Child Labour and Schooling of Children in Rural Bangladesh: A Multinomial Logit Model on Determinants.

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Abstract

This paper seeks better understanding the determinants of child labour and schooling of rural children in Bangladesh. Although literature identified the foremost factors of child labour which constrain schooling attainment of children, however literature has not clarified which determinants encourage children to combine school and work during their study period or solely work without schooling and how the effects of factors vary according to the gender of children as well. The present study contributes to fulfilling these gaps by studying the rural children of Bangladesh. Results show that some particular factors significantly affect to increase to combined (school and work) or work only outcomes and the effect size (size of odds) varies according to the gender of children. There is no significant factor which has a larger effect on the work only outcome for females compared to males.

Keywords: *Child labour, Schooling, Gender Inequality, Logit Model*

Introduction

Child labour constitutes the foremost obstacle to achieving universal primary education and other Millennium Development Goals in Bangladesh. The Government of Bangladesh has established a universal primary education since 1992 to prevent children from early labour. Tuition fees and textbooks are supplied free of charge by the government for all children up

to grade ten. An alternative subsidy program, Food-For-Education (FFE), has also been implemented to help the destitute children regardless of gender. The Female Stipend Program (FSP) has been established since 1994 in Bangladesh to increase the enrolment and retention of girls in secondary schools. Despite these facilities, a large proportion of children are not yet enrolled in school. According to the report of Education Policy and Data Centre (EPDC) (2011), in Bangladesh, 15% of children who are of officially primary school-age are out of school. Approximately 18% of boys within this age group are out of school compared to 13% of girls with the same age. 26% of children in the secondary school age group are out of school of which 24% are female and 29% male.

Children in Bangladesh are engaged in paid and non-paid child labour including in household works, agriculture, industry, and service sectors. According to the UNESCO Institute of Statistics (2011), 81.2% of children aged 5 to 14 years attend schools while working children of this age number 10.1% and children combining work and school are 6.8%. Whether a child engages in child labour is not dependent on a single factor but is determined by multiple factors. These factors act constraints (push factors) or incentives (pull factors) when parents or children choose between work and school (Fares and Raju, 2007). The National Child Labour Survey of Bangladesh (2003) identified the main reason given by parents for child labour was to help increase the family income. Khair (2005) found that parental decision on child labour is based either on the parents making financial decisions based on the economic conditions of the household or considering the economic value of sending their children to school. The author observed that poor parents are more likely to engage their children in work to gain income generating skills on the job rather than in education. Canagarajah and Nielsen (1999) found that the frequency of child labour is higher for older children compared to younger children. Assad et al. (2001) showed that there is a strong inter-generational transfer of human capital from parents to children in households with educated parents, especially with educated mothers in which the child is more likely to go to school and less likely to work. Ahmed et al. (2007) examined that children from food surplus households are more likely to be at school compared to children in food deficit households. The authors also found that approximately 75% of children whose mothers had secondary school education enrolled in secondary school compared to 31% of children whose mothers had no formal education. Amin et al. (2004) demonstrated

the role of poverty as a determining factor of child labour in Bangladesh. Salmon (2005) supports Amin et al.'s finding that poverty compels children to work in Bangladesh instead of schooling and children may sometimes be considered the last economic resource of the household.

Hence, it can be observed that child labour is the foremost cause of preventing schooling of the children in Bangladesh. However, it can also be found that some children are attending school while at the same time performing paid or unpaid works. Though literature on child labour identified certain factors as foremost reasons of child labour which constrain the schooling attainment of children in Bangladesh, we observe that literature has not clarified which factors encourage children to work only, study only, or combine both (work and study) in rural Bangladesh. Another gap is that literature has not demonstrated how the effects of factors vary according to the gender of children. The present study will contribute to fulfilling these gaps by studying the rural children.

