junior secondary education (21.0%) in Sierra Leone is very different suggesting that the factors which affect school attendance at these tiers of education may be dissimilar. In addition, the policies which govern primary and secondary education in the country are different. For instance, primary education is stipulated to be free and compulsory whilst secondary education is neither free nor compulsory. Although some households still have to pay fees and cover the costs of indirect expenses for primary education, it is reasonable to assume that the cost of sending a child to primary school may act less as a barrier than sending a child to secondary school (GoSL 2007a; GoSL 2007b). Further, the rules of admission to the two educational levels are different. Besides the ability of households to sponsor a child's education, admission to junior secondary school is competitively based on achievement in the National Primary School Examination (NPSE), an examination taken upon completing primary education (GoSL 1997). By comparison, admission to primary education, theoretically at least, is based on attaining age 6. Another factor which may influence attendance is school availability and school facilities. In Sierra Leone, the supply of primary schools is greater than secondary schools and the distribution of schools within the country is uneven; there are 5,931 primary schools compared with 888 junior secondary schools (GoSL 2012: xxiv-xxv).

Preliminary analysis was first conducted in stata before fitting the multilevel model in MLwiN. Sampling weights obtained from the SLDHS were used in the preliminary analysis but not in MLwiN (refer to GoSL 2009 for discussion of sampling weights). In the preliminary analysis, univariate and bivariate analyses were performed to understand the distribution of the data and to derive basic correlations between predictor variables and the outcome using two way contingency tables and chi-squared tests. The bivariate analysis is especially useful for showing how school attendance varies by background characteristics and area of residence.

However, because some of the predictors are correlated with one another, the bivariate analysis does not give any indication of the relative significance and strength of the independent variables in predicting the outcome. To achieve this end, multiple logistic regression with multilevel techniques was used in MLwiN. The model for the 6-11 sample was first fitted using the first order Marginal quasi-likelihood approximation (MQL) to derive base estimates; using these initial estimates the results for the final models were obtained using the second order Penalized quasi-likelihood (PQL) as this method is proposed to be the most appropriate method of estimation in multilevel logistic modelling. Final estimates for the 12-14 year old sample were obtained using the first order MQL as the second order PQL produced the same estimates as the previous estimation method. During the model specification, t-tests were performed to assess the contribution of individual covariates and, to assess whether a reference of a categorical variable was significantly different from the contrast groups of that variable. The Wald test was used to ascertain the joint impact of group variables as well as the contribution of random and contextual effects.

A two level model was fitted for the 12-14 aged sample as the variance at the household level was not statistically significant after controlling for all the covariates (p>.05). For the 6-11 year old sample, the variance at the household and cluster levels were still significant after fitting the conditional model. For both samples, 'work in family business or farm' and 'community access to family planning health facility' were excluded from the analysis. The former variable had a strong correlation with 'work in last week' and 'area of residence' such that the majority of children who responded 'yes' to working in a family business or farm also responded 'yes' to having worked in the week prior to the survey; they also disproportionately lived in rural households. Similarly, 'community access to family planning health facility' correlated strongly with community wealth and area of residence. Further, when controlled for in the regression analyses, the two variables did not significantly contribute to explaining the variation in school attendance and they were not significantly associated with the outcome. For these reasons, they were excluded from the analysis. Note that no significant interactions were observed between mothers' community education and any of the covariates named in Table 7-1 above.

The model was fitted in three stages (refer to Table 7-2). In the first step, all individual and household level variables were controlled for along with mothers' community education and random intercepts at the household and cluster levels. In step 2, conditional on controlling for the covariates in step 1, all other community variables were added. Step 3 developed the model in step 2 by including area of residence and administrative region. This modelling process was intended to disentangle the relationship between mothers' community education and children's school attendance from mediating effects which may occur through other community or regional factors such as those considered in the present analysis. Table 7-2 shows the results from the modelling process. For both age-groups, mothers' community education significantly predicted school attendance after controlling for individual, household and community covariates. Among 6-11 year olds, however, the relationship between primary school attendance and mothers' community education loses significance after area of residence and administrative region are added to the modelling process.

Table 7-2: Estimates for mothers' community education for primary and junior secondary school attendance in steps 1-3 of modelling process

Model	Step 1	Step 2	Step 3
Age 6-11			
Mothers' community education	4.274*	1.802**	0.202
Age 12-14			
Mothers' community education	3.535*	1.837*	1.235**

Note: $*p<.01$, $**p<.05$

Chapters 5 and 6 have shown that school availability is significantly related to children's school attendance, particularly at junior secondary education where there is a shortage of schools. To check that the significance of mothers' education is robust and not dependent on school supply, the approach of excluding clusters in which no child is attending school was applied to the models fitted in Table 7-2. The results showed the same relationship with mothers' community education significantly predicting JSS but not primary.

Research has shown that the relationship between children's schooling and parents' educational attainment differs for fathers and mothers education with fathers' education typically showing a stronger effect on children's schooling outcomes (refer to section 2.3 in

chapter 2). If this observation is true in the Sierra Leonean context, it is likely that some of the effect captured by mothers' education is reflecting the unobserved effect of fathers' education. The data used for the present analysis had some limitations which restricted an adequate exploration of this differential relationship between mothers' and fathers' education. Recall from section 7.2.1 that children whose parents were alive were assigned a line number to enable the identification of their parents. This identification process, however, was only possible for children who lived in the same household as their parents. Table 7-3 shows a breakdown of the number of children whose parents were alive and who were living in the same household as either or both parents. The DHS only collects information on parents' survival among children aged 0-17. Among 21,531 children aged 0-17 years, 18,645 were non-orphans and among this group 10,863 lived in the same household as both parents. There were 12,403 children aged 6-14 in total. Of this number, 10,458 were non-orphans and 5,621 lived in the same household as both parents. These figures suggest that there may some selection bias in the number of children who reside in the same household as both parents given the substantial difference between the number of children whose parents are alive and those who actually live in the same household as their parents (see section 3.3 in chapter 3). Therefore, analysis performed on the reduced sample of children who lived in the same household as both parents was taken as preliminary. The results from this preliminary analysis are discussed below but are not presented in the results section (7.4.2).

Table 7-3: Number of children whose parents were alive and living in the same household as their parents

Variable	Age 0-17	Age 6-14
Mother alive	20,284	11,557
Father alive	19,229	10,854
Mother and father alive	18,645	10,458
Mother lives in same household as child	13,850	7,126
Father lives in same household as child	12,931	7,050
Mother and father live in same household as child	10,863	5,621
Total	21,531	12,403

Fathers had a higher level of education than mothers. Eighty three percent of mothers had no education compared to 70% of fathers. Eight percent of mothers had attained secondary

education and 1% had higher education; the corresponding figures for fathers' education were 16% and 5% respectively. There was a strong correlation between parents' education. The majority of children whose mothers had no education also had fathers who had no education (79.3%). Similarly, 72.7% of children had both parents who had attained higher education. To model school attendance with both parents education, variables were added incrementally as in the modelling process above. To begin with, in step 1, controlling for a random intercept at the household and community levels, all individual and household variables along with mothers' community education were added. Next, fathers' education was added followed by fathers' community education. For the next two steps the remaining community predictors were included in the model followed by area of residence and administrative region.

Among 6-11 year olds, mothers' education was only significant in step 1, the variable lost significance after controlling for fathers' education (see Table 7-4 below). Mothers' community education was also significant until fathers' community education was controlled for. Fathers' education however was significantly associated with primary school attendance in all modelling steps except in step five where it lost significance at p<.05 when area of residence and administrative level were added to the modelling process. Among 12-14 year olds, mothers' education was significant at all stages of the modelling process. Mothers' community education was also significantly related to JSS attendance at all stages except in the final stage having controlled for area of residence and administrative region. Fathers' education, by contrast, did not significantly predict school attendance in any of the models. Similarly, fathers' community education was not a significant predictor of the outcome except in step 3.

Table 7-4: Results showing significance testing at p<.05 from modelling the relationship between primary/junior secondary school attendance and parents' education

Modelling process	Mother's education		Mothers' community education		Father's education		Fathers' community education	
	6-11	12-14	6-11	12-14	6-11	12-14	6-11	12-14
Step 1 – individual and household level variables, mothers' education and mothers' community education	Yes	Yes	Yes	Yes	Na	Na	Na	Na
Step 2 – all predictors in step 1 and fathers' education	No	Yes	Yes	Yes	Yes	No	Na	Na
Step 3 – all predictors in step 2 and fathers' community education	No	Yes	No	Yes	Yes	No	No	Yes
Step 4 – all predictors in step 3 and all other community predictors	No	Yes	No	Yes	Yes	No	No	No
Step 5 – all predictors in step 4 and area of residence, administrative region	No	Yes	No	No	Yes	No	No	No

Bearing in mind the limitations of this reduced sample, the results from this analysis provide preliminary evidence to suggest that fathers' education at the household level has a stronger relationship with primary school attendance than mothers' education in Sierra Leone. Parents' community education does not seem to be related to primary school attendance after controlling for community poverty and community agricultural livelihood as well as area of residence. This indicates that the level of development, rural residence and the level of agricultural farming in a community are stronger predictors of attending primary school in this country. For JSS attendance, mothers' education both at the household and community levels appear to be strong correlates of school attendance, even after controlling for fathers' education and other community variables. In comparison, fathers' household education does not significantly predict JSS attendance having controlled for mothers' household and community

education. Fathers' community education is significant at p<.05 in step 3 but this relationship disappears when other community predictors are added in step 4.

The results from this analysis are similar to those presented in Table 7-2 above for the 12-14 year sample but slightly different for the 6-11 sample. In the model developed above which does not account for fathers' education, mothers' community education was significantly related to JSS attendance conditional on controlling for individual, household, community and regional factors. In the reduced sample which controls for fathers' and mothers' education, mothers' community education again comes across as a significant predictor of JSS attendance although this relationship disappears when area of residence and administrative region is controlled for. For the 6-11 year old sample, however, important differences are observable between the model which only controls for mothers' education in Table 7-2 and that which controls for both parents education. Specifically, though by any means not conclusive, the analysis suggests that the relationship between mothers' education and primary school attendance observed in Table 7-2 may in fact be reflecting the relationship between fathers' education and primary school attendance. When data permits, more analysis should be done to further explore this observation.

The model that will be discussed in the results section below is that specified in step 3 in Table 7-2 above. This model can be expressed as follows:

$$log\left(\frac{\pi_{ijk}}{1-\pi_{ijk}}\right)$$
$$= \beta_{0jk} + \beta_1 x_{1ijk} + \beta_2 x_{2ijk} + \dots + \beta_f x_{fijk} + \gamma_1 z + \gamma_2 z_{2jk} \dots + \gamma_m z_{mjk}$$
$$+ \lambda_1 h_{1k} + \lambda_2 h_{2k} + \dots + \lambda_r h_{rk}$$

$$\beta_{0jk} = \beta_0 + v_{0k} + u_{0jk}$$

Child level variables: $x_1, x_2, \dots x_f$

Household level variables: $z_1, z_2, \dots z_m$

Community level variables: $h_1, h_2, \dots h_r$

Children are represented by i $(1 \dots i)$. Households are shown by j $(1 \dots j)$ and clusters are indicated by k $(1 \dots k)$. The response $log\left(\frac{\pi_{ijk}}{1-\pi_{ijk}}\right)$ is for child i in household j in cluster k. x represent a child level predictor and β is the associated unstandardized coefficient for this predictor. z is a household level predictor and γ shows the corresponding coefficient for that predictor. h is a community level variable and λ is the associated coefficient. u_{0jk} shows the variability of attending school between households; v_{0k} is the random intercept for the cluster level showing the degree of variation in school attendance at this level. It is assumed that u_{0jk} has a normal distribution with zero mean and variance σ_0^2: $u_{0jk} \sim N(0, \sigma_{u0}^2)$. v_{0k} also has a normal distribution with zero mean and variance σ_0^2: $v_{0k} \sim N(0, \sigma_{v0}^2)$. In multilevel logistic regression, however, the variance is not estimated for level-1 variance since this is constrained to be 3.29.

