



The Determinants of School Attendance and Attainment in Ghana: A Gender Perspective

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Abstract



This study examines the determinants of school attendance and attainment in Ghana with a view to deriving implications for policy direction. Using micro-level data from the Ghana living standards surveys, our gender disaggregated probit models on current school attendance and attainment show that parental education and household resources are significant determinants of schooling. The effect of household resources on current school attendance is higher for daughters than it is for sons. It appears that for male and female children the impact of household resources on school attendance has reduced, statistically speaking. Father's schooling effects on the education of female children decreased between 1992 and 1999. Mother's schooling effects on school attendance of daughters in 1992 were not significantly different from those realized in 1999. However, the effects of mother's schooling levels on school attendance of male children appear to have reduced. Other significant determinants of children's schooling are the age of children, school infrastructure, religion and urban residency. The paper concludes that education matters and has an intergenerational impact. Arguably, sustainable poverty reduction approaches cannot ignore the role of education and implications for employment, earnings and social development. Hence, gender sensitive policies to ensure educational equity are vital.





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1. Introduction

Globally, there is wide recognition of the importance of education in socioeconomic development of countries in general and those in the developing world in particular. A major concern that has emerged over the last decade has been the need to ensure that children, particularly the girl-child, are given the requisite opportunity to access basic education in their respective communities. Because they constitute the future human capital of the society and therefore have potential to exert significant impact on the growth and development of the economy, children's full participation in basic education is a *sine qua non* for societal progress. As economic systems have become more global in scope and the information and skills required to participate fully in them have become more complex, the scope of imparting skills necessary and sufficient for the populace to participate fully in socioeconomic development has also widened.

The growing evidence on the role of human capital in the development process has made social sector investment an important component of national strategies for sustained growth and development. In Ghana, the share of development budget allocations to social services development has in recent times been in the neighbourhood of 1.2% of GDP. Out of this amount, about 0.7% has been directed specifically to education and health sector development (as shown in Table 1). Selected indicators reflecting social development outcomes are also shown in Table 1.

Table 1: Development expenditures and social development outcomes in Ghana

	1985–1990	1990–1995	1995–2000
<i>Development expenditures (% of GDP)</i>			
Social and community services development	1.2	1.0	1.2
Of which education and health	0.9	0.6	0.7
Economic services development	0.5	1.7	2.1
Others	1.0	1.7	1.3
Total development expenditures	2.7	4.4	4.6
<i>Social development outcomes</i>			
Infant mortality rate (IMR) (deaths per 1,000 live births)	80	76	65
Ghana's IMR % share of developing countries IMR	105.3	100.0	101.6
Life expectancy at birth (LEB) (years)	57	58	58
Ghana's LEB % share of developing countries LEB	96.6	89.2	89.9
Access to safe water (ASW) (% of population)	56	56	62
Ghana's ASW % share of developing countries ASW	76.7	76.7	81.4
Literacy rate (LR) (% aged 15 years and over)	55	62	68
Ghana's LR % share of developing countries LR	94.8	88.6	97.1

Source: Author's calculations based on World Bank's World Development Indicators and UNDP's Human Development Report.

Infant mortality rates in Ghana appear to be going down (having fallen from 80 per 1,000 live births in 1985–1990 to 65 in 1995–2000), but compared with the average for all developing countries are still relatively high. Life expectancy at birth has increased from 57 years in 1985–1990 to 60 years in 1995–2000 but this, too, compares less favourably with the developing world average, which currently stands at 58 years. Literacy rates have also been following an upward trend and 68% of the population aged 15 years and above are now considered literate. Along gender lines, a similar upward pattern in enrolment rates has occurred for both males and females and there are current indications that the gender gap in primary and junior secondary education is becoming narrower. Generally, improvements in education have been associated with better social outcomes (i.e., reduction in infant mortality, increases in life expectancy and increases in access to safe water).

Problem statement

Human capital's role in socioeconomic development has been underscored in various studies.¹ Education, as an aspect of human capital formation, is recognized as being vital in increasing the productive capacity of people. In the case of women, in particular, it helps in reducing fertility preferences, increasing the opportunity cost of time and consequently encouraging more participation in labour market activities. This ultimately results in increased income with positive impact on child development.

A major trend in education in developing economies in general, and Ghana in particular, is that schooling attainments are relatively low and observed differences in such attainments between males and females exist, with those of the latter lagging behind the former. The 2000 UN Millennium Summit affirmed the gender gap in education and pushed forward the goal of narrowing this gap. This trend appears to be a major thrust in education policies being currently evolved by governments in developing economies, Ghana inclusive. In the absence of in-depth studies on the determinants of child education, however, policies may lack empirical relevance. Although the Ghana government's broad education policy objective is to ensure that all people, irrespective of gender and socioeconomic status, have some level of literacy, this objective is far from being realized. The education sector is saddled with various problems that tend to work against the attainment of education policy objective. Notable among these are limited access and low enrolments especially for the poor and females, and poor educational outcomes (Government of Ghana, 1997).

It has been contended that children of parents with some schooling attainment tend to exhibit relatively better nutritional status and schooling and therefore reflect potentially enhanced human capital in later stages in life. Because children today constitute the future labour resource of a country and therefore reflect the future development of a country, it is important to understand how their peculiar situations influence their human capital development. Some of the major issues that emerge are: What are the determinants of children's educational attainments? What effects do parental education and household resources have on the education of sons and daughters? Are there significant gender differences in the education of children? What are the returns to schooling and have these changed over time? These questions are addressed by this study.

Objectives and hypotheses

The overall objective of this paper is to provide comparative evidence pertaining to the determinants of children's school attendance and attainment in Ghana. The paper seeks to show the key variables influencing the education of sons and daughters with special focus on the effects of parental education and household resources with a view to deriving implications for policy direction. More specifically, the paper intends to:

- Analyse the trends in school attendance for males and females vis-à-vis parental education and household resources;
- Estimate models on current school attendance; and
- Assess the determinants of school attainment for sons and daughters and the implications for education policy in Ghana.

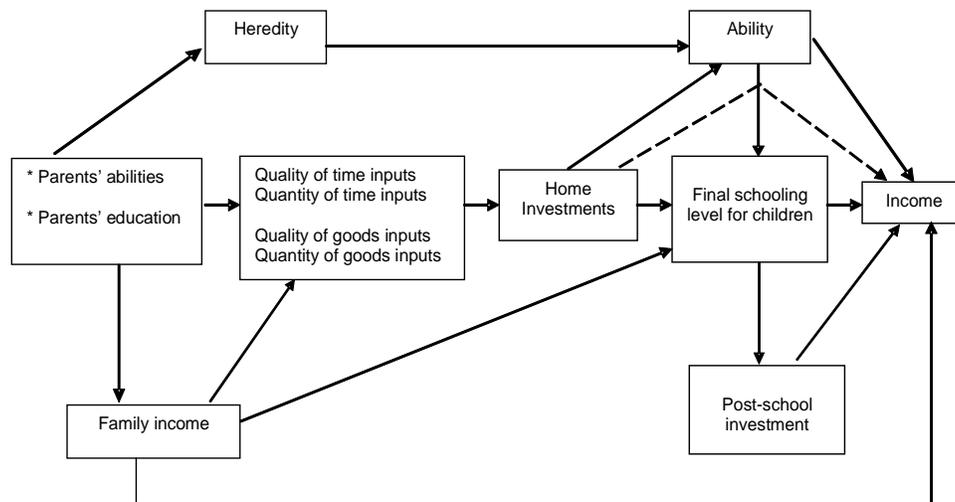
We hypothesize the following: that the effects of mothers' and fathers' education on children's school attendance are significantly different from each other; and that irrespective of time, additional household resources exert positive impact on school attendance.

2. Theoretical framework and literature review

In a rather simple but illustrative manner, the linkage between parental education and household resources, on the one hand, and children's education, on the other, is conceptually provided in Figure 1. Becker and Tomes (1986) point out that parents' concern for the economic capabilities and success of their children prompts them to invest resources in the children's education, health, motivation and other credentials. These expenditures influence the human capital and earnings of children later in life. School attendance is one measure of investment in human capital (Thomas et al., 2003).

Parental education is a decisive factor in the educational attainment of their children. Card (1999) points out that there is a strong intergenerational correlation in education. The quantity and quality of time devoted by parents to their children is positively related to the parents' education status. Parents' attributes also influence family income, which in turn affects the quality and quantity of goods that bear directly on home investment (Leibowitz, 1974). The amount of family income or household resources allocated to children and the timing of their distribution ultimately affects the schooling attainments of children (Haveman and Wolfe, 1995).

Figure 1: Home investments in children



Source: Adapted from Haveman and Wolfe (1995) and Leibowitz (1974).