Theoretical Framework

The present study adopts Beckers' household production model (1981) to analyse the determinants and the relative importance of factors affecting child schooling and or work since this model is able to encompass both demand and supply aspects of schooling or working children. Beckers' model posits that households typically try to maximise utility considering income, time, production, cash, labour, and other constraints. The utility of a household is composed of family members' leisure and composite consumption goods such as food, non-food expenditure, and cost of children's schooling. The time used to produce composite goods can be supplied by parents and or child labour as household income can be earned by selling products or by working as a wage labourer. Hence, the households' utility maximisation decision-making is that children will go to school and or work depending on the availability of household time for work and leisure, income, assets, labour market, and social norms.

Togunde and Carter (2006) demonstrate that two major explanations are given regarding why child labour occurs at the household level; one is the poverty hypothesis and another is the socialisation theory. These theories emphasise economic and cultural factors as vital determinants of children's labour force participation. The poverty hypothesis model

explains child labour as an unavoidable effect of poverty (Amin, 1994; Kathar and Malik, 1998). This model argues that in the less developed countries where there are low levels of technological development, low wages, higher unemployment, and low household income, the labour participation of children who can contribute to household income is essential for alleviating and improving economic stress from households. In this circumstance, child labour emerges as an essential part of household survival strategies.

Another popular explanation of child labour is a socio-cultural perspective that is decisively rooted in social learning theory. This perspective demonstrates that child labour is a learned behaviour and argues that cultural traits at the household level such as parental education and occupation sometimes may determine whether a child works or not and if so for how long and what types of labour activities the child will engage in. This theory finds that depending on the occupation of a parent, a child is more likely to participate in the labour force along with the parent as a means of vocational learning which prepares a child for his or her future adult occupation. In this circumstance, child work could be seen by parents as a traditional form of education, as a socialisation process, and as a means of transmitting acquired skills from parent to child.

Methodology

This study is based on a survey carried out in rural areas of Pirgonj in Bangladesh in June 2018 through questionnaires. The sample size is 485 children aged 6-17 years in rural households in which 277 (57.11%) are boys and 208 (42.89%) girls. A multinomial logit model is used to estimate the effects of factors on outcomes as work only, study only, and combining both (work and study) denote the polytomous variables with multiple unordered categories. To determine whether the effects of variables significantly vary according to the gender of children, we first estimate the odds ratio for the all children and then for male and female children separately.

Table 1. ***Description of variables used in the analysis***

Variable names	Definition
Study only	If children's primary and secondary duty is study (attend school) only or they do not have any other secondary duty except study
Work only	Children whose primary and secondary duty is only some sort of paid or unpaid works
Combining (work and study)	If a child works during his/her schooling
Age of child	Age in year
Housekeeping activity	Amount of hours children spent for the Housekeeping activity
Productive activity	Amount of hours children spent for the Productive activity
Housekeeping and productive activity	Amount of hours children spent for both Housekeeping and productive activity
Sex of household head	Male = 1, Female = 0
Parental operated land	Amount of land (in Hectares) parents operate for agricultural works by themselves
Father's occupation	
Farming	1 if father's occupation is agriculture, 0 otherwise
Service	1 if father's occupation is service, 0 otherwise
Trade	1 if father's occupation is business, 0 otherwise
Day/wage labour	1if father is day / wage labour, 0 otherwise
Mother's occupation	1 if mothers have a work which is outside of the home, 0 otherwise
Number of livestock owned	Total number of livestock owned in household
Household debt	Whether parents have outstanding loan taken from any financial institute or persons which need to be repaid. Yes = 1,

	no=0
Parental education	Parental attained education in year
Household size	Total number of siblings
Birth order	The order a child is born in household. First born = 1, next born = 0
Parental income	Total amount of parental income (monthly)
School distance	Total distance (km) from home to school

Multinomial Logit Model

This study used a multinomial logit model to estimate the determinants of work only, study only, and combining both (study and work) as denoted by the polytomous variables with multiple unordered categories. For instance, there are *i Y j* mutually exclusive categories and associated with P_{i1} $P_{i2\ldots\ldots}P_{ij}$ are the probabilities associated with *j* categories. In this case we have three categories (j = 3):

j = 0 If the child studies (attends school) only,

j = 1 If the child works only.