7.4. Results

7.4.1. Preliminary

The range of the proportion of mothers with secondary or higher education is 0-.8; the mean was .11 with a standard deviation of .16. Table 7-5 shows the percentage distribution of all children aged 6-14 years by background characteristics. Over half of the sample was age 6-11 years (69.4%). There were slightly more girls than boys in the study population (51.4% compared with 48.6%). Seventy-nine percent of children had mothers who had not attended formal education; only 1.5% of mothers had attained higher education. The percentage of children whose mothers had attained primary and secondary education was the same: 8.9%. Forty percent of children lived in poor households. The majority of children lived in rural areas (70.9%) and in the Northern region (48.7%).

Table 7-5: Percentage distribution of children aged 6-14 whose mothers are alive by socio-demographic background, Sierra Leone 2008

Variable	% (n)	Variable	% (n)
Age (years)		Head's sex	
6-11	69.4 (5,177)	Male	79.0 (5,893)
12-14	30.6 (2,282)	Female	21.0 (1,566)
6-14 year olds		Mother's education	
attending correct level		None	80.7 (6,019)
of education		Primary	8.9 (664)
No	49.6 (3,700)	Secondary	8.9 (664)
Yes	50.4 (3,759)	Higher	1.5 (112)
Sex		Poor household	
Boy		Yes	39.8 (2,969)
Girl	51.4 (3,834)	No	60.2 (4,490)
	48.6 (3,610)		
Work		Rural residence	
No	75.0 (5,594)	Yes	70.9 (5,288)
Yes	20.3 (1,514)	No	29.1 (2,171)
Missing	4.7 (351)		
Chores		Region	
No	72.7 (5,421)	Northern	48.7 (3,633)
Yes	22.5 (1,680)	Eastern	18.7 (1,395)
Missing	4.8 (359)	Southern	18.3 (1,365)
		Western	14.3 (1,067)

Results from chi-squared tests for two way contingency tables assessing the association between attending school at the correct level and predictor variables are presented in Table 7-6. The results show that the outcome variable was significantly correlated with many of the predictors; sex of the child, work in last week and sex of household head did not significantly correlate with the outcome ($p>.05$). Age of the child had the strongest association with the outcome followed by area of residence, maternal education, and region ($p<.01$). Mother's education was positively associated with attending school at the correct age: 46.5% of children with mothers who had no education were attending the correct level of education compared to a much higher proportion of children whose mothers had attained higher education (86.3%). Children aged 6-11 years had higher attendance at primary education than did children aged 12-14 at junior secondary education: 63.2% compared with 21.5% ($p<.01$). Children in urban areas (64.7%) and non-poor households (55.4%) had significantly higher attendance than their counterparts in rural areas (44.5%) and poor households (42.8%).

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Table 7-6: Percentage distribution of attending correct level of education among children aged 6-14 whose mothers are alive by socio-demographic background, Sierra Leone 2008

Variable	% (n)	Variable	% (n)
Age*		Poor household*	
6-11	63.2 (5,177)	Yes	42.8 (2,969)
12-14	21.5 (2,282)	No	55.4 (4,490)
Sex		Mother's education*	
Boy	50.3 (5,893)	None	46.5 (6,019)
Girl	50.5 (1,566)	Primary	60.7 (664)
		Secondary	70.0 (664)
		Higher	86.3 (112)
Chores*		Rural residence*	
No	46.6 (3,834)	Yes	44.5 (5,288)
Yes	51.7 (3,252)	No	64.7 (2,171)
Missing	48.4 (373)		
Work*		Region*	
No	51.8 (5,594)	Northern	44.2 (3,633)
Yes	46.6 (1,514)	Eastern	51.6 (1,395)
Missing	49.8 (351)	Southern	50.9 (1,365)
		Western	69.3 (1,067)
Head's sex			
Male	50.3 (5,893)		
Female	50.8 (1,566)		

Note: chi-squared test results for two way contingency tables testing for association between attending school at correct level and predictor variables; *p<.01, **p<.05

7.4.2. Does living in a community with more educated mothers enhance children's likelihood of attending school?

The results from the regression analysis (step 3 in Table 7-2) are presented in Table 7-7 which shows the estimated beta coefficients and their associated standard errors. The interpretation that ensues is conditional on controlling for the predictors in the respective models that are discussed. In addressing the research question, reference is also made to results which were discovered in the analysis but are not presented in Table 7-7. The results are interpreted using mean predicted probabilities (Steele 2009). The research question addressed in this paper has been whether living among mothers who are more educated enhances the likelihood of a child attending school, irrespective of his/her mother's education and other background characteristics? The findings from the analysis show that the level of mothers' education within a community is not significantly related to primary school attendance. A child's own mother's education is however significantly related to the outcome.

Table 7-7: Estimated beta coefficients and their associated standard errors (se) for attending the correct level of education among 6-14 year olds in Sierra Leone, 2008

Predictors	Model 1 - Age 6-11 $\hat{\beta}(se)$	Model 2 - Age 12-14 $\hat{\beta}(se)$
Mothers education		
Mother's education		
Primary	.409 (.207)**	-.188 (.118)
Secondary	.781 (.258)*	.03 (.173)
Higher	1.315 (.655)**	1.407 (.414)*
Mothers' community education	.202 (.805)	1.235 (.528)**
Other predictors		
Sex		
Female	.152 (.097)	-.043 (.111)
Work		
Yes	-.009 (.156)	-.03 (.136)
Chores		
Yes	1.411 (.127)*	.217 (.175)
Head's sex		
Female	-.067 (.154)	.076 (.127)
Poor household		
Yes	-.614 (.145)*	-.559 (.148)*
Poor community	-1.138 (.349)*	-.042 (.306)
Agricultural livelihood in community	-.66 (.361)	-1.02 (.299)*
Rural residence		
Yes	-1.434 (.282)*	-.704 (.216)*
Region		
Eastern	.401 (.201)**	-.215 (.176)
Southern	.528 (.215)**	-.281 (.193)
Western	.152 (.315)	-.135 (.204)
Random intercepts		
Household level variance	3.266 (.247)*	-
Community level variance	.791 (.153)*	.196 (.085)*

Note: *p<.01, **p<.05; Missing categories are included in the models but the coefficients for these were not significantly different from the reference categories at p<.05.

Compared to children whose mothers have no education, children whose mothers have attained primary, secondary or higher education are significantly more likely to attend primary school between the ages of 6 and 11 years. Table 7-8 shows mean predicted probabilities of attending primary school for the different levels of education conditional on all the factors presented in Table 7-7 above. For children whose mothers have no education, the probability of attending school is .653. The probability of attending school for children whose mothers have primary education is 7% higher than that for children whose mothers have no education (p<.05). The probability of attending school for children whose mothers have attained secondary or higher education is 14% and 22%, respectively, higher than children whose mothers have not received any formal education (p<.05).

Table 7-8: Predicted probabilities of attending primary school at age 6-11 years by level of mothers' education

Level of mothers' education	Predicted probabilities	% change in predicted probability
None	0.653	-
Primary	0.699	7
Secondary	0.746	14
Higher	0.799	22

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 7-7; the values to which the controls are set for the estimation is the reference categories as shown in Table 7-7

The likelihood of attending JSS among 12-14 year olds is significantly related to the proportion of mothers with secondary or higher education in a community. The relationship is such that, irrespective of a child's own mother's educational attainment, living among mothers who are more educated is predicted to enhance the probability of a child aged 12-14 years attending JSS. Table 7-9 presents predicted probabilities of attending JSS by the proportion of mothers with secondary or higher education in a community. Recall that the range in the proportion of mothers with secondary or higher education in a cluster in the SLDHS was 0-.8. The predicted probabilities shown in Table 7-9 reflect this observed range in proportions; Figure 7-2 shows a graphical representation of the percentage change in mean predicted probabilities of attending school by the proportion of mothers with secondary or higher education in a community.

Table 7-9: Predicted probabilities of attending junior secondary school at age 12-14 years by proportion of mothers with secondary or higher education in a community

Proportion of mothers with secondary or higher education in a community	Predicted probabilities	% increase in predicted probability
0	.187	-
.08	.202	8
.16	.218	17
.24	.235	26
.32	.253	35
.4	.272	45
.48	.292	56
.56	.313	67
.64	.334	79
.72	.356	90
.8	.379	103

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 7-7; the values to which the controls are set for the estimation is the reference categories as shown in Table 7-7

The results in Tables 7-9 and Figure 7-2 confirm the hypothesis in this paper. Conditional on controlling for other background characteristics, the probability of a child attending school when s/he lives in a community where there are no mothers with secondary or higher education is .187. Using this probability as a base, a ten percent increase in the proportion of mothers with secondary or higher education in a community (i.e. from 0-.08) is estimated to enhance the probability of attending junior secondary school by 8% (from .187 to .202). A fifty percent increase in the proportion of more educated mothers in a community will result in an increase of 45% in the probability of attending school.
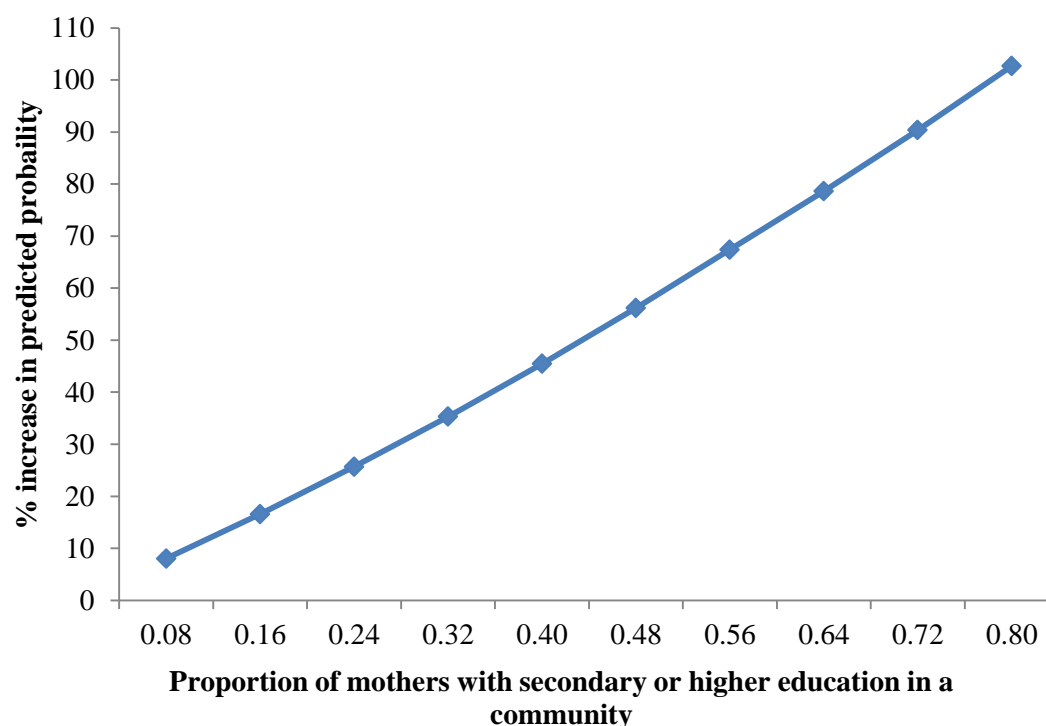
Figure 7-2: Percentage increase in predicted probabilities of attending junior secondary school at age 12-14 years by proportion of mothers with secondary or higher education in a community