There are theoretical underpinnings for the conceptual framework shown in Figure 1. The theoretical framework being used in this paper is the household production model, which springs from the work of Becker (1965) and has been used extensively since then. Consistent with the quality–quantity trade-off models, the household is assumed to maximize a twice differentiable utility function subject to its production functions, and budget and time constraints. The arguments in the utility function are the number of children, quality of children, leisure and consumption of market goods. These are conditioned on household characteristics and community characteristics, some of which are unobservable. Each child’s quality is produced according to a household production function with family members’ time allocated to the i th child and purchased goods as the main arguments.

The child quality production function implies that parents may increase the satisfaction they derive from a given child quality by increasing the resources devoted to the child and that a given level of child quality may be obtained with alternative combinations of time and goods. Tansel (1997) points out that since education improves child quality, the child quality production function could be interpreted as being a function of the time children spend in school and the household expenditures on education. Solving the household’s optimization problem gives a set of demand functions for child quality, number of children, leisure and consumption goods. In the case of child quality, the demand for schooling (S) is given by:

$$S = f(W, P, Y, C) \quad (1)$$

where W is a vector of household wages, P is a vector of prices of inputs purchased in the market, Y is unearned household income, and C is a set of characteristics specific to the child or household (Tansel, 1997). Household wages and unearned income constitute the financial resources at the disposal of the household to finance various activities including the education of children.²

In one way or the other, the growing literature on parental effects on children revolves around this framework. Authors like Glick and Sahn (2000), Handa (1996), Tansel (1997), Behrman et al. (1999), and Haveman and Wolfe (1995) have analysed parental education effects on children’s schooling, while others like Sahn and Stifel (2002) have dwelt on parental effects on children’s nutrition. Various theoretical frameworks have been used, depending on the assumptions being made on how household decision making processes are characterized. Consequently, models reflecting unitary behaviour of the household and collective approach of households in terms of intra-household resource allocation have emerged (Haddad et al., 1997). An important dimension is the recognition of the family and ultimately the household as a basic social unit whose motivations are driven by economics.

Using the household production model and highlighting the interaction between quantity and quality of children, Becker and Lewis (1973) posit that the shadow price of children with respect to their number (i.e., the cost of an additional child, holding quality constant) is greater the higher the quality. Along similar reasoning, the shadow price of children

with respect to their quality (i.e., the cost of a unit increase in quality, holding the number of children constant) is greater, the larger the number of children. In other words, an increase in child quality is more expensive if there are more children because the increase has to be applied to more units.

Lam and Duryea (1999) revisit the child quantity–quality framework in their study on the effects of schooling on fertility, labour supply and investments in children in Brazil by indicating that it provides a useful mechanism for examining how increases in parental schooling could affect the choices they make with regard to the quantity and quality (i.e., the schooling) of their children. These authors conclude that as long as the quality chosen for one child is related to the quality chosen for other children, the choice of child quality will affect the opportunity cost of adjusting child quantity and vice versa.

In considering the determinants of children’s educational choices, Haveman and Wolfe (1995) note that the most fundamental economic factor is the human capital of parents. Usually measured by the number of schooling years attained, parental education reflects a sort of intergenerational transmission of socioeconomic status. The authors observe that a mother’s education tends to be more closely related to the child’s schooling attainment than does the father’s. In terms of household economic resources, the magnitude of family income is influential in educational choices. Family income is positively associated with the educational attainment of children.

Lloyd and Blanc's (1996) assessment of children’s schooling in sub-Saharan Africa identifies the possible effect of other children’s presence on schooling possibilities of any given child. Using Kenya, Tanzania, Cameroon, Niger, Malawi, Namibia and Zambia as case studies, they observe that the presence of young children in the household increases the time needed for childcare, a responsibility often shared among resident adults and older children. On the other hand, with more school-age children in the household, responsibilities for childcare and other domestic tasks could be shared and at least some children could attend school.

Writing on student achievement and schooling choice in low income countries, Glewwe and Jacoby (1994) address selectivity issues relating to the sorting of higher ability children into better schools and high incidence of both delayed school enrolment and early leaving. Using 1988/89 household survey data sets from Ghana as a case study, the authors found an absence of any strong selectivity bias. The results from modelling the determinants of mathematics and reading test scores show that mother’s education had a significant positive effect on both test scores, while that of father had no significant effect. However, mother’s and father’s education both mattered for grade attainment.

Francis et al. (1998), deliberating on school enrolment, attendance and retention in Nigeria, point to regional imbalances in enrolments particularly with respect to female pupils. Attendance levels vary considerably among schools, and are often low in rural areas, especially during the farming season and on occasions such as market days. On education equity, the World Bank (1995) points out that the issue of equity affects several overlapping disadvantaged groups including the poor, street children and children in the workforce. The different access that boys and girls have to the education system should not be ignored because it contributes to gender differences later in life. Low levels of female education lead to legal illiteracy, creating a severe constraint to effective implementation of equitable legal provisions (Gopal and Salim, 1998).

Family factors related to lack of female literacy and educational achievement have been identified by various authors such as Cotton (1996). These factors include the social class of parents and attitudes toward formal education as it affects their cultural values, demand for child labour, division of labour along gender lines, selective education of children based on perceived cost and future benefits of schooling, the need for perpetuation of the family name, and religious beliefs. Parents' education and income levels have been found to have significant positive correlations with their daughters' education.

The issue of measurement of human capital within the framework of socioeconomic development has also been considered in the literature. Strauss and Thomas (1995) have pointed out that most empirical studies have measured human capital by completed years of schooling or highest grade attained. Although these measures have been used interchangeably, they are bound to differ where grade repetition occurs and they have certain limitations that need to be borne in mind. They are neither able to capture the quality of schooling and time spent at school in any given time period nor to control for innate ability. The authors conclude that these limitations ultimately affect the measurement of outcomes (such as child schooling) and determinants (such as parental education).

Using a human capital theory framework and dwelling on the sources of variation in parental financial assistance, Steelman and Powell (1991) distinguish between children as liabilities and as assets. They note that contrary to the conceptualization of the child as an economic liability that does nothing but consume, the human capital model perceives the child as an investment. Consequently, parents acting in a rational manner invest resources in children in such a way as to maximize the probability of future payoffs. The extent to which the "next generation" can be sponsored in their schooling engagements depends in part on family assets and the number of claimants in the family entitled to them.

Along similar lines as Steelman and Powell, Butcher and Case (1994) observe in their paper on sibling composition and educational attainment that where parents are faced with borrowing constraints, the presence of one child may alter the opportunity cost of investing in the education of another. Parents who intend to maximize the sum of their children's incomes but are limited in their ability to borrow will stop short of investing until the rate of return to each child's education is equal to the market rate of interest. In such situations, children with the highest perceived marginal return to education will receive the most education. Various possibilities emerge from this incremental consideration. For example, a girl with only sisters would receive more education than, say, a girl with brothers. This tendency can result in a gender gap in education, however, as long as parents tend to put a higher premium on the education of boys.

3. Methodology

Existing analytical approaches are used to investigate the various issues under consideration. The analysis of education attendance is pursued with a more conventional approach. School attendance for school-age children is analysed within the context of parental education and household resources using cross sectional data in 1992 and 1999. This basically involves the use of graphical representations to show trends over time coupled with verbal descriptions adducing reasons for the prevailing trends. Issues of school quality are discussed using macro time series data sets. Indicators of the quality of schooling are the number of teachers as well as of teachers per student, and the ratio of trained teachers to untrained teachers, growth in schools vs. growth in enrolment, and schools per student enrolled.

For current school attendance, we use a probit model, while for level of schooling attainment we apply an ordered probit method. Our model estimations are based on empirical models commonly used in the literature. These are underpinned by the theoretical framework discussed earlier. As has been pointed out by Glick and Sahn (2000), modelling of current schooling status has an edge over grade attainment in that it allows current schooling choices to be related to contemporaneous aspects of any given household such as income and household structure. The probit model we estimate is of the following form:

$$\begin{aligned} ENROL_i^* &= x_i\beta + \varepsilon_i, \quad i = 1, \dots, n \\ ENROL_i &= 1 \text{ if } ENROL_i^* > 0 \\ ENROL_i &= 0 \text{ if otherwise} \\ \varepsilon &= N(0, 1) \end{aligned} \tag{2}$$

where: $ENROL_i$, the current school enrolment status, is a binary response indicator of the i th individual determined by the underlying latent variable $ENROL_i^*$; x_i is a vector of explanatory variables (personal, household and regional characteristics); β is a vector of unknown parameters to be estimated; and ε_i is the error term. The usual normalizations are imposed so that the variance of the error term ε is normalized to 1 and the cut-off point is normalized to zero. The coefficients obtained in the probit estimation serve only to provide a sense of the direction of the effects of the covariates on the dependent variable, and cannot be used for magnitude impact analysis. To examine the magnitude of impact, the marginal impact of the explanatory variables on the probability of current school enrolment is provided.

