Child labour and school attendance in Bangladesh:
The impact of individual, parental and household factors on human capital development

by

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B.A., York University, 2012

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Supervisory Committee

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Abstract

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Household survey data collected primarily from rural Bangladesh (Multiple Indicator Cluster Survey 2005-2006) is utilized in this paper to identify the important individual, household and district-level factors that influence the decision making process that parents undertake to determine their children's (between the age of 7 and 14 inclusive) absence rate from school and work intensity. Bivariate Tobit model is used to jointly estimate the absence rate and hours worked equations. The results of the analysis conducted in this paper suggest that an increase in perceived returns on human capital from attending school – as measured by the wage differential between low-skilled and higher-skilled occupations in a given market – negatively impact absence rate in rural Bangladesh. Moreover, results suggest that the education level of the parents has an impact on a child's absence rate and the number of hours worked in a week. It is found that the higher the education level of the father, the lower the absence rate and the number of hours worked of a child, while higher levels of the mother's education level is shown to negatively impact the absence rate. It is also found that being the first born child in a household is associated with both higher absence rate from school and greater amount of hours worked per week. With respect to gender, being a girl is found to be associated with a greater number of hours worked. Lastly, household wealth is found to have a U-shaped relationship with both absence rates and number of hours worked; it is negatively associated with both of the dependant variables at lower levels, but has a positive impact on both absence rate and number of hours worked at higher levels. In general, the results detailed in this paper highlight the importance of policies such as the provision of cash stipends to the poorest households, improving the quality of schooling facilities and directed educational schemes meant to eradicate the persistent gender inequality that is hindering truly universal primary education in rural Bangladesh.

Keywords: Child labour, absence rate, bivariate Tobit, skill premium, Bangladesh

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Section 1: Introduction

In the field of development economics, a tremendous amount of significance is placed on education and its role in reducing poverty. In particular, childhood education is considered one of the most cost-effective ways of increasing human capital among the populace of any given developing nation. Studies have shown that individuals who have received quality education have a higher likelihood of becoming productive citizens as opposed to being reliant upon government social programs (IIASA, 2008). Likewise, education has also been recognized as a potential tool for achieving sustainable economic growth (Islam, Wadud and Islam, 2007)

With that in mind, the government of Bangladesh has been committed to making education a top priority for the country. According to the Bangladeshi National Education policy, education is free and compulsory up to grade five. As a result, net enrollment in primary schools have increased from 85% in 2000 to 94% in 2010 (UNICEF, 2012). After Sri Lanka, Bangladesh is the best performing country in South Asia with respect to enrollment rates in primary school. However, retention of children enrolled in schools is another issue; nearly 33% of children enrolled in grade one do not remain enrolled until grade six. As a result, Bangladesh is very far from meeting the goal of universal primary school enrollment and completion for all children in the country (Millennium Development Goal 2).

Despite the fact that the two terms are sometimes used interchangeably in the literature, school enrollment is not the same as school attendance. Even though enrollment rate is generally high in Bangladesh, simply being enrolled does not guarantee that children are actually attending classes. Without being present at school on a regular basis, a student cannot be expected to fully comprehend all the material being taught by the teachers. This can lead to unsatisfactory attainment outcomes as measured by test scores. In turn, consistently poor educational

attainment can lead parents to further increase their children's absence rates or disenroll them from school entirely in order to put them to work instead.

Given the potential impact of school attendance on outcomes in education, the focus of this study is school attendance in rural Bangladesh; in particular for children aged 7 to 14 years inclusive. Using information primarily from the 2005-2006 Multiple Indicator Cluster Survey (MICS), the following are the main contributions of the research detailed in this paper to the existing literature:

1) Recognize the limitations of exclusively concentrating on official enrollment rates and, as a result, shift the focus towards school attendance; a more meaningful indicator of education status since it reveals very insightful patterns of absence from class rooms among students who would otherwise be uniformly described as being "enrolled." This shift in focus adds more granularity to the analysis and exposes the myriad shortfalls of primary school education in Bangladesh that are presently concealed by the focus of previous research on enrollment rates.
2) Examine school attendance and child labour jointly. This is done by not only studying the effects of various individual, parental, and household factors, the research uniquely contributes to the existing literature by also estimating the impact of perceived returns to education on school attendance and child labour in rural Bangladesh.

Bangladesh is a country with a very high incidence of child labour. Based on information from MICS, nearly 56.7% of children aged 7-14 years in rural Bangladesh worked a minimum of 7 hours a week (for the purposes of this paper, "work" is defined as the summation of both household work and work conducted outside of the house). Moreover, girls appear to be more heavily involved with labour activities, as approximately 65% of girls in rural Bangladesh work for at least 7 hours in a week. Previous research suggests that in rural Bangladesh, there is evidence

of a trade-off between schooling and child labour. More specifically, it is stated that children engaged in child labour activities are less likely to receive continuous primary school education (Amin, Quayes and Rives, 2006).

Given that MICS data shows that about 92.5% of all children in rural Bangladesh have attended school at least once, enrollment in school is not a concern of particular importance. In order for children to fully benefit from education, it is important to be present at school in the first place. Based on information from MICS, only 60% of children in rural Bangladesh were reported to be present in school for every day of the survey reference week. Based on previous research, there is evidence to suggest that poor school attendance leads to low test scores and is associated with high incidence of grade-repetition; negative educational outcomes that can eventually lead to dropping out of school entirely (Epstein and Sheldon, 2002).

The results from the research detailed in this paper show that, as expected, higher parental education has a significant impact in reducing a child's labour force participation and is also associated with higher school attendance (or conversely, lower absence from school). This holds true for the education level of both the mother and the father, although a mother's education has a greater impact for children in lower grades compared to children in higher grades within the sample. Household wealth also has a significant impact on both labour force participation and school attendance. It is found that up until a certain point, increase in wealth leads to a reduction in both absence from school and the number of hours worked in a week. However, at higher levels of wealth, it is found that additional increases in household wealth lead to both an increase in absence rate from school and the number of hours worked in a week. In addition, it is also found that the higher the prevailing wages of skilled occupations relative to non-skilled occupations in a district, the better the attendance in school of a given child in the sample.

The rest of the paper is organized as follows: Section 2 and 3 provide a brief overview of Bangladesh alongside a general review of the research literature with respect to child labour and education, both in Bangladesh and in rest of the developing world. Section 4 presents preliminary analysis of the data utilized for the purposes of this research. In section 5, a simple theoretical framework is presented to study the impact of household, individual and district-level characteristics on the two dependant variables of interest; hours worked (measuring labour force participation) and absence rate (measuring school attendance rate). Section 6 describes the econometric model and the independent variables utilized for the estimation procedure. Section 7 delivers discussion on the results achieved from the regression process. Lastly, section 8 provides conclusive thoughts and reflections on the research and a brief discussion on the policy implications of some key findings.

Section 2: Overview of Bangladesh

Education is generally considered to be a fundamental tenet of economic development, particularly in impoverished nations across the world. With a Human Development Index value of 0.558 in 2013, Bangladesh ranked 142 out of the 187 countries with respect to its development level (UNDP, 2014), placing it significantly behind a more prosperous developing nation like Indonesia (HDI value of 0.684; ranked 108), but comfortably ahead of a very impoverished country like Ethiopia (HDI value of 0.435; ranked 173). Moreover, despite a steady increase in urbanisation, nearly 66% of the country's total population still resides in rural areas. As such, agricultural activities are a major part of the country's economy.

In addition, due to the country's precarious location along multiple river deltas in South Asia, Bangladesh is particularly vulnerable to major flooding events. In some years, approximately 7.5 million hectares of crops have been destroyed due to the floods, causing a tremendous amount of financial damage to the country's rural poor who are dependent on agricultural activities

for their livelihood (UNDP, 2014). Aside from the financial impact, Bangladesh has historically also suffered large losses of life over the past decades. For example, nearly 140,000 deaths were caused by a cyclone in 1991. The myriad factors mentioned above make rural Bangladesh a fairly representative setting within the developing world to study the research questions put forth in this paper.

As a signatory to a number of international treaties such as “Education for All” and “Millennium Development Goals,” education has been a major focus in Bangladesh over the past few decades. Based on 2012 figures, the government of Bangladesh had earmarked nearly 11% of the national budget for education, making it the second biggest portion of their annual spending (UNICEF, 2012). However, the share of education in the total national budget has been decreasing since 2009. In real terms, expenditure on education has been stagnant over the past several years (UNICEF, 2012). This has had an impact on the quality of education that is delivered to the students. Due to a lack of adequately large schooling facilities, many schools are now forced to operate on two shifts per day in order to accommodate more students than what the current facilities are able to accommodate (CREATE, 2013).

Moreover, overcrowding of schools has also resulted in primary schools of Bangladesh reporting one of the lowest levels of contact time between students and their teachers in the world. At 587 hours per year, the average contact time in Bangladesh is less than half (1,200 hours per year) of what was reported at Chinese schools (CREATE, 2013). In addition, results from grade 5 students on the Education Watch standardized test suggest that children are failing in many aspects. On a test in which students were designed to pass tests of all competencies, an average student failed one-third of the competencies that they were tested upon (Ahmed and Hossain, 2010). In reality, these results should be considered even more alarming due to the fact that the poorest performing children tend to drop-out of school well before grade 5.

Due at least partially to the rapid overcrowding of schools, teachers report low levels of motivation due to a feeling of being overworked and/or being underpaid. As a result, parents of students are reported to believe that teachers are generally unmotivated, regularly absent from school and can be witnessed sleeping during schools hours (CREATE, 2013). Overall, lack of predictability with respect to school hours, lack of teacher accountability and poor quality of educational activities are all cited as having negative impacts on children's learning capacity.

Another problem in Bangladesh is that children are often over-age for the grade that they are currently enrolled in. This can result due to either being enrolled late (i.e. a child being enrolled in school while being older than 6 years of age) or failing to progress to the next grade in a timely fashion. According to research by Consortium for Research on Educational Access (CREATE, 2011a) over 80% of children enrolled in grade 1 were over-age in 2007. Combined with the failure of many children to progress smoothly onto higher grades, it creates an environment for teachers where they have to cater to children of various ages within the same classroom on a daily basis. In addition to children dropping out of school, nearly 50% of children in grades 1, 2 and 3 did not progress to an appropriate grade in 2009 (CREATE, 2011a).

According to CREATE (2013), children who are enrolled late in grade 1 are from households with lower incomes relative to children who are enrolled on time with respect to their age. In addition, children who struggle to progress to higher grades also tend to come from poorer households. In addition, children who were older than their grade enrollment would indicate also missed more days of school compared to those children who were in the correct grade for their grade. In general, being over-age appears to be associated with negative schooling outcomes such as poor attainment, poor attendance, grade repetition or dropping out of school entirely (Sabates, Hossain and Levin, 2010).

In recognition of the fact that income and wealth are significant factors when it comes to access to education, the government of Bangladesh provides cash stipends to poor families throughout the country in the name of the Primary Education Stipend Project (PESP). These stipends are tied to attendance and achievement thresholds, which are difficult to meet for households that cannot afford private tutors. In addition, the means-testing mechanism for the stipends appears to be sub-optimal. As it stands, the stipends are given to the poorest families in each administrative sub-division, ignoring the difference in wealth between the administrative sub-divisions themselves. As such, the relatively poor in each area receive the stipends, meaning that not all the poor households across the country receive the stipends. In addition, as alluded to earlier, the value of the stipends have decreased over the years in real terms to the point that in 2009, the stipends only covered one-third of the average cost of primary education per child.

To ensure education for deprived and vulnerable children, the government has introduced various safety net programs. These include stipends for primary students, female students in secondary school and higher education, in-school feeding programs, stipends for drop-out students, etc. Expenditure on these safety net programs has increased over the years relative to the total education budget. However, as stated earlier, budget for education as a whole has been on a slight decline relative to the rest of government's expenditure within the same time period.

