Impact of Child Labour on School Attendance and School Attainment: Evidence from Bangladesh

Rasheda **KHANAM**
Discipline of Economics
University of Sydney
N.S.W. 2006
Australia.
r.khanam@econ.usyd.edu.au
Phone: +61 2 9036 9187
Fax: +61 2 9351 4341
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ABSTRACT

This paper uses data from Bangladesh to examine household decisions involving child schooling and child labour. Using Multinomial logit model, we first estimate the determinants of household's decision to put a child in one of the four states - 'schooling' 'working', 'combining schooling and work', or doing nothing for 5-17 year old children. The paper then looks at the impact of work on child's current school attendance and school attainment using logit model. Multinomial logit results show that the education of parents significantly increases the probability that a school-age child will specialise in study. Empirical results further show that if the father is employed in a vulnerable occupation, for example, day-labour or wage-labour, it raises the probability that a child will work full time or combine work and study. The presence of very young children (ages 0-4) in the household increases the likelihood that a school-age (5-17) child will combine study with work. The significant and positive gender coefficient suggests that girls are more likely than boys to combine schooling with work. However, the central message from this study is that child labour adversely affects the child's schooling, which is reflected in lower school attendance and lower grade attainment. School attendance suffers most compared to grade attainment. The gender-disaggregated estimates confirm that work has much devastating effect on current school attendance and grade attainment of girls than that of boys.

JEL Classification: I21, D12, J13, O53

KEYWORDS: Child labour, School Attendance, School Attainment, Bangladesh.

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1. Introduction

The goal of achieving universal primary education has been one of the main objectives of Bangladesh government since the country's independence in 1971. The increasing trend of school enrolment rate in Bangladesh over the years though seems consistent with this goal, child labour is still far from over. Recent labour force survey 1999-2000 revealed that labour force participation rate of children ages 10-14 was about 39 per cent in 2000, which is strikingly high compared to other countries in the region. This increasing trend in school enrolment is not reducing child labour force participation because a large majority of children are also combining school and work along with those who are only working (not studying at all).

In developing countries, children are making remarkable economic contribution to their families. Therefore, opportunity cost involved with school attendance will be substantial to the parents, particularly, if the return associated with time spent at school does not justify the loss of a child's economic contribution. In this case parents may be reluctant to send a child to school. It is also argued that there is a trade off between child labour (current income) and accumulation of human capital through education. Putting a child in productive activities may increase current income but will seriously undermine her human capital development. Therefore, parents' failure to internalise the trade-off between child labour and earning ability will result in high incidence of child labour. A child can go to school full time or can work full time or can combine work and school or can do neither work nor study. However, children's time allocation into different activities will be determined by the parents.

This study proceeds in two steps. First, the paper examines the factors that affect parental decisions to put the children (ages 5-17 years) in child labour and schooling. In the second step, the focus is on the impact of child work on child's school attendance and school attainment.

Previous studies on the consequence of child labour on schooling in developing countries have paid attention on the impact of child labour on school attendance or enrolment ignoring school achievement. These studies have found mixed results. For example, Ravallion and Wodon's (2000) study on Bangladesh found that child labour and

school enrolment were not mutually exclusive. Another study by Boozer and Suri (2001) on Ghana found that an hour of child labour decreases school attendance by .38 hours. Psacharopoulos (1997) found that a child is working reduces his/her educational attainment by about 2 years of schooling. Similarly, Levy (1985) and Rosenzweig and Evenson (1977) reported that child labour markets lower school enrolment and attendance.

Nevertheless recent empirical studies[1] argue that school enrolment or attendance are not ideal measures of potential negative effects of child labour on learning because these are only indicators of the time input into schooling not schooling outcomes. For example, Gunnarsson et al. (2004) argued from Latin American experience that an employed child may be enrolled at the same time and even could attend school by sacrificing her leisure. But, still child work has the potential to harm child's school outcomes by limiting time spent on study, or leaving the child too tired to make efficient use of time in school (Orazem and Gunnarsson 2004). Therefore, it is important to measure school outcomes (for example, test score, schooling-for-age) instead of simply measuring child's time in school (such as, school attendance) to explore real impact of child work on schooling. However, in a traditional developing country like Bangladesh, schooling/learning outcome (such as test score, schooling-for-age) cannot reflect the complete picture of learning achievement; because enrolling all school aged children in school is still a major development challenge of Bangladesh government. Therefore, school attendance is an important measure of educational performance in the context of Bangladesh. However, 'years of schooling' is not an ideal measure of school attainment for this study as sample considered in this study is for young children ages 5-17 years. Other measures of schooling outcome, such as test score, are not always available for a country like Bangladesh.

As there has been a criticism over the use of school enrolment or attendance as an appropriate measure of potential harm of child labour on education, this study also uses schooling-for-age to measure schooling outcome. Schooling–for–age (SAGE) is an appropriate measure of school attainment relative to the child's age, when the sample is

[1] See for instance, Heady (2003), Gunnarsson et al. (2004) and Rosatti and Rossi (2001).

younger and still in school (Orazem et al. 2004). Therefore SAGE is used an appropriate measure of school attainment for the sample in this study.

The rest of the paper proceeds as follows: Section 2 outlines the theoretical framework. Section 3 describes the characteristics of the survey and data set and presents some selected descriptive statistics while section 4 looks at the correlation of child labour with schooling in rural Bangladesh. Section 5 presents the empirical model and estimation issues. The empirical results are reported in section 6. Finally concluding remarks are given in section 7.

2. Theoretical Framework

The theoretical framework adopted in this study is a household production model introduced by Becker (1965), and later developed by DeTray (1973) and Rosenzweig and Evenson (1977). Rosenzweig and Evenson (1977) adopted a household production function to study the multiple activities of children in a developing country. Subsequently, Ridao-Cano (2001) and Emerson and Portela (2001) adopted the same approach in a collective bargaining framework to examine the child time allocation to work and school. Continuing in this tradition and motivated by the Becker-type household models, this study use a general utility maximising framework to model the choices of child's school and activities as a reduced-form function of individual, household, parental and community characteristics. Children's activity is constrained by the household resources and time.

Hypotheses

Parental decisions regarding child's time use in schooling and work will be influenced by the following ways. For example, children's time use options are influenced by parental characteristics. Parental education influences child's school time use in two ways. Higher level of education of parents creates a positive effect on their child's schooling, as parental income is a positive function of their human capital. Educated parents are more likely to earn more income through farm production or wages that tend to increase schooling for their children. In other way, the level of parental education, especially mother's education, is an input of the human capital of children.

The higher will be this input the greater will be child's schooling, as mother acts as a house tutor for the children. Better-educated parents, particularly mother, have a comparative advantage to prepare their child for school lessons. Moreover, higher level of human capital in parents creates a high demand for schooling in their children. Educated parents value their child's education highly. Hence, children with better-educated parents will spend more time in schooling and less working. Other components of human capital of the parents, for example, occupation, are expected to show the same effect as education.

It is also expected that an exogenous increase in household non- labour income tends to increase child's schooling, which in turn would reduce child's work time (market work and household work). However, it is difficult to measure non-labour income in rural Bangladesh, as a large portion of population is engaged with self-employment**.** In the absence of data on non-labour income, Khandkar (1988) and Skoufias (1993) used total land holdings as a proxy of non-labour income.[2] However, Ilahi (2000)'s view about the use of total land as a proxy of non-labour income is that land holding is also a part of the production function of the household farm that creates additional labour demand on the family farm. Hence, the use of total land holding as a proxy of non-labour income is confusing, as it captures wealth and production aspects on it. Ilahi suggests to use a stock variable that captures non-labour and non-production aspects of the household wealth. Homestead area is, therefore, used as a proxy of non-labour income in the empirical analysis. An increase in operated land, which may be a component of household production function, is expected to decrease schooling and increase child labour by demanding additional labour on operated land.