The set of variables representing household and personal characteristics in our empirical model on current school attendance includes school attainment of the child's father and mother, household resources, religion, age of child, and residency. Income data sets typically reported by households during living standards surveys in sub-Saharan African countries are believed to be fraught with inaccuracies. As a result, the empirical strategy has been to use household consumption expenditures as proxy for household income. We follow this approach in our study and use consumption expenditures per adult equivalent as our measure of household resources. In order to account for potential seasonal impact on school attendance, quarterly time dummy variables were added to the set of explanatory variables in the school attendance model. These quarterly time dummy variables correspond to the survey administration periods. Arguably, if the incidence of current school attendance is seasonally driven, then the observations on attendance will be sensitive to the specific month or period the survey was administered.

In assessing the determinants of school attainment for sons and daughters in Ghana, we use an ordered probit approach, an approach that is common in empirical studies on school attainment. The "ordered response" for highest level of school attainment used in our study is as follows: 1 = no schooling; 2 = primary school; 3 = middle school/junior secondary; 4 = senior secondary; and 5 = post senior secondary. Assuming normally distributed error terms, the ordered probit model states that the dependent variable for the i th individual is given by:

$$ATTAIN_i^* = x_i\alpha + u_i, i = 1, \dots, n \quad (3)$$

In this formulation, $ATTAIN_i^*$ is a continuous unobserved variable (i.e., latent). It represents the respondent's "true" underlying educational attainment. The vector of explanatory variables is captured by x_i , while α denotes the set of unknown coefficients and u_i is the error term. Following Bruce and Anderson (2004), the observed educational attainment variable $ATTAIN_i$ is specified as follows:

$$\begin{aligned} ATTAIN_i &= 1 \text{ (no schooling), if } ATTAIN_i^* < \mu_1 \\ ATTAIN_i &= 2 \text{ (primary), if } \mu_1 < ATTAIN_i^* < \mu_2 \\ ATTAIN_i &= 3 \text{ (middle/JSS), if } \mu_2 < ATTAIN_i^* < \mu_3 \\ ATTAIN_i &= 4 \text{ (senior secondary), if } \mu_3 < ATTAIN_i^* < \mu_4 \\ ATTAIN_i &= 5 \text{ (post senior secondary), if } \mu_4 < ATTAIN_i^* < \mu_5 \end{aligned} \quad (4)$$

The μ 's are the threshold parameters or cut-points to be estimated together with the vector of unknown coefficients (i.e., α).

4. Data description and sources

Our main data sets are from the 1991/92 and 1998/99 Ghana living standards surveys (i.e., GLSS3 and GLSS4, respectively) conducted by the Ghana Statistical Services (GSS). These had nationwide coverage. The GLSS4 was carried out from April 1998 to March 1999. We draw two subsamples from the GLSS4. The first subsample is made up of 10,284 children aged 6–20 years. About one-half of these children are girls. This core age group allows us to capture current child school attendance. The second subsample is used in analysing the determinants of school attainment for sons and daughters aged 13–30 years. This second sample has 4,296 females and 3,861 males. In the case of the GLSS3, this survey was carried out from September 1991 to September 1992. This study provides a sample of 8,041 children aged 6–20 years to examine school attendance in the country. In terms of gender, females constituted about 48% of this sample. The school attainment sample comprising sons and daughters aged 13–30 years was 6,175.

Although not panel data, the survey instruments for GLSS3 and GLSS4 were quite similar. In terms of sample design and sampling method, the survey employed the technique of stratification using geographical factors, ecological zones and location of residence as the main controls. Enumeration areas or clusters were stratified into three ecological zones, coastal, forest and savannah, that were further stratified into rural and urban. The main criterion for the stratification was the size of the locality. The sampling method involved a systematic two-stage selection with 300 enumeration areas selected in the first stage. This was followed in the second stage by a selection of a fixed number of 20 households from each enumeration area. Thus, a total of 6,000 households were selected for interview (GSS, 2000).

The database provides adequate information on education for both children and their parents. The education data provide not just general education information but also educational career insights. Under the former are such variables as school attendance and highest educational qualification. For education career insights, the notable variables for which data exist include highest certification achieved and the school type (i.e., private vs. public). The variables used in the GLSS4 model specifications are available in the GLSS3. This ensures some consistency in usage and comparison.

Tables 2 and 3 provide descriptive statistics on the key variables in our school attendance and attainment models, the education levels of parents and the household resources. We observe in Table 2 that both parents and children sampled in 1999 show better educational characteristics than those in 1992. This is consistent with the age cohort effect linked to educational attainment so that younger age cohorts reflect relatively

higher educational characteristics than older ones. It is also true for both mothers and fathers, on the one hand, and children, on the other.

While in 1992 about 75% of boys and 82% of girls aged 6–20 years had been to school before, 61% of girls and 71% of boys were in current school enrolments. These suggest dropout rates (temporal or permanent) of about 14 percentage points for girls and 11 percentage points for boys. By 1999, the average school attendance rates had increased for all children. About one-quarter of children in the school attendance sample were aged 6–8 years. In the case of the sample of children in the school attainment models, the average was about 20 years (see Table 3).

Table 2: Descriptive statistics of sample used in analysing school attendance in Ghana (6–20 years old)

	1992: Daughters		1992: Sons		1999: Daughters		1999: Sons	
	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev
Child ever attended school	0.755	0.430	0.817	0.387	0.851	0.356	0.892	0.310
Child currently attending school	0.614	0.487	0.707	0.455	0.717	0.451	0.767	0.423
<i>Mother's education</i>								
None	0.634	0.482	0.636	0.482	0.597	0.491	0.578	0.494
Primary	0.081	0.272	0.090	0.287	0.117	0.321	0.140	0.347
Middle school or higher	0.260	0.439	0.257	0.437	0.249	0.432	0.256	0.436
Don't know mother's education	0.025	0.157	0.017	0.128	0.036	0.186	0.024	0.152
<i>Father's education</i>								
None	0.441	0.497	0.430	0.495	0.376	0.485	0.330	0.471
Primary	0.052	0.222	0.043	0.203	0.056	0.230	0.069	0.254
Middle school or higher	0.463	0.499	0.491	0.500	0.468	0.499	0.477	0.500
Don't know father's education	0.045	0.207	0.036	0.187	0.089	0.284	0.105	0.307
<i>Household & other characteristics</i>								
Log (expenditure per capita)	11.513	0.630	11.448	0.618	13.446	0.678	13.383	0.684
Child: age 6–8 years old	0.261	0.439	0.256	0.437	0.243	0.429	0.244	0.430
Child: age 9–11 years old	0.227	0.419	0.225	0.417	0.226	0.418	0.226	0.418
Child: age 12–14 years old	0.209	0.407	0.215	0.411	0.224	0.417	0.209	0.407
Child: age 15–17 years old	0.164	0.371	0.169	0.375	0.157	0.364	0.172	0.377
Child: age 18–20 years old	0.139	0.346	0.135	0.342	0.150	0.357	0.149	0.356
Urban resident	0.361	0.480	0.322	0.467	0.340	0.474	0.316	0.465
Rural resident	0.639	0.480	0.678	0.467	0.660	0.474	0.684	0.465
Siblings under 6 years old	0.061	0.240	0.066	0.248	0.051	0.220	0.048	0.213
Siblings between 7 and 11 years	0.267	0.442	0.270	0.444	0.244	0.430	0.268	0.443
<i>School infrastructure</i>								
Lack of school buildings	0.271	0.444	0.287	0.452	0.270	0.444	0.267	0.443
Lack of qualified teachers	0.047	0.211	0.052	0.222	0.087	0.282	0.092	0.290
<i>Survey administration period</i>								
Jan–March	0.285	0.452	0.279	0.449	0.177	0.382	0.198	0.399
April–June	0.263	0.440	0.257	0.437	0.312	0.463	0.314	0.464
July–September	0.190	0.393	0.184	0.387	0.282	0.450	0.275	0.447
October–December	0.262	0.440	0.280	0.449	0.229	0.420	0.212	0.409
No. of observations	3,841		4,200		5,082		5,202	

Source: Author's calculations based on Ghana Living Standards Survey data.

