

DOES MICRO CREDIT INCREASE CHILD LABOUR IN ABSENCE OF MICRO INSURANCE?

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ABSTRACT

This research aims to discover whether access to microinsurance might make any difference to the microcredit receivers in terms of reducing their use of child labour. The research decomposes households into three broad groups: microcredit participants with microinsurance, microcredit participants without microinsurance and non-participants of microcredit and microinsurance. Using household information in Monga (flood) prone areas in Bangladesh, we use regression models to examine determinants of child labour for the different groups of households. The households in the flood prone regions are forced to implement coping strategies like skipping meals, using child labour, or using microcredit services.

In extremely poor households quasi health and/or micro-life insurance in combination with microcredit has a significant effect of reducing the child labour supply, however, credit-life insurance has no significant influence. On the other hand, taking advanced payment from the employer or landlord has a highly significant positive impact on child labour supply. In moderately poor households microinsurance does not make any difference in determining child labour, microcredit has a strong negative influence on the child labour supply, no matter who are the clients of microinsurance. Micro finance has no role in determining child labour in the group of above poverty households, only decision maker's schooling and child's schooling are important determinants of child labour. Therefore, policy considerations should be made not only to provide adequate microcredit to extremely poor households but also to address the issue of microinsurance to protect against the high social opportunity cost of using child labour.

1. INTRODUCTION

Like other less developed countries in the world, low income people in Bangladesh live in a risky environment, vulnerable to numerous dangers, including illness, accidental death, disability, loss of

property due to death of fire, agricultural losses, and disasters of both the natural and man made varieties (Churchill, 2006). Climate related risk is also a major source of income fluctuations for rural households in the Northwestern region of Bangladesh, which is termed 'Monga' which translates as 'near-famine' situation.

This situation occurs from mid September to mid December, a period between transplantation and harvest of aman paddy. In this time there is a lack of wage employment in agriculture and a lack of alternative employment. The situation is further deteriorated and prolonged with climate related risk. The Northern Region of Bangladesh is situated in the Tista and Jamuna basin, and is ecologically more vulnerable to floods, river erosion, drought spells, and cold waves, all of which occur more frequently and intensely than in other regions in Bangladesh. The households in this area adopted different coping strategies to combat the situation, using child labour is one such strategy. Banerjee (2007) shows that, real agricultural wages in Bangladesh decline by 9% with the floods in September-October. If the supply of adult labor in the rural economy exceeds demand, this keeps wages low with little bargaining power for workers. Then child labour is prevalent due to income losses.

Child labour is a common phenomenon in developing countries and a debatable global issue. Most normative studies on child labour arrive at the conclusion that child labour is detrimental to social welfare. South Asia remains home to the largest number of working children in the world. On average, the percentage of working children in the age group 5-14 years varies between 5-42% in five major countries in South Asia (Bangladesh: 19.1%, India: 5.4%, Nepal: 41.7%, Pakistan: 8.3%). In South Asia, Bangladesh is second in terms of the percentage of children who are economically active. In 2002 - 03, the Bangladesh Bureau of Statistics (BBS) conducted the second National Child Labour Survey (NCLS). According to this survey as many as 93.3 per cent of all working children in the age group of 5-17 years work in the informal sector. Agriculture engages 4.5 million (56.4 per cent children), while the services sector engages 2 million (25.9 per cent), and industry, 1.4 million (17.7 per cent). A total of 1.3 million children are estimated to be working 43 hours or more per week. More boys than girls are engaged in this form of child labour across all age groups.

In a recent study Chakrabarty (2006) observed that almost 12% of children in India and Nepal are working to repay their parents' loans through

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microcredit and informal loans and they are not going to school. Therefore the social opportunity cost of micro loans is very high without proper insurance. A very important research question is still to be answered in Bangladesh: does micro credit increase bonded child labour in the absence of micro insurance? Farmers who receive micro credit have to pay their loan installment on a regular basis. Even there is a flood, micro credit banks might give them extra time to repay the debt but with a higher interest rate. Therefore, repayment of micro credit could further increase their informal debt burden to the money lenders or land lords.

Due to a lack of available research, there is little information on the nature and extent of bonded child labour in Bangladesh (Stafford, 2007). A survey by the Bangladesh Bureau of Statistics in 2003 found that out of 1,504 formal-sector establishments in the country's metropolitan cities, 4.2% of them reported that they recruited child labourers by paying an advance to the children's parents and then requiring the child to work to pay off the debt, a practice that the Bureau of Statistics stated 'may be compared to bonded labour.'

This research aims to discover whether access to microcredit without microinsurance might increase debt bondage as well as bonded child labour in *Monga-prone* areas. Bonded labour is a serious consequence of credit market failure that results in the restriction of movement for adult labourers, and forces children to work to repay loans restricting them from going to school. The objectives of the study are following:

- Does microcredit increase debt bondage in the *Monga-prone* areas in Bangladesh?
- Does they use child labour as a source of paying microcredit installments during *Monga*?
- Does microinsurance make any significant contribution in presence of bonded child labour during *Monga*?

Bangladesh is chosen for this study because this country is a founding leader of micro credit programs. There is almost no research on the impact of micro credit on the debt bondage of households in the *Monga-prone* areas in Bangladesh. Therefore this research is an attempt to bridge the knowledge gap and strengthen a link between decent work components and microinsurance.

2 METHODOLOGY OF THE STUDY

This section attempts to validate the rationale behind the selected research methodology, sampling and econometric design. First we discuss sampling design in section 2.1, we then concentrate on econometric estimation in section 2.2.

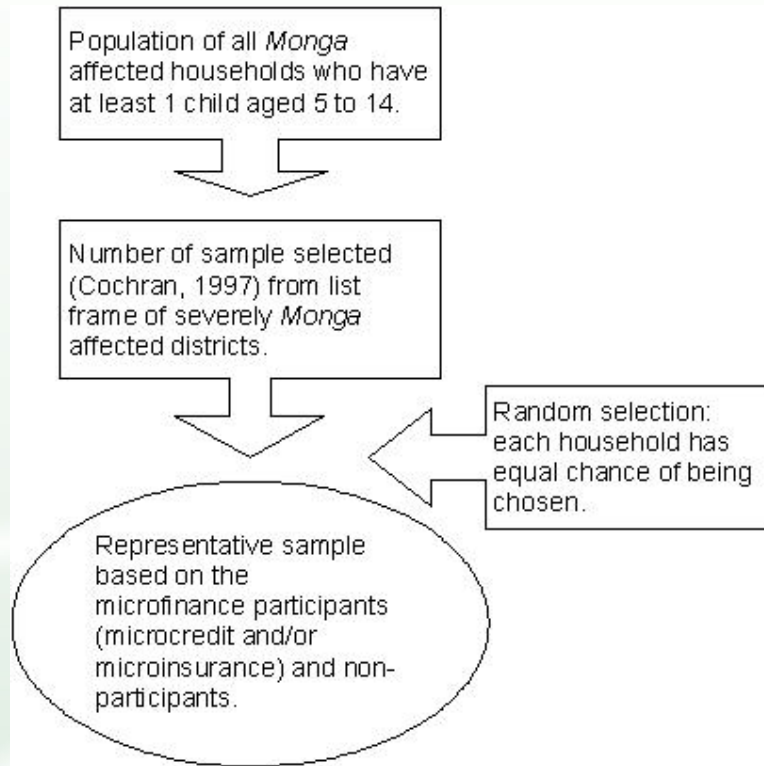
2.1 SAMPLING DESIGN

This research is based on primary data collected from two out of five administrative districts of Greater Rangpur. According to the severity of *Monga* Gaibandha and Kurigram are taken as the area of reference. The total sample is selected from the population defined by the *Monga* affected households and the representative sample is based on research questions. A total of 384 households are selected: 223 from Gaibandha and 161 from Kurigram (Figure 2 and Figure 3) We approached different NGOs like Grameen Bank, BRAC, GUK, ASA, RDRS for their list of clients in the selected *Monga* areas and then randomly select participants from each based on three criteria:

- i) Microcredit program participants with microinsurance
- ii) Microcredit program participants with no microinsurance
- ii) Non-participants of microcredit and microinsurance

Those households were treated as elementary units of the target population where at least one member of the household is a child in the above three groups.

Figure 1: A graphical representation of sample frame



The required sample size is calculated according to Cochran (1997).

$$n = \frac{\sum \frac{N_i P_i (1 - P_i)}{W_i}}{N^2 V_0 + \sum N_i (1 - P_i)} \quad (1)$$

where,

n = required sample size

N_i = Population of i^{th} strata

P_i = proportion of poverty incidence in i^{th} strata

$$W_i = \frac{n_i}{n} = \frac{N_i}{N}$$

$N = \sum N_i$ = Total population

$V_0 = V(P_{st})$ = Specified variance of the the estimate

$$V_0 = \left(\frac{e}{z}\right)^2$$

$z = 1.96$ (z value at 5% level of significance)

$e = 5\%$ (amount of admissible error)

The required sample size (the calculation is described in Figure 2) according to equation (1) is $n = 383.48$.