Moreover, the value of the stipends on a per student basis has remained the same since their introduction in 2003. As a result, the value of the stipends has decreased significantly in real terms since then. This means that these stipends meant to address the issue of education accessibility for children from poorer households have been become less and less effective over the years. Even though primary schooling is free in Bangladesh and the government has invested significant amounts in building school facilities across the rural countryside, expenses associated with attending school for a single child (i.e. examination costs, private tuition, uniforms and transportation costs) account for approximately a quarter of total annual income on average

(CREATE, 2010). As a result, for poor households in rural Bangladesh, schools being located too far away is given as a reason for non-enrollment of primary school-aged children (Ahmed and Hossain, 2010). Given that there is a considerable amount of variation in incomes, it is quite evident that the above mentioned costs can prove to be untenable for the poorest households in rural Bangladesh.

Due to government expenditure on education being stagnant, there is now an increasing presence of schools operated by non-government organizations (NGOs) and private entities in the country. According to Ahmed and Hossain (2010), nearly 19% of all primary school students in the country were enrolled in registered non-government primary schools in 2008, with another 10% enrolled in non-formal primary education schools that are operated by NGOs. Comparison of 2007 figures with data from 2009 shows that there is a trend towards higher enrollment in NGO operated schools and private schools as opposed to government operated primary school.

With specific respect to child labour, it is reported that there are approximately 4.7 million “economically active” children across Bangladesh (UNICEF, 2010). In addition, due to rapid urbanisation of the country, more and more children are expected to transition from household work to income generating market work. Moreover, it is reported that a significant portion of children who are engaged in market work are involved with fairly hazardous jobs that jeopardize their well-being. These jobs include welding, working at auto workshops and tobacco factories, and being involved in road transport. In recognition of the dangers that such occupations pose to children, the government of Bangladesh had introduced the Labour Act in 2006, which explicitly prohibits employment of children under 14 years of age and bans employment of children under 18 years of age in hazardous occupations (UNICEF, 2010). However, there is a lack of a strong enforcement mechanism, which renders the above mentioned law generally ineffective.

Moreover, due to a significant presence of the informal sector in Bangladesh's economy, many of the children who are engaged in market work are well beyond the protection of the above mentioned law. For example, approximately 421,000 children in Bangladesh work as domestic workers (UNICEF, 2010). Nearly all such children work seven days a week and are generally working behind the closed doors of their employer's household. About 60 of such children reported being physically abused during their work, including being slapped and scolded (UNICEF, 2010). In addition, exploitation of these children extends to wage exploitation as well, as attested by the fact that nearly half of such children receive no wages at all, as accommodation, food and clothing comprise the entirety of their compensation (UNICEF, 2010).

Section 3: Literature Review

Global insights on school attendance

In the developing world, coming from a poor family has a significant impact on a child's school attendance. This is because in countries like Botswana, attending school is usually at the expense of all other activities, particularly incoming-generating activities for boys (Chernichovsky, 1985). Moreover, due to rural communities relying on agrarian activities for their livelihood in the developing world, attendance in school is generally impacted by harvesting season, which in some cases affects girls more than boys since many duties on the farm are traditionally assigned to girls. In addition, another household factor that seems to impact girls more than boys is the presence of a baby, as girls are expected to help their mother at the expense of school attendance. The presence of toilets and sources of water within reasonable distance of the household are significant determinants of school attendance as well (Dreibelbis, 2012).

Even though higher enrollment in primary education is, ceteris paribus, a good development, there are quite a few challenges that arise from this as well. For example, as

mentioned by Lewin (2007), increased enrollment rates require development of new curriculums, learning materials and education system that will be financially sustainable in a high-enrollment environment. Moreover, high enrollment in primary schools can prove to be temporary, as was proven in countries such as Nigeria, Tanzania and Uganda. This can be due to factors such as ineffective regional policies, lack of administrative capacity and poor professional practices. As such, it is important to look at school attendance as opposed to strictly school enrollment.

Attendance appears to be highly correlated with failing to graduate to an age-appropriate grade and seems to be a pre-cursor to dropping out of school entirely. According to Epstein and Sheldon (2002), poor attendance in school is highly correlated with failing to graduate to an age-appropriate grade and is a pre-cursor to dropping out of school entirely. In addition, children with higher attendance figures also score better on achievement tests relative to children who are more frequently absent from school. Much like other educational outcome variables, attendance also appears to be related with factors such as parental education and socio-economic situation of the household. Namely, factors such as low monthly household income, poor food security status, household head working as a day labourer, and not owning radio or television were strongly associated with poor attendance as well as other factors such as grade repetition and poor academic performance.

In addition to household and individual factors, variables related to school appear to have an impact on school attendance as well. In countries like Honduras, schools in rural areas are closed more often than school in urban areas (Bedi and Marshall, 2002). Higher instance of teacher absence is another significant factor in rural areas in comparison to urban areas. These factors, in turn, cause lower student attendance figures among schools located in rural areas.

Other school factors such as the continuous presence of electricity and telephone lines also impact school attendance. It is postulated that the lack of facilities such as the ones

mentioned above can impact school attendance in various way. More specifically, these factors can affect the perceptions of parents on the quality of school, hence leading to more days of missed school for their children. Moreover, parents' perception of the quality of education in school through higher test achievement scores can also severely impact a child's school attendance (Bedi and Marshall, 2002).

In addition, another set of factors related to schools that has a significant impact on school attendance is the provision of sanitation facilities. As mentioned before, one of the primary reasons for school absenteeism is illnesses. Aside from asthma and respiratory illnesses, diarrhea and conjunctivitis are important causes of school absenteeism in developing countries like Egypt (Talaat et al., 2011). According to results from hand hygiene campaigns launched in Egyptian schools, extensive interventions led to a significant reduction of laboratory confirmed influenza which, in turn, resulted in a significant decrease in school absenteeism in the schools where the intervention was carried out relative to schools where there were no such campaigns during that time period.

Toilets within schools is also a determinant of school attendance in developing countries. For example, in Kenya, it was found that even though the ratio of toilet per student was not a determinant of absence, the quality of the toilet and provision of regular maintenance of such facilities was indeed associated with recent absences among both girls and boys (Dreibelbis et al., 2012). This may impact school attendance not only through a higher incidence of diseases like diarrhea among the students, but also through a lower perception of the quality of school among the parents of the children attending the school.

In addition, provision of lacklustre facilities can have a significant impact on older girls in primary school who are experiencing menstruation. It is postulated that inadequate supply of water and lack of sufficient privacy in toilets within schools can hinder attendance of girls in that

regard (Grant, Lloyd and Mensch, 2013). In contrast, co-residing with a grandmother is seen as a significant factor in deterring menstruation related absence, probably because they are able to educate their grandchildren on the subject matter, which alludes to the importance of providing sufficient education to all students within schools.

Global insights on the impact of child labour on educational outcomes

Psacharopoulos (1997) finds that in Bolivia, household wealth is an important determinant of child labour, as working children reside primarily in poorer households, especially in rural areas. In addition, it is found that child labour has a very damaging impact on schooling outcomes, as being engaged in work is found to be associated with repeating grades. As a result, working children are found to have educational attainment nearly 2 years less than children who do not work.

Edmonds and Pavcnik (2005) find that there is a non-trivial impact of work on schooling. Quite logically, any time spent working is time that a child cannot utilize to study, participate in extracurricular activities and sleep. Even though the experience gained through working might augment a child's learning in school, it is not evident if that is enough to offset the negative impact of work on education. The authors state that "One reason why families might choose not to send children to school is low perceived returns to attending school, and there is some evidence that child labor can be reduced by improving the incentive for households to send children to school" (p.214). Aside from implementing measures that reduce the explicit costs of sending children to school, there is support for improving the quality of education so that parents would find it more worthwhile to send their children to school at the expense of income they might generate by participating in child labour. It is further elaborated that with economic growth and technological advances, households would be more likely to give up present consumption for the sake of increased benefit in the future as a by-product of human capital development of their children through consistent education.

Insights on Bangladesh related to child education and labour

In their analysis of rural Bangladesh, Ravallion and Wodon (2000) find that parental education is an important determinant of both incidences of child labour and school attendance. To be precise, their results reveal that the higher the level of parental education, the lower the incidence of a child being engaged in work and the higher the school attendance rate. In addition, they also find that owning more land increases demand for labour of boys, but reduces labour engagement for girls. It is speculated that this is possibly due to the fact that activities such as supervising hired farm labourers are more suitable for boys as opposed to girls due to cultural norms in the country. Moreover, by studying the impact of stipends and enrollment subsidies, it is found that wealth is an important determinant of child labour. It is found that even a stipend with a value that was less than the mean wage for children was sufficiently high to ensure full school attendance. In addition, it is also found that the stipend reduces incidences of child labour, although the impact here is not as strong as the impact of the stipend on school attendance.

Khanam (2008) uses a multinomial logit model to study the determinants of schooling and child labour in rural Bangladesh for children aged 5-17 years. Similar to the research detailed in this paper, the author defines work as both being market and household in nature. On the other hand, Khanam (2008) uses school enrollment as opposed to school attendance as a measure of schooling. It is found that in rural Bangladesh, the probability of a girl being both enrolled in school and engaged in work is much higher than boys. In addition, it is found that the higher the education level of the parents (mother and/or father), the more likely it becomes that the child specializes in schooling, as opposed to being engaged in labour activities. It is also found that the presence of very young children in the household (0-4 years of age) reduces the probability of a girl being enrolled full-time in school, while there is no such effect for boys. This indicates that the work generated from having a very young child in the household falls primarily upon girls as opposed to boys.

In Kumar (2015), a bivariate probit model is utilized to jointly estimate the impact of various individual and household factors on grade-transition and labour force participation for children in rural Bangladesh. The results from this research reveal that parental education is not only an important determinant of positive educational outcome in the form of successful grade transition, but higher levels of education of the parents is also associated with a greater likelihood of simply specializing in studying as opposed to being simultaneously engaged in schooling and labour activities. In addition, it is also found that the mother's education level becomes an increasingly important determinant of grade-transition and specialization in studies or work in higher grades, which is in accordance with the cultural norms of rural Bangladesh that places a greater responsibility of child care and education on mothers relative to the fathers. With respect to child specific characteristics, it is found that first-born children in lower grades are significantly less likely to successfully transit to the next grade and to just study. These findings regarding the effect of being the first-born child in the household could be also be due to cultural norms, where older children are saddled with a greater magnitude of household chores and responsibilities relative to younger siblings. In addition, it is also found that greater number of children in the household under the age of five is associated with a greater likelihood of labour force participation. Combined with the findings regarding the impact of being the first born child in the household, this result suggests that household in rural Bangladesh generally face prohibitive resource constraints, hence increasing the demand of labour for older children in the household for the purposes of child care as well as income generating activities.

With respect to child labour specifically, Rahman, Khanam and Absar (1999) describes the impact of the efforts made by the government in Bangladesh to reduce their child labour force is studied. One of the primary reasons behind child labour is said to be poverty, which is labeled a "push factor" by the authors; factors that reluctantly force children to participate in labour activities. Likewise, "pull factors" – defined as factors that attract children to work – are also found

to be important determinants for incidences of child labour. Pull factors can be due to cases such as parents finding it attractive to have their child employed in an engineering workshop as the experience of working might prove to be an invaluable asset for their future career. It is found that efforts to reduce the child labour force in the early 1990's has historically had an adverse impact on working children. For example, while children were initially employed in relatively well regulated and safer industries such as garment manufacturing, after measures were put in place to reduce the working child labour force, most of the children who were displaced from the garment industry were driven to other jobs rather than schools, particularly in the less secure and less lucrative informal sector. This was due to the fact that they money they earned through their jobs was essential for their day-to-day survival and that of the rest of their respective families; expenses that could not be sufficiently offset by the financial incentives provided by the government, which comprised of providing a monthly stipend for each child attending school on a regular basis. The authors state that to reduce child labour "Policies to create labour-intensive economic growth, to increase poor people's access to productive resources and basic services, and to ensure the adequate economic and social protection of all people…" would be more effective (p.999).