The household composition is also expected to have an important influence on the time allocation of children. An increase in the number of pre-school children tends to have a negative effect on child's schooling by demanding more income for raising pre-school children, which increase expenditure of the household. Thus, an increasing demand for income puts pressure on school-age children to spend more time on income

[2] For a description about the proxies used for non-labour income in literatures, see, Ilahi (2000, p 15-16).

earning activities. On the other hand, pre-school children create more work in the form of childcare and housework for school-age children. As division of labour dictates that girls are to be engaged in housework and taken care of younger siblings, therefore presence of pre-school children are expected to increase work for girls.

The number of school-age children increases income of the rural household by increasing farm production. At the same time increased number of school-age children may also demand more human capital. Thus, the number of school-age children raises income and also cost of providing each child with one more unit of human capital. Therefore, it may tighten or relax the budget constraint depending on the net cost of school-age children.

The price of child's school time has two components: opportunity cost and direct cost of child's school time. The opportunity cost of school time is forgoing children's input to the household production, such as family farm or business or housework (and shadow child wage in the labour market), and the second component captures the direct costs of schooling, for example, books, tuition etc. Other components of school price, such as, school quality, travel time, and the level of human capital of parents also influence child's schooling. In the empirical model of this study, the distance to primary school and availability of secondary school are used to capture the opportunity cost of schooling. It is assumed that if other things being equal, a decrease in direct cost and indirect cost of schooling will increase parents' investment in child's education, and hence increase schooling and reduce child work.

It is also expected that children's time allocation will be determined by their age. Older children are expected to spend more time on working and therefore, less time on schooling. Parents may have different preference for sons' and daughters' schooling and work choice. Parents may also favour a particular birth order.[3] This difference may be due to prevailing social norms, different government policies, parental resource constraints, and, also it depends on the labour market returns to education of children. Parents or society may not view daughter as future earnings provider, as labour market returns to men's education may be higher than women's education (Rosenzweig and

[3] How the birth position of a child influences parental decision is discussed in detailed in chapter 7.

Schultz 1982). Children of the household head may allocate their time differently than the children of the other relatives of the household head.

3. Data and Descriptive Statistics

The data set used in this study comes from a survey titled 'Micronutrient and Gender Study (MNGS) in Bangladesh' administered by International Food Policy Research Institute (IFPRI). The data in this survey were collected during the period 1996-1997 as part of an impact evaluation of new agricultural technologies being originated through Non-Governmental Organizations (NGOs[4]). The survey collected extensive information from 5541 individuals in a sample of 957 households, and also conducted a detailed community survey. The three sites covered by the survey were Saturia, Mymensingh and Jessore. The Micro Nutrient and Gender Study (MNGS) survey is a 4-round panel survey[5]. However only data from the first round is analysed here.

For this study we select children in the age group 5-17 years. This study considers only the children who have both father and mother. The resulting sample size is 1628 children. Of these children, 61 per cent are male and, 85 per cent are the children of the household head.

The average age of children in the sample is just over 11 years old. Among 5-17 years of old, the average enrolment age is 6.3 and the average years of schooling 4.3 years. About 54 per cent of children in the sample can read and write and more than 26 per cent of children are illiterate. Another 8 per cent of children can sign only. The average total land holding by household is 175 decimals (1 decimal =408 square feet), whereas the average operated land is 114 decimal, and, the average homestead area is 21

[4] NGOs, private humanitarian organizations, work with the people (of the poor country) whose lives are dominated by extreme poverty, illiteracy, disease and other handicaps. They work for the socio-economic development of the chronically marginalized individuals, households and communities to enable them to achieve greater self-reliance in meeting human need.

[5] Round 1: June-September, 1996; Round 2: October-December, 1996; Round 3: February-May, 1997; Round 4: June-September, 1997.

decimals. The average year of schooling of father and mother is 3.6 and 1.6 respectively.[6]

4. Child Labour and Schooling in Bangladesh

4.1. Schooling Situation in Bangladesh

In Bangladesh, formal education is delivered mainly by the government. However, a non-formal education system offered by NGOs and government also exists side-by-side targeting the disadvantaged children and young adults. Formal education in Bangladesh, however, is divided into 5 years cycle of primary education, 5 years cycle of secondary education, 2 years of higher secondary education and 2-5 years of higher education.

The official age of entry into primary school is 6 years (according to the Primary Education Act, 1992), although many children attend school at the age of 4 or 5 years. Late entry into primary school is also very common in rural Bangladesh. Our data suggest that although average enrolment age is 6.3 in the study area, there are some children who enrolled in school at the age of 15 years.

In Bangladesh, primary education is compulsory for all children. The Government has established a universal primary education to prevent children from early labour. According to the Bangladesh Primary School Act (1992), a child of 6 years old must go to school. To make school attendance easier for children from poor parents, tuition fees and textbooks are supplied free of cost for all children up to grade 5 and up to grade 8 for female children. An alternative subsidy program, Food-For-Education, has also been implemented to help the destitute children and their parents. Despite all of these measures, a large proportion of school age children are not yet enrolled in school.

Data from the survey reveal that the non-enrolment rate is still high in Bangladesh. Figure 1 show that, by the age of 5, around 70 per cent of children is not yet

[6] In a few cases, approximately for 15 per cent children, parents do not refer to the parents of the observed child. Since we were unable to match the children who are not son/daughter of the household head with their parents; the characteristics of the household head and his/her spouse are used to proxy the parental characteristics. Therefore, when we refer to the father and mother, we really refer to either real parents or the proxy.

enrolled in school. The non-enrolment figure declines gradually up to 9 -11 years; after, 11 years, again, the rate rises.

Figure 1 depicts how non-enrolment rates vary across boys and girls. This figure shows an opposite picture of the conventional belief that boys receive more education than girls. Boy's non-enrolment rate is higher than girls at all ages except 14. This is probably because, in recent times, the government of Bangladesh with the help of World Bank introduced an incentive program to increase girls' school enrolment. From the age of 5, non-enrolment rates steadily decline to age 11 years for both boys and girls before it increases again. Girls' non-enrolment rises to 17.7 per cent at age 14 years, whereas, boys' non-enrolment is 14 per cent at the same age. At the age of 13, boys' non-enrolment rate is much higher than that of girls suggesting that boys enter the labour market from this age. Girls' non-enrolment rate again rises sharply from the age of 15. At the age 17, girls' non-enrolment rate is greater than boys. This possibly reflects the fact that girls have married or have withdrawn from school.

The survey collects data on current school attendance. Only 67.8 per cent of children of the total sample respond that they are attending school, while 2.2 per cent of children report that they are attending school sometimes. Conversely, 8.5 per cent of children report that they are not going to school. However, for 21.4 per cent of children, the information about their schooling is missing. In the sample, 74 per cent of children are being educated in a co-educational school and the average distance of the nearest school from residence is between .25-.5 miles. Around 76 per cent of children walk to school in all seasons. About 66 per cent of the children study at the formal public school, while 2.7 per cent of children study at formal madrasha[7] and remaining children receive non-formal education.