j = 2 Combining (If the child works and attends school),

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

$$P_r(Y_i = 0 \mid X) = P_{i0} = \frac{1}{1+\exp(x_i'\beta_1) + \exp(x_i'\beta_2)}$$ = Probability of study only

$$P_r(Y_i = 0 \mid X) = P_{i1} = \frac{\exp(x_i'\beta_1)}{1+ \exp(x_i'\beta_1) + \exp(x_i'\beta_2)}$$ = Probability of work only

$$P_r(Y_i = 0 \mid X) = P_{i2} = \frac{\exp(x_i'\beta_2)}{1+ \exp(x_i'\beta_1) + \exp(x_i'\beta_2)}$$ =Probability of combining both

Where β_1 and β_2 are the covariate effects of the response categories which are work only and combining both respectively with the reference category study only (j = 0) where $\beta_0 = 0$.

Analysis and Result

Children activities (works)

In the appendix, we display the list of typical activities (work) for which children are responsible. According to the type of activities, we divide all the children into the following three groups: (i) housekeeping activity, (ii) productive activity and (iii) housekeeping and productive activity. Figure (a) shows that 25.36% of male children are responsible to do housekeeping activities compared to 52.28% of females. Responses on the productive activities show that 39.30% of male children do the productive activities compared to 28.16% of females. It also shows that children taking both housekeeping and productive activities, among them 6.12% are male and 3.20% are female.