In Salmon (2005), various factors from the Bangladesh Labour Force Survey are utilized to study the determinants of child labour across the nation. It is found that as far as income generating child labour activities are concerned, the contribution of boys to the household is greater than that of girls. It is also found that among the households in the poorest quintile of the dataset, the share of child labour derived income is almost as high as 50 percent of total household income. Additionally, it is found that children are much more likely to work when they belong to a household where the potential of income generation among the adults, including by the mother, are already exhausted. In that sense, there is support for the hypothesis that children are generally considered the last economic resource within the household by their parents. The research also uncovers potentially interesting gender dynamics in terms of child labour force

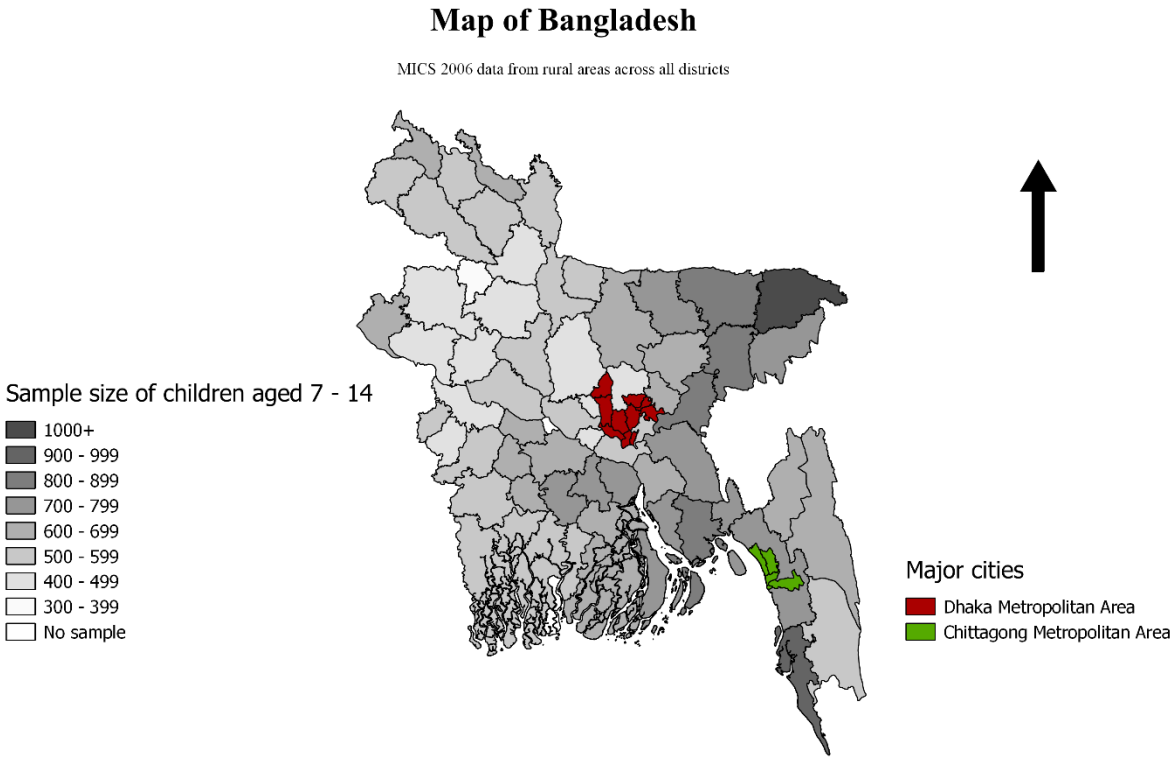
participation. It is found that boys, unlike girls, have a lower likelihood of entering the labour market when their mother is engaged in paid labour activities. It is postulated that could be due to the fact that girls and mothers substitute for each other with respect to household work, while boys and mothers substitute for each other with respect to income generating activities.

Section 4: Data

The primary source of data for the purposes of this research is the Bangladesh Multiple Indicator Cluster Survey (MICS) 3 for 2005-2006 in rural areas. This is a program supported in various countries around the globe by UNICEF, with the intention of better monitoring the situation of children and women in developing nations. This particular iteration of the survey was conducted in 2005 between June and October. This household survey provides detailed information regarding the employment and educational status of the children as well as adult members of household. The dataset is unique in that it provides information about how many days of school a child attended in the survey reference week as well as the amount of time they dedicated to household and market work.

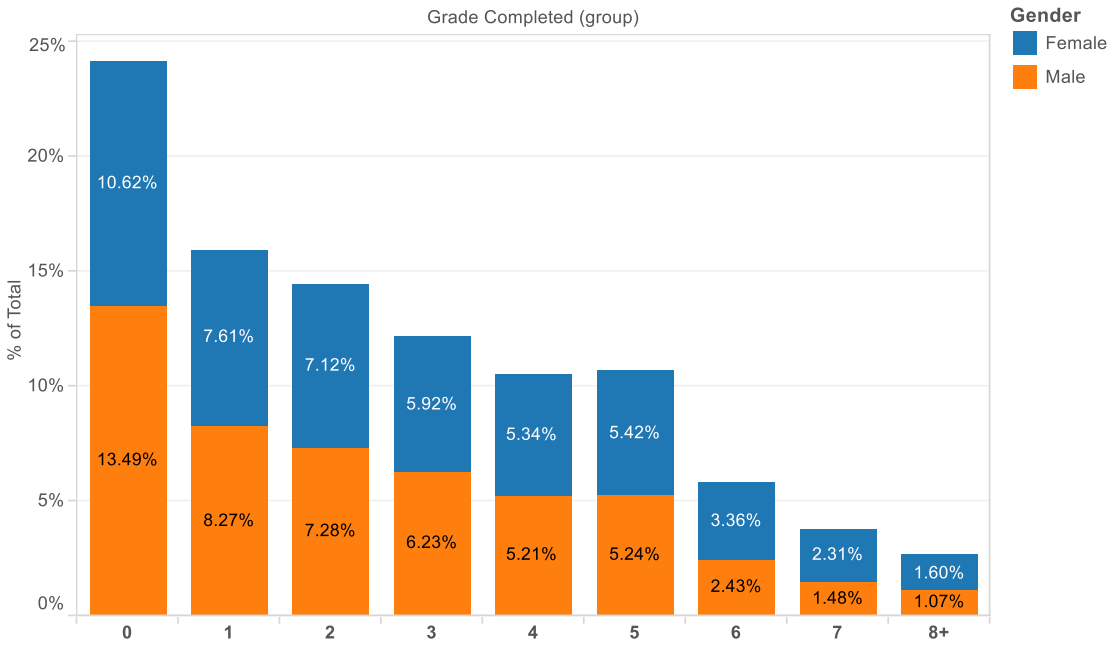
For the purposes of this particular paper, the dataset was restricted to focus exclusively on children aged 7-14 years in rural areas of Bangladesh. The restricted sample consists of 39,737 children in 24,025 households, with 20,147 male and 19,590 female children. The dataset provides information on whether a child attended school in the survey year (2005) and the year before, the highest grade completed in previous years and other child-specific, household-specific and community level characteristics.

Figure 1: District distribution of rural area sample



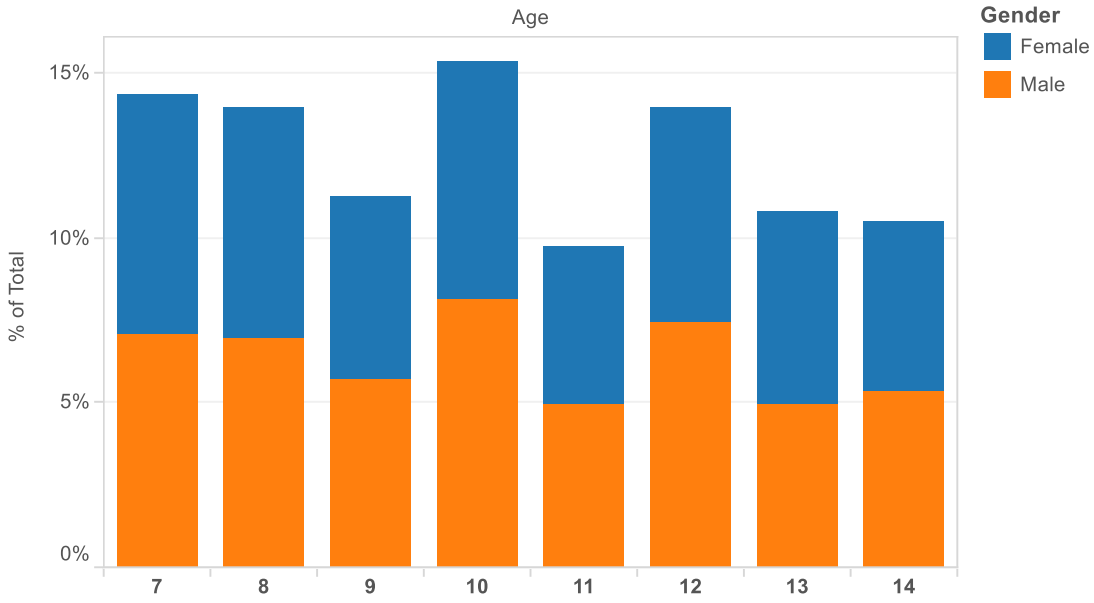
Below is the plot of the distribution of children over highest grade-completed within the sample. The reported grade-completed varies from grade 0 to grade 10. Within the sample, 87.75% of children have a reported highest grade-completed of grade five or less. In addition, female children appear to constitute a greater percentage of total cohorts among higher levels of grade completed (grade 4 or higher) as opposed to lower grades, where male children constitute a bigger share.

Figure 2: Distribution of children by highest grade completed



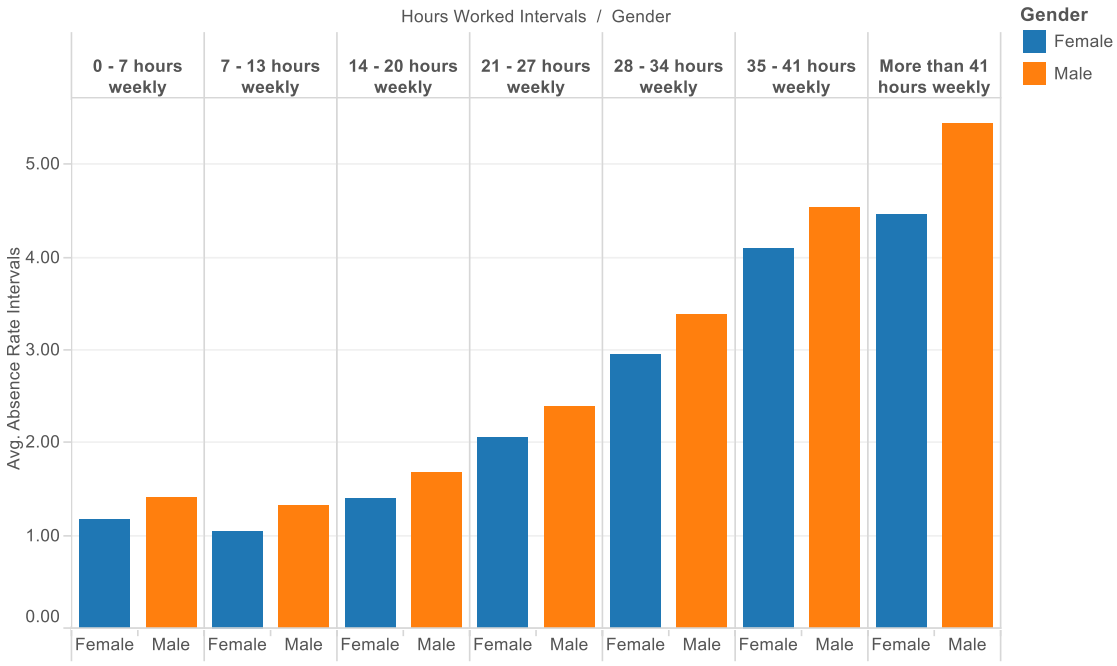
In addition, the sample from the survey provides pretty good coverage with respect to the age of children with the range of 7 to 14 years. Approximately 55% of the children within the sample are between the ages of 7 to 10 (inclusive), while the remaining 45% are between the ages of 11 to 14 (inclusive). In addition, both girls and boys are represented fairly evenly for every age.