4.2. Reason for Drop out from School

For the children not currently attending school the main reason for leaving school has been reported in the data. Table 2 reports the causes of leaving school for 5-17 years old children. Children that dropped out of school (about 8.8 per cent of the total sample) are

[7] A kind of religious school run by government.

asked the reason for dropping out from school; 27 per cent leave school because their parents couldn't afford the expense; 27 per cent do not want to go to school; 13 per cent are deprived of schooling because their labour is essential for household work; and, another 4.2 per cent of children leave school because of working in the own farm or for other income generating activities. Another reason for dropping out is that parents are reluctant to send girls to school, which account for 8.3 per cent of total drop out. Many parents in Bangladesh believe that it is not appropriate to send girls to school. Religious beliefs strengthen their view of not sending girls outside their home after a certain age.

4.3 Measurement of Children's Work

The survey asks question about primary occupation and secondary occupation of all household members. To classify children's activities, however, we focus on the occupation of children reported by household head. We define work broadly by including non-wage work and housework.

We consider two occupations (primary and secondary occupation) as the key indicators to define child work. Work and study are not mutually exclusive categories; as we see in the data, some children are reported attending school, while at the same time they are performing some form of paid or unpaid work. So we create four mutually exclusive categories to define child's activity. These categories are – "study only", "work only", "work and study", and "neither work nor study". We classify the children, in "study only category", if their primary and secondary occupation is student or they do not have a secondary occupation. Similarly, "work only" category includes those children whose primary and secondary occupation is work or they do not have any secondary occupation but their primary occupation is definitely work. If a child works and attends school as well are included in "work and study" category. 'Neither work nor study' category includes all other children in the survey. They are neither going to school nor engaged in work, although they are in school going age.

Table 3 shows that only 48 per cent of children attend school as their only activity. This represents 50.8 per cent of all boys and 44.1 per cent of all girls. As seen from Table 3, another 17 per cent of children are engaged in work as their only activity.

5. Empirical model and Estimation Issues

5.1 Modelling Household Decision

The multinomial logit model is used to estimate simultaneously the determinants of 'work', 'study', combining both, or doing neither.

Let Y_i denote the polytomous variable with multiple unordered categories. Suppose there are j mutually exclusive categories and $P_{i1}P_{i2}\ldots\ldots\ldots\ldots Pi_j$ are the probabilities associated with j categories. In this case, we have four categories ($j = 4$);

$j = 0$ If the child attends school only,

$j = 1$ If child works and attends school,

$j = 2$ If the child neither work nor study,

$j = 3$ If the child works only.

Here, we consider study as reference category. These choices are associated with the following probabilities:

$$P_r(y_i = 0|x_i) = P_{i0} = \frac{1}{1+\exp(x_i'\beta_1)+\exp(x_i'\beta_2)+\exp(x_i'\beta_3)} = \text{probability of study (not working),}$$

$$P_r(y_i = 1|x_i) = P_{i1} = \frac{\exp(x_i'\beta_1)}{1+\exp(x_i'\beta_1)+\exp(x_i'\beta_2)+\exp(x_i'\beta_3)} = \text{probability of combining study and work,}$$

$$P_r(y_i = 2|x_i) = P_{i2} = \frac{\exp(x_i'\beta_2)}{1+\exp(x_i'\beta_1)+\exp(x_i'\beta_2)+\exp(x_i'\beta_3)} = \text{probability of neither work nor study,}$$

$$P_r(y_i = 3|x_i) = P_{i3} = \frac{\exp(x_i'\beta_3)}{1+\exp(x_i'\beta_1)+\exp(x_i'\beta_2)+\exp(x_i'\beta_3)} = \text{probability of work (not going to school,}$$

where β_1, β_2 and β_3 are the covariate effects of response categories study and work, neither work nor study and work only respectively with reference category study ($j = 0$) where $\beta_0 = 0$.

In general, for an outcome variable, Y_i with j categories, the probability can be modelled as:

$$P_r(y_i = j \mid x_i) = P_{ij} = \frac{\exp(x_i'\beta_3)}{1 + \sum_{j=1}^{j-1} \exp(x_i'\beta_j)} \text{ for } j \succ 0$$

and (2)

$$P_r(y_i = 0 \mid x_i) = P_{i0} = \frac{1}{1 + \sum_{j=1}^{j-1} \exp(x_i'\beta_j)}.$$

Now, we estimate the above model for the sample size n. Each of n individuals falls into one of the j categories, with the probabilities given by (2). Let x_i be the vector of explanatory variables, such as child, family and community characteristics. Thus for a model of k covariates, a total of (k+1)*(j-1) parameters are to be estimated. Then we use x_i to see the propensity of i towards j.

5.2 Modelling the Impact of Work[8]

In a simple household demand model, school enrolment or schooling progress is a function of individual, household and demographic factors. This analysis uses two dependent variables: one is for school attendance; the other is for school attainment. School attendance is a dichotomous variable taking the value 1, if the child is reported to be enrolled in school, and 0, if otherwise. An appropriate measure of school attainment is the "schooling-for-age"(SAGE) that measures school attainment relative to age. Patrinos and Psacharopoulos (1997) and Ray and Lancaster (2003) used "schooling-for-age" or "grade-for-age" as educational attainment indicator variable.[9] It is given by

$$\text{SAGE}^{10} = \{\text{Years of Schooling/Age-E}\} * 100 \quad (1)$$

Where E represents the usual school entry age in the country. "Schooling-for-age" measure of 100 indicates complete educational attainment (i.e. no falling behind), and

[8] The information about school attendance and years of schooling are not available for all 1628 children ages 5-17, therefore, the sample is restricted to 1441 children for whom complete information of schooling are available.

[9] Illahi (2000), Patrinos and Psacharopoulos (1995, 1997) also measure grade-for- age for schooling attainment.

[10] How SAGE is measured in this study is described in the appendix.

one of zero indicates none (i.e. completely falling behind). All those with a score under 100 are considered as being below normal progress in the school system. Therefore school attainment/outcome, the dependent variable, is considered as a dichotomous variable that takes 1 if a child is below normal progress (i.e. SAGE < 100) or falling behind in the schooling system. Both dependent variables are measured by logistic estimation procedure.

The explanatory variables included in the regressions are same as multinomial logit model except the cost of schooling variables. Distance to primary and secondary school is not appropriate measure of schooling cost in this study as data show that schools are not far away from the child's residence. Those variables, therefore, have been excluded from the logit regression analysis.

An additional explanatory variable, work, is included in the regression to test the impact of work on school attendance and school attainment. 'Work' is a discrete variable that takes 1 if the child is reported to be working (working includes housework, agricultural work and non-agricultural work) as his primary activity, 0 otherwise.

6. Estimation and Empirical Findings[11]

6.1 Determinants of Parental Decision

In empirical analysis, time use by children in different activities is used as dependent variable. Time use is represented by a variable taking value 0 if the child is reported attending school; 1 if the child attends school and works, 2 if the child neither works nor attends school; and, 3 if the child works only. Table 1 provides mean and standard deviation of the explanatory variables used in the empirical analysis.

To model the child's activity choices a multinomial logit model is estimated for the probability that a child will "work only", or combine both, or be in "neither" category as against "study only". The estimated coefficient, t-statistics and odds-ratios[12] of multinomial logit are reported in the Table 4.

[11] The analysis was conducted using LIMDEP 8.0.

[12] As multinomial logit model is a non-linear model, the marginal effects are less effective to interpret this model (Powers and Xie 2000), so odds ratios are used. In multinomial logit models, a change in Pr ($y_i = j$)

Child Characteristics

Child characteristics, such as age, gender, and whether the child is son/daughter of the head, appear to be important determinants of child labour and schooling decision. First let us consider the effect of age. The age coefficient is found to be significant for all categories ("work and study", "neither" and "work"). The probability of working and 'combining work and study' increases with age[13]. One explanation of this result is that older children either have completed their studies or failed to continue. It may be also the case, as children grow up they acquire more experience and more human capital which creates a prospect of higher wages that induces them to leave school. The significant negative age coefficient of 'neither work nor study' indicates that younger children are more likely to be in neither category. This finding tells a different story in case of Bangladesh whereas studies from other developing countries find that older children are more likely to be in neither category[14]. Levison et al.'s (2001) study in Mexico finds no significant effect of age on the probability of combining work and study and on the probability on "neither work nor study".