Figure 2: Calculation of the sample size (Cochran, 1997)

| Districts of the greater Rangpur | Monga Affected Population (N_i) | $W_i = \frac{N_i}{N}$ | Proportion of Poverty incidence (P_i) | $N_i P_i (1 - P_i)$ | $\frac{N_i^2 P_i (1 - P_i)}{W_i}$ | $N_i^2 V_o$ | $N^2 V_o + \sum N_i P_i (1 - P_i)$ |
|----------------------------------|-------------------------------------|-----------------------|---|---------------------|-----------------------------------|-------------|------------------------------------|
| Gaibandha | 76725 | 0.58 | 0.50 | 19181.18 | 2500860553 | 11049483.35 | 11082078.47 |
| Kurigram | 53656 | 0.41 | 0.50 | 13413.95 | 1748923738 | | |
| Total | 130381 | | | 32595.13 | 4249784291 | | |

Figure 3: Sample size for two zila

| | | Area name | | Total |
|--------------|-----------|-----------|----------|-------|
| | | Fulchhari | Chilmari | |
| District | Gaibandha | 226 | - | 226 |
| | Kurigram | - | 176 | 176 |
| Total Sample | | 226 | 176 | 402 |

2.2 ECONOMETRIC METHOD

Logistic regression is one of the most popular statistical methods of assessing the influence of independent variables on a dichotomous or polytomous dependent variable. A binary multiple logistic regression is used to define the probability that a child is being employed in the following way:

$$\text{logit}(P) := \ln \frac{P}{1-P} = \alpha + \beta' X \quad (2)$$

where

P = Probability (Child is employed | X),

α = Intercept parameter,

β = Vector of slope parameters,

X = Vector of explanatory variables.

The null hypothesis is $\beta_i = 0$ for all i . The explanatory variables are derived from Cigno and Rosati (2005) as described in Table 6.

This research is interested in finding out the probability of an individual child working in any specified group

of household. In this case, household and child characteristics are used as explanatory variables (see Table 6 in the Appendix) to determine whether a child was employed in the last two months in different groups of households. The above econometric approach estimates the odds of child labor by using binary multiple logistic regression.

3 CREDIT MARKET IMPERFECTION AND THE SUPPLY OF BONDED CHILD LABOUR

In June 1999 the International Labor Organization (ILO) adopted the "Worst Forms of Child Labor" convention that calls for an immediate end to the engagement of children in slave labor, debt bondage (article 3a), and other forms of forced or compulsory labour. By ratifying this Convention in 2001 Bangladesh committed itself to prohibiting and eliminating bonded and forced child labour. However, in Bangladesh, there is no legislation against debt bondage (Daru, Churchill and Beemsterboer, 2005) and therefore it is essential to investigate if there is any relation between microcredit or informal loan and debt bondage which force children to work to pay outstanding debts of their parents.

The 1956 Supplementary Convention Against Slavery defines debt bondage as "the status or condition arising from a pledge by a debtor of his personal services or of those of a person under his control as security for a debt, if the value of those services as reasonably assessed is not applied towards the liquidation of the debt or the length and nature of those services are not respectively limited and defined." Most countries have passed laws to ban such labour. However, it is estimated that millions of people are still held in bonded labour around the world, including 15 million children in India alone (Genicot, 2007).

Daru, Churchill and Beemsterboer (2005) discussed the root causes of this bondage, which include: interlinked and monopolistic labour and credit markets, deeply entrenched social exclusion, and asymmetric information particularly regarding legal rights. The above causes could be identified by credit market imperfection, credit rationed households, less educational status of the household members, and no legal status of the problem. Basu and Chau (2003) suggested systematic correlations between the incidence of child labour in debt bondage. Although the financial development indicators are at best imperfect proxies for the degree of access to consumption smoothing by agrarian households, countries with positive incidence of child labour in debt bondage have lower level of financial sector development.

Microcredit programs were developed in response to the failure of traditional financial credit market, such as government financial organizations and private financial development banks to serve the credit needs of the poor. Poor people have little trust in, or access to, commercial banks. People cannot get a bank loan because they have no land or any other property for

collateral. Proponents of microcredit consider increasing the poor's participation to institutional credit is an important means of ending poverty (Yunus 1983). Mahjabeen (2008) examined the welfare and distributional implications of microfinance institutions (MFIs) in Bangladesh in a general equilibrium framework. The general equilibrium model of Bangladesh is based on the data set of the real-financial social accounting matrix of 1999 to 2000. Due to the scarcity of data on MFIs, Grameen Bank, the largest and only formal MFI of Bangladesh is used to represent MFIs in this study. The major findings are that MFIs: (i) raise income of all households, (ii) increase consumption of all commodities by all households, (iii) generate employment, (iv) reduce income inequality and, (v) enhance social welfare. These findings suggest that microfinance is one of the required critical interventions for empowering the poor people.

Credit market imperfections can create inefficiency in production and consumption and affect disproportionately in rural poor areas (Foster 1995; Townsend, 1994). In their view improved access to credit smooths production and consumption fluctuation by raising the employment, incomes and productivity of the poor. Generally microcredit are targeted at that section of the poor people who cannot offer collaterals for loans and are hence not considered credit worthy by conventional financial institutions. The proponents argue that microcredit program could reach the poor to overcome problems of credit market imperfections. Considering the above discussion, a question arise, do all poor households get access to microcredit in Bangladesh?

3.1 CREDIT RATIONING HOUSEHOLD AND CHILD LABOUR

We define credit rationed as those households who applied for credit, but were denied and households who donot apply but need credit (Guarcello, Mealli and Rosati, 2003, 2010; Cigno and Furio, 2005). In our survey on Bangladesh households are asked whether they have applied for microcredit and, in the case of applying, whether they were denied microcredit. If yes, then this survey also identifies the reasons why households are credit rationed.

Figure 4: credit-rationed households by poverty level.

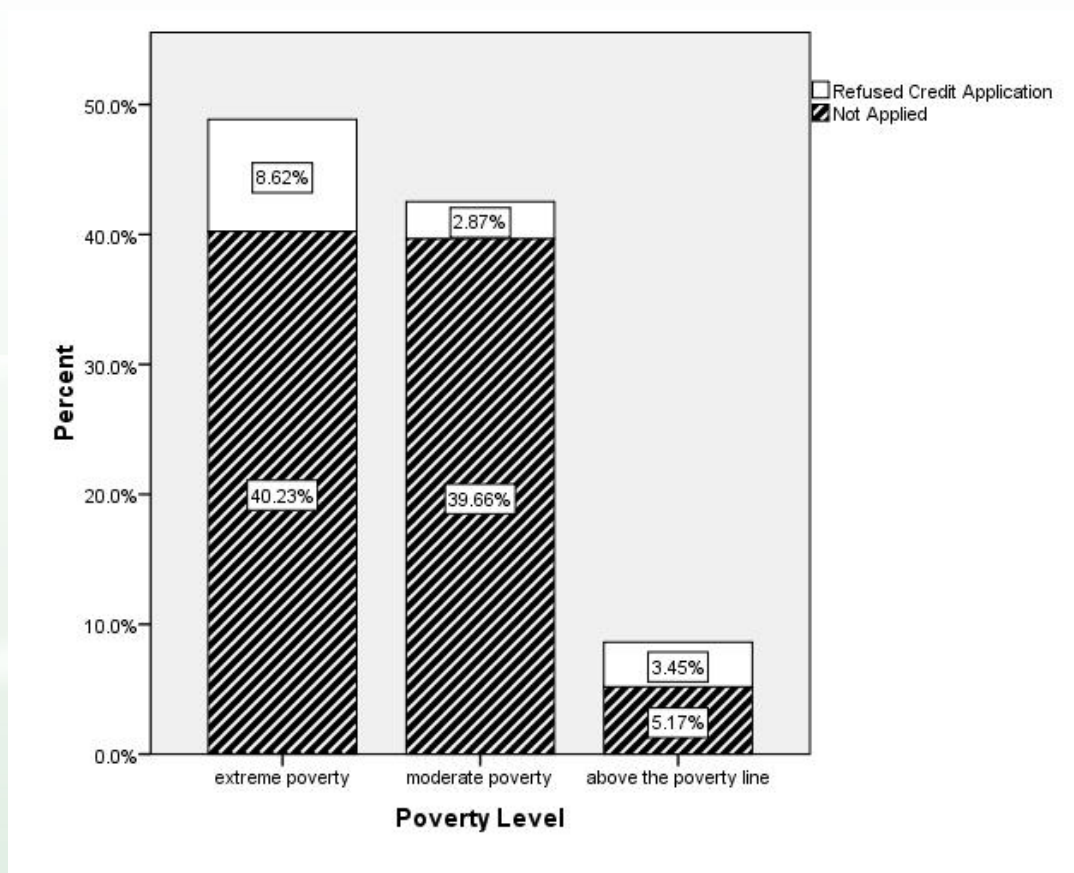


Figure 4 shows descriptive statistics of credit-rationed households, broken down by poverty level²