Figure 3: Distribution of children by age



As mentioned previously, one of the most important features of this dataset for the purposes of this research is the presence of information regarding absence rate from school and hours worked in a week. Figure 4 presents that information and depicts the positive relationship between the two jointly determined dependant variables within this paper. As evidenced below, the more time a child spends working in a week, the higher their absence rate from school is within the same week. This relationship holds for both genders. In addition, absence rate from school is higher for male children than their female cohorts across all intervals of total hours worked.

Figure 4: Average absence rate by hours worked intervals



Another important aspect of the MICS 2005 dataset is the presence of information regarding parental education. As discussed previously, one of the most important determinants of a child's educational and work outcomes is the education level of the mother and the father. Figures 5 to 8 depict the relationship between absence rate and hours worked, and parental education. On average, a child with parents who both have an education level of secondary school or greater has half the absence rate relative to a child with parents who have no education (0.90 versus 2.06). Similarly, a child with parents who both have an education level of secondary school or greater works about 3.5 hours less per week than a child with parents who have no education (7.57 hours versus 11.25 hours). Within the dataset, nearly 45% of fathers and 56% of mothers reported having no education whatsoever. In addition, approximately 13% of fathers and 17% of mothers reported having some level of primary education, while 9% and 11% of fathers and mothers reported completing primary school respectively. Lastly, 13% of fathers and 12% of mothers reported having some level of secondary education, whereas nearly 20% of fathers and 3% of mothers reported completing secondary school at the very least.

Figure 5: Average weekly absence rate by mother's education

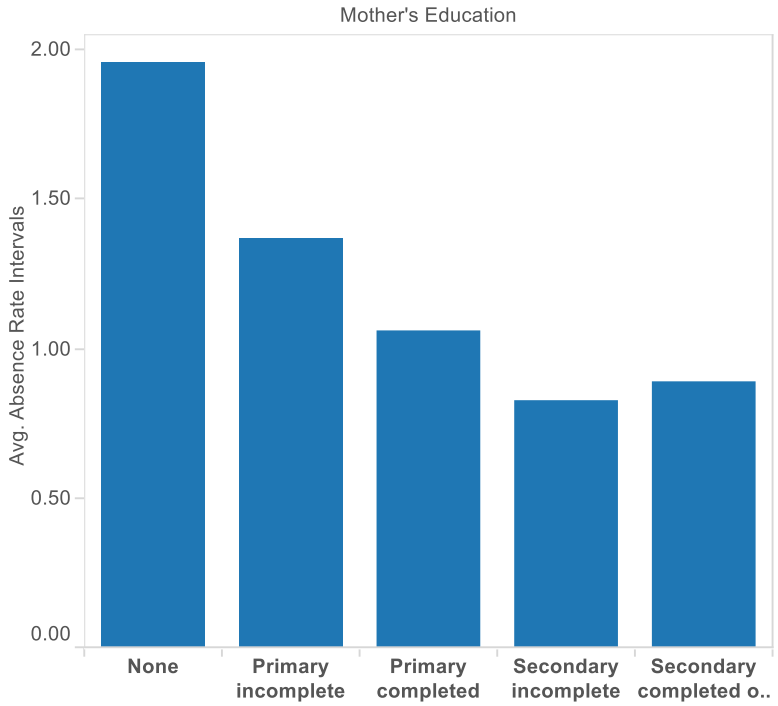


Figure 6: Average weekly absence rate by father's education

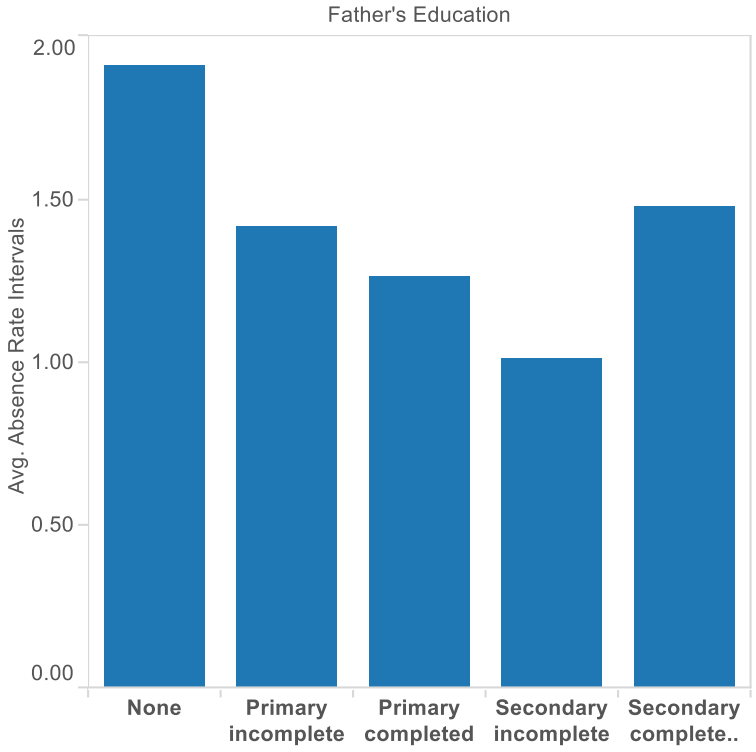


Figure 7: Average hours worked per week by mother's education

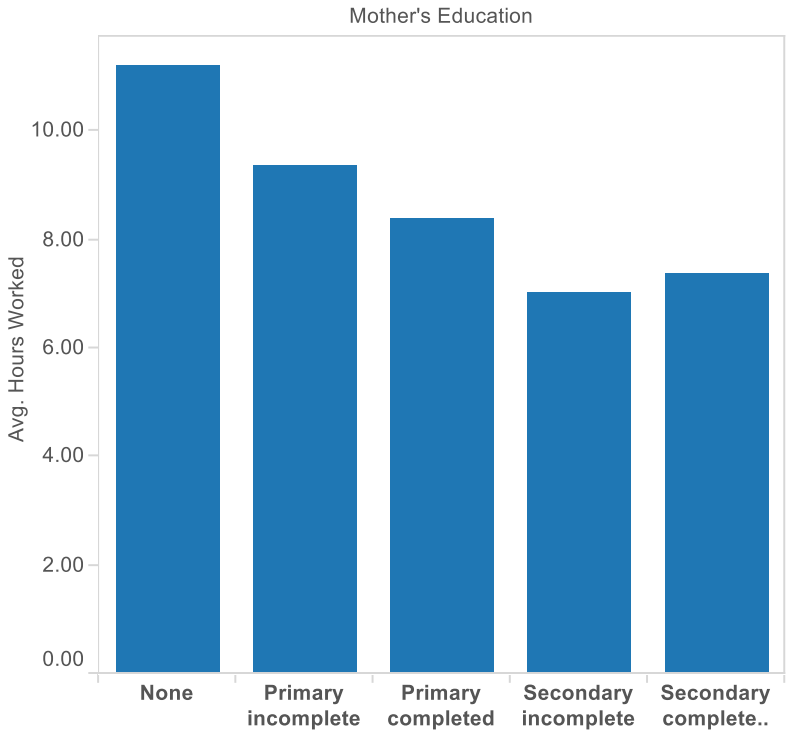
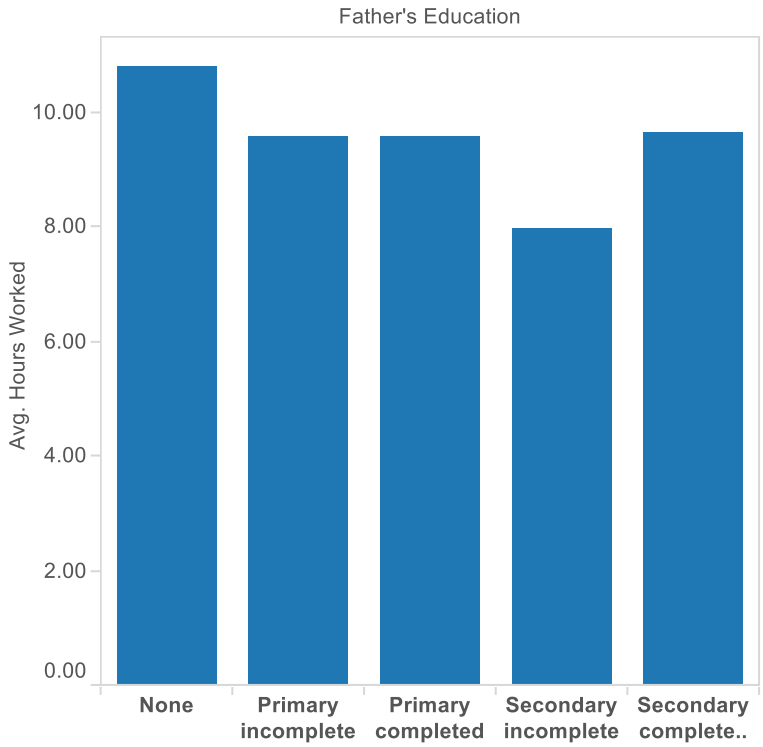
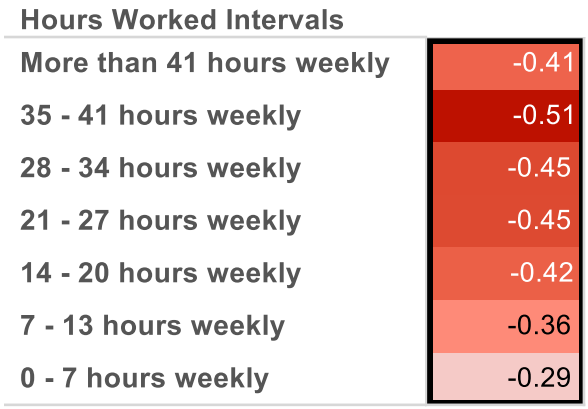


Figure 8: Average hours worked per week by father's education



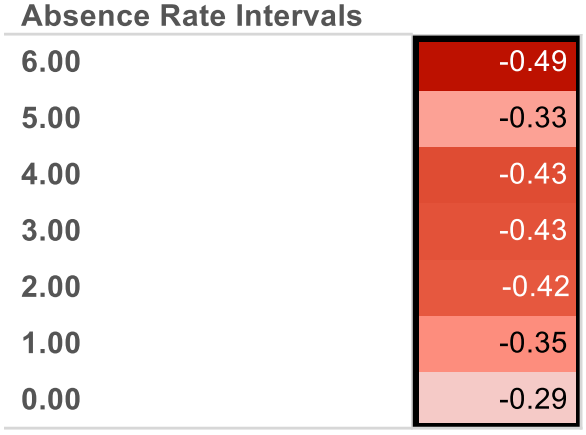
In addition, the MICS dataset also provides information on household wealth. This information is tabulated in the form of a relative wealth-score that is based upon a principal component analysis of the assets owned by the household. Figures 9 and 10 present household wealth-scores alongside information regarding the absence rate and hours worked of a child belonging to that household. The figures suggest that in general, children who have a higher absence rate and work a high amount of hours per week belong to poorer households relative to children who have a lower absence rate and work less hours per week.

Figure 9: Average wealth score by hours worked intervals



Hours Worked Intervals	
More than 41 hours weekly	-0.41
35 - 41 hours weekly	-0.51
28 - 34 hours weekly	-0.45
21 - 27 hours weekly	-0.45
14 - 20 hours weekly	-0.42
7 - 13 hours weekly	-0.36
0 - 7 hours weekly	-0.29

Figure 10: Average wealth score by absence rate



Absence Rate Intervals	
6.00	-0.49
5.00	-0.33
4.00	-0.43
3.00	-0.43
2.00	-0.42
1.00	-0.35
0.00	-0.29

Section 5: Theoretical model

A theoretical model of schooling and child labour based on Kumar (2013) and Kumar (2015) is utilized to motivate the empirical analysis. Consider a household consisting of a parent (*p*) and a child (*k*). In period 1, child is endowed with one unit of time, which can be used for work, study, and leisure. The time spent studying in period 1 increases the human capital/earnings of child next period. All decisions regarding child are made by the parent.