Table 4 confirms that if a child is the son or daughter of the head of household, he or she is more likely to specialise in study and less likely to specialise in work. This can be explained differently that if a child is not the son or daughter of the head, his or her odds to specialise in work are 9.25 times as greater as that of a child of the head of household. This coefficient shows significant positive effect on the probability of combining work and study, which implies that son and daughter of the household head is also likely to combine study and work as opposed to the children of other relatives of the household head. This reflects that household head favours his/her own child with schooling or at least to combine school and work.

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does not necessarily have the same sign as β_{jk} (Powers and Xie 2000:231). See Powers and xie (2000:230-234) for a detail review of interpreting results from multinomial logit models.

[13] Grootaert's (1999) study in Cote-d'Ivoire and Cigno and Rosati's (2000) study in India find the same effect on the probability of combining work with study and on the probability of 'neither work nor study'. Cigno and Rosati, however, find mixed effect of age on the probability of full-time work. Their findings show that probability of full time working decreases for the children up to 8 years old, then increases with the age up to age 12, then decreases again.

[14] See for example, Blunch and Verner (2000)

Now let us turn to the gender coefficient. Although the gender coefficient has no effect on the probability of working and on the probability that a child will neither study nor work (Table 4); it has significant effect on the probability of combining study and work. Female children are more likely to combine study with work, since the odds of combining study with work for girls are nearly 3 times as higher as those of boys. This result is not surprising, as we include housework in the definition of work. It is thus consistent with the finding of Levison, et al.'s (2001) who also find that if housework is included in the measurement of work, then, girls are 14.1 per cents points more likely than boys to combine work and study. However, other studies (for example, Grootaert, 1999; Maitra and Ray, 2002; Cigno and Rosati, 2000) that use conventional definition of work find that girls are less likely than boys to combine work and study.

Parent Characteristics

Among parental characteristics, both the education of father and mother and the occupation of father, have significant impact on child labour and schooling decision. Consistent with the theoretical assumption, empirical findings also reveal that the higher level of education of parents increases the likelihood that a school-age child will specialise in study relative to the likelihood that the child will "work only" or do neither. For example, the odds of working or doing nothing as opposed to schooling for children from illiterate father (used as reference category) are respectively (1/exp (-.902)) 2.47 and 3.35 times as great as those from better-educated father (who can sign and write) (Table 4). On the other hand, relative to children from better educated mother (who can sign and write), children from illiterate mother are 1.55 times more likely to combine study with work, 4.49 times more likely to be in neither category, and 2.23 times more likely to work fulltime as opposed to study fulltime. Mother's education further confirms that the schooling will be full-time rather than part-time (Table 4). Both parents' education significantly reduces the probability that a school-age child will be in neither category.

Among the other parental variables, age of the parents is found to be insignificant. Some of the coefficients of occupation variable, however, give significant results. For example, if father's occupation is trade, then it is more likely for a child to specialise in schooling. This gives the expected results that are predicted in the theoretical model. If a

father is engaged in trade then positive income effect dominates to keep the children in the school. On the other hand, if the father of a child is day labourer or wage labourer, then it reduces the probability that the child will 'study only' and increases the probability that the child will combine 'study and work' or 'work only'. For example, relative to reference category (father's occupation is farming), children of day/wage labourer are nearly one and half times more likely to combine study with work, or doing nothing and nearly three time more likely to work fulltime (Table 4).

Household Characteristics

The number of total members in the household raises the probability that a school-age child will "study only" relative to the probability that the child will "work only" or "work and study", but it has no effect on the probability of "neither work nor study". It is consistent with the argument that in a larger household with many potential workers the probability of any single child will be working is somewhat lower. An increase in the number of pre-school children reduces the likelihood of full-time schooling and indicates that schooling will be part-time with work. Theory also assumes that additional number of pre-school child tends to withdraw school-age children from schooling to work by the increased demand for child care time or by the increased cost of raising pre-school children.

Total land area owned by the household does not exhibit significant effect on child labour and schooling decision, where it is statistically significant, for example, on the probability of 'neither work nor study', the effect is weak. On the other hand, an increase in operated land is associated with the higher probability of combining study and work relative to 'study only'. This is consistent with our expectations. Since an additional amount of operated land tends to demand more labour that requires school-age children to be involved with farm work, because land and labour are complementary. The homestead area gives ambiguous results. However, the odds ratio is unity for all land coefficients, which denies strong link between land ownership and child labour. Cost of schooling variables are found to be insignificant, but where significant, it gives an unexpected sign. One possible explanation of this result is that school is not very far away from a child's residence.

6.2 Impact of Work on School attendance and School Attainment

The entire sample is stratified by gender and separate models are estimated for boys and girls. The sample is also stratified into age groups and separate estimates are computed for the younger age group ages 5-11 and for the older age group ages 12-17. Tables 5 –8 present maximum likelihood logit estimates for school attendance and SAGE. Marginal effects[15] are also reported, as they can be interpreted easily. Though the main hypothesis is to test the impact of work on current school enrolment and school attainment, a number of variables, such as child characteristics, household and parents characteristics, are also used as control.

School Attendance

The results support the main hypothesis that work has a substantial negative effect on child's school attendance and schooling progress measured by schooling-for-age. Estimates from all models confirm that school enrolment suffers most compared to grade attainment if a child's primary activity is work. Corresponding marginal effects indicate that work has, more or less, three times higher negative effect on school attendance than grade attainment. Column 3 of Table 5 reveals that relative to a non-working child, a working child is 89 percentage points less likely to be enrolled in school. The gender-disaggregated estimates confirm that work has much devastating effect on current school attendance of girls than that of boys. For example, Column 7 of Table 5 demonstrates that working girls are 93 percent less likely to be enrolled; on the other hand, working boys are 88 percent less likely to be enrolled in school (, Table 5, Column 5).

Though the main focus of this empirical investigation is to examine the impact of work on child's schooling progress, there are some important results emerged from this

[15] The marginal effects for binary models are unambiguous, as a positive coefficient implies a positive change in the probability (Powers and Xie 2000)

study that deserve special attention. For example, being a son/daughter of the household head, age of the child and parents' education appear to be significant determinants of school attendance. Being a child of the household head significantly increases the likelihood of current school attendance with the exception of the younger sample. Gender disaggregated result however confirms that being a son/daughter of the household head increases the probability of enrolment (by nearly 15 percentage points for male children as opposed to other relatives), particularly for boys (Table 5, Column 4) as girls' sample does not confirm this result.

The estimated coefficients of age are always very significant. The significant and positive coefficients of age indicate that the probability of school attendance increases with the age of a child. Age squared is also included as a regressor to examine the non-linearity in the age. The estimated coefficient of age-squared is negative and significant that indicates non-linearity in the age effect. However, age disaggregated older sample (Table 8) does not show a significant age effect for school enrolment with the exception of the younger sample (Table 7).

All estimated coefficients of gender variable in school enrolment equations show positive sign implying that female children are more likely to be enrolled. The coefficient is only statistically significant in older sample (12-17). These results confirm that the probability of school enrolment is higher for girls ages 12-17 than those of boys. This is an interesting finding in South Asian context; because evidence shows that girls are disadvantaged in school attainment in many developing countries, especially in South Asian countries. This result of this study is, however, consistent with the recent statistics released by Primary and Mass Education Division (PMED) of Bangladesh.