Table 3: Descriptive statistics of sample used in analysing school attainment in Ghana: (13–30 years old)

	1992: Daughters		1992: Sons		1999: Daughters		1999: Sons	
	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev
<i>Child's school attainment</i>								
None	0.304	0.460	0.163	0.370	0.212	0.409	0.102	0.303
Primary	0.441	0.497	0.502	0.500	0.450	0.498	0.480	0.500
Middle school/JSS	0.226	0.418	0.270	0.444	0.284	0.451	0.310	0.463
Senior secondary	0.021	0.145	0.040	0.197	0.043	0.202	0.076	0.266
Post senior secondary	0.007	0.085	0.024	0.152	0.011	0.105	0.032	0.176
<i>Mother's education</i>								
None	0.811	0.392	0.802	0.399	0.734	0.442	0.729	0.445
Primary	0.050	0.219	0.056	0.231	0.070	0.256	0.080	0.272
Middle school or higher	0.128	0.335	0.135	0.342	0.167	0.373	0.168	0.374
Don't know mother's ed	0.011	0.103	0.007	0.082	0.029	0.168	0.018	0.131
<i>Father's education</i>								
None	0.645	0.479	0.603	0.490	0.524	0.500	0.475	0.500
Primary	0.045	0.207	0.051	0.220	0.054	0.225	0.067	0.250
Middle school or higher	0.282	0.450	0.319	0.466	0.345	0.476	0.377	0.485
Don't know father's ed	0.028	0.166	0.028	0.164	0.070	0.255	0.066	0.248
<i>Household & other characteristics</i>								
Log (expenditure per capita)	11.630	0.668	11.632	0.687	13.568	0.718	13.562	0.746
Child's age (years)	20.925	5.409	19.624	5.162	20.681	5.506	19.776	5.094
Urban resident	0.382	0.486	0.356	0.479	0.371	0.483	0.349	0.477
Rural resident	0.618	0.486	0.644	0.479	0.629	0.483	0.651	0.477
<i>School infrastructure</i>								
Lack of school buildings	0.260	0.439	0.273	0.446	0.259	0.438	0.259	0.438
Lack of qualified teachers	0.042	0.202	0.050	0.217	0.082	0.274	0.078	0.268
No. of observations	3,180		2,995		4,296		3,861	

Source: Author's calculations based on Ghana Living Standards Survey data.

In order to understand better the educational trends, it is appropriate to touch on the educational system in Ghana, the quality of education, cost of schooling and implications for attendance. We turn attention to these issues in the ensuing section.

5. Education in Ghana: System, cost, attendance and attainment determinants

Prior to the structural adjustment programme, Ghana's educational system consisted of six years of primary schooling after which students either continued to middle school (i.e., grades 7 through 10) or had to pass an entrance examination to attend secondary school. The secondary school system had two levels – ordinary and advanced. The former consisted of five years of study after which students had to take the General Certificate of Education (GCE) “ordinary level” examination. Successful students then moved to the “advanced” level where they studied for two additional years. At the end of this period, a GCE “advanced” level examination had to be taken and those who passed qualified to enter one of the universities. There was, in addition, specific education in the form of commercial, vocational, and teacher and nursing training schools (Oliver, 1995).

Since the educational reforms of 1987, the pre-tertiary educational system has been changed from 17 years to 12 years, comprising six years of primary school and three years each of junior secondary school (JSS) and senior secondary school (SSS). In principle, basic education, which is made up of primary school and JSS, is compulsory and free. Although primarily financed by the government, it is common to see private sector provision of primary and JSS education services (Canagarajah and Ye, 2001).

At the primary school level, teachers are assigned by grade. Lower primary school level courses comprise five subjects: mathematics, English, Ghanaian language and culture, environmental studies, and religious/moral education. At the upper primary level, integrated science (i.e., science and agricultural science) and physical education are added to the primary level courses.

The curriculum for JSS is made up of mathematics, English, Ghanaian language and culture, environmental studies, religious/moral education, pre-technical skills (which includes technical drawing), social studies, and French (which is optional). Other subjects offered but not subject to external examination at the JSS level are music, life skills and physical education. Unlike the primary school level, where teachers are assigned by grade, JSS teachers are assigned specific courses on the basis of their specialty (Canagarajah and Ye, 2001).

The Ghanaian education system allows for private provision at the various levels. Private tertiary institutions tend to share certain characteristics: They offer a limited range of professionally or practically focused courses and programmes such as accounting, business administration, marketing and computer studies, among others. They are located in or around urban areas and draw students from a wide range of income levels. They mostly employ part-time teaching staff and they derive revenues from tuition and boarding

fees (LaRocque, 2001). Table 4 shows that the average cost of school (expressed as a share of total household expenditures) has increased by about a percentage point from 2% in 1992 to 3% in 1999. School fees and registration accounted for about one-third of all expenses incurred by households in 1999, compared with less than one-quarter in 1992.

A change in household contribution to child school financing appears to be developing. While traditionally the norm has been for the father to play the role of sole or dominant financier of a child's schooling, this seems to be waning and co-sponsorship is gradually emerging. In 1992 the incidence of both mother and father bearing school expenditures for their children was about 8%. By 1999, this had increased to 14%. At the same time, the role of mothers as sole bearers of educational expenditures has been fairly stable in the neighbourhood of 16%. These trends have implications for household resources and parental educational attainment and impact. Again, they underscore the role of mothers in labour market activities and how earnings from such activities provide additional resources to finance the education of their children.

Table 4: Cost of schooling and school expenditures incidence in Ghana: 1992 and 1999

Average school expenditures ratio (%) (School expenditure/Total household expenditures)			Who pays for child's school expenses (%)		
	1992	1999	1992	1999	
School and registration fees	0.49	1.04	Child's father	61.03	51.88
Parent-Teacher Association dues	0.06	0.04	Child's mother	16.49	16.77
Uniforms and sport clothes	0.36	0.26	Both parents	8.12	14.17
Books and school supplies	0.25	0.24	Other household member	5.20	10.05
Transportation	0.12	0.14	Other relative	5.25	3.86
Food, board and lodging	0.53	1.10	Non-relative	0.32	0.27
Other expenses (e.g., extra classes)	0.11	0.16	Child herself/himself	3.05	2.99
Other in-kind expenses	0.21	0.06	Other	0.55	0.02
Total	2.13%	3.03%	Total	100.00	100.00

Source: Author's calculations based on data from the GLSS3 and GLSS4.

Important areas of the education system requiring attention include issues of quality, equity and efficiency. Quality education, as stated in the country's poverty reduction strategy document, is constrained by poorly equipped and supervised public schools, wide geographical disparities in access and outcomes to basic education, limited relevance and spread of vocational and technical education, and management gaps (Government of Ghana, 2003). With most, if not all, children from poor households attending public schools, at least at the basic education level, the issue of quality is an important one and can affect the functional capabilities of these vulnerable groups.

On average, there has been a rise in student-teacher ratios at the basic level. Table 5 shows that between 1991/92 and 2002/03 the number of students per teacher at the primary level rose from about 27 to 32. Similarly, at the SSS level, the ratio rose from 14 to 22. For JSS, the student-teacher ratio appears to be fluctuating around a value of 18. The increase in class sizes does not necessarily imply that there has been decline in the

quality of education. On the contrary, it could indicate some economies of scale, especially in the area of science education. Nevertheless, in response to quality issues at the primary school level, there has been a tendency for students to choose private schools over public schools.

Table 5: Student/teacher ratio in Ghana, by educational level

Education level	1991/92	1992/93	1995/96	1996/97	1998/99	2002/03
Primary school	27	30	32.6	33	30	32
Junior secondary school	18	19	20	18	20*	18
Senior secondary school	14	14	17	17	20*	22

Note: * averages for all secondary level of education.

Sources: Calculations for the period 1991/92 through 1996/97 were based on data from the Ghana Statistical Service (2001) Quarterly Digest of Statistics; data for 2002/03 are from UNESCO (2005), while data for 1998/99 are from UNESCO's online database.

At the tertiary level, persistent shortages of qualified senior staff continue to mar education delivery capacity. In addition, the tertiary system has been unable to attract the financial resources necessary to maintain educational quality within the context of an expansion in enrolment. The relevance of tertiary education has also been an issue of concern. In 1997, the government's Vision 2020 made a case for developing the productive skills of the labour force and noted the weak linkages between training institutions and the different sectors of the economy. It was observed that training programmes tended to be driven by supply instead of demand and that there was a bias towards academic rather than practical and experimental forms of training (GOG, 1997).

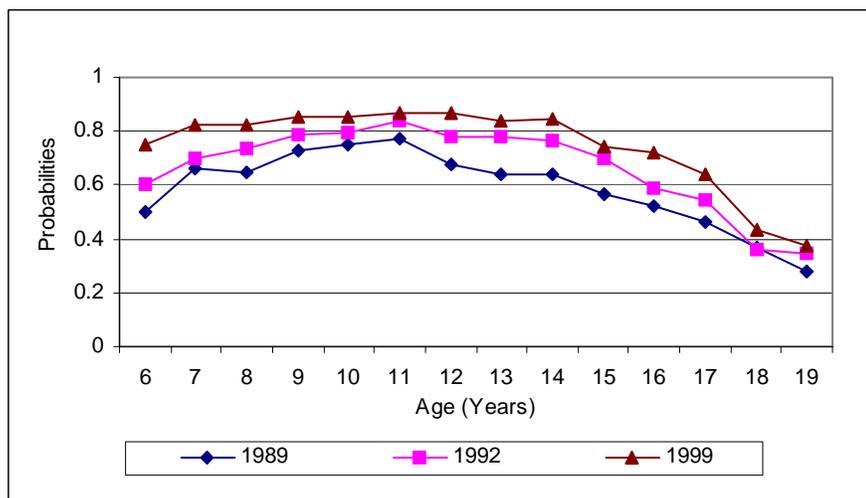
A recent study by Boateng and Ofori-Sarpong (2002) identified the problem of supply–demand gaps in graduate output. They observed that there was an over supply of graduate labour in those courses that were easily accessible, in particular arts and humanities, and an under supply in critical areas like engineering, accounting, medicine, information technology and management. They stressed that the existence of supply–demand gaps not only contributes to the problem of graduate unemployment but also undermines the efficiency of public investment in tertiary education. In an attempt to address the issues of education quality and relevance, an Education Sector Project was approved in March 2004 by the World Bank with the dual objective of (a) promoting equitable access to, and efficient delivery of quality services in pre-tertiary education and (b) fostering innovation, relevance and efficiency in tertiary education (World Bank, 2004). An analysis of the projected impact of this World Bank project falls outside the scope of this study. However, insights could be obtained on the situation prior to this project. In this regard, we consider issues of child school attendance in general, and in particular, the role of parental education and financial resources.