Living among more educated mothers then is associated with JSS attendance but not with primary school attendance. One possible explanation for this difference is as follows. Sierra Leone is a post-conflict state (1991-2002) with a weak education infrastructure (World Bank 2007). The post-war period experienced huge international investments to expand access to primary education. These investments succeeded in improving levels of primary school attendance, and to a limited extent, also an improvement in junior secondary school attendance. Yet, the ratio of children attending school at the official ages is different between primary (61.6%) and junior secondary education (21%). Households are more likely to be familiar with primary education than secondary education, especially with the promotion of universal primary education in the immediate aftermath of the civil war. Access to junior secondary education remains limited due to poor investment and promotion of progression to this level of education. There is then likely to be a greater benefit to secondary school attendance than primary school attendance among children who live among more educated women. This is because, since primary is more widespread and much more publicised, mothers are likely to

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already be aware of policies relating to this educational level irrespective of their educational attainment and so the interactive process of observation and learning are less significant. For junior secondary education however, more educated mothers are more likely to be aware of junior secondary education policies and may be more willing to enrol their children than their less educated counterparts. By living among more educated mothers, therefore, less educated mothers will be in a better position to learn about the processes of secondary school admission and will be more encouraged to invest in post-primary education as a result of observing and interacting with more educated women.

There are stronger correlates of primary school attendance at the community level. These factors include, for instance, the level of development within a community which is closely linked to school availability and area of residence like rural or urban residence or region (GoSL 2009). The level of development within a community, measured here by the proportion of people living in poor households in a community, has an inverse association with primary school attendance; a significant interaction between this predictor and area of residence shows that children living in less developed rural communities are significantly more disadvantaged than their counterparts in urban areas. The results for this interaction are not shown in Table 7-7 but are presented in Table 7-10 and Figure 7-3 below. Children in rural areas experience a greater reduction in their probability of attending school than urban children with deterioration in the level of community development. The predicted probability of attending primary school in a community with no poor household is .705 in rural areas and .801 in urban areas, conditional on controlling for the present interaction and all the covariates in Table 7-7. Using this probability as the reference, a ten percent increase in the proportion of people living in poor communities reduces the probability of attending primary school by 3% in rural areas compared to a .1% reduction in urban areas. This difference in the depreciation of predicted probabilities widens to 12% in rural areas and .8% when the proportion of poor people in a community is increased by 40% and to 29% in rural areas and 2% in urban areas when the proportion of poor people in a community is increased by 90%.

Table 7-10: Predicted probabilities of attending primary school at age 6-11 years by proportion of people living in poor households in a community

Proportion of people living in poor households in a community	Predicted probabilities - rural	Predicted probabilities - urban
0	.705	.801
.1	.684	.8
.2	.663	.798
.3	.641	.796
.4	.619	.795
.5	.596	.793
.6	.573	.791
.7	.549	.788
.8	.526	.786
.9	.502	.784
1	.479	.782

Note: Predicted probabilities are conditional on controlling for all the covariates in Table 7-7; the values to which the controls are set for the estimation is the reference categories in the fitted model

Figure 7-3: Percentage decrease in predicted probabilities of attending primary school at age 6-11 years by proportion of people living in poor households in a community
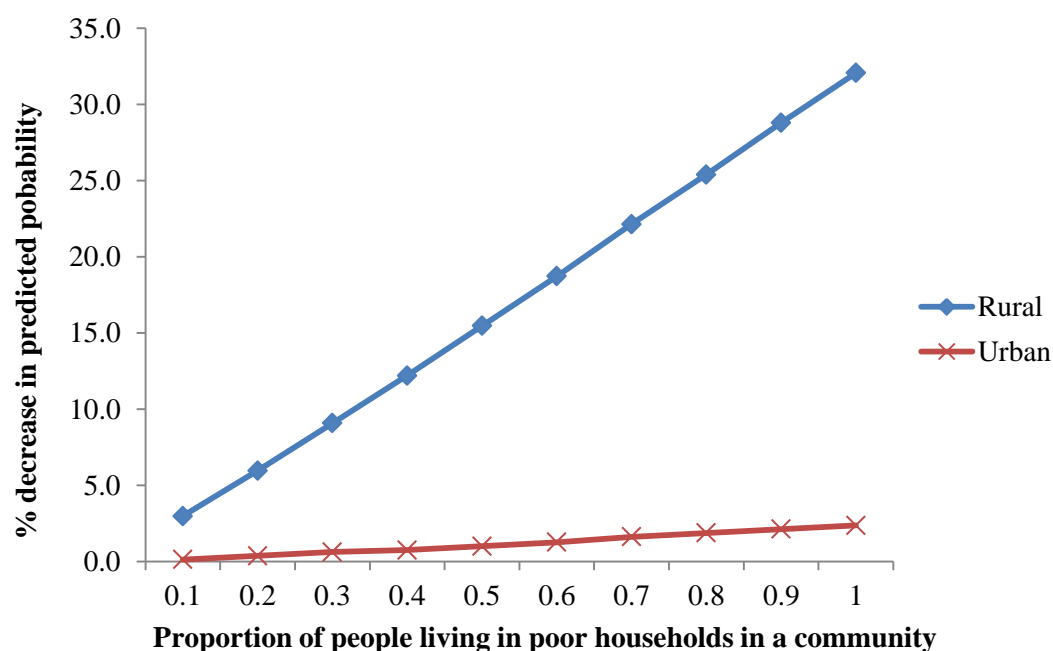
The interaction between area of residence and community development may be due to the difference in community development and school provision between urban and rural areas. The

provision of primary school in Sierra Leone is strongly associated with the level of development within a community and the area in which a child lives (GoSL 2007b; GoSL 1997). Historically, the provision of primary schools was mainly provided in the capital city, Freetown, and other main district capitals like Bo and Kenema. The Northern region had the fewest schools and the lowest levels of educational participation. The Eastern and Southern regions had similar levels of school attendance and school infrastructure. The Western region in which Freetown is located had the highest supply of educational infrastructure and the highest levels of school attendance. Since the cessation of the civil war, post-war reconstruction efforts invested in the development of primary schools and other social services such as health and water and sanitation community projects (GoSL 2003). Although post-war reconstruction expanded access to other localities beyond the main district capitals, the level of provision and development is still far greater in urban areas than in rural areas. Therefore, a child living in a poorly developed community in an urban area will a have higher probability of attending primary school than a child living in similar conditions in a rural area because s/he is more likely to live in closer proximity to other communities which are likely to have primary schools. This means that even if a child in an urban area does not live within a community that is developed or has a primary school, s/he may still be able to access a school in neighbouring communities; an option which is less likely in rural areas due to (1) the relatively lower levels of development (2) more sparsely populated households meaning greater travelling time to other localities and hence higher cost of schooling.

The variance estimates presented in Table 7-7 above shows that after controlling for all the predictors in the models, there is unexplained variation between communities in both primary and JSS attendance. These results suggest a significant homogeneity within communities and heterogeneity between communities in the probability of attending school. The variation for primary school attendance (.791) is higher than that for JSS attendance (.196). The variance for the household level was not statistically significant in the final model for JSS but remained highly significant for primary education. This suggests that whilst the probability of attending school is similar for children living in the same household, there is a large variability between households indicating that children from different households do not have similar access to primary education, controlling for the covariates in the final model. As in section 5.5.2 in chapter 5, the predicted probability of attending school for an average community with $v_k = 0$

can be estimated (see Steele 2009: 6-8). Under the assumption that v_k is normally distributed, it is expected that the 95% coverage interval for children's whose mothers have no education and live in a community with an average proportion of mothers with secondary or higher education lies between 0.22 and 0.63. For primary education, we expect the probability of attending school for children whose mothers have no education to lie between 0.49 and 0.97 in 95% of communities.

7.5. Conclusion

This paper has investigated whether living in a community with a high level of mother's education enhances the level of primary and secondary school attendance among children aged 6-14 years old in Sierra Leone. The results from the analysis have shown that living among a high proportion of more educated mothers does increase the likelihood of a child attending school. This relationship is significant for junior secondary education but not for primary education. The level of mothers' education within a community therefore improves the probability of attending junior secondary school among 12-14 year olds, irrespective of a child's own mother's educational attainment. Among 6-11, the level of a child's mother's educational attainment is related to the probability of a child attending primary school. Children whose mothers had attained primary, secondary or higher education were significantly more likely to attend primary school than those whose mothers had no formal education. Although the proportion of more educated mothers within a community did not significantly predict primary school attendance, the level of development within a community and the area of residence were significant correlates of school attendance at this level.

Policy recommendations deriving from these findings are to: (1) promote awareness of post-primary education policies and school admission; (2) advocate for girls educational success; and (3) support community engagement programs for sensitisation of traditional attitudes towards girls' schooling. Future research should try to understand the different pathways through which mothers' education is related to school participation in Africa. When data permits, further exploration of these pathways may enhance our understanding of the relationship between mothers' education and children's school attendance in an African setting.

8. Discussion

This chapter presents a discussion of the findings from the four empirical chapters and how they address the research objectives in this thesis. The analytical framework used is these chapters; the limitations of the analyses performed and, the contribution of the research to the field of international education are discussed. The thesis has investigated the patterns and correlates of school attendance in West Africa. Three research objectives have been explored including to:

1. Assess Sierra Leone's progress towards achieving Universal Basic Education (UBE)
2. Investigate the determinants of school attendance at basic education
3. Explore the relationship between mother's community education and children's school attendance at basic education

Three related points have motivated the undertaking of this research. Firstly, there is a strong correlation between education and personal/national development. Consecutive Human Development Reports have shown a higher index of human development and economic prosperity among countries in which there are high levels of educational attainment (UNDP 2011; 1990). The majority of countries in West Africa have consistently been classified as having low human development; in 2011, only Ghana was classed as having a medium development index (UNDP 2011). Given the association between education and development, one way to improve economic progress and human welfare in a largely poor West Africa is to invest in education. The importance of education to improving development indicators (i.e. health, poverty, wellbeing, and gender equality) was given recognition in a policy framework – Universal Primary Education (UPE) – designed by the international community to promote access to primary education in 1990 (UNESCO 1990). The goal of UPE was to enable all children to attend a full course of primary education by 2015. This goal was reaffirmed in 2000 as part of a wider framework, Education for All (EFA) (UNESCO 2000). The second motivation for writing this thesis is that countries in West Africa look unlikely to achieve UPE. In spite of this shortcoming, the factors affecting school attendance in the region are little known apart from in Ghana where much scholarly research has been focused (Akaguri 2013; Akyeampong 2009a). The third motivation then for this research is the need to provide robust evidence on the determinants of school attendance focusing specifically on the significance of

community poverty and, the differences between post-conflict and stable countries in West Africa.