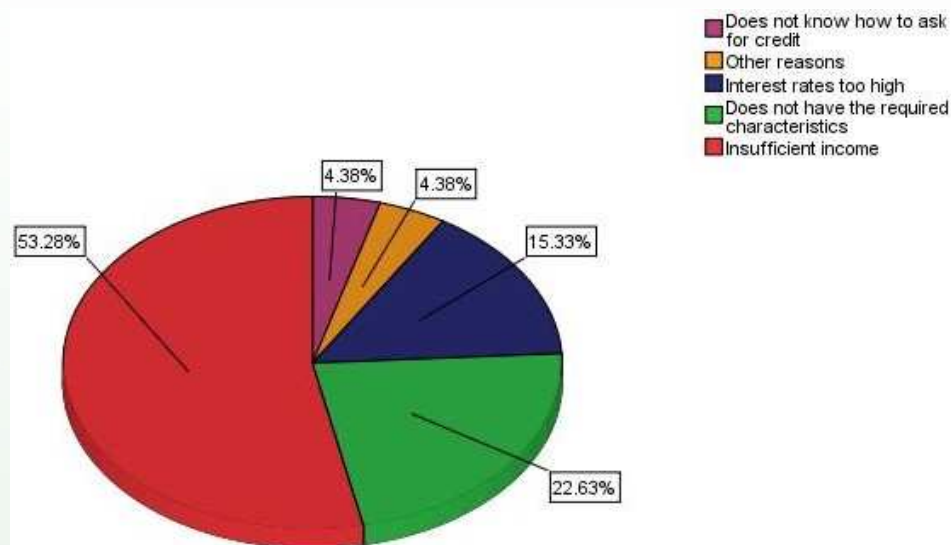
The rate of rejection of credit applications is highest for extreme poverty (8.62%) and less for moderate poverty (2.87%) and above the poverty level (3.45%). The overall incidence of credit rationed households rise with poverty, ranging from about 48.85 per cent for households extreme poverty line to almost 8.62% for above the poverty line.

Lack of sufficient current income (53.28), lack of savings/collateral (22.63) and high interest rates

(15.33) are the most common reasons for not applying for microcredit.

²Poverty line is estimated by per capita normative daily requirements of nutritional requirement for good health, such as 2,100 Calories per person per day and nonfood expenses is based on 30% of food expense (Khandker and Chowdhury, 1996). In the household expenditures, food and non-food items are included. Extreme poor households are defined by minimum expenditure of TK. 643.2 (\$9.32) per month for Chilmari (Kurigram District) and minimum per capita expenditure TK. 664.80 (\$ 9.62) per month for Fulchari Upazila (Gaibandha district). Moderately poor households are regarded by the minimum expenditure of TK. 1090.2 (\$ 15.79) for Chilmari and 1136.40 (\$ 16.46) for Fulchari. The detailed estimation is given in the Figure 15.

Figure 5 : Reasons for Credit rationing



The method of combating the moral hazard inherent in lending without collateral consists of requiring the borrower to contribute a specified amount each month to a compulsory savings scheme, the proceeds of which can be used to insure against certain named events which may cause the borrower's project to fail and the borrower to default. However, a lack of collateral or low savings often restricts the poor households from accessing formal credit markets or microcredit organizations. The poorest may have been left out because they feel they are not credit worthy because they cannot save and the microcredit programs also do not judge them to have the entrepreneurial ability necessary to invest the credit properly. Perhaps the challenge for microcredit organizations is to reach to the hard core poor who are named as "credit rationed" households.

Child labour is part of a vicious cycle, with poverty as a main cause as well as a main consequence. An efficient credit market is a very important determinant for breaking the vicious cycle. Credit rationing is one of the most important determinants of child labour. The credit question comes up in the model of Baland and Robinson (1998). In a two-period model of child labour in which inefficiency occurs despite parental altruism, because parents may run out of resources needed to educate the child. The only option for credit rationed households is to borrow against the child's future income, which is not possible in the formal credit market.

Parsons and Goldin (1989) and Ranjan (1999) found that child labour acts as a consumption-smoothing device for poor households in the absence of credit markets. He presented models in which child labour arises because of imperfect credit markets. When households have no access to the formal credit market they seek credit from informal source. Sometimes, a

child's labour is directly pledged as security for a loan. Allowing other family members to be responsible for repayment of a debt can clearly improve credit access and is often used (Genicot, 2007).

3.2 CREDIT MARKET FAILURE AND CHILD LABOUR

Dowla (2006) showed that microfinance corrects two type of market failure i) credit market failure and ii) under provision of public goods in the sense that microfinance institution (MFI) can create social capital (social capital is a public good - non-excludable and non-rivalrous - the market will underprovide such good). The credit market fails if poor people are unable to borrow for socially beneficial projects, that is, projects with an excess of social benefits over social costs (Hulme and Mosley, 1996). Schultz (1961) and Becker (1993) also highlighted the problem of credit and insurance market imperfections which often undermine human capital investment. However, a research by Maldonado and Vega (2008) showed a conflicting result. On the one hand, microfinance may increase the demand for education as a result of increased income, better risk-management, and gender influence. But on the other hand, credit-constrained farming households might increase their demand for child labour by expanding farming activities or assisting siblings while the mother operates a new or expanded business.

Tables 1-3 give more detailed information on the use of microcredit/informal loans broken down by three households groups: those with a combination of microinsurance and microcredit, no microinsurance and non-participants of microcredit and microinsurance (received informal loan).

Table 1: Use of microcredit in combination with microinsurance (credit-life, quasi health and life)

| Use of credit | 1st Credit | | 2nd Credit | | 3rd Credit | | 4th Credit | |
|-----------------------------|------------|-------|------------|-------|------------|-------|------------|-------|
| | Column N% | Count | Column N% | Count | Column N% | Count | Column N% | Count |
| Repayment of another credit | 21.56 | 36 | 16.87 | 14 | 13.16 | 5 | 200% | 4 |
| Small business | 34.13 | 57 | 36.14 | 30 | 42.11 | 16 | 35.0% | 7 |
| Crop production | 11.38 | 19 | 12.05 | 10 | 7.89 | 3 | 5.0% | 1 |
| Food purchase | 16.77 | 28 | 15.66 | 13 | 18.42 | 7 | 5.0% | 1 |
| Dowry | 3.59 | 6 | 9.64 | 8 | 7.89 | 3 | 15.0% | 3 |
| House construction | 5.39 | 9 | 2.41 | 2 | 5.26 | 2 | 5.0% | 1 |
| Treatment | 2.99 | 5 | 2.41 | 2 | 2.63 | 1 | 15.0% | 3 |
| Land purchase | 2.40 | 4 | 3.61 | 3 | 2.63 | 1 | 0% | 0 |
| Childs educational cost | 1.80 | 3 | 1.20 | 1 | 0.00 | 0 | 0% | 0 |

Source: Own Study

Table 2: Use of microcredit without microinsurance (credit-life, quasi health or life)

| Use of credit | 1st Credit | | 2nd Credit | | 3rd Credit | | 4th Credit | |
|-----------------------------------|------------|-------|------------|-------|------------|-------|------------|-------|
| | Column N% | Count | Column N% | Count | Column N% | Count | Column N% | Count |
| Repayment of another credit/ loan | 9.9% | 12 | 7.0% | 5 | 6.1% | 2 | .0% | 0 |
| Small business | 45.5% | 55 | 53.5% | 38 | 66.7% | 22 | 73.7% | 14 |
| Crop production | 14.0% | 17 | 11.3% | 8 | 6.1% | 2 | 5.3% | 1 |
| Horticulture | .8% | 1 | .0% | 0 | .0% | 0 | .0% | 0 |
| Food purchase | 20.7% | 25 | 14.1% | 10 | 21.2% | 7 | 21.1% | 4 |
| Dowry | 2.5% | 3 | 4.2% | 3 | .0% | 0 | .0% | 0 |
| House repairing/construction | 2.5% | 3 | 7.0% | 5 | .0% | 0 | .0% | 0 |
| Treatment | .8% | 1 | 1.4% | 1 | .0% | 0 | .0% | 0 |

| | | | | | | | | |
|--------------------------|------|---|------|---|-----|---|-----|---|
| Land purchase | 1.7% | 2 | 1.4% | 1 | .0% | 0 | .0% | 0 |
| Child's educational cost | 1.7% | 2 | .0% | 0 | .0% | 0 | .0% | 0 |