Let *l* and *s* be the time spent working and studying respectively by child in period 1. The human capital function of a child is given by $E(h_2, B)$ where h_2 is the human capital of child in period 2, and *B* is the vector of exogenous factors which can affect the human capital function such as scholastic ability/motivation of children, parental ability/motivation, children capacity to work, and household and school environment. h_2 is given by:

$$h_2 = (1 - \delta)h_1 + s \qquad (2.1)$$

h_1 is the highest grade completed previously by the child and δ is the rate of depreciation of human capital. In the rest of the paper, h_1 is referred to as *grade-completed*. The human capital function is an increasing and concave function of h_2 with $E(0, B)>0$[1]. Consumption of child in period 2 depends on its human capital, h_2.

[1] For any function f(x), $f_x(x)$ and $f_{xx}(x)$ denote the first and the second derivative respectively.

The parent is altruistic and her utility depends not only on her own consumption in period 1, c_1^p, but also on the utility of child. The utility of child depends on her leisure in period 1 and consumption in period 2, c_2^k. The parental utility function is thus given by:

$$W^p = U\left(c_1^p\right) + \lambda[U\left(c_2^k\right) - M(l+s)] \qquad (2.2)$$

U() is a twice continuously differentiable function, strictly increasing, and concave function of consumption. *M()* is a twice continuously differentiable, strictly increasing, and convex function of disutility incurred from studying and working, *l+s*. Parameter $0<\lambda<1$ measures the degree of parental altruism.

Let *w* and p_S *be* the earnings of the child and the cost of schooling per unit of time respectively. The parent chooses time spent working and studying by child and her own consumption, taking grade-completed, h_1, as given. Let *A* be the earnings of the parent. The budget constraints in two periods are:

$$c_1^p = A + wl - ps^s \qquad (2.3)$$

$$c_2^k = E(h_2, B) \qquad (2.4)$$

The parental optimization problem is:

$$max_{c_1^p,l,s}\, U\left(c_1^p\right) + \lambda[U\left(c_2^k\right) - M(l+s)]$$

subject to the budget constraints 2.3 and 2.4. The first order conditions associated with the optimal choices are:

$$l: U_c\left(c_1^p\right)w = \lambda M_l(l+s), \;\; if\; l > 0\;; \tag{2.5}$$

$$l: U_c\left(c_1^p\right)w \;\leq \lambda M_l(l+s), \;\; if\; l = 0\;; \tag{2.6}$$

$$s: \lambda U_c\left(c_2^k\right)E_s(h_2, B) = \; U_c\left(c_1^p\right)p_s + \;\; \lambda M_s(l+s), \;\; if\; s > 0 \;\; \& \tag{2.7}$$

$$s: \lambda U_c\left(c_2^k\right)E_s(h_2, B) \leq \; U_c\left(c_1^p\right)p_s + \;\; \lambda M_s(l+s), \;\; if\; s = 0 \tag{2.8}$$

(2.5) equates the marginal benefit of child labour with its marginal cost. If the marginal cost of child labour exceeds its marginal benefit, the parent would choose *l=0*, implying no labour market involvement. (2.6) characterizes this condition. Similarly, (2.7) equates the marginal benefit of studying to its marginal cost. If the marginal cost of studying exceeds its marginal benefit, the parents would choose s=*0*, and the child would not attend school during any day of the week. (2.8) characterizes this condition.

With respect to the marginal benefits and costs associated with schooling as described in (2.5), there are multiple factors that impact this condition. For example, if the earnings potential of a child is increased, w (earnings of the child) will also increase, hence increasing the marginal benefit of child labour relative to the marginal cost. Ceteris paribus, this will naturally lead to an increase in child labour (in the form of number of hours worked as described in this paper) for that particular child. Likewise, if the level of parental altruism is higher (λ as described in the theoretical model), the marginal cost of child labour is increased as a whole relative to the marginal benefit, hence causing a decrease in child labour.

Similarly, there are various factors that impact the marginal benefits and costs condition (2.7) for schooling. For example, the human capital function is described as being a marginal benefit of schooling in the theoretical model. The human capital function is in turn a function of

factors such as scholastic ability, parental education, household factors, school environment and other societal factors. As such, if parental education level is increased, this will have a positive impact on the child's human capital function, hence increasing the marginal benefit of schooling relative to the marginal cost. Ceteris paribus, this directly leads to an increase in schooling (which is captured lower absence from school in this paper). In addition, this function could also capture factors such as the quality of education provided within the schools. For example, if the quality of teachers is improved in school or if the student-to-teacher ratio is improved, this will have a positive impact on the human capital function, hence increasing the marginal benefit from schooling; this will lead to improved attendance in school. In addition, the human capital development function can also capture the impact of skill premium in the economy. Increased wages in the district for skilled occupations relative to unskilled occupations can hence lead to improved school attendance.

On the other hand, there are also various factors that impact the marginal cost of schooling. Within the theoretical model, this is captured by the utility function of the child as well as the cost of schooling. As such, if cost of schooling is increased through, for example, increased transportation cost due to long distance to the primary school, the marginal cost of schooling relative to the marginal benefit will increase, leading to a decrease in schooling for the child (which is captured by higher absence from school in this paper). Similarly the utility function can also capture the impact of the child's health on schooling. An onset of a serious illness can decrease the utility of the child in period 1, hence increasing the marginal cost of schooling. Ceteris paribus, this will, in turn, lead to higher absence rate from school for the child.

Section 6: Econometric Model and Explanatory Variables

Econometric Model

The two dependant variables for the purposes of this study are absence rate (which is inversely related to schooling as defined in the theoretical model; increase in absence rate is indicative of a decrease in schooling) and numbers of hours worked (which is positively related to labour as defined in the theoretical model). Absence rate is coded with a value of 0 if the child was present at school the entire week, 6 if the child did not go to school at all, and values of 1 to 5 corresponding with the number of school days missed in the reference week. The second dependant variable, hours worked, is coded with a value of 0 if the child has done less than 7 hours of combined household and/or market work, value of 6 if the child has one more than 41 hours of worked and values of 1 to 5 if the child has worked anywhere between 7 to 41 hours (each number corresponds with intervals of 7 hours worked). Since the data is derived from a survey, intervals of hours worked were utilized to account for measurement errors.

The theoretical model indicates that both absence rate and the number of hours worked in a week are jointly determined by parents of the children. As such, bivariate regression is utilized, where in a multivariate regression model is fitted for both dependant variables with the same independent variables. The bivariate nature of the model allows for the fact that the error terms of the absence-rate equation and the hours-worked equation can be correlated. Undertaking a joint estimation is shown to be asymptotically efficient and relatively more efficient compared to simpler estimation models (Greene, 2012). As a result, joint estimation is understood to be become more efficient as the sample size is increased.

Moreover, since there is censoring in the dependant variables (i.e. a child cannot be absent from school for less than zero days or more than six days in a school week), the Tobit model (also called the censored regression model) is utilized. Due to the censoring of the data,

latent values are consequently transformed to either the lowest (0 in the case of this dataset) or the highest observable value. This is problematic because there is a greater degree of variation in the independent variables (generally uncensored in the case of the dataset utilized for this research) than there is in the dependant variable, in particular the variable on attendance rate as measured by days ranging from 0 to 6. In situations like these, ordinary least square estimates are inconsistent, but are generally computed nonetheless for the sake of comparison. For consistent estimation and useful interpretation of the estimates, maximum likelihood techniques are generally utilized (Greene, 2012). It is stated that OLS estimates are generally smaller than the Tobit, maximum-likelihood estimates.

Let a_i *and* b_i denote the absence rate and hours worked by the ith child respectively. Then the estimated equations are:

$$a_i = \varphi X_i + v_i \quad (3.1)$$

$$b_i = \omega X_i + \epsilon_i \quad (3.2)$$

where *X* is the matrix of explanatory variables including grade-completed, φ and ω are the associated vectors of coefficients, and $v \sim N(0,1)$ and $\varepsilon \sim N(0,1)$ are joint normally distributed error terms with $cov(v, \varepsilon) = \rho$.

It should be noted that at the time of decision making by the parent, grade-completed by a child is a predetermined variable. However, it is the result of past decisions made by the parent and depends on all the factors in *B* such as the ability of children and their motivation, the parental background, and the school and the household environment. Thus, grade-completed will not be exogenous variable in a fuller model and the association between grade-completed and the absence rate and hours worked by a child cannot be interpreted as a causal relationship.

Explanatory Variables

Child-specific characteristics

Based on previous findings in the literature, numerous variables were utilized to estimate the joint decision of attending school and doing work. With respect to characteristics that are specific to a child, one variable being utilized is GradeComp. This variable indicates the highest grade completed prior to the survey year 2005. Within the sample, the value of this variable ranges from 0 to 9. It should be noted that a value of 0 includes children whose highest grade completed prior to 2005 is pre-school as well children who have never attended any form of school. In addition, since grade completed may not necessarily have a linear relationship with absence rate and hours worked, both grade completed and its square are used as explanatory variables.

To account for differences in gender – a potentially significant factor in a country such as Bangladesh – a dummy variable (Male) takes the value of 1 if the child is male and 0 if the child is a female. In addition, to capture the differential impact of gender on absence rate and hours worked, the interaction of the gender variable with grade completed is also utilized as an explanatory variable.

Using information from the survey on both 2004 and 2005, a dummy variable is created (GapStudent) to indicate whether a child has had interruption in schooling or not. If the child did not attend school in 2004 but has a reported grade completed of at least 1, this dummy variable takes a value of 1. Otherwise, the dummy variable has a value of 0. This variable is also interacted with the gender and grade completed variables (Male and GradeComp, respectively) to capture its differential impact on absence rate and hours worked. Based on the same information, an additional set of variables are included that identify whether a child is a repeat student or not (NonRepeat).

Combining information on the grade attended in the 2004 with grade completed, a dummy variable is generated to indicate whether the child completed the grade attended in the year prior to the reference year of 2005 (NonRepeat). This variable is given the value of 1 if the grade attended by a child in the previous year and the grade completed are the same and a value of 0 otherwise. In addition, this variable is interacted with both gender and grade completed as well.

Given the extensive discussion in literature about the difference in education attainment and work intensity based upon birth order of children with siblings, a dummy variable indicating whether the child is the first born is included (FirstBorn). The dummy variable takes a value of 1 if the child is the first born and a value of 0 otherwise. The variable, however, does not take into account twins. In addition, this variable is interacted with the gender and grade completed variables as well.

Similarly, given the discussion in literature about the change in school involvement and work intensity as a child becomes older, a variable indicating the age of the child is also included (Age). Also, given that age may not necessarily have a linear relationship with the variables of interest, the squared values of age are also used in the estimation. In addition, due to the cultural context of Bangladesh and the difference in treatment of male and female children as they approach puberty and health related issues that might arise for female children at that age, a variable indicating whether the child is a male and a teenager (aged 13 or 14) is also included (MaleTeen). This variable takes on a value of 1 if the child is both male and a teenager, and 0 otherwise.

Household characteristics

Due to the fact that decisions regarding a child's school attendance and work involvement are made by parents, multiple variables specific to parents and general household characteristics are included in the estimation. Since a tremendous amount of significance is placed on the role

of parental education in the literature, variables detailing the education level of both the mother and the father are included (MothEduc and FathEduc respectively). The survey provides information on how much education a parent has (none, primary incomplete, primary complete, secondary incomplete, secondary completed or higher); the included variables in the estimation take values ranging from 0 to 4, with 0 indicating no education and 4 indicating secondary completed or higher. Likewise, both mother and father education variables are interacted with variables containing information regarding the corresponding child's gender and grade completed variables.