8.1. What is the progress towards achieving universal basic education in Sierra Leone?

The first research question in this thesis was to assess Sierra Leone's progress towards UBE. The motivation behind this question was to provide an up-to-date monitoring report on levels of school participation in the country. Since the cessation of the war in 2001 there have been a number of policies geared towards achieving UBE (Maclure and Denov 2009; GoSL 2004). Studies on education in Sierra Leone have shown that these policies were successful in expanding access to primary education (Nishimuro 2007; World Bank 2007). The focus of these studies, however, has not been to provide a report on the country's progress towards UBE. The analysis undertaken in the current thesis contributes to educational research by assessing the level of school attendance in Sierra Leone since the introduction of free primary education in 2001 among children of official school going age.

The analytical framework used for this research was informed by the United Nations (2009) technical guidelines for indicators used for assessing progress towards EFA goals. This framework was presented in Table 2-1 in chapter 2; it is again presented below for ease of reference showing only the indicators for UPE. The indicators for UPE can be applied to assess participation at junior secondary education since the focus in the current analysis is on basic education. The net attendance rate, net intake rate, and participation rates by sex, household wealth and urban/rural residence were used to assess progress towards UBE. In addition, enrolment rates by grade were presented. The Global Monitoring Report for the EFA goals has typically used gross/net enrolment rates along with net intake rates (UNESCO 2000; 1990). This approach has been adopted in other research such as country specific studies by the World Bank (2010b; 2005; 2004b). These studies also use participation rates by gender, household wealth and area of residence as well as rates of survival to the end of primary school. The choice of indicators used for the current research question are appropriate for assessing progress towards UBE and are consistent with the United Nations Educational Scientific Cultural Organisation's technical guidelines (UNESCO 2009).

Table 8-1: Summary of indicators used to measure progress towards Education for All goal 2

Education for All goal 2	Aim of goal	Indicators commonly used to measure goal
Universal Primary Education	Ensure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to, and complete, free and compulsory primary education of good quality	1. Gross enrolment rate 2. Gross attendance rate 3. Net intake rate 4. Net enrolment rate 5. Net attendance rate 6. Participation rates by gender, household wealth, and area of residence 7. Survival rate to end of primary school 8. Completion rate

A paper by Lewin (2011) provides a critical appraisal of indicators used to measure progress towards EFA. It argues that indicators like the gross/net enrolment rates and gender parity index offer an incomplete account of levels of participation and can give misleading signs of progress (Lewin 2011: 571). The gross enrolment rate (GER), which is the most commonly used indicator, is especially flawed because it fails to take into account the age structure of the school population. The net enrolment rate offers (NER) an improvement on the GER measure because it is restricted to the school population for the level of education to which it refers. However, it is also limited because it does not reveal the age distribution within grades and so it is not possible to tell whether children are enrolled in the correct grade (Lewin 2011: 577). Delayed enrolment is common in African education systems meaning that net enrolment figures give an inflated sense of enrolment because the proportion of children in the correct grade is lower than the NER implies (Lewin 2011: 577). Lewin is also critical of the type of data used to assess UPE indicators. He cautions that the use of administrative data from developing countries may give an inaccurate account of participation due to challenges in data collection and storage; the use of survey data may also be susceptible to error because of the tendency to over-report school enrolment.

The analyses undertaken in this thesis has been cautious of the limitations highlighted by Lewin's research. I have used indicators which take into account the age-group (net attendance

rate, NAR) as well as the grade in which children are enrolled (age in grade attendance). The NAR has been disaggregated by boy/girl, urban/rural, and poorest/richest household in order to understand participation rates by background characteristics; these analyses were simple cross tabulations and so the results show unconditional relationships between attendance and the various factors. The Demographic and Health Survey (DHS) and Integrated Household Survey (IHS) were used for analysis. Both surveys collect information on school attendance, age of the child, grade of education, sex of the child, household wealth, and area of residence. They therefore contain the relevant information to undertake the analysis.

The Sierra Leone DHS household members' dataset was the main dataset used for analysis. Questions for this dataset were administered to the household head or a senior member of a household if the head was absent at the time the interviewer visited the household. The respondent was asked questions on school attendance and the characteristics of the child. The responses on age and school attendance may be susceptible to error for two reasons. Firstly, it is not uncommon to over-report incidence of desirable social behaviour, in this case sending a child to school. One way to check the accuracy of these results would be to compare them to administrative data. This exercise however has not been possible in the current research due to poor record keeping and limited sources of reliable administrative education data in Sierra Leone. Secondly, birth registration is a rarity in the country and so it is not possible to verify the age of children (GoSL 2009: 29). The age distribution and NAR were however compared to the country's 2004 population and housing census for quality checks. The results from this exercise showed similarities between the two surveys with there being similar proportions of the school age population and levels of net attendance (GoSL 2006b).

The findings from the analysis showed that Sierra Leone is unlikely to achieve UBE by the 2015 deadline. Between 2003/04 and 2008, the proportion of children aged 6-11 years entering the education system declined significantly by 10 percentage points; the decline among 12-14 year olds was 4.4 percentage points. In 2008, 61% of children aged 6-11 years were attending primary school compared to 74.5% in 2003/04. Among 12-14 year olds, 21% were attending junior secondary school (JSS), 48% were still in primary education, and 30% were out of school in 2008. The difference between sexes in net attendance was not statistically significant at primary education (p>.05); boys however had a higher attendance at JSS (23.2% vs 8.8%,

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p<.05). Children living in urban areas and in the richest households had significantly higher levels of attendance than children living in rural areas and in the poorest households at both primary and junior secondary education. At primary education, the NAR for children in rural areas was 20.7 percentage points lower than children in urban areas; the difference at junior secondary education was 20.8 percentage points. For both primary and junior secondary education, the difference between the poorest and richest households was the most pronounced relative to that between boys and girls and between rural and urban areas. The ratio for poorest/richest attendance worsens from .54 at primary education to .21 at junior secondary education.

Compared to other West African countries, Sierra Leone's progress towards achieving UBE has been moderate. The country's NAR for primary education (61.6%) is higher than in Guinea (50.6%) and Liberia (30.0%) but lower than in Ghana (73.7%) and Nigeria (59.6%). The same pattern is observed for junior secondary education. Also, at junior secondary education, apart from in Guinea, girls are most deprived in Sierra Leone relative to the other countries. The rural/urban ratio of attendance at primary education in Sierra Leone (.73) is worse than in Nigeria (.74) and Ghana (.87) but better than in Liberia (.45) and Guinea (.54). The same patterns are observed for junior secondary education. For primary education, compared to Sierra Leone, only in Ghana are children from the poorest households less disadvantaged than children from the richest households.

The findings from this research corroborate results from recent EFA Global Monitoring Reports (2011a) as well studies in Sierra Leone (Nishimuro 2007; World Bank 2007). These studies have shown problems of delayed enrolment which reduce the net attendance figures. Other research in Sub-Saharan Africa has also assessed the impact of UPE policies on enrolment (Lewin 2009; Rolleston 2009). The results from these studies have documented similar observations of delayed enrolment, poor transition rates, and marginalisation of the poor in accessing education. Much of the shortfall in school attendance is found among children from poor households. A study by Lewin and Sabates (2012) investigated whether access to basic education in six Sub-Saharan African countries had narrowed inequalities in participation rates between poor and non-poor households. They found that household wealth continues to be a strong determinant of education; the relationship had changed to varying

degrees over time in different countries. The gap between the poorest and richest households in accessing school had deteriorated overtime in Nigeria, for instance, but improved in Zambia and Malawi (Lewin and Sabates 2012: 521). The study also found that inequalities between socio-economic groups are more severe than that observed between sexes and between rural and urban residence (Lewin and Sabates 2012). This finding is in resonance with that reported in the current thesis as well as that reported in earlier research (Kazeem et al 2010; Knodel and Jones 1996).

The continuing marginalisation of poor children from education systems can be explained in part by inadequacies in free education policies. Free education has formed the centre piece of universal education. This policy has promised to remove the cost of tuition for admission but this measure alone did not do sufficiently to remove economic barriers to education for the poor. Akyeampong (2009a) advanced this argument in his assessment of Ghana's 1995/6 Free and Compulsory Universal Basic Education (FCUBE) policy. He shows that after the introduction of FCUBE schools introduced levies to compensate for the lost revenue from the abolition of school fees. As a result, children from poor households were either unable to remain in school or ended up attending poor quality schools because their parents could not finance the maintenance of schools or indeed supplement state budgets for teaching resources. These findings from Akyeampong's study have been noted elsewhere (Chimombo 2009; Nishimura et al 2008; Wedgwood 2007).

The differences between sexes in school participation found in the current analysis are not as consistent as that found with regard to household poverty in other research. Globally, the gender gap has narrowed overtime (Grant and Behrman 2010; Knodel and Jones 1996). Some countries have shown significant advancements with girls showing greater attendance and progression rates than boys (Asadullah and Chaudhury 2009; Fleisch and Shindler 2009). In some African and Asian countries, however, there continues to be a preference for educating boys over girls (Siddhu 2011; Moyi 2010). The reasons for low female enrolment are due mainly to cultural and economic reasons (Tuwor and Sossou 2008; World Bank 2008a). In Malawi and Bangladesh, for instance, Chisamya et al (2012) found that girls' education was not supported by parents and community members; they believed that girls were less safe at school and that education was not needed for girls' inevitable role as wives. These cultural

barriers have been found to prevail in other rural communities like in Mozambique (Roby et al 2009) and Guinea (Glick and Sahn 2000).

The findings from this research contribute to educational research in two ways. Firstly, they offer an insight into the patterns of school attendance with the aim of elucidating the level of progress towards universal education in a post conflict country, Sierra Leone. Sierra Leone received significant post-conflict intervention to redevelop the country's primary education system. In spite of this investment and subsequent efforts to promote attendance, little is known of the success of UBE policies in including marginalised groups in the education system or indeed in retaining the enrolment of students once they enter school. The current research has helped to narrow this knowledge gap in educational research. Secondly, these findings show Sierra Leone's relative position in West Africa by comparing the country's attendance ratios to countries in the Mano River Region (MRR) which share similar economic and unstable political contexts as well as with more developed countries in other parts of West Africa. The results from this comparative analysis shows that whilst Sierra Leone is unlikely to reach the 2015 target, its progress towards UBE is significantly better than in neighbouring Guinea and Liberia but worse than in Ghana and Nigeria.