Source: Own Study

Table 3: Use of informal loan (non-participants of microcredit and microinsurance)

| Use of credit | 1st Credit | | 2nd Credit | | 3rd Credit | | 4th Credit | |
|-----------------------------------|------------|-------|------------|-------|------------|-------|------------|-------|
| | Column N % | Count | Column N % | Count | Column N % | Count | Column N % | Count |
| Repayment of another credit/ loan | 12.8% | 12 | 17.4% | 4 | 6.1% | 2 | .0% | 0 |
| Small business | 13.8% | 13 | 13.0% | 3 | 66.7% | 22 | 73.7% | 14 |
| Crop production | 5.3% | 5 | 4.3% | 1 | 6.1% | 2 | 5.3% | 1 |
| Food purchase | 54.3% | 51 | 47.8% | 11 | 21.2% | 7 | 21.1% | 4 |
| Dowry | 5.3% | 5 | .0% | 0 | .0% | 0 | .0% | 0 |
| House repairing/construction | 3.2% | 3 | 4.3% | 1 | .0% | 0 | .0% | 0 |
| Treatment | 5.3% | 5 | 13.0% | 3 | .0% | 0 | .0% | 0 |

Source: Own Study

The main objective of micro credit providers is to create self-employment opportunities for the rural unemployed, especially women. This self-employment is largely in non-farm self employment (Afrin, Islam and Ahmed, 2008). The multiplier effect of microcredit increases income and generates employment in the poor households, however the multiplier effect (how much income and employment would be generated via small credit depend on the nature of investment, i.e. how much productive is the investment. More specifically, how much forward and backward linkage could be generated by investment.) The proponents of microcredit believe that there is a direct link between microcredit expansion and real growth of output and employment. The micro investors receive the small investment fund from microcredit organization and Table 1 depicts the sectoral investment of microcredit when households also purchase microinsurance.

Table 1, Table 2 and Table 3 show that poor households use microcredit not only for small businesses but a significant portion of microcredit users repay previous debts from the present credit/loan, others purchase food, pay for dowry and health

treatments (in absence of health microinsurance). Unproductive investments like the repayment of another loan or credit is the second highest use of credit after small business creation in all of the three categories of households. One of the reasons for the above issue could be 'the size of the microcredit', the size of the credit is an important determinant to profitable investment, marginal efficiency of capital also depends on the size of financial capital. If the size is too small then there is no possibility to invest and have a good return on that. The size might be inadequate to fulfill the demand of capital and start a small business, however loan repayment in microcredit programs in Bangladesh are on a weekly basis, but income streams from the financial capital are not necessarily a weekly phenomenon or adequate to pay the first couple of installments. Therefore repayment by poor borrowers might take place from other sources of credit or loans or using child labour.

It is observed that households who are in debt because of outstanding credit have more chance to be trapped in the credit cycle and become bonded. In our study we found that households in the last 20

years took credit up to 14 times from 4 different NGOs. Each credit creates a credit cycle until its full payment with interest. Our questionnaire considers credit cycles for 4 different microcredits. It is observed from our study that the households who received credit (microcredit organization) or loan (informal source) 16 percent of them are spending their money by repaying previous debt burden or to end previous credit cycles, 33 percent invest the money for small business, 28 percent of them are using their credit or loan to purchase food, 9 percent households are taking credit/loan for meeting up dowry payments. Only 2 percent of the households are taking microcredit and using it to educate their children. They are not using this credit for small business what they comply with the microcredit organizations. It also represents a credit market imperfection for child schooling and the situation is even more dreadful in presence of climate risk or *Monga*.

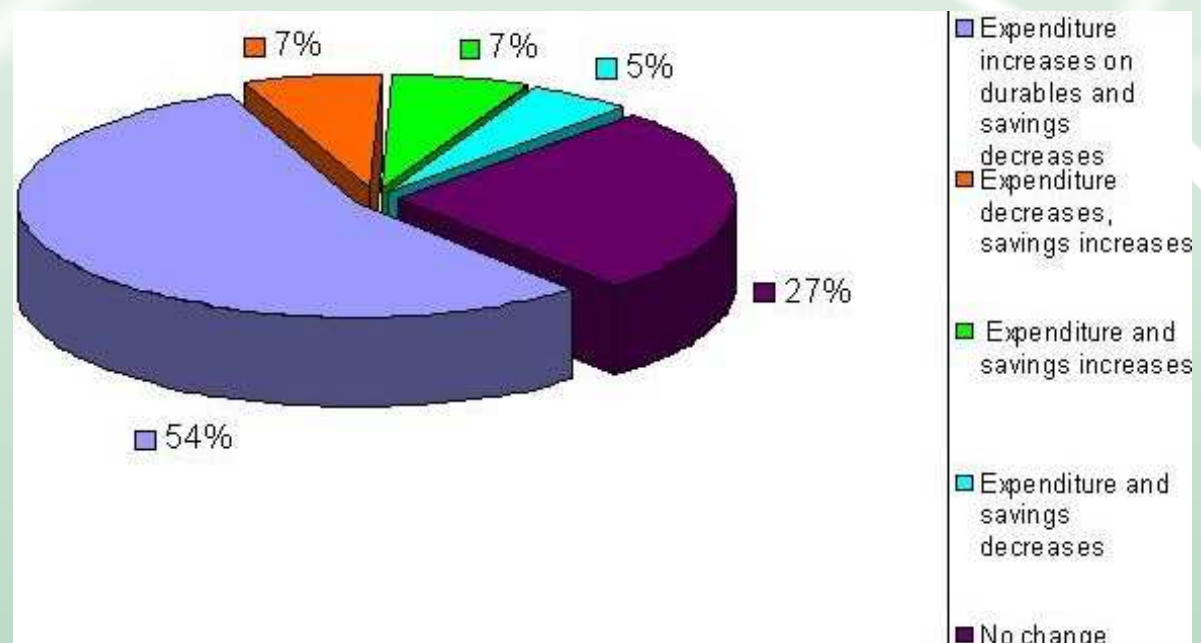
Most prominent studies on microcredit impact take the household consumption as an indicator to observe the microcredit impact on the lives of the poor. If consumption increases due to microcredit without generating income or employment then it is not sustainable. It is therefore questionable to include consumption expenditure (before and after microcredit) as an indicator of measuring the success of microcredit. In our study we asked a direct question to the households on how they think about their livelihood change due to microcredit (Figure 6). About

55 percent reported that their consumption expenditure increased significantly, however saving decreased. About 27 percent reported no changes of their economic status due to microcredit.

Poverty is a very complex social phenomenon with a multidimensional explanation. Its dimensions include access to education, health, gender equality, empowerment, freedom of movement and other social issues. How microcredit is affecting these social issues including child labour would be discussed next.

It is evident that accepting repeated credit for breaking the credit cycle is not the right answer to the problem. Rather it generates a more complicated debt bondage situation for all members of the household. In such situations, microcredit is very unlikely to have an employment generation impact as a large part of it is used for consumption, and hence, could potentially increase debt bondage for adult members of the households and this burden could easily transferred to the child members of the same households. As such, the provision of microcredit without proper microinsurance may jeopardize the schooling of poor children by putting them into debt bondage and increase their vulnerability of becoming child labourers. According to Genicot (2007), the bondage situation is so serious that the condition of bonded labourer is intergenerationally transmitted to the child after the death of his parent. Among different societies at different time, children are responsible for their parents' debt after their death.

Figure 6 : Expenditure of micro loans



4 CHILD LABOUR AND DEBT BONDAGE

Millions of workers in South Asia are bonded to their employers, forced to work for substandard or no wages because their earnings are retained by the employer (or a middleman) to repay an outstanding debt (Churchill and Gu rin, 2005). The Worst Forms of Child Labour Convention, 1999 (C. 182) of the International Labour Organization defines the worst forms of child labour as: all forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour, including forced or compulsory recruitment of children for use in armed conflict.

Professor Yunus' called the process of substituting the provision of collateral with group harmony and other aspects of microcredit as 'freeing of credit from the bondage of collateral' (Yunus, 1997). Proponents of microcredit have long believed that the poor already possess the necessary entrepreneurial skills to start a small business but only lack in the capital. Hence providing loans will enable them to do so. However, most of the poor, especially the very poor, are unlikely to have the knowledge and the capabilities to run a business (Sjamsuoddin, 2010). From the above section we could understand that loans are sometimes marginal for a small investor and their unproductive use of this loan create a debt cycle which is the main reason of debt bondage in Bangladesh.

It is true that debt bondage does not solely originate from collateral in Bangladesh although it happens in many South Asian countries. Due to a lack of available research, there is little information on the nature and extent of bonded child labour in Bangladesh (CWA, 2007). The nature of debt bondage in Bangladesh is quite different from many other countries because of the extensive use of collateral free microcredit in Bangladesh without any potential microinsurance to combat climate or health risk. Debt bondage in Bangladesh also originates from advanced payment from employers. In our study we had only 79 households who received advanced payment from the employer. 18 households (22 percent) of those are using child labour to pay back the advanced payment. Many of them (40 percent) are working overtime (more than 8 hours) to pay back the money from their employer.