School attendance

Figure 2 shows the probability of attending school for children in Ghana between the ages of 6 and 19. Primary school commencement is generally at age six, although it is common for some children to enter the first grade when they are seven years old.

Between 1989 and 1999, school attendance increased for all age groups. For six-year-old children, the probability of attending school increased from 50% in 1989 to 75% in 1999. Between ages 11 and 12, when children are expected to complete grade 6, school attendance probabilities increased from about 73% in 1989 to 87% in 1999. Therefore, there has been a tendency for more children to complete the primary level of schooling. Beyond this level, school attendance begins to decline. In 1999 about 37% of 19-year-olds were attending school, up from 28% in 1989. Thus, the school attendance profile shows some concavity, with attendance probability rising at early school age (i.e., the initial stages of school) and falling later on as children enter the teenage threshold.

Figure 2: School attendance probabilities for children in Ghana

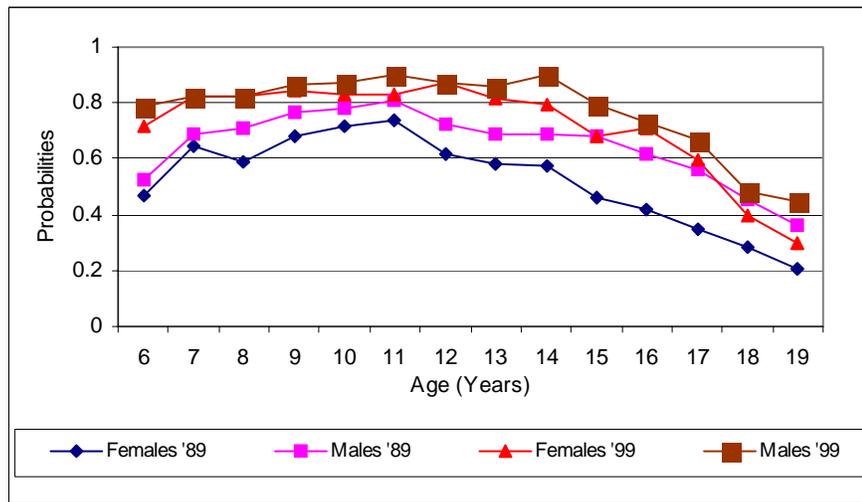


Source: Author's calculations based on survey data from the GLSS2, GLSS3 and GLSS4.

A survey by the Ghana Statistical Service in 1997 titled Core Welfare Indicators Questionnaire Survey (CWIQ) identified some of the reasons why children were not in school (GSS, 1998). The major reasons given by children were: working at home or family enterprise (33.8%); expensiveness of education (28.6%); school not being interesting (9.1%); distance (7.4%); failing of examination (4.5%); marriage (4%); pregnancy (3%); and illness (2.3%).

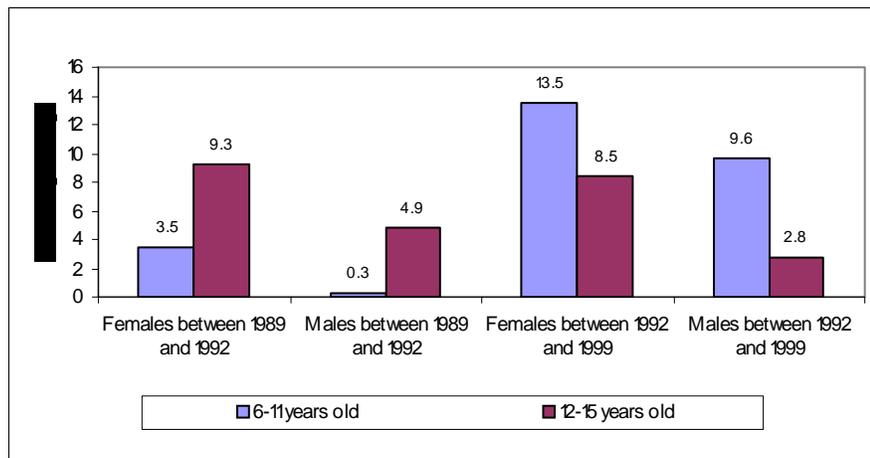
From a gender perspective, we observe that generally the likelihood of girls attending school is relatively lower than that of boys, as shown in Figure 3. For the girl-child in 1989, the probability of attending school rose from 47% at age 6 to 74% at age 11, and fell to 20% at age 19. For boys, on the other hand, the corresponding attendance probabilities were 53%, 81% and 36%. Between 1989 and 1999, school attendance improved for both girls and boys, with attendance rates reaching a high of about 85% and 89%, respectively, between the ages of 11 and 12 years. What is remarkable to observe is the general tendency for the attendance rates of girls to rise faster than those of boys, as shown in Figure 4, suggesting a narrowing of the gender gap in basic education. Therefore, girls, who could be regarded as “late starters”, appear to be catching up with boys in terms of school attendance.

Figure 3: School attendance in Ghana, by gender and age



Source: Author's calculations based on survey data from the GLSS2 and GLSS 4.

Figure 4: Percentage change in school attendance rates in Ghana: 1989–1999



Source: Author's calculations based on data from Ghana Statistical Service's GLSS2, GLSS3 and GLSS4 reports.

Two major factors that are often cited to explain the observed trend in education attendance and attainment of children are the educational status of their parents and the resources at their disposal of households to finance education. Table 6 shows a tabulation of parental education and school attendance for females and males between the ages of 6 and 19 years.

Table 6: Parental education and school attendance rates for children in Ghana

Ages	Parents' Education	1992		1999		Percentage change	
		Females	Males	Females	Males	Females	Males
6–11 years	<i>Mother's education</i>						
	No school	64.0	69.7	71.1	77.6	11.1	11.3
	Primary	89.2	81.1	91.1	90.1	2.2	11.1
	Junior secondary or higher	89.8	95.7	92.3	94.3	2.7	-1.5
	<i>Father's education</i>						
	No school	60.9	66.2	70.6	75.6	16.1	14.2
12–14 years	<i>Mother's education</i>						
	No school	66.9	75.7	73.3	78.7	9.5	4.0
	Primary	87.5	63.2	86.3	90.5	-1.4	43.3
	Junior secondary or higher	88.6	98.5	92.7	96.6	4.6	-1.9
	<i>Father's education</i>						
	No school	55.7	78.7	67.9	80.7	21.9	2.5
15–17 years	<i>Mother's education</i>						
	No school	40.4	68.2	58.0	65.0	43.5	-4.7
	Primary	41.7	64.3	61.5	60.9	47.7	-5.3
	Junior secondary or higher	72.0	80.6	71.2	71.4	-1.1	-11.3
	<i>Father's education</i>						
	No school	35.5	62.5	55.0	64.8	55.0	3.8
18–19 years	<i>Mother's education</i>						
	No school	15.4	43.8	19.2	42.0	24.8	-3.9
	Primary	-	-	27.8	42.9	-	-
	Junior secondary or higher	28.9	59.4	38.3	50.0	32.3	-15.8
	<i>Father's education</i>						
	No school	12.4	43.7	23.5	34.1	89.7	-21.9
18–19 years	<i>Father's education</i>						
	Primary	-	-	38.5	46.2	-	-
	Junior secondary or higher	32.2	50.0	30.2	48.9	-6.3	-2.2

Note: (-) represents cells with less than 25 observations.

Source: Author's calculations based on the 1992 and 1999 Ghana Living Standards Survey data (un-weighted).

The major patterns that emerge are as follows:

- “No schooling” status of both mother and father is associated with the least probability of child school attendance.
- With few exceptions, the higher the educational attainment of the parent, the higher the probability of school attendance for both girls and boys for any given school-age cohort, *ceteris paribus*.
- For children aged 6–11 years, having mothers with primary school education tends to be associated with a relatively higher probability of the girl-child over the boy-child in attending primary school, but the opposite occurs beyond primary school attainment of mothers.