8.2. What are the determinants of school attendance at basic education in West Africa?

The second research question that has been investigated in this thesis is: 'What are the determinants of school attendance at basic education in West Africa'? This question has been answered in two empirical chapters which focus separately on primary and junior secondary school attendance. The first of these chapters looked at whether there was an interaction between household and community poverty with the aim of deciphering whether poor children living in poor communities experienced an additional barrier to accessing primary school as a result of the environment in which they lived. The second chapter provided a comparative analysis of the determinants of attending junior secondary education between countries that have been affected by recent episodes of conflict and those which have not. The objective of understanding the determinants of attending basic education was therefore answered by exploring two subsidiary questions:

i. Does living in poor communities disadvantage poor children more than affluent children in accessing primary school?

ii. What are the determinants of attending junior secondary school in post-conflict and non-post-conflict countries in West Africa?

The motivation behind the first subsidiary research question was that household poverty has long been identified as a leading correlate of school attendance in West Africa (Lloyd and Hewett 2009; Filmer and Pritchett 1999). However, it is unclear whether this marginalisation is worsened if children from poor households are located within poor communities. This is a valid question to ask when placed in the current study context. West Africa is a poor region with low levels of development. In many countries within this region, less developed communities suffer from a lack of social service provision including access to schools and poor infrastructure. The combination of these factors means that children who live within such vicinities may be less likely to attend school, even if they are not from poor households. Poor children may however experience a 'double burden' of poverty, an experience that may reduce their likelihood of attending school beyond that which a child from a more affluent household living in similar conditions might experience. This interaction between household and community poverty may arise in contexts where there is a spread of schools between communities within commutable distance so that children who do not have access to schools within their own community can opt to travel to a neighbouring community to attend school.

The rationale behind the second question is that there is a dearth of knowledge on the determinants of JSS attendance in West Africa, particularly in post-conflict countries. Studies that have been conducted in this region have often focused on primary education; they have also failed to observe differences between post-conflict and more stable countries (Lincove 2009; Glick and Sahn 2000). In West Africa, research on children's education has commonly used Ghana as a case study along with other more developed countries in the region (Kazeem et al 2010; Akyeampong 2009a; Rolleston 2009). The findings from these studies may not be applicable to the wider region because the majority of countries in the region, especially those in the MRR, have had unstable political histories that have prevented sustainable investment in social services and economic development. The context within these countries therefore is one of poverty, under-development, and premature provision of post-primary education (Poirier

2012; UNESCO 2011a). These circumstances stand in contrast to more politically stable and more mature economies like Ghana. There are, therefore, likely to be differences between these countries in the correlates of school attendance. The variation between countries in NAR for junior secondary education provides supportive evidence of this (United Nations Children's Fund (UNICEF) 2011; UNESCO 2011a).

The analytical framework presented in Figure 2-1 in chapter 2 (presented again below) for analysing the determinants of school attendance was used to answer the two subsidiary research questions. The factors are separated into two camps – demand and supply – which are further demarcated into three groups. The demand side factors are separated into: individual, household, and community; the supply side factors are separated into infrastructural, institutional and political. The relationship between school attendance and demand/supply side factors are not independent but are related to each other in various ways. For instance, political factors like stability in governance, legislation on basic education, and education budgets affect the institutional as well as infrastructural factors (Poirier 2012). Similarly, the community in which a child lives is related to whether s/he has access to a school and the quality of education that s/he is able to attend (Cameron 2011; Oketch et al 2010; Maclure and Denov 2009).

Figure 8-1: Analytical framework for analysing determinants of school attendance
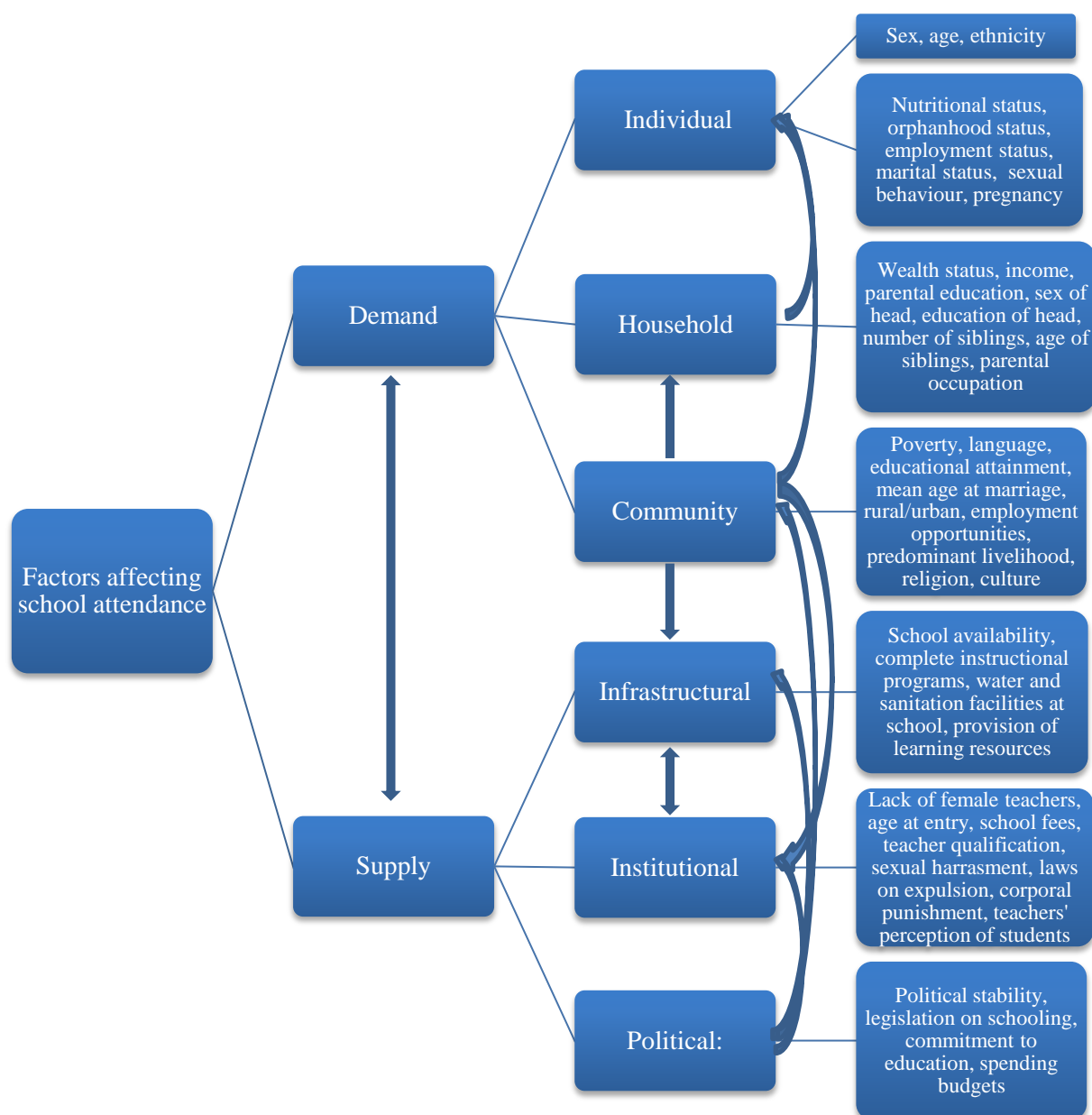
The DHS for Ghana (2008), Liberia (2007) and Sierra Leone (2008) were used for analysis. The DHS is designed to collect information on nutrition, health and population issues in developing countries. Information on school attendance, individual and household characteristics is also collected. However, because the focus of the survey is not on education, factors named under 'supply' in the analytical framework are not collected. The direct relationship between these factors and school attendance could, therefore, not be estimated in the present thesis. This omission presents a limitation of the analyses because supply factors, other studies have shown, are significantly related to school attendance (Kazeem et al 2010; Filmer 2007; Bommier and Lambert 2000). By not controlling for them, therefore, the results

from the analyses in this thesis may be upwardly biased in that they may be carrying some of the effects from omitted variables. The likelihood of this occurrence, however, has been minimised through the modelling process for the analyses in two ways.

One way in which this has been achieved is by controlling for demand side variables that have been shown to be related to supply side factors. To exemplify, school availability and quality of school provision are related to area of residence with urban areas having a greater supply of schools as well as greater access to the provision of better quality education (Moyi 2012; Cameron 2011). The level of wealth within a community also reflects levels of development within a community which in turn is related to the type of schools supplied within a community (Oketch et al 2010; Mugisha 2006). For both research questions, urban/rural residence, administrative region, and community wealth are controlled for as a way of accounting for variations in school supply and school characteristics. In both Sierra Leone and Ghana, data from the Ministry of Education supports the plausibility of this approach (Ghana EMIS 2012; GoSL 2012). That is, in both countries, the supply of schools and quality of schools vary by administrative region. In Liberia, the prolonged episode of civil conflict inflicted much destruction on education services including records documenting the country's education sector (GoL 2009b). Therefore, administrative data in this area is either absent or largely susceptible to error. However, census data taken at the end of the war gives an indication of the distribution of schools around the country (GoL 2009a: 287-90).

A second way in which school availability was accounted for in the analyses was by developing a separate model that excludes communities in which no child reported to attending school commensurate to their age. For the question on household and community poverty, this approach is particularly relevant because the hypothesis for the question contends that children living in poor communities have lower levels of school attendance because poor communities have lower levels of school availability. Although these two factors (community poverty and school access) are not independent, it is important to distinguish their relationship with children's school attendance so as to make clearer policy recommendations. It is reasonable to assume that communities in which no child is attending school have a lack of school provision. By excluding these communities, only communities in which there is a provision of school or in which there is a school of reachable distance are used in the analysis. Using this reduced

sample, the relationship observed between community poverty and school attendance is less likely to reflect variations in school supply because all children in the sample live within reachable distance of a school. The results from this reduced sample can then be compared to the models for the full sample. If the relationship between community poverty is significant in the full sample but insignificant in the reduced sample, this would support the argument that children in poor communities have lower attendance because they have limited access to schools. If, however, the relationship between community poverty and school attendance is significant in both the full and reduced samples, this would suggest that the relationship between community poverty and school attendance can be explained by other areas of development other than the availability of school infrastructure.

For the second research question – differences in the determinants of school attendance between post-conflict and non-post-conflict countries – the approach of isolating communities in which no child reported to attending school is also relevant. The net attendance ratio for JSS is less than 50% in all countries with Ghana (32.2%) having the highest and Liberia (7.9%) having the lowest. Even when the calculations are not restricted to the legal age for attending JSS, the gross enrolment figures suggest low participation at this educational level across the countries (GoGh 2009: 19; GoSL 2009: 22; GoL 2008: 14). The low level of attendance in these countries is likely to be related to school supply. By fitting a regression model for all communities, the significance of predictors that are strongly related to school attendance (i.e. community poverty, women's community education) are likely to be overestimated. However, if communities in which no child is attending school are excluded, the analysis would reduce the upward bias in covariates that are associated with school supply.

The approach described above of excluding communities in which no child is reported to attending school presents a simple way of addressing the problem of omitted variable bias which may arise as a result of not directly controlling for supply side factors such as school availability in the modelling process. It does not, however, fully address the potential of bias in the coefficients for variables that may be strongly related to school attendance. The size of the bias resulting from this omission is unknown and is one which cannot be explored in the current thesis because the DHS does not enumerate school provision. When data becomes available future research may control for school availability to assess the direct relative

strength and significance of this variable on school attendance conditional on demand side factors as well as the omitted variable bias that the omission of this variable might cause in models predicting school attendance.