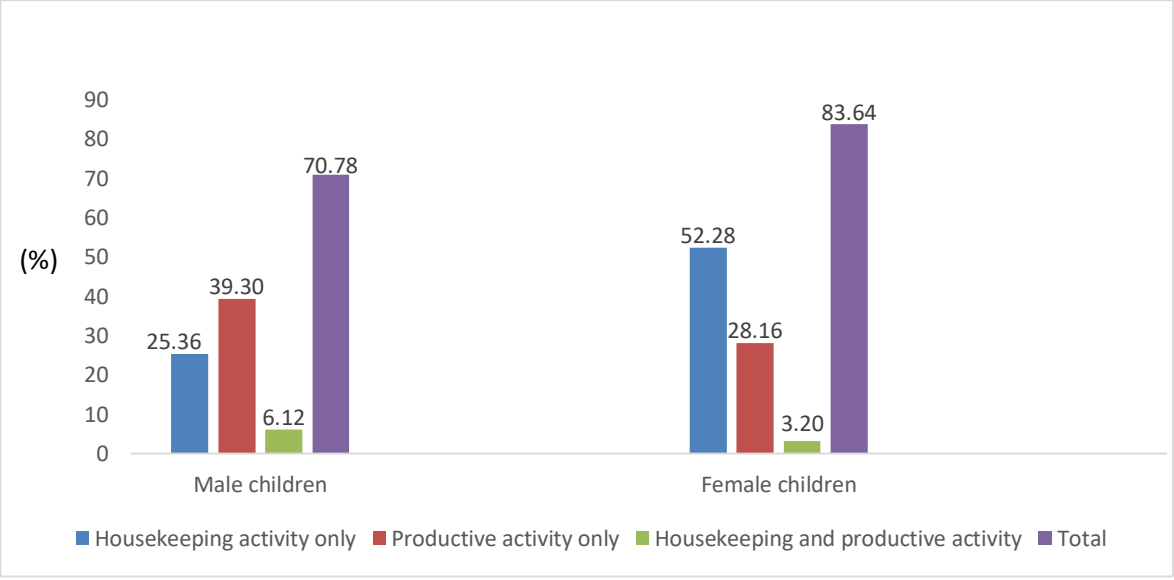

Figure 1. ***Difference in Children Activities by Sex***

Source: Authors' calculation Table in appendix

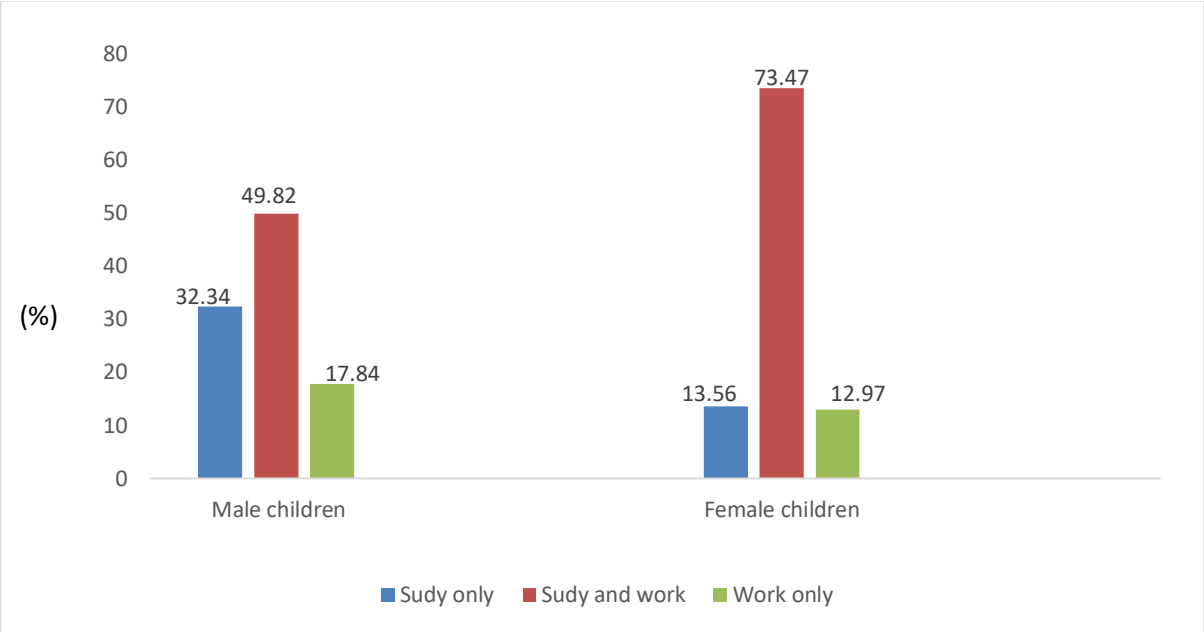

Figure 2. ***Difference in Children Activities by Sex***

Source: Authors' calculation Table in appendix

Figure (2) shows that though males do study only and work only (32.34% and 17.84% respectively) more than females (13.56% and 12.97% respectively), females are more responsible combining study and work (73.47%) compared to males (49.82%). From figures 1 and 2 we observe that females do more work and are combine study and work compared to males. On the other hand, males tend dominate the work only or study only categories.

Results on Logit Models

The results show that age has positive and significant effects on the probability of combining work and study and work only (5.231*** and 4.322*** respectively) for all the children which implies that the probabilities of combining working and study and working only increase with age as opposed to the probability of study only. It also can be observed that (Table 3) females have greater odds of combining work and study compared to males (3.331**, 3.012** respectively) which implies that if age increases, then females are more likely to combine study and work than males. Conversely, the working only results show that males have greater odds of working only compared to that of females (3.113**,

2.116** respectively) which indicates that if age increases, then males are more likely to work only than females.

Table 2. ***Multinomial Logit Estimates for All Children (reference study only)***

N = 485

Variable Names	Study and Work Odds ratio	Work only Odds ratio
Age of children	5.231***	4.322***
Gender of children (ref. male)		
female	4.112***	0.511**
Housekeeping activity	5.223***	1.264
Productive activity	1.166	4.670***
Housekeeping and productive activity	1.200	5.777***
Sex of household head (ref. male)		
Female	4.433***	4.401***
Parental operated land	4.688***	3.881***
Household size	2.877**	2.341*
Birth order (ref. next born)		
First born	2.274**	2.381**
Service	0.680***	0.564***
Trade	0.667***	0.559***
Day/wage labour	3.884*	3.118***
Mother's occupation (ref. housewife)		
Working mother	2.787***	0.496***
Household debt (ref. no)		
Yes	3.336**	2.982**
Parental education	0.599**	0.646**
Parental Income	0.871**	0.489**