Let us turn to the results of parental education and occupation. Father's education appears to be more significant for school enrolment than mother's education. The marginal effects (Column 3 of Table 5) show that, relative to the reference category (illiterate father) the probability of current school enrolment is higher by 4.4 percentage points if father can sign only, is higher by 6.1 percentage points if father can sign and read. On the other hand, the probability of school attendance increases by 5.5 percentage points if mother can read and write relative to reference case of illiterate mother. Interestingly gender disaggregated sample reveals that mother's education (in this case

father's level of education is found to be statistically insignificant) is important for boys (Table 5, Column 5) school enrolment and father's education (in this case mother's education is found to be statistically insignificant) is important for girl's enrolment (Table 5, column 7). Age disaggregated sample shows that father's education is stronger than mother's education to increase the enrolment probability among young children. The probability of school enrolment among younger children increases by 6.3 percentage points if father can sign and write relative to reference case (illiterate father); on the other hand the corresponding increases in the probability are 5.1 percentage points if mother can read and write relative to illiterate mother (Table 7, Column 3). Estimated coefficients from the older sample reveal that parents' education has no effect on the enrolment probability among older children.

Father's occupation does not show any significant effect on school attendance for the entire sample. Gender disaggregated sample, however, reveals that the probability of current school enrolment is lower by 8.4 percentage points for male children whose father is day labourer/wage labourer relative to the male children from farming household (Table 5, Column 3). Young children (ages 5-11) from day-wage labourer father are 4 percent less likely to be enrolled in school (Table 7, Column 3). Similar to father's education, father's occupation also has no impact on the current school enrolment of the older children (ages 12-17).

There are some other results that are worth noting. For example, the estimated coefficients of the number of children ages 5-17 are always negative but insignificant with the exception of the girls' sample. The gender specific result suggests that an increase in the number of children ages 5-17 reduces the probability of enrolment of girls, but the corresponding marginal effects indicate that this effect is very negligible.

Schooling-for-Age (SAGE)

The estimated significant and negative coefficients of work variable provide strong evidence that work has potential to harm a child's schooling progress, though the detrimental effect of work is relatively lower on schooling progress than school attendance. For example, relative to a non-working child, a working child is 30 percentage points more likely to falling behind in grade attainment (Table 6, Column 3).

Gender specific results once again demonstrate that work has much harmful effect on girls' grade attainment than that of boys. The corresponding marginal effects suggest that a working girl is 36 percentage points more likely to falling behind in schooling progress (Table 6 Column 7) while a working boy is 26 percentage points more likely to falling behind (Table 6 Column 5).

Age-disaggregated sample reveals that older working boys (ages 12-17) are 22 percentage points more likely to falling behind in schooling progress than those of non-working boys (Table 7, Column 5). Surprisingly, the coefficient of work variable turns to be insignificant for younger children. Though, work has a significant negative effect on school attendance or current enrolment for young children (ages 5-11); but if they are enrolled once, surprisingly, work has no impact on their school attainment. There are two possible explanations of this result. Firstly, these children might be enrolled in school in due time; so they were not falling behind in schooling system. Secondly, young children who are enrolled may be less involved with work than older children, therefore, work does not have any negative effect on their school progress.

Now attention will be paid on the other determinants of SAGE. The estimates of school attendance equation show that whether a child is the son/daughter of the household is an important determinant for school current enrolment/school attendance, however, results from 'schooling-for-age' document that this variable has no real impact (for younger age group this variable is weakly significant) on grade attainment. Though the negative sign of this variable indicates that relative to other children in the household, son/daughter of the household is less likely to falling behind.

The estimated coefficients of age provide mixed results for SAGE. However, for younger children ages 5-11, age has no significant effect on school enrolment, while it has a significant positive effect on grade attainment. This implies that young children who are enrolled, they are less likely to falling behind within 11 years. Once again, age has no effect on school enrolment and schooling-for-age for the older children (12-17).

Now turn to the results of the education and occupation of parents. Parental education has much significant effect on schooling progress than current school enrolment. Also, all samples confirm that mother's education has a stronger effect than father's education on schooling progress. For the entire sample, relative to the reference

category of illiterate father, the probability of falling behind is lower by 8 percentage points for children whose father can sign only, is lower by 9.3 percentage points for children whose father can read and write (Table 6, Column 3). On the hand, compare to baseline category (illiterate mother), the probability of falling behind in grade attainment is lower by 12 percentage points if the mother can read only, is lower by 29 percentage points if mother can read and write (Table 6, Column 3). Age-disaggregated sample show that father's education has no effect on grade attainment of the older children. Mother's education, for example, if mother can read and write relative to being illiterate, decreases the probability of falling behind by 20 percentage points for younger children (Table 7). Hence it can be concluded that parents' education plays an important role to improve child's schooling progress. All these findings about the impact of parental education are consistent with the finding of Ray and Lancaster (2003). Ray and Lancaster (2003:32) argued that "better educated adults will, by ensuring that their children make more efficient use of the non labour time for study, will help to reduce the damage done to the child's learning by her work hours".

Now turn to the parent's occupation, father's occupation appears to have stronger effect on grade attainment than current school enrolment. Children from service holder father are less likely to falling behind in grade attainment. For example, Column 3 of Table 6 shows that relative to reference case of farming father, the probability of failing behind in grade attainment is lower by 18.2 percentage points for children whose father's occupation is service.

7. Summary and Conclusions

This paper first examines the household decisions involving child schooling and child labour, it then looks at the effect of work on school attendance and schooling progress. The central message from this study is that child labour adversely affects the child's schooling, which is reflected in lower school attendance and lower grade attainment. School attendance, however, suffers most compared to grade attainment. The gender-disaggregated estimates confirm that work has much devastating effect on current school attendance of girls than that of boys. Parental education has much bigger effect on schooling-for-age than school attendance. Interestingly the gender dis-aggregated

analysis reveals that father's education is important for the enrolment probability of girls; on the other hand, mother's education is important for the enrolment of boys.

The empirical findings from multinomial logit estimate also reveal that the education of parents significantly increases the probability that a school-age child will specialise in study. Empirical results also show that if the father is employed in a vulnerable occupation, for example, day-labour or wage-labour, it raises the probability that a child will work full time or combine work and study.

Most of the studies on child labour in developing countries find that boys are more likely to combine study and work. However, the significant and positive gender coefficient of this paper suggests that girls are more likely than boys to combine schooling with work in Bangladesh. Most of the girls in study areas are engaged in household work that allows them to combine school and work; because household work is more flexible than formal wage earning jobs. Another interesting finding of this study is that the analysis of the data shows that girls' enrolment rate is higher than boys at all ages. This is probably because there is an on going education subsidy program for girls' education in Bangladesh that attracts parents to send their daughter to school.

The findings of this study provide important directions for policy makers. As we see working is common among the older children, therefore, policy makers should target the older children that can not continue with school for various reasons and the older girls that are deprived from schooling as a result of early marriage. More attention should be paid to children of less educated and poor parents (estimated by occupation); as they cannot afford schooling. We also find that the children who are not the sons and daughters of the head of household are more likely to work than the sons/ daughter of the household head. This may reflect the fact that if the household head is resource constrained then it is more likely for him to choose his own child for schooling first.

Another important conclusion can be drawn from this study: if there is no subsidy program for girls' education then girls who are combining school and work would more likely to be found in work or in 'neither' children. Moreover, appropriate policy can shift children who are both attending school and working toward schooling as their primary

activity. Hence, the government of Bangladesh should continue the education subsidy program while more focus should be given to its proper and fruitful implementation.