In addition to parental education, a lot of discussion in the literature has been regarding the importance of household wealth and its impact on a child's educational outcome. It is expected that wealth has a positive impact on schooling and a negative impact on child labour. However, it is also possible that wealthy households might have more lucrative avenues available to them to employ their children, hence there is a possibility of the opposite relationship existing between wealth and schooling/child labour. Even though MICS 2005 data does not provide information on the earnings of adults and children, there is information regarding the wealth of the household as a whole. For each household, there is a corresponding wealth score, which is based on the principal component analysis of all the assets contained within the household. As such, this wealth score and its squared value are utilized as explanatory variables (Wealth and WealthSquare respectively). In addition, wealth score is interacted with variables delineating the gender of the child and the grade completed.

Aside from the household-specific variables mentioned above, multiple dummy variables were also included in the estimation. These include variables indicating whether the household head is a direct relative of the child (DirRelative – value of 1 if the child is son/daughter, grandchild or niece/nephew of the household head; 0 if otherwise), whether the father and mother stay reside in the household (FatherStay and MotherStay – 1 if living in the same household as the child; 0

otherwise – both interacted with the variable indicating the gender of the child), whether the household has children under the age of 5 (ChildrenUnderFive – value of 1 or higher if yes; 0 otherwise – interacted with the gender variable), whether the household has access to electricity (Elec – value of 1 if yes, 0 otherwise) and whether the head of the household is Muslim (Religion – value of 1 if yes, 0 otherwise).

In addition to all of the variables mentioned above, additional dummy variables are also included to control for variation in geographical location (64 different districts across Bangladesh) and the month of year 2005 (June through October) the surveyor conducted the survey on the given household.

Labour market return

Due to the discussion in the literature detailing the importance of labour income on decisions regarding schooling and child labour, data from another survey was utilized to attain information about wages as an indicator of returns on education in the rural Bangladeshi labour market. For that purpose, the 2005 Household Income and Expenditure Survey for Bangladesh was used to acquire such information. Like MICS 2005, this is also a nationally representative survey encompassing the whole of Bangladesh. The survey contains information regarding the occupation of all those employed and the wages they earn (both explicit and in-kind) for their services. Since the occupations are detailed in accordance with International Labour Organization's (ILO) International Standard Classification of Occupations (ISCO), it is possible to further break-down the occupations and their corresponding wages based on skill levels (Hoffmann, 2003). A breakdown of major occupation groups by their corresponding level of skills is provided in the appendix. For example, occupations like farm-hands, mining labourers, and freight handlers are occupations that are classified as low-skill. On the other hand, occupations such as motor vehicle mechanics, precision-instrument makers, and salesmen are classified as higher-skilled occupations. Since children with low levels of education (primary incomplete or less)

can reasonably be expected to earn wages in line with prevailing wages for the lowest skill occupations, the difference in average wages between the lowest skill and higher skill occupations is utilized in the estimation as an explanatory variable.

More specifically, the difference is calculated for each of the 64 districts in Bangladesh and labelled as “skill premium.” For each district, wage data for all low-skill occupations is utilized to calculate the average daily wage of individuals engaged in occupations classified as low-skilled. Afterwards, wage data for all medium and high skilled occupations is combined to calculate the average daily wage of individuals engaged in occupations that are classified as either medium-skill or high-skill level. SkillPremium is then defined to be the average medium and high-skill level occupation daily wage divided by the average low-skill level occupation daily wage. This is done with the expectation that parents will incorporate their observation of the prevailing wages of higher skilled occupations in their labour market while making decisions regarding their children’s schooling and child labour status. Within the given sample, the average skill premium ranges from 1.2 to 3.4 among the 64 districts in Bangladesh; depending on their district of residence, individuals involved in medium and high-skill occupations earn between 1.2 times to 3.4 times more than individuals involved in low-skill occupations.

In general, this data from the 2005 Household Income and Expenditure Survey was incorporated in this study because the MICS 2005 dataset does not contain comparable information. Given that despite being carried out at roughly the same time period, the two datasets do not have the same coverage with respect to the strata and households surveyed, any information augmented from one dataset to another is not entirely comparable. However, since wages are determined at the market level, it is hoped that district level average wages during the same time period are comparable across the surveys.

Section 7: Results

For the purposes of this research, two kinds of estimation methods are undertaken. First of all, ordinary least squares is utilized to establish a baseline. Secondly, Tobit model (also called a censored regression model) is used to study the relationship between all of the variables of interest. The results from the Tobit model will be referenced from here on in as it is the preferred estimation method among the two. This is the case because there is censoring within the two dependant variables in the estimation. Absence rate is censored because students cannot be absent from school for more than six days a week (the length of the school week in Bangladesh), nor can they be absent for less than zero days. Similarly, the amount of hours worked is also bounded by the maximum number of hours in a week and zero hours. OLS estimation is limited in this case because it can potentially provide inconsistent estimates (Long, 1997). For the sake of robustness, OLS estimates are also provided in the Appendix alongside the regression results (and average marginal effects) from the Tobit model.

In addition, the results cited from the Tobit model are in reference to the average marginal effects, not the initially estimated coefficients. In order to compute how much the dependant variables change when the value of an independent variable is altered (holding other variables constant), an additional step is undertaken wherein the initial Tobit estimates are utilized to calculate the marginal effects at the mean values of each of the independent variables.

Furthermore, although not cited in the appendix, additional robustness checks were conducted in the form of recoding of the hours worked dependant variable to reflect actual reported hours worked as opposed to intervals. The results from that specification are largely similar to the ones cited and reported in this paper. Ultimately, bivariate estimation is primarily utilized and cited since our hypothesis is that absence rate and amount of hours worked are jointly

determined. The usage of bivariate specification allows for the error terms of absence rate estimation and hours worked estimation to be correlated.

Based on the estimated coefficients of the Tobit specification, GradeComp, MothEduc, FathEduc, NonRepeat, Wealth, Age, MaleInteractTeen FatherStay, MotherStay and Skillpremium all have a negative and statistically significant impact on Absence rate. On the other hand, GapStudent and being the FirstBorn child have a positive and statistically significant impact on AbsenceRate.

Similarly, the estimated coefficients of the Tobit specification indicate that GradeComp, Male, FathEduc, MothEduc, NonRepeat, Wealth, DirRelative, FatherStay and MotherStay all have a negative impact on HoursWorked, whereas GapStudent, FirstBorn, Age and MaleTeen have a positive impact on HoursWorked.

Average Marginal Effects

Based on the average marginal effects of the estimated coefficients, it is found that GradeComp, NonRepeat, MothEduc, FathEduc, Wealth, Age, DirRelative, MotherStay and SkillPremium all have negative and statistically significant impact on AbsenceRate; that is to say that the absence rate of a child from school decreases as the value for the independent variables listed above increases (or the value is 1 as opposed to 0 for dummy variables). On the other hand, GapStudent and FirstBorn have a positive and statistically significant effect on AbsenceRate. In addition, there are statistically significant interaction effects between GradeComp and MothEduc; GradeComp and FathEduc; GapStudent and Male; GapStudent and GradeComp; GradeComp and FirstBorn; GradeComp and SkillPremium; and Male with Teen.

With regards to the second dependant variable in the regression, GradeComp, NonRepeat, Male, MothEduc, FathEduc, GapStudent, Wealth, FirstBorn, Age, DirRelative and MotherStay all have a statistically significant effect on HoursWorked. In addition, there are

statistically significant interaction effects between GradeComp and Male; Male and MothEduc; Male and GapStudent; Male and Wealth; and GradeComp and FirstBorn.

Grade completed

Based on the average marginal effects presented in Table 2 of the Appendix, it is evident that GradeComp (the variable that shows the highest grade completed prior to 2005) has a statistically significant impact on both the dependant variables – AbsenceRate and HoursWorked. In addition, it is also found that the impact of GradeComp on the two dependant variables becomes smaller in magnitude as the grade completed by the child increases. In general, the higher the grade completed, the lower the absence rate of the child in a given school week.

Similarly, it is found that the higher the grade completed, the lower the hours of work undertaken by a child in a week. This finding falls in line with previous evidence in the literature that suggests an association between grade completion and the number of hours worked (Gunnarson, Orazem and Sanchez, 2006; Psacharopoulos, 1997). The latter finding is noteworthy because within the same estimation, it is found that Age has a significant, yet positive impact on HoursWorked; meaning that ceteris paribus, a child engages in more hours of work as they get older.

In addition, it is also found that GradeComp has significant interaction with some other independent variables in the estimation. In particular, it is found that there is a significant gender differential, wherein the absence rate of boys from school is lower than girls as the grade completed increases. There is a similarly significant effect in place for hours worked in a week, suggesting that boys work less than girls as the highest grade completed increases.

Parental education

According to the estimation, it is evidenced that both the education level of the mother and the father have a significant impact on a child's absence rate from school and the level of

engagement with work during a week. As expected, the higher the education level of the mother and the father, the lower the child's absence rate. Similarly, the higher the education level of the mother and the father, the less hours worked by the child during the week. The finding that parental education is an important determinant of child labor is supported by previous research (Salmon, 2005; Kumar, 2015). Moreover, the results also align with the findings by Khanam (2008) in that in rural Bangladesh, the higher the level of parental education, the more likely it becomes that their children will specialize in education and will be less likely to be involved in child labour. In both cases, the magnitude of the impact of mother's education on the dependant variable is higher than that of the father's education. In addition, there is a statistically significant impact of mother's education on male children; the higher the mother's education, the lower the absence rate and the amount of hours worked in a week for boys relative to girls.

Moreover, there is a significant, positive interaction effect of the mother's education level with the highest grade completed by the child on their absence rate. This implies that the effect of the mother's education on absence rate is greater in lower grades and smaller in higher grades. As such, the mother's education matters more for children in lower grades and this effect decreases for children who have managed to move on to higher grades. The finding that the mother's education level becomes more crucial for a child education attainment for children in higher grades is in line with cultural and social norms in Bangladesh, where child-care duties fall primarily on the mother. Mothers are generally more involved with the education of their children (Doss, 2013) and the effect of their education becomes more pronounced with higher grade-completed (Sawada and Lokshin, 2009). In general, the findings are in agreement with the consensus in the literature that parents with higher education levels understand the true value of education and, as a result, create an environment more conducive to continued education for all the children within their household (Khanam, 2008).

Wealth

Based on the average marginal effect of the Wealth variable, it is evidenced that household wealth has a significant impact on both absence rate and the amount of hours worked in a week. This result is consistent with previous research in the literature which suggested that financial constraints are important determinants of incidence of child labour and/or school participation (Chernichovsky, 1985; Belachew et al., 2011; Salmon 2005; Ravallion and Wodon, 2000; Kumar, 2015). Based on the average marginal effects from the Tobit model, it is found that up until a certain point, increase in wealth leads to a reduction in both absence from school and the number of hours worked in a week. However, at higher levels of wealth, it is found that additional increase in household wealth leads to both an increase in absence rate from school and the number of hours worked in a week. This result is also found in previous research on rural Bangladesh (Kumar, 2015), wherein it is found that children from both very wealthy and very poor households are less likely to transit to the next grade and are more likely to specialize in labour activities. This could potentially be due to the fact that children belonging to very wealthy households (particularly the ones that own land) work more due to availability of more lucrative opportunities than those belonging to poorer households. There is evidence that ownership of land can have a positive impact on child labour, for both female (Bhalotra and Heady, 2003) or male children (Ravallion and Wodon, 2000). Another explanation could be that in wealthier households, mothers are also engaged in market work, hence a greater burden of household work and chores fall upon the children (Salmon, 2005).