Random logistic regression was used to model the data. Random models were developed to account for the complex sample design of the DHS; binary logistic regression was used because of the binary nature of the outcome (1 for attending a level of education commensurate to the age-group and 0 if otherwise). Two separate models were developed to answer each question. The first model included all children aged 6-11 and 12-14 since these are the ages at which should attend primary and junior secondary schools respectively. The second model did not include any community (enumeration area) in which no child was reported to attending school. For each question, the same variables were controlled for each country DHS. The following discussion presents the results from the final models for the different countries which were conditional on controlling for individual, household, and community level variables.

8.2.1. Does living in poor communities disadvantage poor children more than affluent children in accessing primary school?

The results from the analysis showed significant differences in the relationship between primary school attendance and household/community poverty between countries. Sierra Leone was the only country in which there was a significant interaction between household and community poverty. In Liberia, a significant association was observed between school attendance and community poverty but this relationship did not vary by household poverty. In Ghana, community poverty did not significantly predict primary school attendance; household poverty however had a significant relationship with school attendance. In the case of Sierra Leone, the predicted probabilities of attending school for poor and more affluent children when there are no poor households in a community are .708 and .711 respectively. If the proportion of poor people in a community is increased by 10%, the probability of attending school for poor children is reduced by 2.5% (from .708 to .690) compared to .7% for more affluent children (from .711 to .706). For a 50% increase in the proportion of poor people in a community, the probability of school attendance attenuates by 13.1% for poor children relative to a lower decrease of 3.9% for more affluent children. In Liberia, the predicted probability of attending school for children living in a community in which there are no poor households

is .328. This probability reduces by 3% when the proportion of poor people is increased by 10% and by 16% when the proportion of poor people is increased by 50%. In Ghana, the probability of attending school for affluent children (.773) was 9% higher than that for poor children (.712).

The relationship between community poverty and school attendance observed in Liberia and Sierra Leone is linked to school supply. That is, conditional on other factors, children living in poor communities are significantly less likely to attend primary school because they have limited access to school infrastructure. The results presented in the preceding paragraph are based on the full sample of children aged 6-11 years. When the model fitted using this sample is applied to a reduced sample of communities in which there are no children attending school, the relationship between school attendance and community poverty loses significance in Liberia and becomes only marginally significant in Sierra Leone at p<.05. In Ghana, community poverty did not significantly predict school attendance in both the full and reduced model indicating that, conditional on other factors, distance to school is no longer a significant correlate of primary school attendance.

These findings from the analyses are intuitive but this research has, up until now, not been applied comparatively in West Africa. In Sierra Leone and Liberia no study has sought to understand the relationship between school attendance and household/community poverty. In both countries, the significant relationship between poverty and school attendance is not unexpected given the low levels of economic progress and high levels of household poverty (UNDP 2011). Similarly, the relationship between school attendance and school supply is not unexpected. Almost 8% of the 298 clusters in the 2007 Liberia Demographic and Health Survey (LDHS) had no child aged 6-11 years attending school. This lower access to school in the country is supported by results from the 2008 population and housing census which showed that 17% of households live over an hour away from the nearest primary school (GoL 2009a: 287). In six of the country's 15 counties, over 20% of households live more than an hour away from the nearest primary school: Grand Bassa (41%), Bong (31%), Rivercess (27%), Margibi (25%), Gbarpolu (22%), and Bomi (20%) (GoL 2009a: 287-90). The significant relationship between community poverty and attendance observed in Liberia suggests therefore that, irrespective of the wealth of a household, children who live in poor communities are unlikely to attend school because poor communities suffer from a dearth of school infrastructure.

In Sierra Leone, poor children were found to experience an additional disadvantage beyond that which is experienced by children who are not poor. This interaction between household and community poverty in Sierra Leone arises because there is wider access to schools than in Liberia. Out of 353 clusters in the 2008 Sierra Leone DHS, only 0.6% had no child aged 6-11 years attending primary school. Therefore, if a child lives in a community in which there are no schools, s/he can opt to travel to a neighbouring community to attend schools. This additional cost of travelling to another community presents a greater obstacle to children from poorer households than children from more affluent households. The significant relationship between attendance and primary school availability has been noted in other studies (Kazeem et al 2010; Huisman and Smits 2009; Bommier and Lambert 2000). Some studies have shown variations between sexes and rural/urban residence with girls and rural children having lower access to schools than boys and urban children (Hou 2010; Hazarika 2001).

Notwithstanding the significance of school supply as a correlate of school attendance presented thus far, it must be noted that simply providing schools does not lead to substantial increases or indeed sustained enrolment (Filmer 2007). Put another way, in developing countries with wider provision of school infrastructure, it continues to be the case that attendance is not universal. As results from the first empirical chapter suggests, the children most excluded from school continue to be those from poor households. In both Sierra Leone and Liberia children from poor households were the least likely to attend school in communities in which there was access to school. This is largely because of an inability to pay school fees. In the 2007 Liberia DHS, the reasons for school absenteeism was asked to children aged 6-14 who were not attending school in the week prior to the survey. Among the 2,491 children to whom the question was posed, 50% responded 'no money for fees' compared to 10% who said 'school is too far' (GoL 2008: 17). This very question was to posed to community members in Sierra Leone; 34% cited economic difficulties, 31% cited parental indifference to education and 13% cited distance as a reason for non-attendance (World Bank 2007: 49). This relationship between household poverty and school attendance is also observed in Ghana.

In Ghana, conditional on other factors, household poverty has been found to be a stronger predictor of school attendance than community poverty. Following the logic that community poverty is related to school supply, the relationship between school attendance and community poverty is not significant because there is a wide provision of school infrastructure in the country (Ghana EMIS 2012). The difference between Ghana and the other countries under study is a differentiated supply of education whereby the community in which a child resides affects the quality of education that they can receive (Akyeampong 2009b). The differentiated supply of education, namely the growth in low fee private education, has emerged as a response to increasing pressure on state schooling and the resultant effect which this has had on the quality of education offered in state schools (Akugari 2013; Akyeampong 2009a). In rural Ghana, Akaguri (2013) finds that fee-paying private schools are inaccessible to the poor and that in state schools, although tuition has been removed, students are still required to pay for uniforms, feeding and learning materials (Akaguri 2013: 11-3). These additional costs act as a barrier to children from poor households. The exclusion of poor children from primary education is also confirmed by Rolleston (2009) whose study finds that between 1991 and 2006 children from privileged backgrounds showed higher retention and completion rates than those from poor backgrounds in spite of government efforts to universalise access to basic education.

The demand for quality education has also been noted in other countries. In Tanzania, for instance, Wedgwood (2007) finds that the quality of education varies markedly between poor and rich areas. In the aftermath of free primary education, enrolment soared at a pace that could not be managed by state school provision. Learning facilities were therefore stretched and the process of learning severely compromised resulting in high dropout rates and low attainment rates. Wealthier parents could afford to supplement state provision by paying additional fees levied by schools to upkeep school standards. The result was that children from more affluent communities were able to access better quality schools which not only improved retention at primary school but also improved the chances of progression to secondary school. In another study in Kenya, Oketch et al (2010: 24) looked at the use of private schools between urban slum and non-slum communities in the aftermath of the free education policy. The study finds that in slum communities, poor parents send their children to low quality private schools because the provision of state schooling does not serve the school population in these communities. In non-slum communities, however, parents deliberately opt for fee-charging schools in order to access better quality education for their children (Oketch et al 2010).

Research in other regions has also documented the differentiated quality of school supply in the aftermath of free primary education (Woodhead et al 2013; Cameron 2011).

The findings from the current analysis contribute to educational research in two important respects. Firstly, the results demonstrate that, irrespective of household wealth, children living in less developed communities have lower levels of school attendance because of an inadequate supply of school infrastructure. This is true in Liberia and Sierra Leone although there is greater access to primary schools in Sierra Leone than in Liberia. The relatively greater provision of schools in Sierra Leone creates a situation in which children from poor households are more disadvantaged in attending primary school than those from non-poor households. This occurs because, if a school is not available within a community in which a child resides s/he may opt to travel to a nearby school in another locality; this additional cost of travelling is a greater barrier to poor children. A second way in which the findings from this research contribute to education studies is by showing that in Ghana, a country with a more developed education system and wider school provision, the relationship between community poverty and school supply and therefore between school attendance and school availability is insignificant. Household poverty has a stronger relationship with school attendance because, in spite of school availability, there are notable differences in the quality of education offered between schools and accessibility to this quality education is dependent on household budgets. For Liberia and Sierra Leone, a policy recommendation from this research is to expand school provision. In doing so, as lessons from Ghana indicate, it is important to develop equitable education services that offer quality education.

8.2.2. What are the determinants of attending junior secondary school in post-conflict and non-post-conflict countries in West Africa?

The analysis undertaken in this thesis has found that there are significant differences in the determinants of JSS attendance between post-conflict (Sierra Leone and Liberia) and more stable countries (Ghana) in West Africa. There are also differences between the two post-conflict countries under study. A common determinant between all countries is education of the household head and the proportion of women with secondary or higher education in a community (women's community education). Conditional on other factors, relative to children whose heads had no formal education, the probabilities of attending JSS in Ghana for children

whose heads have secondary (.317) and higher education (.506) are 48.8% and 137.6% higher (p<.05). In Liberia and Sierra Leone, only children whose heads have attained higher education are significantly more likely to attend school than children whose heads have no education. In these countries, compared to children whose heads had no education, the probability of attending school for children whose heads had higher education was 100% higher in Liberia (.076 compared with .038) and 91.1% higher in Sierra Leone (.302 compared with .154). At the community level, increasing the proportion of women with secondary or higher education in a community by 10% was predicted to enhance the probabilities of attending JSS by 16.8% for girls and 7.8% for boys in Sierra Leone and, for both sexes, by 10% in Ghana and 41% in Liberia.

The significance of women's community education suggests that, irrespective of a child's individual or household characteristics, the likelihood of attending JSS improves as the proportion of women with secondary or higher education in a community increases. This relationship is significant in both the full and reduced samples indicating that the higher levels of school attendance observed in communities with more educated women cannot simply be explained by better provision of schools in these communities. There are a number of ways in which community education can affect school attendance. Firstly, the relationship may operate through value modification and changes to cultural tastes (Kravdal 2002; 2001). That is, education tends to modify traditional behaviours and practices. It also tends to emphasise child centeredness within families so that households are encouraged to invest in their children's well-being and personal development (Caldwell 1980). As formal education becomes more widespread, it is perceived as a rational choice of investment and so the need for schools is promoted within communities. Secondly, to the extent that education is positively associated with earnings and thus household wealth, communities with high levels of education are more likely to be affluent and are therefore better able to make the necessary investments in their children's education (Tilak 2007). This hypothesis is confirmed by findings in the modelling process where the relationship between household poverty and school attendance becomes insignificant after controlling for women's community education in two of the three countries (Liberia and Ghana).