In this section we will try to see a systematic relationship between parents' debt burden and unproductive use of credit with the use of child labour. According to BBS (Bangladesh Bureau of Statistics)

we might regard those children as bonded labourers because they are working to pay off the debt burden of their parents.

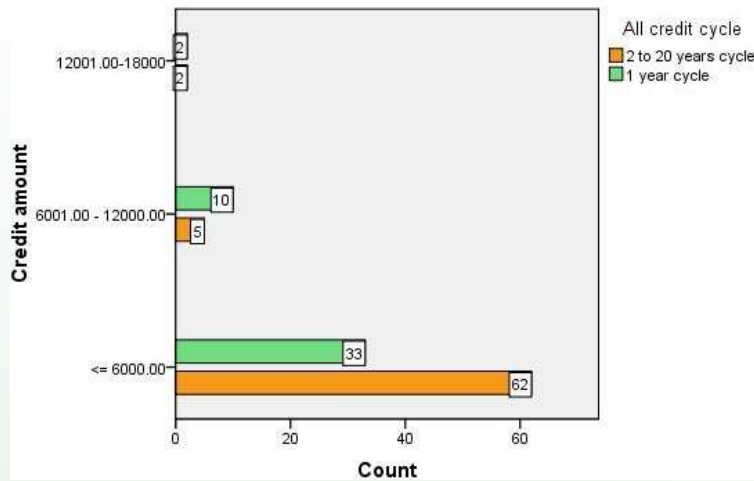
Bonded child labour refers to situations where a child's labour services are offered in exchange for a loan. Sometimes bondage is intergenerational: once a parent is no longer able to work, debts are passed down from parent to child (Genicot, 2007). Children enter into bondage in three main ways (Stafford, 2007) : they can work as part of a bonded family, they can inherit a debt from a parent or other family member, or they can be pledged individually to work in various sectors. As with adult bonded labourers, the majority of bonded child labourers are found in the informal sector.

The size of microcredit is an important determinant in whether the credit is unproductively used and whether it extends the debt cycle of their clients. Our findings reveal that 84 percent of the households received credit less than or equal to TK. 6,000 (\$87 approximately), 13 percent of the households receive more than TK. 6,000 and less than TK. 12,000 (\$87 - \$174) while the remaining 3 percent households received up to TK. 18,000 (\$261) from microcredit organizations like BRAC, Grameen Bank etc. From this amount they have to pay back weekly instalments. Is it possible to start a new small business using this small amount of money?

Let us answer this question with an example: if some one owns a milk producing cow, the average cost of food for that cow is TK. 14,000 (\$203) per year (Rashid et. al., 2007). From the above figure only 3 percent of microcredit receivers could afford to become the owner of a cow. Those who already have an established small business or have the skill to start a business are likely to use the credit as a working capital to expand an existing small business.

On the contrary, among households who do not have an existing business or potential to run a small business use this microcredit to increase their spending on food and shelter or to pay other debts. This is a danger for *Monga* areas in Bangladesh where people have less job opportunities, no microinsurance and therefore, outstanding debt could turn their children into a debt bonded forced labourer. Figure 7 demonstrates the idea that if credit is smaller then the credit cycle is larger and becomes lengthier for repeated borrowings by the household.

Figure 7: Credit size and cycle



In the above discussion we have mentioned that extended credit cycles have an adverse impacts on children, because children can not go to school and they are forced to work to break the credit cycle for their parents. It is now important to answer the question: is there any association between extended credit cycles and child laborers working in Bangladesh?

Observed Fact: *The presence of an extended credit cycle increases the incidence of child bonded labour in Bangladesh.*

This hypothesis deals with the associations between the following two categorical variables in a contingency table.

ChildLab = Atleast one child labour was working in last two months (Yes=1 /No=0)

DurAllCreditCyl_Sum = Duration of credit cycle (one year cycle=1, two to twenty years credit cycle=2)

Null hypothesis: Child working (ChildLab) is independent from credit cycle, i.e.

Null hypothesis: Child working (ChildLab) is independent from the credit cycle, i.e.

$$\Leftrightarrow \pi_1 = \pi_2 \quad \Leftrightarrow \theta = 1.$$

where

$$\pi_1 := P(\text{child working} | \text{One year cycle})$$

$$\pi_2 := P(\text{child working} | \text{Two to twenty years cycle})$$

$$\theta := \frac{\frac{\pi_1}{1 - \pi_1}}{\frac{\pi_2}{1 - \pi_2}} = \text{The odds of one year cycle against the odds of two to twenty years cycle} = \text{Odds Ratio.}$$

Table 4: Cross tabulation of credit cycle and child labour

| Credit cycle (Due debt burden from microcredit) | Child Labour | | |
|---|--------------|--------------|---------------|
| | No | Yes | Total |
| One year cycle | 64 47.1% | 72 52.9% | 136 100.0% |
| Two to twenty years cycle | 35 26.1% | 99 73.9% | 134 100.0% |
| Total | 99 36.7% | 171 63.3% | 270 100.0% |

Data Source: Own Survey. Note: Pearson Chi-Square= 12.74, significance value '.000'

Table 4 represents a 2 x 2 contingency table, cross classifies 270 households (category-1³ and category-2⁴) by their credit cycle and child working status. In Table 4, child labour is a response variable and the credit cycle is an explanatory variable. We therefore study the conditional distributions of child labour, given the credit cycle.

The proportions (47.1% for no child labour, and 52.9% for child labour) are one year cycle sample conditional distribution of child labour. For two to twenty years cycle, the sample conditional distribution is 26.1% for no child labour and 73.9% for child labour.

The sample relative risk is 2.51 ([1.5;4.1]95%CI) i.e. the sample proportion of child laborers with longer credit cycle (one to twenty years cycle) is 2.51 times the proportion of those with a one year cycle. This study finds that the lower and upper limits of relative risks are 1.5 and 4.1 (95% confidence interval). The proportion of child laborer for longer credit cycle cases is between 1.5 (lower limit) and 4.1 (upper limit)

times higher than the proportion of lower credit cycle cases with 95% confidence interval. The confidence interval for the relative risk indicates that the risk of child labour is at least 50 percent higher for the longer credit cycle households.

The Pearson's Chi-Square test examines whether there is an association between credit cycle and child labour and this is highly significant ($p < .001$). We reject the null hypothesis that a Child working (ChildLab) is independent from the credit cycle, and accept the alternative hypothesis that they are related in the above mentioned strength. This significant finding reflects the fact that when credit is due for more than 1 year, about 74% of the households who are in credit cycle use child labour and 26% do not, whereas when credit is due for only 1 year 53% of the total households who are in credit cycles use child labour and 47% do not. Therefore, we can conclude that credit cycle significantly influences child labour situation: more children are working given longer credit cycles than a shorter ones.

The above discussion concentrates only on the government registered microcredit program, if we include informal credit markets (loans from landlords

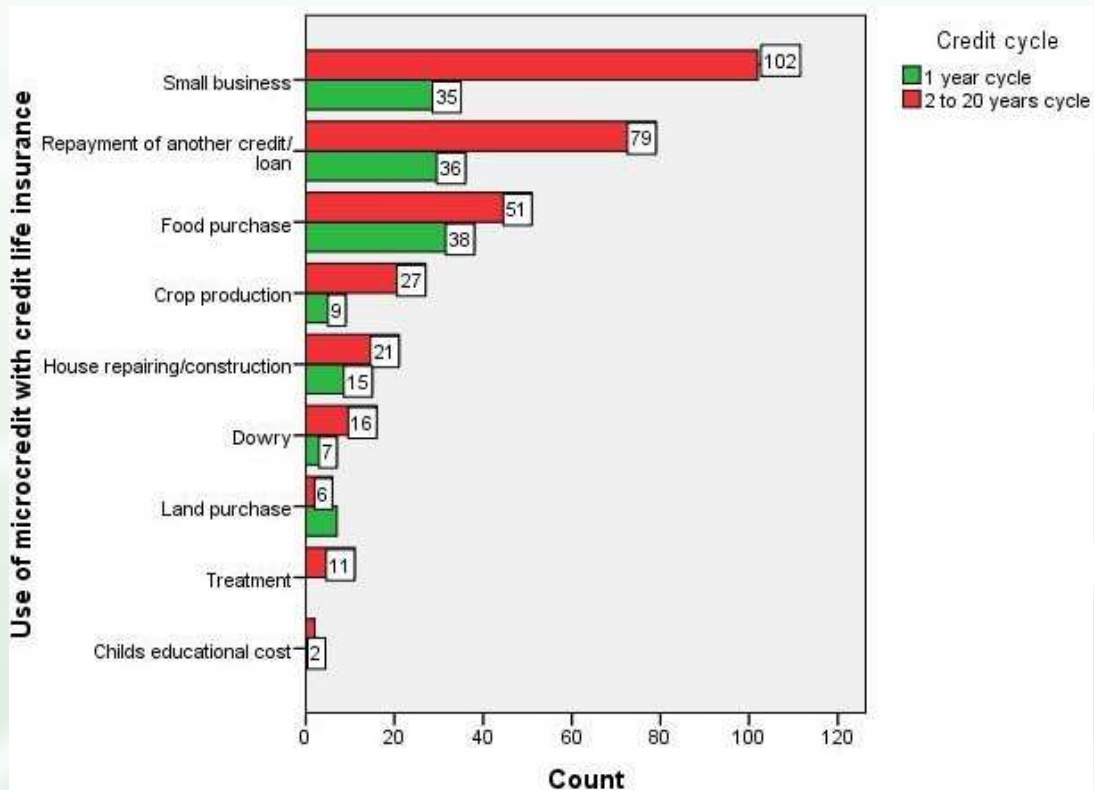
³households received microcredit with microinsurance.