- Father's education tends to favour boys more than girls – both primary and at least junior secondary school attainment of fathers are correlated with relatively higher school attendance for boys than girls in 1992 and 1999.

At the junior secondary school level, which coincides roughly with the age group 12–14 years, we see a switch in gender school attendance emphasis as far as mothers' primary educational status and school attendance rate between 1992 and 1999 are concerned. Unlike the 1992 pattern, we observe boys experiencing higher school attendance rates than girls (i.e., 91% vs. 86%). This apparent switch could be the result of more girls in this age group participating in labour market activities and hence experiencing more school dropout rates. Another plausible reason could be early motherhood.³

Household resources play a key role in the education of children. Following an approach similar to that of Thomas et al. (2003), we use per capita expenditures as proxy for household financial resources and show school attendance incidence for the different expenditure quartile group. The results, reported in Table 7, show a general trend towards increased school attendance for the various per capita expenditure categories.

Table 7: Household resources and school attendance rates for children in Ghana, 1992–1999: Age group 6–19 years

Quartile of expenditure per capita	1992		1999		Percentage change	
	Females (%)	Males (%)	Females (%)	Males (%)	Females (%)	Males (%)
Q1	56.8	65.9	67.4	73.9	18.7	10.8
Q2	63.4	71.7	75.2	79.6	18.6	9.9
Q3	68.2	76.3	77.8	81.9	14.1	6.8
Q4	72.7	84.7	77.8	83.3	7.0	-1.7

Note: Percentage change as indicated in the last two columns represents percentage change in enrolment for girls and boys between 1999 and 1992. A negative value implies a decrease in enrolment, and vice versa. Source: Author's calculations based on the Ghana Living Standards Survey micro data.

The rising attendance could be explained in terms of the general improvement in the standards of living of the average Ghanaian in recent times. Between 1992 and 1999, poverty incidence fell from 51.7% to 39.5%. At the same time the poverty gap ratio declined slightly from 36% to 35% (GSS, 2000). The attendance rates for boys and girls in the second and third expenditure quartiles are higher than those in the first quartile but lower than those in the fourth quartile. If school attendance rate is a positive function of household resources, then these patterns are not unexpected.

The determinants of school attendance in Ghana

Continuing our examination of the determinants of children's school attendance in Ghana, we focus here on parental education and household resource effects. As noted by Lillard and Willis (1994), the effect of parents' education on that of their children is one of the key factors in any consideration of the intergenerational transmission of human capital and economic wellbeing within families. Our econometric analysis of school

attendance determination revolves around the probability of females and males attending school in recent times. The survey asked the respondents whether they had attended school or college at any time during the past 12 months. The response to this question has been used to construct a dummy variable on school attendance (1=currently attends school; 0=does not attend school).

The analysis has been carried out in a comparative framework using data from 1992 and 1999. The results on the determinants of school attendance are reported in Table 8. To facilitate interpretation of results, the marginal impacts are shown together with the corresponding z-values. The likelihood ratio chi-squared test result shows that the model is well fit. The predicted probability for current school attendance increased from 63.1% in 1992 to 74.9% for female children. In the case of male children, the predicted probabilities for school attendance were 74.1% in 1992 and 80.2% in 1999.

Table 8: Probit estimates for the determinants of current school attendance by children in Ghana (age 6–20 years)

	1992 Females		1992 Males		1999 Females		1999 Males	
	Marginal effect	Z-value	Marginal effect	Z-value	Marginal effect	Z-value	Marginal effect	Z-value
<i>Mother's educational status</i>								
Primary	0.118**	2.08	-0.064	-1.28	0.087**	2.51	0.044	1.31
Middle school or higher	0.125*	3.36	0.153*	4.76	0.121*	4.43	0.084*	3.21
Don't know mother's education	-0.266**	-2.47	-0.026	-0.22	-0.056	-0.78	-0.094	-0.99
Mother's ed missing	0.088*	3.52	0.040***	1.93	0.110*	5.51	0.071*	4.02
<i>Father's educational status</i>								
Primary	0.163*	3.26	0.089***	1.92	-0.035	-0.85	-0.002	-0.06
Middle school or higher	0.163*	5.95	0.065*	2.63	0.057*	2.66	0.049**	2.47
Don't know father's education	0.011	0.14	-0.142***	-1.78	0.022	0.54	0.027	0.74
Father's ed missing	0.143*	5.52	0.026	1.23	0.104*	5.09	0.044**	2.46
<i>Individual & household characteristics</i>								
Log(expenditure per capita)	0.119*	7.70	0.089*	6.81	0.084*	7.59	0.057*	5.98
Child's age: 6 to 8 yrs	0.159*	5.20	0.016	0.58	0.154*	6.94	0.077*	3.75
Child's age: 9 to 11 years	0.252*	8.34	0.113*	4.10	0.188*	8.39	0.129*	6.10
Child's age: 12 to 14 years	0.199*	7.94	0.136*	6.42	0.157*	8.37	0.131*	7.94
Child's age: 18 to 20 years	-0.363*	-11.38	-0.319*	-11.53	-0.352*	-14.13	-0.317*	-14.16
Siblings under 6 years old	-0.137*	-3.17	-0.060***	-1.65	-0.121*	-3.17	-0.041	-1.23
Siblings 7 to 11 years old	0.023	0.78	0.053**	2.06	-0.039	-1.61	0.006	0.30
Christian	0.233*	10.46	0.200*	11.05	0.243*	9.29	0.204*	9.89
Muslim	0.028	1.01	0.068*	3.22	0.097*	3.74	0.107*	5.49
Urban resident	0.018	0.81	0.037***	1.93	0.019	1.09	0.053*	3.45
<i>School characteristics</i>								
Lack of school buildings	-0.046**	-2.07	-0.068*	-3.67	-0.054*	-3.10	-0.036**	-2.41
Lack of teachers	-0.044	-1.04	-0.121*	-3.45	-0.063**	-2.46	-0.020	-0.91
<i>Survey administration period</i>								
January to March	0.023	0.90	0.024	1.10	0.050**	2.55	0.078*	4.78
April to June	-0.020	-0.77	0.038***	1.74	-0.038**	-2.24	0.019	1.29
October to December	-0.020	-0.80	0.001	0.03	0.061*	3.35	0.038**	2.33
LR chi(23)	995.14		831.47		1183.01		993.27	
Pseudo R ²	0.194		0.164		0.195		0.176	

Continued

Table 8, continued

	1992		1999	
	Females	Males	Females	Males
	Marginal effect	Z-value	Marginal effect	Z-value
No. of observations	3841	4200	5082	5205
Observed probability of attendance	0.614	0.707	0.717	0.767
Predicted probability of attendance	0.631	0.741	0.749	0.802

Notes: *, ** and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively.

(a) Educational levels are dummy variables with values of 1 if specific level occurs and zero if otherwise. The omitted group is "no schooling"

(b) The age groups are dummy variables with a value of 1 if the relevant age group applies and zero if otherwise. The omitted group is children between the ages of 15 and 17 years.

(c) The religious affiliation variables are dummy variables. The omitted group is traditional and other religions.

(d) Urban residence is a dummy variable. It has a value of 1 if child lives in an urban area and zero if he/she resides in a rural area.

For both females and males in the 1992 and 1999 models, mothers' and fathers' educational attainment, especially at higher levels relative to no schooling, significantly increase the probability of children attending school in recent times (i.e., any time during the past 12 months prior to the survey period). The positive effect of parent's education on school enrolment or attendance of children has been found in empirical studies such as Glick and Sahn (2000) on Guinea, Tansel (2002) on Turkey, Tansel (1997) on Côte d'Ivoire and Ghana, and Oliver (1995) and Glewwe and Jacoby (1994) on Ghana.

Using household per capita expenditures as a proxy for household resources, Table 8a shows this variable is a significant determinant of school attendance for both girls and boys.⁴ In both the 1992 and 1999 models, the impact of household resources on children's school attendance is seen to be higher for girls than for boys. In 1992, the marginal impact of household resources on girls' school attendance was 1.3 times larger than it was for boys (i.e., 0.119 vs. 0.089). In 1999, the household resource impact was 1.5 times higher for female than male children (i.e., 0.084 vs. 0.057). These results must not be misconstrued to mean that household resources are less important in the school attendance of boys. On the contrary, in a given context of limited household resources and the choice between schooling for girls and for boys, higher amounts of financial resources ease this constraint and puts girls in a better position to attend school.

In 1992 Ghana's economy grew by 3.9% compared with 5% in the previous year (Bank of Ghana, 1996). In 1999 Ghana experienced a relatively better macroeconomic performance with a GDP growth rate of 4.4% (Bank of Ghana, 2001). During these two periods, poverty incidence fell from 52% in 1992 to 40% in 1999 (Ghana Statistical Service, 2000). These trends underscore the relevance of household resources. During periods of "tight" household resources (such as periods of higher poverty prevalence), the availability of additional flows of resources appears to exert a relatively stronger impact on the likelihood of girls attending school, and where resources are "loose" (due to good macro performance and poverty reduction) this constraint is reduced to some extent, and so is the impact on school attendance.