Community poverty did not significantly predict JSS attendance in the three countries after fitting the conditional model in the complete sample. In Ghana, however, when all clusters with no child attending school are excluded from the analysis, community poverty becomes a significant correlate of school attendance. This suggests that in communities in which schools are available or are within reachable distance, the level of development within a community can influence whether a child attends school or not. One explanation for this is that poor communities are more likely to have access to poor quality schools. It was argued above that the differentiated supply of primary schools in Ghana's education system disadvantages children from poor households because they are unable to access low fee private schools and struggle to meet the costs for state schools. The supply of private education is also a determinant of school attendance at junior secondary education. However, unlike primary education where low fee private schools are widely accessible, the supply of private education at junior secondary education is almost 50% less than at primary education meaning that private junior secondary schools are more likely to be concentrated in affluent areas (Ghana EMIS 2012). Since attending post-primary education is more costly, the quality of education offered to students is likely to carry a greater weight in households' decision making process for junior secondary education than primary education (Akaguri 2013). That is, households in poor communities are less likely to send their children to school because they do not perceive that the quality of education offered to them is worthy of investment.

The relationship between community poverty and access to quality education has been noted in other studies. In the case of Ghana, Akyeampong (2009b: 181-2) argues that the FCUBE policy created a situation in which 'poor communities ended up with poor schools' because '... resources available to schools depended on the wealth of surrounding communities ...'. The reason being, the influx of students entering school after the introduction of FCUBE did not match government input of resources to upkeep educational standards. As a result of this mismatch between demand and investment, teaching and learning resources were strained leading schools to charge levies to support learning activities. Those communities that could afford to meet these additional costs were able to maintain learning standards; those that could not were left with poorly resourced schools. Research in other countries such as in Tanzania (Wedgwood 2007), in Bangladesh (Cameron 2011), and in India (Harma 2009) have noted the relationship between area of residence and access to quality schools. Studies have also shown a

significant relationship between indicators related to quality education and school attendance (Yamada and Ampiah 2009; Brown and Park 2002; Bommier and Lambert 2000).

Unlike in Ghana where there is wide access to junior secondary schools, the availability of junior secondary school remains a challenge in Liberia and Sierra Leone. The problem is most acute in Liberia. The NAR for junior secondary education in Liberia is 7.9% compared to 21% in Sierra Leone and 32.2% in Ghana (GoGh 2009; GoSL 2009; GoL 2008). Liberia's poor rate of net attendance can be explained by the absence of a strong education culture in the country. Historically, secondary education structures have been inaccessible to much of the population as they have been predominantly based in Monrovia (GoL 2009b: 22). Education was seen as a reserve for the elite prior to the civil war and so successive governments did little to invest in the expansion of access beyond Monsterrado County (GoL 2009b: 22). As late as 2007, access to junior secondary education remained scarce: 69% of 298 clusters in the country's 2007 DHS did not have any child attending school indicating a major deficit in the supply of schools. Availability of junior secondary schools is also a challenge in Sierra Leone but to a lesser extent than in Liberia. The results from the 2008 DHS show that 28% of the 353 clusters did not have any child attending junior secondary education. This figure is much lower than in Liberia because: (1) Sierra Leone had greater access to post-primary education in the pre-war period with there being secondary schools in almost all the district headquarters; (2) greater investment in basic education in Sierra Leone than in Liberia (GoSL 1997).

The significance of school availability at the secondary level has been highlighted in other research (Guimbert et al 2008; Handa 2002; Tansel 2002). Girls especially have been found to be less likely to attend school when there is limited access to school with this relationship being more pronounced in rural and agricultural communities. The reasons for this, evidence suggests, is threefold. Firstly, rural communities tend to have a lack of school infrastructure which creates a longer traveling distance to school (Moyi 2012; Hou 2010). Parents, fearing the safety of their daughters, are discouraged from sending their daughters to school. This fear is linked to the second reason, the cultural positioning of girls. Girls are positioned as being future wives who should be virgins when entering matrimony. The threat of sexual harassment when walking to school compromises girls' marital prospects; parents are therefore reluctant to take the risk of making their children travel long distances (Siddhu 2011; Roby et al 2009).

Also, because the final destination for girls is marriage, education is not viewed as a valuable or meaningful training which prepares girls for this destination. Instead, they are typically kept at home to perform domestic chores and care for younger siblings, a tendency which increases as girls near puberty. Finally, rural communities tend to have higher levels of household poverty. In poor households where there are low budgets, if a choice has to be made between investing in education for a boy or a girl, preference is given to the boy (Kazeem et al 2010; Buchmann 2000; Glick and Sahn 2000).

Living in a community in which the main source of livelihood was agriculture or self-employment was found to have a significantly inverse association with school attendance in Sierra Leone and Liberia. Conditional on controlling for other factors, increasing the proportion of people engaged in agriculture or self-employment in a community by 10% reduces the probability of attending school significantly by 5.9% in Sierra Leone and 16.2% in Liberia. The disadvantage experienced by children from agricultural communities in Liberia is due mainly to an inadequate supply of schools in these communities. This explanation is supported by the fact that the relationship between community agricultural livelihood and school attendance reduces to non-significance when communities with no children attending school are excluded from the analysis. A similar argument can be advanced for Sierra Leone although here the poor levels of attendance in agricultural communities are not due simply to low school availability but may also be due to the opportunity costs of sending children to school. According to the 2008 SLDHS over 50% of children aged 12-14 years worked in a family business or farm of whom only 16% were attending junior secondary education (GoSL 2009). Also, the majority of children working in family business or farm lived in poor households (66%) and in rural areas (67%) (GoSL 2009). The results are in consensus with other studies which have shown that the opportunity costs of sending children to school increases as they get older because of the need for them to contribute to household subsistence either through paid employment or farming (Admassie 2003; Admassie 2002).

Relative to Sierra Leone and Liberia, community livelihood did not have a direct significant association with school attendance in the full or reduced models in Ghana having controlled for other factors. The variable was significant in both models until women's community education was controlled for indicating that children living in agricultural communities may be less likely

to attend school because of lower levels of female attainment within such communities. This is a plausible explanation if one takes communities in which there are high proportions of more educated women as holding more progressive attitudes towards girls' education and having less conformity to cultural norms which assign women to marriage and domesticity. In addition, although not borne out by the results from this thesis, it may be that children are less likely to attend school in agricultural communities because of high incidence of child labour (Akaguri 2013; Hilson 2010; Akyeampong 2009a). Results from the country's 2010 population census showed that 11% of children aged 4-15 years worked for pay; the highest incidence of child labour were found in the Northern (30%), Upper West 23% and Upper East (22%) regions (GoGh 2012: 68-9).

The results from this research contribute to educational research by highlighting the differences in the correlates of school attendance between conflict affected countries and politically stable countries in West Africa. Much research until now has focused on primary education and those which have looked at secondary education have used more developed countries in the region like Ghana. The circumstances within this country with regard to the stage of educational development is relatively more advanced than in poorer and more politically fragile countries like Sierra Leone and Liberia. In Liberia especially, the concept of mass education is a novelty and so access to secondary education remains scarce. In Sierra Leone, access to secondary education is slightly higher than in Liberia but also remains low. In Ghana, although net attendance is far from universal, junior secondary education is more accessible because of: (1) longer period of peace to invest in education (2) more policies and programs – FCUBE, free school meals, capitation grants – to expand access and (3) political commitment to basic education. The differences in political and economic climate as well as educational history create different contexts for education systems to provide services to the school population. These contextual differences urge different policy frameworks to be directed towards post-conflict and more stable countries. One recommendation from the current research is for the expansion of school provision at post-primary education in all countries; in Ghana efforts should be made to increase standards of quality in state schools. Beyond this, the education of girls especially in rural and agricultural communities in Sierra Leone and Liberia should be promoted. In both countries, the results show that living in a community with more educated women has a strong positive relationship with school attendance yet girls and children from rural agricultural communities are significantly less likely to attend school.

8.3. Does living in a community with more educated mothers enhance children's school attendance at basic education?

The final research question answered in this thesis sought to understand whether living in a community with a high proportion of more educated mothers enhances children's school attendance. The relationship between children's education and their parents' education has been widely researched (Haveman and Wolfe 1995). The observed relationship is that children whose parents have achieved higher levels of education will also achieve similarly high levels of education (Tramonte and Willms 2010; Huisman and Smits 2009). The pathways through which this relationship occurs are many including the transmission of ability from parent to child, higher socio-economic status among more educated parents, greater cultural capital among more educated parents, higher expectations and better attitudes of more educated parents, and more constructive interaction and stimulating environment provided by more educated parents for their children (Faas et al 2013; Huang 2013; Kan and Tsai 2005). Empirical evidence varies according to these various pathways but there is a general consensus that the level of education of the parent has a positive association with children's schooling. Also variable between research findings is the strength of the relationship between mother' and fathers' education and their children's school attendance (Kazeem et al 2010; Brown and Park 2002). Often, in both developing and developed countries, the education of the father has been shown to have a stronger association with school attendance than mother's education on children's educational attainment (Smits and Hosgor 2006; Glick and Sahn 2000).

Studies have often explored the relationship between mothers' education and children's education at the household level, using mothers' education as a control for socio-economic status (Abuya et al 2012; Oketch et al 2012). This approach is arguably more plausible to father's education. To the extent that educational attainment is correlated with paid employment and thus to household income, fathers, having higher levels of education, are more likely than mothers to have better paid jobs and thus higher incomes. Studies which have compared the effects of maternal and paternal death on children's school status have found that paternal death is correlated with increased risk of household poverty since the loss of a father means the loss of income (Case and Ardington 2006: 402). The relationship between mothers' education and children's school attendance is then likely to operate through interaction where

the knowledge, attitude, and values of the mother are transmitted to their children. Assuming this to be the case, it is also possible that mothers' education can influence the schooling of other children through interaction at the community level. The contribution of this research question is its hypothesis that living in a community with a high proportion of more educated mothers can enhance the likelihood that a child will attend school irrespective of his/her background or personal attributes.

Random logistic models were applied to the 2008 Sierra Leone Demographic and Health Survey to investigate this research question. The data contained information on mothers' and fathers' education as well as child and household level information used to answer the preceding research questions. Mothers' community education was created by aggregating information of children's mothers' education to the community level. Communities were defined as clusters in the DHS which designate census enumeration areas representative of small villages or neighbourhoods. There were 353 clusters in the Sierra Leone DHS. Information was used on all children whose mothers could be identified in the survey (n=13,850) to create the aggregated variable for mothers' education; the mean number of mothers per cluster was 46 meaning there were adequate numbers to derive meaningful estimates of community proportions. One of the drawbacks of the DHS data was that fathers' education could not be controlled for in the final model. The reason being, children's parents could only be identified if they lived in the same household as the child. Therefore, although 10,458 children aged 6-14 years had both parents alive, 5,621 of these lived in the same household as both parents. Since the focus of the research question is on mothers' education, and to avoid issues of selection bias, the sample of children living with their mothers was used for analysis (n=7,126). Two models were fitted for primary (6-11 years) and junior secondary school (12-14 years) attendance. As with the previous research questions, the models fitted on the complete sample of children was applied on the reduced sample as a way of checking whether the relationship between mothers' community education and school attendance was not dependent on a proxy for school availability.