⁴households received microcredit without microinsurance.

or employers) in the above analysis as a different category (category-3 in our sampling distribution) then we would find that 85% of these households in different credit cycles use child labour. Therefore the

situation is even worse in the informal credit market, possibly because of very high interest rates rather than the interest rate on microcredit.

Figure 8: Credit cycle and use of microcredit for those households who use at least one child labour.



Since bondage results primarily from the inter-linkage of credit and labour markets, Figure 8 shows output from cross tabulation on the use of 'microcredit with credit life insurance', 'credit cycle' and 'at least one child labour in households'. If we compare different uses of credit with alternative credit cycles then this indicates households who use credit for small business purposes and have larger credit cycles (two to twenty years) use a maximum amount of child labourers. Wydick (1999) presented a theoretical model of a household enterprise which shows a "family-labour-substitution effect" which might increase child labourers when households gain access to credit. Capitalization increases the return to child labour and thus the opportunity cost of schooling. As a consequence, the relief of credit constraints in a developing country setting like Guatemala does not appear to unambiguously increase investment in child schooling.

Figure 8 also shows that households who are using credit to repay their last loan and have a longer credit cycle (two to twenty years) and use a significant

amount of child labour. Child income is also contributing to return back the microcredit used for food purchase, dowry payment and health treatments within the households.

According to Churchill and Guérin (2005) access to appropriate financial services is a fundamental prevention strategy. However, microfinance is not sufficient to prevent bondage, but a group-based savings and credit delivery mechanism can be an excellent vehicle to provide other essential services for economic and social empowerment. A similar study by Hazarika and Sarangi (2008) examined the effect of a household's access to microcredit upon work by 7 to 11-year-old children in rural Malawi. It is found that, in the season of peak labour demand, children's propensity to work in rural Malawi increases in household access to microcredit. Further, microcredit-stimulated work by children does not appear to reduce their school attendance, suggesting that more child work leads to less leisure rather than to less schooling. Which mean that child labour is substituted by the leisure time, not by the school time.

5 ECONOMETRIC ESTIMATES OF CHILD LABOUR SUPPLY

The econometric framework underlying the empirical analysis is based on a logistic regression model of the child labour supply. There are three groups of households with different microcredit and microinsurance status: one group took microcredit with microinsurance, the other group took microcredit without any microinsurance, and another group is non-participants of microcredit or microinsurance. The above groups are divided into five subgroups: i) microcredit with credit-life insurance⁵ ii) microcredit with quasi micro health⁶ and life insurance iii) Microcredit with no microinsurance, iv)Co-operative v) Non-participants of microcredit and microinsurance. The logistic regression model allows for dummy variables to test both groups and subgroups differently for the robustness of the econometric results (Table 5 and Table 7 in the Appendix).

The 'category' of a household is an important factor in decreasing child labour participation. Table 5 shows that for each child, the magnitude of the estimated child labour involvement decreases with a microcredit intervention (with or without microinsurance) compare to non-participants of microcredit and microinsurance.

There are two types of microinsurance offered in the survey region: i) microinsurance linked up with microcredit (credit-life insurance) ii) microinsurance or

quasi microinsurance, not linked up with microcredit (quasi health insurance and normal life insurance). It is therefore important to isolate the effects of quasi health microinsurance and normal life insurance from the credit-life insurance.

Table 7 demonstrates that in three sub-categories like, microcredit with quasi health and life insurance, microcredit with no microinsurance and co-operative have significant negative influence on child labour supply compare to non-participants of microcredit and microinsurance.

In subcategory-2 'microcredit with quasi health and life microinsurance' compared with the reference group 'non-participants of microcredit and microinsurance' reduce the odds of being a child labour by .423 7, which is greater than the odds of other two subgroups i.e microcredit with no microinsurance (.324) and co-operative (.178).

Therefore, health microinsurance is important in combination with microcredit if we want to remove child labour. However, microcredit with the credit-life insurance that is usually offered by microcredit organizations like Grameen Bank or BRAC is not found to be significant in reducing child labour.

⁵Credit-life insurance is attached to a loan, and repays the outstanding balance on the loan in default due to the death of a borrower. BRAC, Grameen Bank, RDRS, and Society for Social Service bundle credit-life insurance with their microcredit loans. The premium is about 2% of the total loan amount. The scheme provides a benefit of forgiving the balance of the loan upon death of the policyholder.

⁶Ganoshashthya Kendra (GSK), Grameen Kalyan (GK), Sajida Foundation (SF), Society for Social Services (SSS) and some other NGO/MFIs have been offering a variety of micro health insurance (MHI) products in Bangladesh. However, none of them are working in the Monga areas. Ahmed et al(2005) compared three health insurance schemes in Bangladesh, namely those run by BRAC, Grameen Kalyan (GK) and the Society for Social Services (SSS) and found that NGOs are often the only source of health services in rural areas, and the only one trusted by the population they serve. However, poor people do not normally have a concept of risk pooling and are sceptical of a scheme in which payments come first with no immediate return. They are normally reluctant to part with funds before a health problem arises. May be this is the reason why these organizations are not operating in the Monga areas in Bangladesh. Only the Shurjer Hashi ("Smiling Sun") scheme is a quasi health insurance product. With a premium of 30 Bangladesh Taka (USD \$0.43), the scheme provides free services at Smiling Sun health clinics to members of very poor families. It ought to be clarified that SKS, alongside the provision of microcredit, engaged in a variety of health interventions aimed at provision of primary care, vaccination, family planning, nutrition and hygiene advisories as part of their social mission to the poor. But these were not designed as 'micro health insurance' in any formal sense of the term, therefore it is regarded as quasi health microinsurance.

⁷In Table 7 the point estimator of the odds ratio of 'microcredit with quasi health and life microinsurance' vs. non-participants of microcredit and microinsurance is 0.42

Table 5: Logit regression results for the probability of child labour considering different groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | | Odds Ratio Estimates | | |
|--|---|----------|-----|----------------------|----------------|--------|
| Parameters | | Estimate | | Points Estimate | 90% Confidence | Limits |
| DecMakerSchool | No education vs. primary education | 1.024 | *** | 2.784 | 2.010 | 3.855 |
| Gender_child | Male vs. female | .212 | | 1.236 | .896 | 1.705 |
| Category(1) | Microcredit with microinsurance vs. non-participants | -.487 | * | .615 | .384 | .983 |
| Category(2) | Microcredit with no microinsurance vs. non-participants | -1.295 | ** | .274 | .173 | .433 |
| CreditRationed | | .363 | | 1.438 | .761 | 2.719 |
| Exp_Month_Scaled | | .158 | *** | 1.171 | 1.061 | 1.292 |
| HH_IncGT14_Scale | | -.087 | ** | .917 | .859 | .978 |
| PovertyLine_Local(1) | Extreme vs. above poverty | 1.090 | ** | 2.974 | 1.318 | 6.712 |
| PovertyLine_Local(2) | Moderate vs. above poverty | 1.336 | *** | 3.803 | 2.003 | 7.222 |
| IsChildSchool(1) | Yes vs. no | -1.838 | *** | .159 | .098 | .258 |
| DependRatio | | .472 | *** | 1.604 | 1.190 | 2.162 |
| Age_Child | | .625 | ** | 1.868 | 1.235 | 2.824 |
| Age_Child_Square | | -.023 | * | .977 | .957 | .998 |
| IndividualShocks(1) | Income & employment decreased vs. no shock | -.242 | | .785 | .433 | 1.424 |
| IndividualShocks(2) | Illness vs. no shock | .491 | * | 1.634 | 1.053 | 2.538 |
| AdvPayment(1) | Advanced payment vs. No advanced payment | .556 | ** | 1.744 | 1.172 | 2.596 |
| Constant | | -4.845 | *** | .008 | | |

***, **, * : Significant at 1%, 5% and 10%.

Source: Own regression result.

Being from a 'non-participants of microcredit and microinsurance' household increases the odds of being a child labourer by 2.36 (that is, 1/423) compared to 'microcredit with quasi health and life microinsurance'. The result reveals that the likelihood of using child labour is higher in non-participants group consisting of credit rationed households and informal borrowers than the other groups of households who receive microcredit.