School distance	1.821	1.110

Note. Standard errors are in parentheses *p <.05,**p <.01, ***p <.001

Results of the gender effect indicate that though the odds (0.511**) of gender have a negative significant impact (as odds is less than 1) on the probability of working only, it has a positive significant impact (4.112***) on the probability of combining study and work. Females are more likely to combine study with work, since the odds of combining study with work for girls are four times (4.112) higher than those of males. On the other hand, females are less likely to do work only compared to males as the odds are negative which is less than one (0.511**) in this respect.

Results of housekeeping activity show that though it has positive significant odds (5.223***) for combining study and work, it has no significant impact on children's working only outcome (1.264). We also observe (Table 3) that the odds of housekeeping works is significant only for females and not for males (3.240*** and 1.401 respectively). This implies that females are significantly more likely to combine study and work because of assuming housekeeping activities. This result is significant only for males not for females (4.670*** and 1.166 respectively). Results of productive activity show that it has a significant positive impact on working only outcome (4.670***) and this effect is significant only for males (3.711***). Results of housekeeping and productive activity show that it has significant positive impact for working only but not for combining study and work (5.777*** and 1.200 respectively). Furthermore, when we consider the gender, (Table 3) results show that only males are likely of working only as it has significant odds (3.890***) which is insignificant for females (1.070).

The positive odds of household head on combining study and work and work only (4.433*** and 4.401*** respectively) indicate that if the household head is female then children are more likely to combine school and work and work only compared to the male-headed household for all children. Results also show that the odds of females combining study and work is greater than that of males (3.380*** and 2.119** respectively). This implies that if the household head is female then female children are more likely to combine study and work than male children. Alternatively, when considering work only, results show that males have greater odds than females (3.331**, 2.051** respectively) indicating that males are more likely to be working only than female children when the household head is female.

Similarly, the positive odds of parental operated land on combining study and work and work only (4.688*** and 3.881*** respectively) for all children indicate that if parents operate more land by their self, then children are more likely to combine study and work and work only. When we concern the gender of children, we observe hat only males are more likely of combining study and work and work only as both the odds are significant only for males (3.357*** and 3.128*** respectively). Hence, amount of parental operated land positively effects both combining and work only outcomes for male children.The positive odds of household size indicate that household size significantly effects combining school and work and work only (2.877*** and 2.341** respectively) for all children. Results in Table 3 show that the odds of female children on study and work is greater than the odds of male children (1.416* and 1.951** respectively). Conversely, the odds of males working only is greater than the odds of females (1.708** and 1.623* respectively).When considering the birth order of children, we found that children who have first born status are more likely to combine school and work and work only compared to others (2.274* and 2.381* respectively). We also observe that (in Table 3) if female children have first born status they are more likely to combine study and work than males (2.150* and 1.238* respectively). Conversely, if males have first born status then they are more likely to be working only than females (2.260* and 1.116* respectively).

Table 3. Multinomial Logit Estimates for Male and Female Children (reference category is study only), N = 485

	Study and Work odds ratio		Work only odds ratio	
Variables	Male children	Female children	Male children	Female children
Age of child	3.012**	3.331**	3.113**	2.116**
Sex of household head (ref. male)				
Female	2.119**	3.380**	3.331**	2.051**

Housekeeping activity	1.401	3.240***	1.111	1.231
Productive activity	1.108	1.301	3.711***	1.034
Housekeeping and productive activity	1.005	1.007	3.890***	1.070
Amount of parental operated land	3.357***	1.100	3.128***	1.222
Household size	1.416*	1.951**	1.708*	1.623*
Birth order (ref. next born)				
First born	1.238*	2.150**	2.260*	1.116*
Father occupation (ref. agriculture)				
Service	0.489***	0.488 ***	0.470***	0.467***
Trade	0.551***	0.580***	0.491***	0.481***
Day/wage labour	2.442***	1.842**	2.930***	2.303**
Mother's occupation (ref. housewife)				
Working mother	1.122	2.301**	0.323**	0.108*
Household debt (ref. no)				
Yes	3.001**	1.282*	2.570*	1.333*
Parental education	0.281**	0.284**	0.342**	0.410***
Parental Income	0.612**	0.411***	0.481**	0.330**
School distance	1.201	1.301	1.001	1.000