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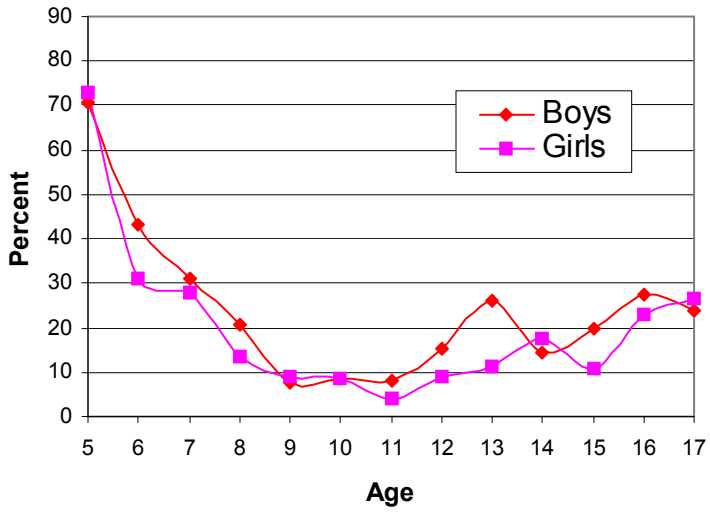
Table 1: Variable names and definitions, means and standard deviations (standard deviation in parentheses under means) of variables.

Variables Name	Definition	Total (N=1628)	Boys (N=993)	Girls (N=635)
Child Characteristics				
Female	Gender of child (1 if Female, 0 otherwise	.39(.48)	0(0)	1(0)
Son/daughter	1 if son/daughter of the Head, 0 otherwise	.85(.35)	.86(.34)	.83(.36)
Age	Age of Child	11.12(3.57)	11.27(3.59)	10.88(3.54)
Age Squared	Age of Child, squared	136.51(79.46)	140.04(80.33)	131(77.82)
Household Characteristics				
Children (5-17)	Number of Children in Household 5-17	2.84(1.26)	2.77(1.28)	2.95(1.23)
Children (0-4)	Number of Children in Household 0-4	.53 (.72)	.49(.71)	.59(.73)
Total Member	Number of Total Member in Household	6.57(2.74)	6.43(2.69)	6.79(2.81)
Total Land	Total Land measured in decimal (1 decimal = 408 square feet)	175.59(247.29)	173.73(234.00)	178.43(266.93)
Operated Land	Operated Land measured in decimal	113.86(156.33)	114.85(154.86)	112.32(158.71)
Homestead	Homestead measured in decimal	21.26(24.14)	21.41(23.69)	21.04(24.85)
Parents Characteristics				
Father Age	Age of Father	46.86(10.57)	47.01(10.75)	46.61(10.28)
Father Education				
Illiterate	1 if father is illiterate, 0 otherwise	.26(.44)	.26(.44)	.25(.43)
Can sign only	1 if father can sign only, 0 otherwise	27(.44)	.27(.44)	.26(.44)
Can read only	1 if father can read only, 0 otherwise	.02(.16)	.02(.16)	.02(.16)
Can read and write	1 if father can read and write, 0 otherwise	.43(.49)	.43(.49)	.45(.49)

Father Occupation				
Farming	1 if father's occupation is agriculture, 0 otherwise	.48(.49)	.48(.49)	.47(.49)
Service	1 if father's occupation is service, 0 otherwise	.11(.32)	.11(.32)	.12(.33)
Trade	1 if father's occupation is business, 0 otherwise	.16(.37)	.16(.37)	.16(.37)
Day/Wage Labourer	1 if father is day labour and wage labour, 0 otherwise	.19(.39)	.19(.39)	.21(.40)
Other Occupation	1 if father is engaged in other occupation than the occupation stated above, 0 otherwise	.03(.18)	.03(.18)	.02(.15)
Mother Age	Age of Mother	38.01(9.21)	38.12(9.27)	37.84(9.12)
Mother Education				
Illiterate	1 if mother is illiterate, 0 otherwise	.36(.48)	.39(.48)	.31(.46)
Can sign only	1 if mother can sign only, 0 otherwise	.36(.48)	.34(.48)	.39(.48)
Can read only	1 if mother can read only, 0 otherwise	.04(.20)	.03(.17)	.05(.23)
Can read and write	1 if mother can read and write, 0 otherwise	.23(.42)	.23(.42)	.23(.42)
Mother's Occupation	1 if mother does housework, 0 otherwise	.94(.22)	.94(.23)	.95(.21)
Cost of Education				
Distance to Primary School	Distance to the nearest primary school	.25(.43)	.28(.46)	.20(.38)
Secondary School	1 if there is any secondary school in the village, 0 otherwise	.87(.33)	.86(.34)	.88(.31)
Region Dummy				
Saturia	1 if household resides in Saturia, 0 otherwise	.31(.46)	.39(.48)	.20(.40)
Mymensingh	1 if household resides in Mymensingh, 0 otherwise	.36(.48)	.33(.47)	.41(.49)
Jessore	1 if household resides in Jessore, 0 otherwise	.31(.46)	.27(.44)	.37(.48)

Figure 1: Children not Enrolled in School by Age and Gender.



Source: MNGS in Bangladesh, 1996-97.

Table 2: Reason for Leaving School.

Cause	**Per cent**
Couldn't Afford	27.1
Sickness	4.2
Needed for Housework	13.2
Needed for Own Farm	0.7
Needed for Income Generating Activities	3.5
School too Faraway	6.9
Not Appropriate to send girls to School	8.3
Did not Want to Go	27.1
Other Reason	9
Total	100

Source: MNGS in Bangladesh, 1996-97.

Table 3: Activity Status of Children across Gender and Age (in per cent).

	Study Only	**Work and Study**	**Neither**	**Work Only**	**Total**
Gender					
Boys	50.8	18	11.9	19.3	100
Girls	44.1	30.7	11.8	13.4	100
Age					
5	26.9	0.9	72.2	0	100
6	59.4	1.0	39.6	0	100
7	60.0	8.2	30	1.8	100
8	77.7	5.1	16.2	0	100
9	79.3	10.3	7.0	3.4	100
10	69.7	22.1	4.1	4.1	100
11	58.8	35.3	2.5	3.4	100
12	50.6	33.1	0	16.3	100
13	35.0	37.6	0	28.4	100
14	37.6	39	0	23.4	100
15	24.6	37	0	38.4	100
16	23.1	30	0	46.9	100
17	17.2	26.8	0	56	100
Total	48.0	23.0	12.0	17.0	100

Source: MNGS in Bangladesh, 1996-97.

Table 4: Multinomial logit estimates for all children (The reference category is Study only).