Following the luxury axiom of Basu and Van (1998), this study tests whether there is a relationship between child labour and adult income ('HH_IncGT14_Scale' scaled adult's income in TK.500). It can be concluded that the sign and the statistical significance of the estimated adult income coefficient supports the Basu and Van model. The estimated odds ratio for adult income are 0.917 in Table 5 and 0.916 in Table 7. This means, that for each additional TK. 5.00 increase in adult income, the odds for child labour decreases by 0.917 and 0.916. This shows a strong, negative association between adult income and child labour in the household.

Improvement of the decision maker's education ('DecMakerSchool') significantly decreases the probability of a child's employment in the labour market. This is confirmed by the negative and significant estimates in the odds ratio of 'at least primary education' and 'no education' in both of the regression models. The estimated odds ratio for decision maker's education are 2.784 in Table 5 and 2.732 in the Table 7. This means that the odds of child labour increases by a factor of 2.7 for those households and children where the decision maker has no education compared with those households where the decision maker completed at least primary school. This shows a strong positive association between the educational level of the adults with the eradication of child labour. Najeeb (2007) examined household schooling and child labour decisions in rural Bangladesh. The results suggest that variables such as low parental education are associated with lower child schooling and greater child labour.

The ratio of non-earning members to earning members of the household (DependRatio) shows a significant and positive effect on child labour supply. The use of children as a form of insurance (Portner, 2001) also provides some insight into the role of the dependency ratio in determining child labour. The idea behind this might be that the older the head of the household and other members are, the more is he/she is dependent for livelihood in the future. Child laborers can be seen as an 'economic insurance' in old

age for the family members. Thus, the probability of a child to work is increasing with the dependency burden.

The estimated odds ratio are 1.60 for both regressions, which means that the odds of child labour are 60 percent higher for each 1 unit increase of dependency ratio. This shows a positive association between the dependency ratio and child labour. Obviously, the number of children in the household determines the potential supply of child labour, and hence fertility behavior is a determinant of the supply of child labour. Amin et al. 2001 examine the impacts of microcredit with and without health care facilities. They observed that women who have access to health care with microinsurance significantly increase contraceptive use and therefore, a decline in fertility. They also disseminate information which has a spill over positive effect on other women.

The sign of the coefficient of the monthly expenditure of the household 'Exp_Month_Scaled' shows that with an increase in the household expenditure, the probability of child labour increases in both of the regressions with category and subcategories.

This study finds a significant influence of poverty level (PovertyLine_Local) estimated by CBN method considering local prices (detailed estimation of the method is described in the Figure 15). The odds of child labour increases by a factor of 2.9 for those households who are under the extreme poverty line relative to those households who are above poverty line. The odds of child labour increases by a factor of 3.8 for those households who are under the moderate poverty line relative to those households who are above poverty line.

In contrast to the above subsistence level, the statistical significance of the estimated poverty coefficient stimulates child labour. In the below subsistence group (under the poverty line) the likelihood of using child labourers is less than the group who are moderately poor. This might provide support to the idea of a link between nutrition levels and child labour, which is relevant to the efficiency wage argument (Chakrabarty and Grote, 2009).

The child participation rate in the labour market increases with a child's age (5-14). This means that for each additional year of child's age, the probability of a child being a labourer increases by 84 to 87 percent. Moreover, child age exhibits non linearity in its effect on child employment via significance of the 'age square' coefficient.

Individual shocks like sickness of a household member increases the odds of child labour by 58 to 64 percent.

Advanced payment received by any household members from the employer increases the odds of child labour by 74 to 78 percent.

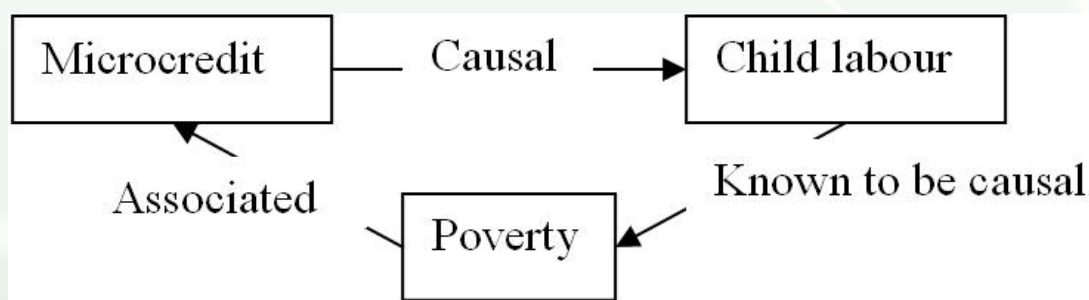
A child's gender plays an important role on child labour supply. This study finds that being male significantly increases the probability of a child's employment in the labour market by 23 and 29

percent. This is confirmed by the positive and significant estimates in the odds ratio.

However, this study neither finds a significant influence of child's gender (Gender_child) nor a significant influence of the credit rationing household (CreditRationed) on child labour supply.

Confounding effects: microcredit reduce poverty or microcredit reaches only to those households who are not extremely poor

Figure 9: Could poverty confound an association between microcredit/microinsurance and child labour?



Now the question is whether microfinance could reach the poor vulnerable groups. Jutting (2004) analyzed whether rural Senegal members of a health insurance scheme are actually better-off than nonmembers. The analysis revealed that while the schemes achieved to attract poor people, the poorest of the poor remained excluded. Is there any selection bias of microcredit organization for choosing their client? Let us examine from the existing literature, Amin et al. (2003) investigated this question in Bangladesh and observed that microcredit (Grameen Bank) is successful in reaching to the poor but less successful in reaching to the vulnerable.

Shah, Wodon and Ravallion (1999) studied Grameen bank and focused on their clients' economic status. They found that most of the Grameen clients have their own land and the poorest rural households-those owning less than half an acre of cultivable land where not clients.

Poverty in Bangladesh is a manifestation of increasing landlessness, high unemployment, low literacy, and high population growth. Therefore land lessness is an important determinant of poverty status. A correlation between microcredit worthy households and poverty status of the household could be considered not improbable and it is likely that microcredit could make a contribution to the child labour status of the household and could also be related to their poverty status. This confounds the relationship between

microcredit and child labour. Figure 9 demonstrates this issue.

One needs to control for the confounding effects of poverty to isolate the impacts of microcredit on child labour. Because the confounder (poverty status) is associated both with risk of being child labour and with microcredit status, failure to account for the confounder either by a restricted stratified design or by analytical adjustments (standardization methods) can lead to misleading estimates of the relationship between the microcredit and the risk of being a child labourer. This study analyzes the same models stratified by the confounding variable, poverty status. This means, the association between microcredit/microinsurance status and child labour status would be analyzed for each poverty group. If the different poverty groups (or poverty strata) yield much different odds ratios, poverty status must be viewed as a confounding variable and the result could be verified.

Control of confounding in data analysis can be achieved by stratified analysis. In a stratified analysis, the objective is to compare the group of cases and of controls within homogeneous categories of the confounding variable. The steps in controlling for confounding through stratified analysis are (Varkevisser, Pathmanathan and Brownlee, 2003): Calculate the odds ratio without stratifying (crude OR), stratify by the confounding variable, calculate the

adjusted odds ratio (OR), compare the crude OR with the adjusted OR

If the adjusted estimate (OR) is equal to the unadjusted one, then there is no confounding. If they are different, then there is confounding. As a rule of thumb if the crude OR differs from the adjusted OR 10% or more, there is important confounding. The adjusted OR should then be calculated by stratifying the confounding variable (Varkevisser, Pathmanathan and Brownlee, 2003). The 90% CI (and formal significance testing) can now be calculated to measure the significance of the association between the risk factor (child labour) and the problem for the different stratas based on poverty level. Now we are ready to discuss a logistic model that considers the effects of several independent variables including the microcredit and microinsurance status of the household and, in particular, allow for the control of the confounding variable by considering three groups of poverty status separately in different regressions (See Appendix, Table 8 to Table 13).

As discussed above, microcredit with microinsurance is thought to be an instrument that decreases child labour; poverty is assumed to be a possible confounder. The data analyzed is post-stratified by poverty group - this means, the association between microcredit/microinsurance categories and child labour would be analyzed for each poverty group.

It is evident from Table 8 that within extremely poor households microcredit with microinsurance as well as microcredit without any microinsurance have a negative effect on child labour participation. The point estimator of the odds ratio of child labour .52 and .46. This means, that the odds of having a child laborer in an extremely poor family not being assisted by any microfinance organization are almost 2 times the odds of having a child laborer in a non-assisted family. This result make difference between households who are assisted by microfinance organization (credit and insurance) and those who are not assisted (non-participants of microcredit and microinsurance). However, this result does not bring any difference between households who have received microcredit with microinsurance and those who only received microcredit without microinsurance.