The wealth variable also has a statistically significant interaction effect with the gender dummy and the highest grade completed variables. More specifically, higher levels of wealth is associated with lower levels of absence rate and hours worked for boys more so than girls. As discussed above, this is generally in line with previous research in the literature as wealth can have a positive impact on work load of girls more so than boys, since the former can be engaged

in work that is both household and agricultural in nature (Salmon, 2005). Since boys in Bangladesh are generally relied upon for financial contributions to household wealth more so than girls, an increase in wealth level, with all else being equal, is expected to decrease the amount of hours worked for boys more so than girls as well. In addition, the interaction between highest grade completed by the child and the household wealth level is negative for hours worked, suggesting that the impact of wealth on child labour decreases for a child in higher grades.

Schooling interruption

Based on the average marginal effect of GapStudent variable, children who were not enrolled in school in 2004 are extremely likely to be entirely absent from school in 2005 and are instead more likely to be working a greater number of hours during the week relative to other children. This finding is consistent with previous research for rural Bangladesh where it is suggested that gap students may be of relatively low scholastic abilities and/or be suffering from adverse familial circumstances (Orazem and King, 2007; Kumar, 2005) In addition, there is a strong and statistically significant interaction effect between the GapStudent and Male variables. The sign and magnitude of the interaction effect between the two variables suggest that male children who were gap students in the previous year had an even higher rate of absence from school than their female counterparts. In addition, male gap students also worked a greater amount of hours than girls. As suggested in Kumar (2015), this could be due to that fact that if households suffer from negative impact shocks, male children, who are generally relied more for income generating activities relative to girls, are impacted severely, resulting in having to drop-out of school and joining the labour force in order to augment the household's total income.

In addition, it is also found that the effects of school interruptions increase as the highest grade completed by a child increases. A child with a schooling interruption in a higher grade has a higher rate of absence from school in the subsequent year. Similarly, a gap student in a higher

grade also works a greater number of hours per week relative to a child whose highest grade completed is at a lower grade.

Grade repetition

Based on the estimated average marginal effect of the NonRepeat variable, it is found that children who do not repeat their grades have a significantly lower absence rate from school and they also work less hours in a week compared to children who have repeated grades. In both cases, it is also found that male children who have not repeated grades have even lower absence rates and lower amount of hours worked relative to female, non-repeat students. Sabates et al. (2010) also find that children who repeat their grades are more likely to drop out of school entirely.

On the other hand, based on the estimated average marginal effect of the interaction term between GradeComp and NonRepeat variables, it is found that both absence rate and hours worked in a week increase for non-repeating students as their highest grade competed increases. These results are in accordance with previous research on rural Bangladesh (Kumar, 2015), where it is suggested that children who are grade repeaters may suffer from illnesses and physical disabilities that constraint not only their schooling outcome but also limit their labour activities.

Skill premium

According to the estimation, the district level average wage differential between low skill and higher skill occupations has an impact on a child's rate of absence from school, but not the amount of hours worked in a week. The average marginal effect of the corresponding variable is statistically significant and negative, indicating that the higher the skill premium in a district, the lower the absence rate of a child attending school in that district. In addition, the interaction effect between SkillPremium and GradeComp suggests that absence rate of a child decreases even further in higher grades relative to someone in a lower grade. Overall, it appears that as expected, the wage differential observed by parents in a given labour market does impact the rate of

absence of a child in that region. This finding underlines the importance of improving the perceived returns to human capital of attending school. There is indeed evidence in the literature to that effect regarding the developing world in general (Edmonds and Pavcnik, 2005).

Other characteristics

Based on the average marginal effects derived from the estimation, there are various child specific factors that have a significant impact on both the absence rate of the child and the amount of hours they work in a week. In general, it is found that boys have a lower absence rate than girls. In addition, boys also work less hours than girls. In general, these results hint towards the existence of gender bias against female children in rural Bangladesh, as education for young girls does not appear to have as much importance for parents as education for young boys. Instead, girls contribute more to the household in terms of hours worked in a week than boys the same age as them. These findings support previous evidence in the literature that hint towards the impact of gender bias against female children with respect to labour force participation and school enrollment in Bangladesh (Khanam, 2008). In addition, it should be noted that girls primarily contribute with respect to household chores, whereas boys are generally relied upon for income generating activities, especially among the poorest households (Salmon, 2005).

In addition, a child who is the first born child of a household has a statistically significant higher rate of absence from school. Moreover, a first born child also works more hours in a week compared to someone who is not the first born chid of the household. There is also a statistically significant interaction effect between the first born dummy variable and the highest grade completed. The absence rate of a first born child decreases as their highest grade completed increases. Similarly, the amount of hours worked in a week also decreases for a first born child as the highest grade completed increases. This result is in-line with previous findings in the literature (Kumar, 2005), where it is found that being the first born child in the household is associated with a greater likelihood of being solely engaged in labour activities and lower

likelihood of specializing in their studies. There is, however, no gender differential observed for a first born child with respect to either the absence rate from school or the amount of hours worked in a week. Due perhaps to cultural norms in rural Bangladesh, first born children are asked to share a greater share of responsibility when it comes to providing for the household than their younger siblings.

Research in the literature suggests that there is generally a trade-off between the number of children in a household and some aspect of their "quality," due to the price of raising children (Becker and Lewis, 1973). In addition to the FirstBorn variable, an additional variable quantifying the presence of children under the age of five in the household was included in the estimation. However, there was no significant relationship found between that variable and AbsenceRate and HoursWorked. If quality is equated to educational and labour outcomes, even though the number of young siblings does not appear to be significant, the significant results as they relate to the FirstBorn variable suggest that the oldest sibling in a family generally ends up with the worst outcomes in the form of higher absence rates and more hours worked in a week.

As expected, the age of a child also has a significant impact on both the absence rate and the amount of hours worked in a week. As age increases, the absence rate from school decreases and the amount of hours worked increases. Even though there is no statistically significant gender differential observed, age does appear to matter for older children as far as absence rate from school is concerned. Older girls – aged 13 and 14 in the sample – have a higher absence rate compared to their male counterparts, potentially implying that, as previous research in the literature suggests, cultural and health issues surrounding the onset of puberty potentially impact school attendance of girls (Grant et al., 2013). In addition, it is also found that being a male of aged 13 or 14 is associated with a greater number of hours worked relative to younger boys and girls of the same age. Since boys are generally found to be relied upon for income generating labour activities (Salmon, 2005) – in contrast with girls who are primarily relied upon for household

chores – this finding aligns with previous research in the literature as it suggests that boys start working a greater number of hours at an age when their market earning potential could truly begin to be realized.

Children who reside in a household with a direct relative (mother/father, uncle/aunt or grandparents) have a significantly lower absence rate from school. In addition, such children also work less hours than children who do not reside in such a household. Children residing in a household with their mother experience a similar effect as far as both absence rate and hours worked are concerned. These findings are in-line with previous research on rural Bangladesh (Kumar, 2015). However, the effect of a father residing in a household with the child is not similarly statistically significant, supporting the general consensus in the literature that a mother has a greater impact on the education outcome of the children in a household than the father.

Section 8: Conclusion

Even though the government of Bangladesh has done well to increase school enrollment, spending on education has stagnated over the past decade. Based on historical experiences in other developing nations, the increase in enrollment rate in primary school is not necessarily permanent and as such, these gains could be undone by a lack of continued focus on education. Moreover, increasing enrollment rates should not be the goal in and of itself. As evidenced by previous research in the literature, a high rate of enrollment does not directly translate into a high attendance rate. Regular absence can potentially lead to poor academic performance, grade repetition and disenrollment from school altogether.

Given the relative lack of attention paid to the issue of absence from school, this paper utilized the Multiple Indicator Cluster Survey (MICS) for the country of Bangladesh to further analyze the topic. Alongside extensive data on individual, household and community characteristics, the most important feature of this household survey is the presence of information

on school attendance and the reported number of hours worked in the reference week. An additional dataset – the Household Income and Expenditure Survey (HIES) – was utilized to augment the primary dataset with district level information on prevailing occupational wages during the same time period. Sending their children to school and engaging them in work (either household or market) is treated as a simultaneous decision by parents. As such, school attendance is analyzed through the lens of opportunity costs and perceived human capital benefits. The analysis conducted in this paper provides some new insights into the decision making process behind school attendance and engagement in work.

In accordance with expectations based upon previous research in the literature, it is found that a lot of factors that determine a child's education and labour market outcomes in developing nations are significant in rural Bangladesh as well. Not surprisingly, factors such as the education level of parents, household wealth as well as the size and structure of the family in the household are all quite important. Additionally, it is found that grade repetition and interruption in schooling are both strongly related with undesirable outcomes in education and work. In general, these findings hint at the presence of a vicious cycle that traps households in poverty over generations.

More importantly, the results in this paper also provide some evidence regarding the significance of perceived human capital benefits of attending school. Based on the information concerning prevailing wages across the 64 districts of Bangladesh, it is found that the wages observed by parents in rural areas of the country have an impact on attendance rates of their children. More specifically, the greater the difference between low-skilled and higher-skilled occupational wages in a given labour market, the lower the absence rate of a child enrolled in primary school. The trade-off between the costs of sending a child to school and developing human capital for perceived future gains is proxied by this observed wage differential. Given the clear linkages between school attendance and academic achievement, this finding supports the postulation of the presence of an intertemporal choice faced by parents when sending their

children to school. As such, it is evidenced that the perceived net-benefit to human capital development of a child from attending school is indeed a potentially significant determinant of absence rates across rural Bangladesh.

Policy implications

The results from this research hint towards significant policy implications with regards to both school attendance and child labour in Bangladesh. Based upon the findings regarding the importance of household wealth, it is quite clear that the simple provision of free primary school is not sufficient when it comes to regular school attendance. With expenses such as uniforms and school supplies, there are various explicit costs associated with sending a child to school. In addition, given the importance of child labour for mere survival within very poor households, regular school attendance comes with a heavy opportunity cost as well. Even though programs such as the Primary Education Stipend Project exist within Bangladesh to address exactly such issues, there are numerous flaws with the provision of the stipend that prevent the poorest households within the country from successfully accessing such funds. Moreover, the value of these stipends has decreased in real terms since the introduction of the project, hence even the households with access to these funds are not receiving a sufficient amount of money to off-set the costs of sending children to school.

In addition, as evidenced by the analysis of the data, girls are more susceptible to be absent from school and become engaged in work than boys their age. This has significant implications for the future as the education level of a mother is a very important determinant of the eventual education outcomes of the children within the household. Based on previous research in the literature, it is evident that there is generally a higher demand of labour of a girl for household work (including work related to agricultural activities). More specifically, girls are generally involved in activities such as helping raise very young children in the household. This demand of their labour is quite clearly detrimental to their educational outcome. With respect to

policy options, provision of free or cheap childcare facilities could serve to free up the demand of girls for such activities and lead to improved school attendance.

Moreover, older girls in rural Bangladesh have even poorer attendance than boys their age and younger girls. Based on previous research in the literature and findings within the analysis conducted in this paper, there is some evidence suggesting that the onset of puberty and the associated physiological challenges induce higher rates of absence among girls enrolled in schools. Even though the dataset utilized within this paper was not suited for further analysis of the subject matter, there is extensive research in the literature suggesting that insufficient provision of medical and educational resources that help girls deal with the onset of menstruation is indeed one of the causes of a higher absence rate among older girls. A school curriculum that provides children and their parents with proper education regarding this issue, and the provision of more numerous or more effective medical facilities to help deal with such challenges can potentially aid in improving the educational outcomes of older girls.

Lastly, the finding in this paper regarding the importance of human capital development with respect to school attendance has various wide-ranging implications for the labour market and the economy at large. With all else being equal, improved job opportunities for skilled individuals in the labour market can induce improved school attendance across Bangladesh. More importantly, the significance of the linkages between absence rate and perceived returns on schooling with respect to human capital have implications for schools themselves. It is not sufficient to simply provide a school for students to attend. The facilities within the school must be conducive to quality education. Moreover, the quality of the education provided within the confines of the school must be high enough that parents do not view sending their children to school as a waste of their time and money. As such, attending school must result in concrete academic achievement gains. This implies that there must be further investments made within the existing primary schools to improve the educational outcomes of all the students who are enrolled.

Previous research in the literature suggests that parental perception of the school based upon the quality of the facilities impacts attendance of the students; it must be evident that attending school actually does translate into tangible human capital development.