The age of children is seen to be a significant determinant of their school attendance. Apart from the age of children, the presence of younger siblings, relative to older ones, tends to reduce the probability of school attendance. The reduction in the probability of schooling by virtue of having younger siblings is higher for girls than for boys. This finding is consistent with previous studies on school attendance, and is driven by socio-cultural norms and practices on gender roles in households. School quantity and quality variables also play an important role in school attendance. The lack of school buildings (relative to availability of school buildings) and lack of qualified teachers (relative to availability of qualified teachers) in any given community are negatively associated with school attendance for boys and girls.

Did the parents' schooling levels and household resource effects on children's school attendance change between 1992 and 1999? In order to answer this question a t-test was conducted on the various models estimated. The results are summarized in Table 9. It appears that for boys and girls the impact of household resources on school attendance declined, statistically speaking. Father's schooling effects on the education of their girl-children decreased between 1992 and 1999. Mother's schooling effects in 1992 were not significantly different from what was realized in 1999. However, the effects of mother's schooling levels on school attendance of boys appear to have changed between 1992 and 1999; so has father's primary schooling effects.

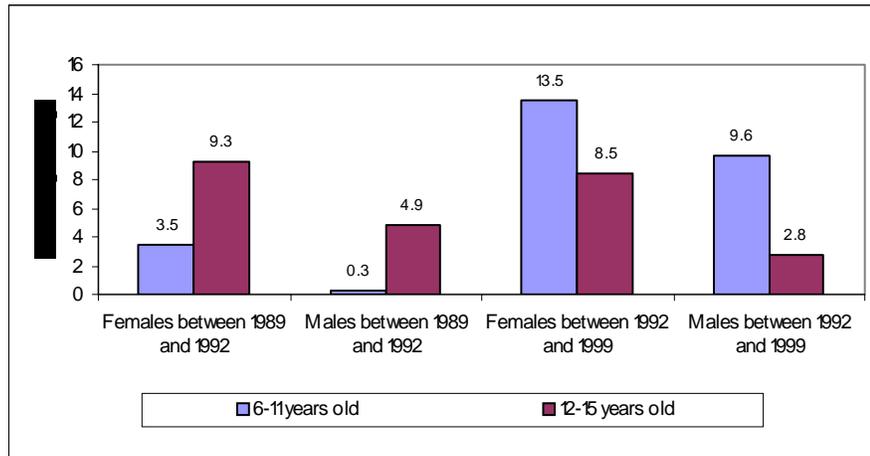
Table 9: Testing for difference in parents' schooling and household resource impacts on school attendance of children between 1992 and 1999

Ho: Parents school and resource impacts for 1992 same as that for 1999				
	1992 and 1999 female models		1992 and 1999 male models	
	Difference in marginal effects	t-test	Difference in marginal effects	t-test
Mother's primary school	-0.031	-0.51	0.108	1.76***
Mother's middle school or higher	-0.004	-0.11	-0.070	-2.09**
Father's primary school	-0.198	-3.26*	-0.092	-1.64***
Father's middle school or higher	-0.105	-3.20*	-0.017	-0.55
Log (expenditure per capita)	-0.035	-1.85***	-0.032	-1.95**

Note: *, ** and *** denote the difference is statistically significant at the 1%, 5% and 10% levels, respectively, and therefore the null hypothesis of equality of coefficients for 1999 and 1992 is rejected (one-tailed).

School attainment: Trend and determinants

School attainment has improved for both boys and girls in Ghana. This trend is displayed in Figure 5. The percentage of sons and daughters with no schooling has fallen. There are relatively more females and males with middle school or junior secondary school attainment than in the past. Also, modest improvements in senior secondary and post senior secondary school attainments have occurred for both males and females (see Figure 5).

Figure 5: School attainment in Ghana (13–30 years old): 1992–1999

Source: Author's calculations based on survey data from the GLSS2 and GLSS4.

In examining the determinants of level of school attainment, ordered probit models were estimated separately for males and females for 1992 and 1999. The level of educational attainment is ranked as follows: none; primary; middle school/junior secondary school level (JSS); senior secondary school level (SSS); and post senior secondary school level. The results are reported in Table 10. We must point out that interpreting the coefficients from an ordered probit model is difficult. A positive coefficient for a given variable in the model indicates that the variable increases the probability of the highest educational outcome and at the same time reduces the lowest educational outcome. However, the effect on the intermediate outcomes is unknown without further calculations. More specifically, in order to ascertain the effect of a specific explanatory variable on the intermediate educational outcomes, it is necessary to calculate marginal effects. Because the marginal effects depend on the levels of all variables, these have been computed at the mean values of all variables.

The results reported in Table 10 show positive coefficients on the following variables: mother's primary and middle schooling or higher; father's primary and middle schooling or higher; household expenditure per capita (i.e., household resources); child's age; Christian and Moslem children; and urban residents. The positive coefficients imply that these variables increase the highest educational outcome for sons and daughters and reduce the lowest outcome for these children. On the other hand, the lack of school buildings and qualified teachers increases low school attainment and decreases the highest attainment of schooling. The marginal impact of major variables of school attainment levels has been reported in Table 11.

**Table 10: Ordered probit models on school attainment for sons and daughters:
Age group 13–30 years: 1992 and 1999**

Dependent variable: Ranked levels of school attainment								
Estimation technique: Ordered probit								
	Female 1992		Male 1992		Female 1999		Male 1999	
	Coef	Z-value	Coef	Z-value	Coef	Z-value	Coef	Z-value
<i>Mother's educational status</i>								
Primary	0.282**	2.37	0.024	0.18	0.426*	4.78	0.206***	1.93
Middle school or higher	0.460*	5.54	0.191**	2.14	0.626*	9.38	0.463*	6.06
Don't know mother's education	0.221	0.85	0.242	0.63	0.072	0.48	0.027	0.11
<i>Father's educational status</i>								
Primary	0.753*	6.64	0.265**	2.19	0.333*	3.43	0.263**	2.35
Middle school or higher	0.688*	11.49	0.451*	7.08	0.476*	9.41	0.354*	6.32
Don't know father's education	0.196	1.24	-0.135	-0.73	0.362*	3.97	0.196***	1.71
Mother's education missing	0.398*	6.98	0.167*	3.12	0.570*	11.80	0.275*	5.72
Father's education missing	0.592*	9.39	0.233*	4.09	0.351*	6.51	0.248*	4.77
<i>Individual & household characteristics</i>								
Log(expenditure per capita)	0.378*	10.99	0.320*	9.45	0.371*	13.42	0.302*	10.87
Child's age	0.309*	8.62	0.322*	8.76	0.359*	12.04	0.447*	13.73
Child's age squared	-0.006*	-7.60	-0.006*	-6.80	-0.008*	-10.89	-0.009*	-11.22
Christian	0.537*	9.53	0.659*	12.01	0.878*	12.59	0.746*	12.21
Muslim	-0.267*	-3.53	-0.163**	-2.35	0.319*	3.79	0.319*	4.22
Urban resident	0.216*	4.22	0.279*	5.34	0.229*	5.13	0.299*	6.40
<i>School characteristics</i>								
Lack of school buildings	-0.167*	-3.07	-0.123**	-2.28	-0.107**	-2.33	-0.023	-0.50
Lack of teachers	-0.288*	-2.63	-0.085	-0.86	-0.003	-0.05	-0.042	-0.59
<i>Cut points for levels of school attainment</i>								
μ_1	8.201*	15.49	7.132*	13.48	9.445*	20.16	8.922*	18.15
	9.678*	18.09	8.864*	16.52	10.941*	23.11	10.698*	21.46
	11.234*	20.57	10.239*	18.87	12.403*	25.78	11.989*	23.77
	11.925*	21.49	10.810*	19.82	13.234*	27.15	12.754*	25.14
Chi ²	1195.1		1033.7		1505.4		1299.6	
Log likelihood	-3144.3		-3115.2		-4532.9		-4194.4	
Pseudo R ²	0.160		0.123		0.142		0.134	
No. of observations	3179		2992		4296		3861	

Note: *, ** and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Generally, the results in Table 11 support our hypotheses that parental education matters as far as children's educational attainments are concerned. The importance of household resources in school attainment is clear. Locality differences exist as far as children's school attainment is concerned. Residing in urban areas, relative to rural areas, not only reduces the chances of children not going to school, but also increases the schooling levels to be attained. Children residing in rural areas, well known for relatively higher incidence of poverty, are more likely not to go to school, and when they do, are likely to have lower educational attainments, *ceteris paribus*.