Note. Standard errors are in parentheses *p <.05,**p <.01, ***p <.001

Odds of the most important factor of occupation show that parental occupations in service and trade sectors have a negative impact (as odds are less than1) on combining school and work and work only outcomes (Table 2). Hence, if parents have service or trade occupations then children are less likely to combine school and work and work only compared with parents employed in the agriculture sector. On the other hand, children whose parents have day/wage labour status are more likely to combine school and work and work only compared to the children whose parents employed in agriculture (Table 2). Furthermore, results in Table 3 show that parental occupation of service and trade significantly reduce combining study and work and work only. Male children with day labour parents are more likely to combine study and work and work only than females (2.442***, 2.930*** and 1.842**, 2.303 respectively). Concerning the mother's occupation, results show that

children whose mothers have working status are more likely of studying and working and are less likely to be working only (2.787** and 0.496** respectively) compared to children whose mothers are housewives. In this respect, we also observe that female children are more likely to combine study and work than males (2.301* and 1.122 respectively).

Results on household debt show that if families have any outstanding loan taken from any individual or institution which needs to be paid back, then children are more likely to combine school and work and work only (3.336* and 2.982* respectively) compared to children whose households have no debt and its effects are more for males than females (in Table 3). Results of parental backgrounds show that both parental education and income have negative and significant impacts on combining school and work and work only (Table 2) in which children with more parental income and education are less likely to combine school and work and work only compared to study only. These effect are significant both for male and female children. Although the odds of school distance (Table 2) indicate that school distance has a positive effect on combining school and work and work only, these results are not statistically significant in this study.

Discussion

Results show that age has positive and significant effects on the probability of combining work and study and work only compared to study only for all the children and for both boys and girls. The clarification of this result is that as children grow up, the opportunity cost for study (only) increases and consequently they either combine study and work or fully devote to work. Grootaert's (1999) study in Cote-d'Ivoire and Cigno and Rosati's (2002) study in India find similar impacts of age on the probability of combining work with study. Results indicate that female children are more likely to combine study with work compared to males. This is because the present study includes non-paid household work in the definition of work. Thus, this result is consistent with the finding of (Levison et al. 2001) who also finds that if household work is included in the measurement of work, then girls are more likely than boys to combine work and study.

Results show that female children are significantly likely to be combining study and work because of taking housekeeping activities. In fact, Bangladesh is a male dominated country and especially in rural society male people are typically engaged in income relevant works

while females are engaged in housekeeping works. In this circumstance, female children largely act as helping hands for their mothers in the housekeeping activities during their schooling period. We observe that both productive and housekeeping activities and productive activity significantly impact only on the working only outcome for the male children. This is because school-aged male children are usually involved in agricultural farm works or other paid or unpaid productive works to help financially support their family.

Results on household head indicate that if the household head is female, then children are more likely of combining school and work and work only compared to the male-headed household for all children. In fact, female-headed households in Bangladesh are generally "male-absent households," or households where the male-head has died or been enfeebled due to illness (Cain, Khanam and Nahar, 1979). Consequently, female-headed households are poorer than male-headed households and are less able to invest in education of their children (World Bank, 2001). In this circumstance, children especially male children do work to provide financial support to their household by doing paid work or become responsible for some household work.

Odds of parental operated land indicate that if parents operate more land then children are more likely to combine school and work compared to school only for all children. The explanation of these results is that an additional amount of operated land tends to demand more labour that requires school-aged male children to be involved with farm work when the land and labour are complementary. Bangladesh is an agriculture dominated country. Children (especially males) of land-rich households are more likely to work in their parental lands to help their parents and are less likely to be in school than the children of land-poor households.