	Study and Work			Neither			Work		
Variable Names	**Coefficient**	**t-statistics**	**Odds-ratio**	**Coefficient**	**t-statistics**	**Odds-ratio**	**Coefficient**	**t-statistics**	**Odds-ratio**
Constant	-9.252	-6.084		9.106	4.75		-12.5	-4.378	
Child Characteristics									
Female	1.037	6.659	2.82	-0.017	-0.078	0.983	-0.174	-0.815	0.84
Son/Daughter	0.595	1.97	1.81	-0.158	-0.358	0.853	-2.221	-8.075	0.108
Age	1.156	5.069	3.177	-1.43	-3.603	0.239	1.451	3.5	4.267
Age squared	-0.031	-3.379	0.969	0.034	1.407	1.034	0.029	-1.884	0.971
Household Characteristics									
Children (5-17)	0.039	0.475	1.039	0.223	1.759	1.249	-0.01	-0.114	0.99
Children (0-4)	0.34	2.76	1.404	-0.061	-0.326	0.94	0.102	0.619	1.107
Total member	-0.13	-2.641	0.87	0.028	0.397	1.028	-0.112	-1.937	0.894
Total land	0	1.038	1	-0.001	-1.656	0.999	0	-0.084	1
Operated land	0.002	1.95	1.002	-0.002	-1.292	0.998	0	-0.026	1
Homestead	-0.006	-1.622	0.994	0.019	2.389	1.019	-0.005	-1.208	0.99
Parent Characteristics									
Father's age	-0.017	-1.017	0.983	-0.022	-0.822	0.978	0.029	1.577	1.029
Father's Education (ref.: Illiterate)									
Can sign only	0.006	0.028	1.006	-0.79	-2.755	0.453	-0.607	-2.296	0.544
Can read only	0.54	1.112	1.716	-1.064	-1.279	0.345	0.242	0.387	1.273
Can read and write	-0.358	-1.629	0.699	-1.205	-3.845	0.299	-0.902	-3.369	0.405
Father's Occupation (ref.: Farming)									
Service	-0.364	-1.437	0.694	0.110	0.248	1.116	-0.438	-1.291	0.645
Trade	-0.565	-2.449	0.568	0.229	0.726	1.257	0.006	0.023	1.006
Day/wage labourer	0.395	1.774	1.484	0.388	1.194	1.474	0.995	3.452	2.704
Other Occupation	-0.276	-0.621	0.758	-0.069	-0.122	0.933	0.264	0.533	1.302
Mother's Age	0.015	0.736	1.015	0.003	0.084	1.003	-0.02	-0.916	0.98
Mother's Education (ref.: Illiterate)									
Can sign only	-0.227	-1.251	0.796	-0.399	-1.566	0.67	-0.609	-2.632	0.543
Can read only	-0.299	-0.738	0.741	-0.798	-1.25	0.45	-0.611	-1.094	0.542
Can read and write	-0.439	-1.922	0.644	-1.500	-3.966	0.223	-0.802	-2.726	0.448
Mother's Occupation	-0.332	-1.019	0.717	-0.087	-0.164	0.916	0.063	0.156	1.065
Cost of Education									
Distance to primary school	-0.188	-1.04	0.828	0.279	1.057	1.321	-0.071	-0.322	0.932
Secondary school	0.003	0.013	1.003	-0.033	-0.093	0.967	0.410	1.278	1.506
Region Dummies (ref.: Saturia)									
Mymensingh	-0.016	-0.079	0.984	0.166	0.564	1.18	0.497	1.903	1.644
Jessore	-0.061	-0.321	0.94	-1.117	-3.793	0.327	0.523	2.155	1.687
Chi squared				1471.672 (d.f.81)					
Pseudo R-squared				0.363					
Number of Observations				1628					

Table 5: Impact of Work on School Attendance

	All		Boys		Girls	
Variable	**Coefficient**	**Marginal Effects**	**Coefficient**	**Marginal Effects**	**Coefficient**	**Marginal Effects**
Constant	-11.089***	-0.861	-11.159***	-1.178	-13.669***	-0.38454
Child Characteristics						
Female	0.337	0.026				
Son/daughter	0.779**	0.078	1.033**	0.1465	0.995	0.041
Age	2.039***	0.158	2.011***	0.2123	2.514***	0.071
Age Squared	-0.083***	-0.006	-0.084***	-0.008	-0.099***	-0.003
Working	-5.822***	-0.894	-5.673***	0.023	-7.196***	-0.936
Household Characteristics						
Children (5-17)	-0.183	-0.014	-0.006	-0.001	-0.546**	-0.015
Children (0-5)	0.19	0.015	0.348	0.037	-0.11	-0.003
Total Member	0.019	0.001	0.026	0.003	0.051	0.001
Total Land	0.001	0	0.001	0	000	0
Operated Land	0.001	0	0.0002	0	0.004	0
Homestead	-0.017	-0.001	-0.017**	-0.002	0.004	0
Parent Characteristics						
Father's Age	0.013	0.001	0.020	0.002	-0.013	0
Father's Education (ref: Illiterate)						
Can sign only	0.634**	0.044	0.465	0.045	1.121**	0.026
Can read only	0.725	0.043	0.171	0.017	1.592	0.024
Can read and write	0.810***	0.061	0.558	0.057	1.446***	0.041
Father's Occupation (ref: Farming)						

Service	-0.259	-0.022	-0.403	-0.048	-0.139	-0.0041
Trade	-0.429	-0.038	-0.675**	-0.084	-0.028	-0.0008
Day/Wage Labourer	-0.54**	-0.048	-0.703**	-0.087	-0.228	-0.006
Other Occupation	0.037	0.289	-0.027	-0.003	0.026	0.0007
Mother's Age	0.013	0.001	0.012	0.001	0.004	0.0009
Mother's Education (ref: Illiterate)						
Can sign only	-0.108	-0.008	-0.162	-0.017	-0.064	-0.002
Can read only	0.837	0.001	-0.01	-0.001	0.212	0.005
Can read and write	0.858**	0.055	1.133**	0.096	0.518	0.012
Mother's Occupation	0.092	0.007	0.158	0.017	0.185	0.006
Region Dummies (ref: Saturia)						
Mymensingh	0.68**	0.048	0.157	0.016	1.731***	0.044
Jessore	0.814***	0.057	0.233	0.023	2.068***	0.057
Number of Observations	1441		875		566	
Chi squared	827.394		527.259		317.44	
Pseudo R2	0.560		.552		0.620	
Log likelihood function	-324.775		-213.91		-97.37	

*** indicates coefficients are significant at 1 % level, ** indicates coefficients are significant at 5 % level, and indicates coefficients are significant at 10 % level.

Table 6: Impact of Work on Schooling-for-Age

	All		Boys		Girls	
Variable	**Coefficient**	**Marginal Effects**	**Coefficient**	**Marginal Effects**	**Coefficient**	**Marginal Effects**
Constant	0.853	0.186	0.093	0.019	2.262	0.516
Child Characteristics						
Female	0.032	0.006				
Son/daughter	-0.409	-0.083	-0.317	-0.062	-0.443	-0.095
Age	0.152	0.033	0.278	0.058	-0.104	-0.023
Age Squared	0.004	0.001	-0.002**	0	0.015	0.003
Working	1.958***	0.302	1.735***	0.266	2.625***	0.368
Household Characteristics						
Children (5-17)	0.164**	0.035	0.071	0.014	0.346***	0.079
Children (0-5)	0.014	0.003	-0.008	-0.001	-0.007	-0.001
Total Member	-0.001	0	0.014	0.003	-0.019	-0.004
Total Land	-0.001**	0	-0.001*	0	-0.001	0
Operated Land	0	0	0.001	0	-0.001	0
Homestead	0	0	-0.002	-0.001	0.003	0.001
Parent Characteristics						
Father's Age	-0.02	-0.004	-0.019	-0.003	-0.012	-0.002
Father's Education (ref: Illiterate)						
Can sign only	-0.360**	-0.08	-0.362	-0.077	-0.414	-0.096
Can read only	0.055	0.011	0.921	0.155	-1.31**	-0.316
Can read and write	-0.426**	-0.093	-0.209	-0.043	-0.849***	-0.194
Father's Occupation(ref: Farming)						
Service	-0.776***	-0.182	-0.811***	-0.186	-0.703**	-0.169

Trade	0.137	0.029	0.094	0.019	0.318	0.07
Day/Wage Labourer	0.066	0.014	0.29	0.058	-0.207	-0.048
Other Occupation	0.077	0.016	-0.326	-0.071	1.112	0.203
Mother's Age	-0.008	-0.001	-0.012	-0.002	-0.011	-0.002
Mother's Education (ref: Illiterate)						
Can sign only	-0.105	-0.023	-0.142	-0.029	-0.099	-0.022
Can read only	-0.546*	-0.128	-0.687	-0.158	-0.595	-0.143
Can read and write	-0.993***	-0.294	-1.361***	-0.311	-1.193***	-0.284
Mother's Occupation	-0.037	-0.008	0.206	0.044	-0.58	-0.12
Region Dummies (ref: Saturia)						
Mymensingh	-0.33**	-0.073	-0.440**	-0.095	-0.198	-0.045
Jessore	-1.23***	-0.278	-1.096***	-0.243	-1.376***	-0.313
Number of Observations	1441		875		566	
Chi squared	421.998		259.702		184.9479	
Pseudo R2	0.221		0.228		0.241	
Log likelihood function	-744.644		-440.141		-290.967	

*** indicates coefficients are significant at 1 % level, ** indicates coefficients are significant at 5 % level, and indicates coefficients are significant at 10 % level.