The findings from the analysis showed that the level of mothers' education within a community is not significantly related to primary school attendance. A child's own mother's education was however found to be significantly related to school attendance. Compared to children whose

mothers have no education, the probability of attending primary school for children whose mothers have attained primary, secondary or higher education was significantly higher by 7%, 14% and 22%, respectively. Mother's community education was however significantly associated with junior secondary school attendance. The relationship is such that, irrespective of a child's own mother's educational attainment, living among mothers who are more educated is predicted to enhance the probability of a child aged 12-14 years attending JSS. For instance, a ten percent increase in the proportion of mothers with secondary or higher education in a community was estimated to enhance the probability of attending JSS by 8% (from .187 to .202) and a 50% percent increase in the proportion of more educated mothers in a community was estimated to result in an increase of 45% in the probability of attending school. This relationship between mothers' community education and JSS attendance may not be due to school availability as the result remains significant in the reduced sample of children.

The difference in the relationship between mothers' community education and primary/secondary school attendance can be explained in the following way. In the aftermath of the country's civil war, there were huge international investments to expand access to primary education. Through this expansion the policy of free and compulsory education was widely promoted in the country by international agencies. By contrast, in spite of the policy of UBE, access to junior secondary education remains relatively limited due to poor investment and promotion of progression to this level of education. Because access to primary education is more widespread, mothers are likely to already be aware of policies relating to this educational level irrespective of their educational attainment and so interaction with more educated mothers will have little benefit for children aged 6-11. For junior secondary education, however, mothers with low levels of education will be better placed to be exposed to the behaviours of more educated mothers who are more knowledgeable about the education system and are more likely to send their children to school. By living among more educated mothers, therefore, less educated mothers will be in a better position to learn about the processes of secondary school admission and will be more encouraged to invest in post-primary education.

Though not specifically related to mothers' education, other research has noted the positive relationship between contextual adult education and children's schooling (Weir 2007; World Bank 2005; Bommier and Lambert 2000). Bommier and Lambert (2000: 195) for instance

found that the higher the average education of the household head in a cluster the less likely children were to delay entry into school in Tanzania. In Ethiopia, a study by the World Bank (2005) found that living in a community with high parental literacy increases the probability of enrolment. At the household level, previous research has found that the education of the father has a stronger relationship with children's schooling than mothers' education (Yi et al 2012; Brown and Park 2002). That is, whilst both boys and girls with more educated fathers are significantly more likely to attend school, mothers' education only appears to significantly affect girls' education (Smits and Hosgor 2006: 556; Hazarika 2001: 243; Glick and Sahn 2000: 76). Notwithstanding, other studies have found a stronger effect of mothers' education than father's education (Zhao and Glewwe 2010; Kazeem et al 2010: 312; Maitra 2003: 145). Though fathers' education could not be robustly controlled for in the current analysis, preliminary analysis using a reduced sample in the DHS data shows that controlling for paternal education reduces the association between maternal education and primary school attendance to insignificance. For junior secondary education, however, including fathers education does not significantly modify the relationship between mothers' education and school attendance. More analysis would need to be done on a less biased sample to confirm the robustness of these results of fathers' education.

8.4. Future research

Future research should seek to understand the retention and progression of students in the education cycle using longitudinal surveys where possible to track the trajectory of children once they enter school. The present research has shown a pattern of delayed enrolment in Sierra Leone but it has not studied how children progress through the education system once they gain access. The discrepancies in school attendance between primary and secondary education shows a poor level of transition in the school cycle but it is unclear the point at which children drop out of school within a level of education and which factors contribute to their attrition. The importance of this study design is not restricted to Sierra Leone but extends to the other case studies as they too have problems retaining students in their education systems.

Detailed information on infrastructure and institutional policies regarding school attendance at the regional and local levels will be required for the proposed research. This is because whilst there are national policies to guide school attendance, it is likely that the administration of

these policies vary between localities due to various factors such as tradition and customs regarding education, availability of infrastructure, and the willingness as well as feasibility of enforcing government legislation. A qualitative approach may be used in conjunction with statistical analysis to interview dropouts about their experiences of schooling and the circumstances which led to their attrition from the education system. The household heads and parents of such children may also be interviewed to understand their perceptions of education, their ability to educate their children, and their efforts to educate their children even when their economic situation is strenuous. In Sierra Leone and Liberia especially such a study would contribute substantially to educational research for it would expose the personal and contextual factors which inhibit school participation in recent conflict affected countries. The findings would also hold great policy implication by helping to direct future policies and interventions in education in post-conflict states.

Another area of research which could benefit from exploration is the impact, if any, of the civil conflicts in the MRR on school attendance. The MRR includes Sierra Leone, Liberia, Guinea and Cote d'Ivoire. The region has a history of unstable governments and non-international armed conflict. It also has high levels of poverty and low levels of school participation and retention. The motivation for undertaking such a research would be due less to the developmental promises of education and more to the correlation between education and peace building. It has been suggested that high levels of educational attainments are a significant component of building sustainable peace. In the MRR, where there has been decades of internal civil conflict and vast destruction to human lives and properties, a justification can be made for wanting to improve levels of education in the region as a way of building and sustaining peace.

The objectives of this research could be to: (1) understand the intensity and spread of conflict in the region (2) study the level of school participation by region in the pre-war period, during the conflict and, in the post-war period and (3) explore post-war reconstruction efforts. Researching the intensity and spread of the conflict is important for understanding the areas which were most affected by the conflict and the scale of destruction in these areas. This would help to guide areas that are most in need of rehabilitation and reconstruction. Studying the level of school participation as a continuum from pre- to post-war period will show the effect, if any,

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which war has on school attendance. Conventional wisdom suggests that war disturbs the number of years of schooling and so it should have an adverse effect on school attendance. However, in areas where mass education is a novelty and therefore the level of school participation is limited prior to conflict episodes, it is unlikely that the low levels of school attendance observed in these areas in the post war era is attributable to conflict. Further, in areas where children had been attending school but the rate of attendance was in decline prior to the war, as was the case in the MRR, it is also likely that the deterioration in school attendance was not caused by the occurrence of conflict. Mapping the chronology of the war by levels of school participation may help to address these hypotheses.

The exploration of post-war reconstruction efforts, particularly interventions by non-governmental organisations (NGOs), could also help to explain the peripheral effects of conflict on school attendance. The hypothesis here is that post-war reconstruction enhances participation rates through education projects and investments by local and international organisations. Undertaking this research in the MRR would require a mixed methods approach. Secondary data from Ministries of Education, local NGOs, and government planning divisions may be useful. The Truth and Reconciliation Commission reports may also be of use as these tend to collect information on the intensity and spread of the conflict by region, district and chiefdoms or by administrative areas. Geographic information systems may be used to map the variation in the intensity of the conflicts as well as the levels of school participation by region. Census data and other survey data may be relied upon for information on school attendance. Policy documents detailing the provision and implementation of education may also be useful.

9. Conclusion

The research presented in this thesis has investigated school attendance at basic education in West Africa. In doing so, it has explored the progress towards Universal Basic Education (UBE) in Sierra Leone and has used statistical models to predict the determinants of school attendance focusing mainly on women's education and poverty in the region. The key findings from this thesis may be summarised as follows.

9.1. Demographic and Health Survey (DHS)

- Data designed to be nationally representative and so inferences can be made to the population. Quality checks confirm the reliability of the DHS data.
- The data does not administer questions on supply side school factors. Supply side factors have therefore not been controlled for directly.
- The sample of children living in the same household as both parents is biased in favour of urban areas. Since the education of a parent could only be identified for children who lived in the same household as the child, a complete analysis could not be conducted where both parents' education were controlled for.
- The sampling frame for the DHS does not take into huge urban inequalities as may be represented by informal urban settlements. This feature of the DHS sampling is unlikely to impact on the interpretation of the results observed in this thesis, particularly for Chapter 5. This is because the countries studied do not have concentrations of informal urban settlements meaning there are unlikely to be huge urban inequalities.
- Community level variables are not readily available in the DHS. The approach used in this these has been to aggregate household and individual data to the cluster level where the cluster is taken to represent a grouping of households that are representative of communities. The limitations of this approach – measure error and bias in predicted coefficients – have been mitigated against through the large sample size from which the aggregations have been made and by controlling for variables (i.e. area of residence and administrative region) which carry significant contextual information. Secondary sources of data and information from population as well as school censuses for the main case studies (Ghana, Liberia, and Sierra Leone) have also been used to inform the covariates used in the statistical modelling for Chapters 5, 6, and 7.

9.2. What is the progress towards achieving universal basic education in Sierra Leone?

- Sierra Leone has shown modest progress towards achieving UBE.

- The proportion of children aged 6-14 who have ever attended school has declined since 2003/04. The net attendance ratio for primary education has also declined but the attendance ratio for junior secondary education has almost doubled.

- There is no difference between girls and boys in school attendance at primary education but at junior secondary education girls have lower attendance.

- Children from the poorest households are the most disadvantaged in accessing school followed by rural children and girls.

- In general, school attendance is higher in Ghana and Nigeria than in Sierra Leone but lower in Guinea and Liberia.

- Future policies should aim to improve the number of children entering school at age six years; enforce existing policies on tuition-free education and; promote post-primary education for girls.

9.3. Does living in a poor community disadvantage poor children more than affluent children in attending primary school?

- Children in poor communities in Liberia and Sierra Leone are significantly less likely to attend school.

- In Sierra Leone, poor children experience a double burden of poverty as living in poor communities further attenuates their likelihood of attending primary school.

- The lower level of school attendance in poor communities in the two countries can be explained by an inadequate supply of school infrastructure.

- In Ghana, living in a poor community was not significantly related to children's primary school attendance. However, living in a poor household reduces the likelihood that a child will attend school.

- Policy recommendations are to improve the supply and distribution of schools in Liberia and Sierra Leone especially in poor communities. In Ghana, efforts should be made to reduce the cost of attending schools to enable poor children to participate.

9.4. What are the determinants of junior secondary school attendance in post-conflict and non-post-conflict countries in West Africa?

- In Liberia and Sierra Leone, girls were significantly less likely to attend school although in Sierra Leone this relationship interacted significantly with women's community education so that the disadvantage experienced by girls was reduced if they lived in a community with a high proportion of women with secondary or higher education.

- Living in a community where the main source of livelihood is agriculture or self-employment reduced the likelihood of school attendance in Liberia and Sierra Leone.

- In Ghana, living in a poor community reduces the likelihood of attending school among children who have access to school.

- In all countries, the proportion of women with secondary or higher education in a community increases the probability that a child will attend school. This relationship is significantly more pronounced in Liberia than in the other two countries.

- School availability is significantly related to attendance in all countries. Liberia has the least supply of junior secondary schools and the lowest attendance at this educational level.

- Future policies should expand access to schools by increasing the supply of school infrastructure. In Ghana, efforts should be made to improve quality standards in poor communities. In addition, promoting education for girls could have significant benefits.

9.5. Does living in a community with more educated mothers enhance children's school attendance at basic education?

- The level of mothers' community education is not significantly related to primary school attendance. A child's own mother's level of education is however positively associated with school attendance.

- Mothers' community education is positively associated with attending junior secondary school meaning the probability of attending school is increased as the proportion of more educated mothers in a community increases. A child's own mother's level of education is also significantly associated with attendance at this level of education.

- The result for mothers' community education should be interpreted cautiously as the sample used in the analysis was biased in favour of rural areas. The identification of children's mothers in the DHS was problematic as only children living in the same household as their mother could be used in the analysis.

- Notwithstanding, future policies should advocate for girls' post-primary education through both national campaigns and community engagement.

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