The positive odds of household size in household indicate that household size significantly affects combining school and work and work only for all children and male and female children individually. Parental resources such as money, time, and care become limited when the size of the household increases as the amount of resources available to each child in the household becomes increasingly diluted (Blake 1981 and Downey 2001). As a consequence, children with large household size exhibit poorer intellectual ability and lower levels of educational attainment compared to children with small household size. In this respect, female children may be highly involved in housekeeping activities in the large

household and consequently are more likely of have a combined status. On the other hand, male children do more labour to financially support their family.

We found that male children who have first born status are more likely to combine school and work and work only compared to children who have next born status. In this respect, (Canagarajah and Nielsen 1999) also have found that the incidence of child labour is usually higher for the older children than the younger children and the presence of older siblings creates space for younger siblings to be involved in education.

Analyses on parental occupation show that if fathers are employed in the service or trade sector, it is more likely for the child to be attentive in study compared to the children whose fathers are employed in agriculture. This is because if a father is engaged in trade or service then their level of income effects keeping the children in the study only. On the other hand, if the father is a 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. The odds of working mother imply that children with working mothers are more likely to combine study and work and it has a significant impact to be combining study and work for the female children. This is because, if a mother works outside the home then female children usually help with household works.

Results on parental education reveal that a higher level of education among parents increases the likelihood that a school-age child will devote to study only relative to the likelihood that the child will combine study and work and work only. In fact, parents with higher levels of human capital have better potential income than that of lower educated parents and consequently higher income of parents increases the likelihood of the children to study only rather than work.

Conclusion

The present study examines the determinants of child labour and schooling of rural children in Bangladesh. Results show that the effects of factors vary according to the gender of children on both combining and working only outcomes. We observe that some particular factors significantly affect only male children while some affect only females. Factor which significantly impact the case of male children to increase the combining outcome is amount

of parental operated land and for the female children are housekeeping activity and mothers' working status.

Similarly, factors which have significant impact on males to increase the work only outcome are productive activity, housekeeping, and parental operated land. In this respect, we also observe that though some particular factors have positive significant impact on working only outcome for males, however there is no significant factor which affects only females for this outcome.

We also observe that though some particular factors have significant positive effects for both male and female children on both outcomes, the effect size (size of odds) varies according to gender. In this respect, factors which have larger impacts on combining status for the case of male children than females are parental day/wage labour status and household debt. On the other hand, factors which have larger impacts on the combining outcome for female children than males are age of the children, sex of household head, household size, and birth order of children. Results on work only outcome show that some factors have greater effect to increase the work only outcome for males compared to females, which are age of children, sex of household, household size, birth order, parental day/wage labour status, and household debt. Though some factors have more effects to increase the work only outcome for the male children, there is no factor which affects more females to increase this work only outcome. Concerning parental background factors, we observe that parental strong background such as higher income, education, and having better occupations significantly reduce both outcomes for both male and female children. The core findings of this study might provide important directions for policy makers in Bangladesh. Since it is evident that working is common among school-aged children in rural regions, policy makers should target those children who are out of school and cannot continue their study because of child work.

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Appendix

Table. *Children Activities by Sex in Percentage*

Activities (works)	Male children (N=277)	Female children (N=208)
Ploughing/digging	yes	no
Harvesting	yes	yes
Irrigation	yes	no
Livestock tending/take caring	yes	yes
Fodder collection	yes	no
Collecting firewood for domestic use	yes	yes
Bringing drinking water	yes	yes
Goods selling/ purchasing	yes	no
House cleaning	no	yes
Cloth washing	no	yes
Cooking food/ hands in cooking	no	yes
Caring for siblings	no	yes

Others	yes	yes
Housekeeping activity only	25.36	52.28
Productive activity only	39.30	28.16
Housekeeping and productive activity	6.12	3.20
Total	70.78	83.64
Study only	32.34	13.56
Work and study	49.82	73.47
Work only	17.84	12.97
Total	100.00	100.00

(Source, authors' calculation)