Table 7: Impact of Work on School Attendance and Schooling-for-Age for Children Ages 5-11

	School Attendance		Schooling-for-Age	
Variable	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effect**
Constant	-8.699***	-0.5027	7.799***	1.9473
Child Characteristics				
Female	0.095	0.005	-0.014	-0.003
Son/daughter	0.631	0.045	-0.579**	-0.143
Age	1.318**	0.076	-1.511***	-0.377
Age Squared	-0.033	-0.002	0.108***	0.026
Working	-4.435***	-0.781	1.160	0.267
Household Characteristics				
Children (5-17)	-0.269	-0.015	0.3045***	0.076
Children (0-5)	0.291	0.016	0.022	0.005
Total Member	-0.036	-0.002	-0.098**	-0.024
Total Land	0.001	0	-0.001	0
Operated Land	0.001	0	0	0
Homestead	-0.016	-0.001	0.001	0
Parent Characteristics				
Father's Age	0.002	0	-0.037**	-0.009
Father's Education (ref: Illiterate)				
Can sign only	0.779**	0.039	-0.395**	-0.097
Can read only	0.827	0.034	0.404	0.100
Can read and write	1.150***	0.063	-0.608***	-0.15
Father's Occupation (ref: Farming)				
Service	-0.489	-0.033	-0.413	-0.15
Trade	-0.593	-0.04	0.3133	0.078
Day/Wage Labourer	-0.623**	-0.041	0.168	0.041

Other Occupation	-0.407	-0.027	0.217	0.054
Mother's Age	0.046	0.003	0.009	0.002
Mother's Education (ref: Illiterate)				
Can sign only	0.187	0.011	-0.071	-0.017
Can read only	0.148	0.008	-0.657	-0.158
Can read and write	1.130**	0.051	-1.349***	-0.31
Mother's Occupation	-0.184	-0.009	-0.39	-0.096
Region Dummies (ref: Saturia)				
Mymensingh	1.029***	0.051	-0.260	-0.064
Jessore	1.051***	0.055	-1.270***	-0.303
Number of Observations	747		747	
Chi squared	231.49		176.38	
Pseudo R2	0.353		0.17	
Log likelihood function	-211.8		-429.4	

*** indicates coefficients are significant at 1 % level, ** indicates coefficients are significant at 5 % level, and indicates coefficients are significant at 10 % level.

Table 8: Impact of Work on School Attendance and Schooling-for-Age for children ages 12-17)

	School Attendance		Schooling-for-Age	
Variable	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effect**
Constant	-15.849	-1.304	15.504**	2.052
Child Characteristics				
Female	1.393***	0.103	0.150	0.019
Son/daughter	1.785***	0.253	-0.289	-0.035
Age	2.865	0.236	-1.901	-0.252
Age Squared	-0.109	-0.009	0.072	0.009
Working	-6.406***	-0.899	2.238***	0.2175
Household Characteristics				
Children (5-17)	-0.138	-0.011	-0.024	-0.003
Children (0-5)	0.005	0	0.136	0.018
Total Member	0.148	0.012	0.151**	0.02
Total Land	0.002	0	-0.001**	0
Operated Land	-0.001	0	-0.001	0
Homestead	-0.006	0	0	0
Parent Characteristics				
Father's Age	0.011	0.001	-0.001	0
Father's Education (ref: Illiterate)				
Can sign only	0.511	0.038	-0.23	-0.031
Can read only	-0.421	-0.041	-0.593	-0.094
Can read and write	0.307	0.025	-0.071	-0.009
Father's Occupation (ref: Farming)				
Service	0.545	0.038	-1.198***	-0.208
Trade	0.089	0.007	-0.016	-0.002
Day/Wage Labourer	-0.936	-0.099	0.063	0.008

Other Occupation	0.639	0.041	-0.099	-0.013
Mother's Age	-0.045	-0.003	-0.037	-0.005
Mother's Education (ref: Illiterate)				
Can sign only	-0.87	-0.081	-0.249	-0.034
Can read only	-0.867	-0.098	-0.609	-0.096
Can read and write	-0.175	-0.015	-1.261***	-0.206
Mother's Occupation	0.279	0.025	0.342	0.05
Region Dummies (ref: Saturia)				
Mymensingh	-0.344	-0.03	-0.414	-0.057
Jessore	0.268	0.021	-1.296***	-0.198
Number of Observations	694		694	
Chi squared	605.37		173.37	
Pseudo R2	0.758		0.228	
Log likelihood function	-96.639		-292.787	

*** indicates coefficients are significant at 1 % level, ** indicates coefficients are significant at 5 % level, and indicates coefficients are significant at 10 % level.

Appendix

Construction of SAGE Variable

In Bangladesh, official enrolment age is 6 years, which indicates that by the age of 6 years a child should be enrolled.[16] Many parents, however, send their child in school at 4 years old even at 3 years. The sample (children ages 5-17) used in this study suggests that among 5 years old 57 per cent[17] of children are enrolled in school. It indicates that enrolment age (E) can be considered 4 or 5 years in the SAGE equation.

The aim of measuring SAGE is to find out the correct grade/schooling-for-age for the children. As this study has used the children ages 5-17 years, therefore E= 6 cannot be used for the entire sample in constructing SAGE. If E= 6 is used then SAGE will take negative value for 5 years old children and infinite for 6 years old children. Therefore E should be less than the minimum age of children considered in the sample. In this case, one could argue that E= 4 could be used for the entire sample. However, if E=4 is used for the entire sample, there will be more children who are falling behind in schooling than the actual ones. For example if E= 4 is used in SAGE equation, then only 4.9 per cent of children are in the right grade for their age, which does not seem logical. Hence, E= 4, E = 5 is considered for the children of 5 years old and 6 years old respectively and E = 6 for the remaining in constructing SAGE variable.

However, if the above mention procedure is used (for 5 years old E= 4, for 6 years old E= 5, for the rest E= 6), then 37.7 per cent (544 children out of 1441) of children are in the correct grade for age. This figure of 37.7 per cent of children is much acceptable than that of 4.9 per cent of children in the correct grade. About 62.2 per cent of children are falling behind (SAGE< 100) than their correct grade, among them 11.3 per cent are completely falling behind (SAGE =0) and the information for SAGE (years of schooling) is missing for 11.4 per cent of children. Therefore, the above procedure of measuring SAGE is justified.

[16] Official enrolment age is not enforced in Bangladesh. Therefore late enrolment is also a common phenomenon in Bangladesh, particularly in rural areas.
[17] Among 5 years old children (n=115), 66 children are enrolled when remaining are not enrolled.