Future research

There are several avenues present for further research that build upon the work conducted in this paper. Based on research in the literature, health status is an important indicator when it comes to school attendance. Diseases and illnesses are generally found to be a leading cause for absences from school for students in both the developed and developing nations (Kearney, 2008). To that extent, a viable expansion of this work would be to augment information from a dataset that is closely related to MICS; the Demographic and Health Surveys (DHS). The various indicators pertaining to maternal health, child health and nutrition within the dataset can prove to be invaluable in gaining additional insight into the factors that determine educational and labour market outcomes for children in Bangladesh and the developing world in general.

Also, due to the nature of the MICS dataset, the analysis conducted in this paper has primarily been concerned with household factors that impact school attendance. However, as alluded to multiple times previously, there are various supply-side factors that are known to impact school attendance as well. Previous studies in the literature suggest that factors such as the location of the school, availability of space within schools, quality of washrooms, absence rate of the teachers etc. are all important determinants of absence rate of the children who are enrolled in schools (Bedi and Marshall, 2002). As such, information on the aforementioned variables or even detailed data regarding government investment on education by districts would help in undertaking a more thorough analysis of the supply-side factors that impact educational and labour market outcomes in Bangladesh.

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Appendix

Table 1: Summary Statistics

Variables	Mean	Std. Dev.	Min.	Max.
AbsenceRateIntervals	1.58	2.38	0	6
HoursWorkedIntervals	1.14	1.46	0	6
GradeComp	2.60	2.28	0	9
Male	0.51	0.50	0	1
MothEduc	0.89	1.19	0	4
FathEduc	1.51	1.61	0	4
NonRepeat	0.72	0.45	0	1
GapStudent	0.08	0.27	0	1
Wealth	-0.35	0.58	-1.08	3.63
FirstBorn	0.60	0.49	0	1
Age	10.30	2.28	7	14
DirRelative	0.95	0.22	0	1
FatherStay	0.92	0.27	0	1
MotherStay	0.97	0.18	0	1
ChildrenUnderFive	0.59	0.76	0	7
Elec	0.36	0.48	0	1
Religion	0.89	0.31	0	1
SkillPremium	1.90	0.40	1.19	3.37

Table 2: Bivariate Tobit Estimated Coefficients

Bivariate Tobit						
	AbsenceRate			HoursWorked		
	Coeff.		Std. Error	Coeff.		Std. Error
GradeComp	-1.686	*	0.044	-0.127	*	0.011
GradeCompSqr	0.187	*	0.012	0.024	*	0.003
Male	0.501		0.617	-0.655	*	0.161
MaleInteractGradeComp	-0.559	**	0.053	-0.032	***	0.014
MothEduc	-0.726	*	0.088	-0.070		0.024
FathEduc	-0.305	*	0.067	-0.054	*	0.018
MaleInteractMothEduc	-0.157	**	0.093	-0.069	*	0.025
MaleInteractFathEduc	0.053		0.073	-0.001		0.019
GradeCompInteractMothEduc	0.142	*	0.019	0.003		0.005
GradeCompInteractFathEduc	0.042		0.015	-0.004		0.004
NonRepeat	-2.194	*	0.833	-0.329	*	0.131
MaleInteractNonRepeat	-0.168	*	0.696	-0.342	*	0.093
GradeCompInteractNonRepeat	0.311	*	0.265	0.075	*	0.031
GapStudent	4.331	*	0.422	1.122	*	0.211
MaleInteractGapStudent	0.812	*	0.212	0.982	*	0.113
Wealth	-1.259	*	0.182	-0.280	*	0.048
WealthSquare	0.354	*	0.080	0.090	*	0.022
MaleInteractWealth	-0.311	*	0.178	-0.087	***	0.047
GradeCompInteractWealth	0.352	**	0.045	-0.009	*	0.012
FirstBorn	1.426	*	0.185	0.606	*	0.051
MaleInteractFirstBorn	0.045	**	0.198	-0.056	***	0.054
GradeCompInteractFirstBorn	-0.876		0.061	-0.126	*	0.016
Age	-3.235	*	0.244	0.705	*	0.067
AgeSqr	0.200		0.012	-0.017		0.003
MaleInteractTeen	-0.862	*	0.229	0.107	*	0.057
DirRelative	-1.776		0.225	-0.435	*	0.059
FatherStay	-0.291	*	0.300	-0.036	*	0.078
MotherStay	-1.789	**	0.415	-0.679	*	0.106
MaleInteractFatherStay	0.024	*	0.427	0.093	*	0.114
MaleInteractMotherStay	0.830		0.600	0.078		0.155
ChildrenUnderFive	0.069	*	0.084	0.000		0.022
MaleInteractUnder5	0.042		0.120	0.040		0.032
Elec	-0.350	*	0.124	-0.084		0.033
Religion	0.029		0.151	0.027		0.040
SkillPremium	-0.210		0.113	0.009		0.030
SkillInteractGradeComp	-0.003	*	0.012	0.000		0.012

***, **, and *** indicate significance levels at 1%, 5% and 10% respectively**

Log likelihood	-129841.94	**Number of obs.**	39736
Prob > chi2	0.00	**Wald chi2(103)**	19441.9
Rho	0.690256	**Rho p-value**	0.00

Table 3: Bivariate Tobit Average Marginal Effects

Bivariate Tobit AME						
	Absence Rate			Hours Worked		
	Coeff.		Std. Error	Coeff.		Std. Error
GradeComp	-0.480	*	0.031	-0.120	*	0.031
GradeCompSqr	0.026	*	0.003	0.014	*	0.003
Male	-0.169		0.153	-0.652	*	0.151
MaleInteractGradeComp	-0.034	**	0.014	0.027	***	0.014
MothEduc	-0.074	*	0.020	-0.023		0.021
FathEduc	-0.045	*	0.016	-0.062	*	0.016
MaleInteractMothEduc	-0.047	**	0.022	-0.067	*	0.023
MaleInteractFathEduc	0.016		0.017	0.019		0.018
GradeCompInteractMothEduc	0.015	*	0.004	-0.005		0.005
GradeCompInteractFathEduc	0.001		0.003	-0.005		0.003
NonRepeat	-2.194	*	0.048	-0.329	*	0.050
MaleInteractNonRepeat	-0.168	*	0.060	-0.342	*	0.064
GradeCompInteractNonRepeat	0.311	*	0.021	0.075	*	0.022
GapStudentAltered	3.344	*	0.210	0.643	*	0.118
MaleInteractGapStudentAltered	0.504	*	0.179	0.955	*	0.102
GradeCompInteractGapStudentAl	0.844	*	0.054	0.058	***	0.030
Wealth	-0.106	**	0.043	-0.200	*	0.044
WealthSquare	0.102	*	0.020	0.069	*	0.021
MaleInteractWealth	-0.100	**	0.042	-0.079	***	0.044
GradeCompInteractWealth	0.004		0.011	-0.032	*	0.011
FirstBorn	0.220	*	0.043	0.505	*	0.045
MaleInteractFirstBorn	0.055		0.047	-0.036		0.049
GradeCompInteractFirstBorn	-0.125	*	0.014	-0.086	*	0.015
Age	-0.066		0.059	0.844	*	0.060
AgeSqr	0.016	*	0.003	-0.025	*	0.003
MaleInteractTeen	-0.119	**	0.056	0.157	*	0.053
DirRelative	-0.442	*	0.055	-0.398	*	0.055
FatherStay	-0.011		0.071	-0.117		0.072
MotherStay	-0.676	*	0.102	-0.644	*	0.098
MaleInteractFatherStay	0.021		0.101	0.172		0.105
MaleInteractMotherStay	0.420	*	0.146	0.133		0.142
ChildrenUnderFive	-0.006		0.020	0.006		0.021
MaleInteractUnder5	-0.003		0.029	0.041		0.030
Elec	-0.044		0.031	-0.061	***	0.032
Religion	-0.044		0.038	0.013		0.039
SkillPremium	-0.380	*	0.079	-0.050		0.081
SkillInteractGradeComp	-0.033	*	0.012	0.000		0.012
*, **, and *** indicate significance levels at 1%, 5% and 10% respectively						

Log likelihood	-129841.94	**Number of obs.**	39736
Prob > chi2	0.00	**Wald chi2(103)**	19441.9
Rho	0.690256	**Rho p-value**	0.00

Table 4: Bivariate Ordinary Least Squares Estimated Coefficients

Bivariate OLS						
	Absence Rate			Hours Worked		
	Coeff.		Std. Error	Coeff.		Std. Error
GradeComp	-0.409	*	0.025	-0.055	*	0.018
GradeCompSqr	0.021	*	0.002	0.010	*	0.002
Male	-0.039		0.120	-0.369	*	0.086
MaleInteractGradeComp	-0.029	*	0.011	0.004		0.008
MothEduc	-0.073	*	0.017	0.005		0.012
FathEduc	-0.042	*	0.013	-0.021	**	0.009
MaleInteractMothEduc	-0.034	***	0.018	-0.034	*	0.013
MaleInteractFathEduc	0.011		0.014	0.013		0.010
GradeCompInteractMothEduc	0.012	*	0.004	-0.007	*	0.003
GradeCompInteractFathEduc	0.002		0.003	-0.008	*	0.002
NonRepeat	-1.973	*	0.039	-0.089	*	0.028
MaleInteractNonRepeat	-0.147	*	0.049	-0.161	*	0.036
GradeCompInteractNonRepeat	0.277	*	0.017	0.014		0.012
GapStudentAltered	2.030	*	0.097	0.695	*	0.070
MaleInteractGapStudentAltered	0.037		0.083	0.726	*	0.060
GradeCompInteractGapStudentAl	0.432	*	0.025	0.018		0.018
Wealth	-0.107	*	0.035	-0.073	*	0.025
WealthSquare	0.085	*	0.016	0.047	*	0.011
MaleInteractWealth	-0.079	**	0.034	-0.015		0.024
GradeCompInteractWealth	0.005		0.009	-0.028	*	0.006
FirstBorn	0.188	*	0.035	0.329	*	0.025
MaleInteractFirstBorn	0.047		0.039	-0.090	*	0.028
GradeCompInteractFirstBorn	-0.105	*	0.012	-0.055	*	0.008
Age	0.013		0.047	0.300	*	0.034
AgeSqr	0.009	*	0.002	-0.004	**	0.002
MaleInteractTeen	-0.151	*	0.043	0.052	***	0.031
DirRelative	-0.315	*	0.043	-0.270	*	0.031
FatherStay	-0.012		0.058	-0.061		0.042
MotherStay	-0.470	*	0.080	-0.497	*	0.057
MaleInteractFatherStay	0.014		0.081	0.052		0.058
MaleInteractMotherStay	0.276	**	0.113	0.241	*	0.082
ChildrenUnderFive	-0.004		0.016	0.004		0.012
MaleInteractUnder5	0.001		0.023	0.010		0.017
Elec	-0.042	***	0.025	-0.030	***	0.018
Religion	-0.026		0.031	-0.013		0.022
SkillPremium	-0.536	*	0.172	-0.484	*	0.124
SkillInteractGradeComp	-0.025	*	0.009	-0.002		0.007
*, **, and *** indicate significance levels at 1%, 5% and 10% respectively						

Equation	Obs.	Parms	RMSE	R-sq	F	P
AbsenceRateIntervals	39,736	104	1.727249	0.4739	346.582	0.000
HoursWorkedIntervals	39,736	104	1.242917	0.2791	148.9471	0.000

Table 5: Major occupation groups and corresponding skill level

Occupation Groups	Skill Level
1. Legislators, senior officials and managers	4th (Highest level)
2. Professionals	4th
3. Technicians and associate professionals	3rd
4. Clerks	2nd
5. Service workers and shop and market sales workers	2nd
6. Skilled agricultural and fishery workers	2nd
7. Craft and related workers	2nd
8. Plant and machine operators and assemblers	2nd
9. Elementary occupations	1st (Lowest level)