Table 11: Marginal effects for ordered probit models

	Daughters 1992				Sons 1992			
	School attainment levels				School attainment levels			
	Primary school	Middle sch/JSS	SSS	Post SSS	Primary school	Middle sch/JSS	SSS	Post SSS
Mother's primary schooling	-0.005	0.079**	0.007***	0.002	-0.004	0.007	0.001	0.000
Mother's middle school or higher	-0.020***	0.132*	0.014*	0.003*	-0.036***	0.054**	0.010***	
Father's primary schooling	-0.080*	0.222*	0.032*	0.008**	-0.054***	0.075**	0.015***	0.007
Father's middle school or higher	-0.024*	0.193*	0.021*	0.005*	-0.092*	0.127*	0.026*	0.012*
Log(expenditure per capita)	0.016*	0.098*	0.007*	0.001*	-0.050*	0.090*	0.015*	0.006*
Child's age	0.013*	0.080*	0.006*	0.001*	-0.050*	0.091*	0.015*	0.006*
Child's age squared/100	-0.026*	-0.163*	-0.012*	-0.002*	0.093*	-0.167*	-0.028*	-0.011*
Urban resident	0.006*	0.057*	0.005*	0.001*	-0.048*	0.079*	0.014*	0.006*
Lack of school buildings	-0.010**	-0.042*	-0.003*	-0.001**	0.018**	-0.034**	-0.006**	-0.002**
Lack of teachers	-0.028***	-0.067*	-0.004*	-0.001*	0.012	-0.024	-0.004	-0.001
Predicted probability	0.538	0.194	0.007	0.001	0.586	0.272	0.022	0.007
	Daughters 1999				Sons 1999			
	Primary school	Middle sch/JSS	SSS	Post SSS	Primary school	Middle sch/JSS	SSS	Post SSS
Mother's primary schooling	-0.075*	0.125*	0.029*	0.006*	-0.060***	0.052**	0.022***	0.007
Mother's middle school or higher	-0.119*	0.179*	0.048*	0.010*	-0.141*	0.107*	0.055*	0.021*
Father's primary schooling	-0.054**	0.098*	0.021*	0.004**	-0.077**	0.065**	0.029**	0.010***
Father's middle school or higher	-0.066*	0.139*	0.028*	0.005*	-0.101*	0.089*	0.038*	0.013*
Log (expenditure per capita)	-0.038*	0.109*	0.018*	0.003*	-0.080*	0.080*	0.029*	0.009*
Child's age	-0.036*	0.105*	0.017*	0.003*	-0.119*	0.118*	0.043*	0.013*
Child's age squared/100	0.077*	-0.222*	-0.037*	-0.006*	0.229*	-0.228*	-0.082*	-0.025*
Urban resident	-0.026*	0.067*	0.012*	0.002*	-0.082*	0.077*	0.030*	0.010*
Lack of school buildings	0.010*	-0.031**	-0.005**	-0.001**	0.006	-0.006	-0.002	-0.001
Lack of teachers	0.000	-0.001	0.000	0.000	0.011	-0.011	-0.004	-0.001
Predicted probability	0.534	0.278	0.021	0.002	0.533	0.342	0.052	0.011

Note: *, ** and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively. The predicted probabilities reported in the table do not sum up to 1 because the "no school attainment" variable has not been included.

Table 12 examines the change in the marginal impact of parent's higher level of schooling on children's school attainment between 1992 and 1999. We focus on school attainment of children beyond the primary level. The results show that with the exception of father's education effects on middle school/JSS attainment of sons and daughters, there appears to have been an increase in the impact of parent's education on higher levels of educational attainment of sons and daughters. The impact of household resources on school attainment at the JSS level was not statistically different in 1999 from what occurred in 1992. For sons and daughters at the senior secondary school level, however, the impact of household resources increased over the seven-year period under consideration. This finding could be driven by the fact that free and compulsory education ends at the basic level of education (i.e., from primary through JSS). Beyond that, household resources play one of the key roles in determining accessibility to senior secondary and higher levels of education.

Table 12: Testing for difference in parents' schooling and household resource impacts on school attainment for sons and daughters between 1992 and 1999

Ho: Parent's school an resource impacts for 1992 are same as that of 1999

	Primary school		Middle school/JSS		Senior secondary		Post senior secondary	
	Difference	t-test	Difference	t-test	Difference	t-test	Difference	t-test
<i>Daughters attainment model</i>								
Mother's middle school or higher	-0.0991*	-4.71	0.0477	1.53	0.0336*	3.87	0.0073*	2.65
Father's middle school or higher	-0.0423*	-3.31	-0.0538**	-2.33	0.0072	1.34	0.0004	0.25
Log(expenditure per capita)	-0.0534*	-9.59	0.0106	0.85	0.0106*	4.71	0.0015**	2.31
<i>Sons attainment model</i>								
Mother's middle school or higher	-0.1050*	-3.29	0.0523***	1.79	0.0451*	3.60	0.0166*	2.79
Father's middle school or higher	-0.0090	-0.38	-0.0383***	-1.73	0.0112	1.33	0.0005	0.12
Log(expenditure per capita)	-0.0299*	-3.02	-0.0106	-0.85	0.0136*	3.75	0.0026	1.61

Note: *, ** and *** denote the difference is statistically significant at the 1%, 5% and 10% levels, respectively, and therefore the null hypothesis of equality of coefficients for 1999 and 1992 is rejected (one-tailed). The "difference" is calculated by subtracting the marginal impact in 1992 from 1999. Thus, a positive number for the difference implies the marginal impact in 1999 was larger than it was in 1992.

6. Conclusion

We have examined the impact of parental education and household resources on the education of children. Our results support the notion of the significance of mothers' and fathers' education and financial resources at the disposal of households in charting a future course of life for their children through current investments in their schooling. For all age groups and for both girls and boys, school attendance is on the rise. More especially, girl-children are experiencing a faster rate of growth in school attendance than boys, and this trend appears to be narrowing the gender gap in education. Household resources continue to play an important role in the education of children, and higher expenditure quartiles tend to be associated with higher rates of school attendance for children.

Children of parents with no school whatsoever face the worst educational prospects, while those who have parents with at least high school education have by far the best educational prospects. Holding other factors constant, higher levels of parental education tend to reduce the probability of children not attending school. It appears that for both boys and girls the impact of household resources on school attendance has reduced, statistically speaking. Father's schooling effects on the education of daughters decreased between 1992 and 1999. Mother's schooling effects in 1999 were not significantly different from what they had been in 1992. However, the effects of mother's schooling levels on school attendance of boys appear to have declined between 1992 and 1999.

It appears that parents' long-term human capital endowment as represented by their educational status tends to be more important for the long-term human capital endowment of their children (in terms of educational attainment) than short-term tendencies (as reflected in current school attendance). This could be because children may be out of school and back to school again on a temporary basis. Although this will delay school completion, it is not likely to alter their ultimate stock of educational endowment for their time horizon. A child may drop out of school for a season but with encouragement from parents, underpinned by their own schooling experiences, it may be possible to get the child back to school. Moreover, in terms of current school attendance, the survey administration period matters. In such a situation, the incidence of current school attendance could be survey period-sensitive.

Our main hypothesis that the effects of mothers' and fathers' education on school attendance of children are significantly different from each other has been confirmed. Also, our study confirmed our hypothesis that irrespective of time, additional household resources exert a positive effect on school attendance by children. Without doubt, education matters and has an intergenerational impact. Arguably, sustainable poverty reduction approaches cannot ignore the role of education and its implications for employment, earnings and social development. Hence, gender sensitive policies to ensure educational equity are vital.

Notes

1. See Jolliffe (2004), Maitra and Ray (2004), Edwards and Ureta (2003), Glick and Sahn (2000), and Strauss and Thomas (1995) for further exposition.

2. In terms of marginal impacts of the right-hand side variables on schooling (i.e., child quality) the following are expected, a priori:

$$\partial S/\partial W > 0; \partial S/\partial P < 0; \partial S/\partial Y > 0; \partial S/\partial C > 0 \text{ or } < 0$$

3. A study on adolescent fertility and reproductive behaviour in Ghana by Nabila and Fayorsey (1996) noted that sexual activity among adolescents commenced at an average age of 16 years. The earliest age of commencement was 10 years. They observed that most pregnancies occurred with the ages of 10–14 years among adolescents in the city of Kumasi, compared with 15–19 years in the city of Accra. The issue of adolescent sexuality, therefore, appears to be more pronounced in Ghana's major urban cities. The main reasons accounting for this trend are poverty, unemployment, peer pressure, moral degradation, the spate of divorce, and adolescents' general lack of knowledge about reproductive behaviour and implications.

4. The need to use instruments for the household consumption expenditure per capita variable is due to the potential endogeneity of this variable. We acknowledge the difficulty in getting appropriate instruments from our survey data sets to be used in predicting long-term resources of the household. This approach was abandoned, after an initial attempt.

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