Table 9 shows this difference, and establishes that only co-operatives (highly significant) and quasi micro health insurance in combination with microcredit are the best strategies for combating child labour. Microcredit without any type of microinsurance has no significant effect on child labour supply. However, not all types of microinsurance reduce child labour, only quasi micro health insurance in combination with microcredit is an effective policy instrument for reducing child labour. The point estimator of the odds ratio of child labour is 0.14. This means, that the odds

of having a child laborer in an extremely poor family not being assisted by any quasi health microinsurance is almost 7 times the odds of having a child laborer in an assisted (either my microcredit or microinsurance organization) family.

Thus, the null hypothesis of "microinsurance has no influence" is rejected by the successful influence of quasi health microinsurance which is shown to be the most important factor in preventing child labour among the extreme poor households. On the other hand, households who are involved in co-operatives have a significant negative influence on child labour supply. The point estimator of the odds ratio of child labour is 0.10 for a household who are involved in co-operative. This means, that the odds of having a child laborer in an extremely poor family not being involved with a cooperative is almost 10 times the odds of having a child laborer in a family who are involved with a cooperative.

Other important variables in the case of extreme poverty are adult income, advanced payment, child school, gender of the child and decision maker's school. Advanced payment has a significant positive effect on the child labour supply. Extremely poor households who take advanced payment use most of their children as a bonded child labour. The estimated odds ratio for category wide regression is 2.35 and for subcategory wide regression is 2.68, which means that the likelihood (odds) of a child to work increases by the factor 2.35 or 2.68. This shows a strong and positive association between taking advanced payment and using child labour.

The gender of the child in a extremely poor household plays a significant role in determining child labour. If a child is male then his work participation is 80 to 99 percent higher than a female child. If the decision maker has no education then the probability of employing child labour is higher than a decision maker who has at least primary education: the likelihood (odds) of a child to work increases by the factor 9.15 or 9.35 if the decision maker has no schooling.

In the group of households in moderate poverty (Table 11 and Table 10) microfinance organizations have a strong role in reducing child labour participation, no matter who is insured. However, quasi health microinsurance and co-operative organizations have a very significant negative influence on child labour participation. Other variables which have a significant negative influence on child labour are adult income, child schooling. The variables which have a significant positive influence on child labour supply are advanced payment taken by the adult, adult employment and income shock, illness of adult household member, age of the child, dependency ratio, expenditure of the household.

In the group of households above the poverty threshold (Table 12 and Table 13) microfinance has no role in determining child labour. Rather the decision maker's schooling is a highly significant factor in determining child labour. Other than that child schooling is substitute for child labour in the above poverty level group.

6 CONCLUSION

The empirical conclusions from this research generally supports that access to microcredit decreases child labour, however, the relationship between access to microcredit and child labour is not unequivocally negative. The negative effect of microcredit on child labour is explained by the combination of an appropriate microinsurance scheme. Overall (if we do not group households into different poverty status), in most of the cases microcredit is combined with credit-life insurance and it has no significant role in abolishing child labour (Table 7), however, health and life microinsurance in combination with microcredit has the capacity to fight against child labour.

Credit life insurance could not be isolated from some of the big microcredit organizations like Grameen Bank and BRAC. However, there are very few cases where households (insurance policy holders) could reap benefits from credit life insurance. On the other hand, there are pretty good chances for the households that they get sick and ripe benefit from microhealth insurance. Life insurance (insurance and saving mixtures) is also another component from which household could get benefit either minimizing risk or using this as a savings instrument. This is a type of 'return of premium' term life insurance policy, in which customers pay monthly premiums for life insurance, but receive a lump sum of all the premiums paid if they are still alive at the end of the term. However in the case of credit life insurance people have 'no claims refunds' policies without their death.

If households are extremely poor and receive microcredit with usual credit-life insurance, families may still prefer to use children's labour rather than adult labour, despite the fact that the relaxation of credit constraints could allow hired labour to be substituted for child labour. Microcredit programs may alleviate child labour in extremely poor households, specifically when it is combined with micro health and life insurance (Table 9). This research shows that a loan from a co-operative also significantly reduces child labour. Co-operatives play a significant role in fighting against child labour in the extremely poor households as well as for moderately poor households. For the moderately poor households (without considering the extreme poor cases), only microcredit (without any microinsurance) is successful in reducing child labour, although credit-life or quasi health insurance further accelerates the process of reducing

child labour. However, households above the poverty threshold, microinsurance or microcredit has no role in determining child labour (Table 12 and Table 13).

As a consequence, the relief of credit constraints in Bangladesh does not appear to unambiguously decrease child labour unless it is combined with proper microinsurance (quasi microhealth and life insurance) for extremely poor household. Ill health and the cost of health care act as major obstacles to persons trying to break out of the poverty cycle and therefore the health of the poor must be addressed before they can rid themselves of want. Without more effective precautionary and loss management strategies in place, extremely poor households are remain locked in a vicious circle. The opportunity costs of illness or income shock for the extremely poor households are very high. In the absence of access to proper insurance markets, child labour plays a very important role, not only as an insurance against income volatility but also as an old age income support. In the absence of microinsurance children can be treated as a substitute for insurance: first, children can provide health care out of their pocket income, physical and emotional assistance. Second, parents rely on children as a source of insurance against future disability.

Therefore, it is time for microfinance to not merely face up to this reality, but to embrace the opportunity that it presents. Many loans ostensibly taken for micro enterprises are used for otherwise unproductive purposes, interest rates are too high (varies from 12% to 35%) and financial capital is too low for a new investment. Especially in the Monga areas in Bangladesh many of these loans are being used to deal with emergencies. This should be addressed through microinsurance. There is also a missing link between provision of microfinance and skills to use it. Bangladesh has only limited provision for pre-vocational/vocational skills training and there are related constraints such as the quality of the skills training, market, employment linkages and certification. Upgrading skills is important not only for small business but also for understanding credit and insurance mechanism.

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APPENDIX

Table 6: Definition of variables and summary statistics⁸

| Variable name (short name) | Variable Description | Type of categories | Frequency Statistics |
|----------------------------|---|-------------------------|----------------------|
| DecMakerSchool | Decision maker's education | No schooling | 64.1% |
| | | At least primary school | 35.9% |
| Gender_child | Gender of the child | Male | 61.2% |
| | | Female | 38.8% |
| Category | Microcredit with microinsurance | | 36.0% |
| | Microcredit without microinsurance | | 30.2% |
| | Non-participants of microcredit and microinsurance. | | 33.9% |
| CreditRationed | Yes | | 9.3% |
| | No | | 90.7% |
| Exp_Month_Scaled | Last month total expenditure of family (scaled by TK 500) | | 7.46 (2.99) |
| HH_IncGT14_Scale | Last month total income of adult (>18) members (scaled by TK 500) | | 6.73 (3.482) |
| PovertyLine_Local | Poverty line based on CBN (cost of basic need) | Extreme | 36.9% |
| | | Moderate | 52.6% |
| | | Above | 10.4% |
| IsChildSchool | Is child going to school? (1=yes, 2=no) | Yes | 66.7% |
| | | No | 33.3% |
| DependRatio | Ratio of non-earning members to earning members. | | 1.33 (0.65) |
| Age_Child | Age of the child | | 10.29 (2.875) |

⁸ Variables for analysis selected from the model by Cigno and Rosati, 2005

| | | |
|------------------|--|-------|
| IndividualShocks | Income and employment decreased | 7.8% |
| | No individual shock | 17.7% |
| | Income, employment decreased and illness | 74.5% |
| AdvPayment | No | 80.7% |
| | Yes | 19.3% |

Table 7: Logit regression results for the probability of child labour considering different sub-groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | | Odds Ratio Estimates | | |
|--|--|----------|-----|----------------------|-----------------------|-------|
| Parameters | | Estimate | | Points Estimate | 90% Confidence limits | |
| DecMakerSchool | No education vs. primary education | 1.005 | *** | 2.732 | 1.964 | 3.799 |
| Gender_child | Male vs. female | .256 | | 1.292 | .933 | 1.790 |
| SubCategories (1) | Microcredit with credit-life insurance vs. nonparticipants | -.322 | | .725 | .435 | 1.207 |
| SubCategories (2) | Microcredit with quasi micro health and life insurance | -.861 | ** | .423 | .228 | .782 |
| SubCategories (3) | Microcredit with no micro-insurance vs. non-participants | -1.128 | ** | .324 | .199 | .526 |
| SubCategories (4) | Co-operative non-participants | -1.726 | *** | .178 | .095 | .334 |
| CreditRationed | | -.372 | | .689 | .364 | 1.306 |
| Exp_Month_Scaled | | .152 | ** | 1.165 | 1.055 | 1.286 |

| | | | | | | | |
|----------------------|--|--|--------|-----|-------|-------|-------|
| HH_IncGT14_Scale | | | -0.88 | ** | .916 | .858 | .977 |
| PovertyLine_Local(1) | Extreme vs. above poverty | | 1.077 | ** | 2.936 | 1.293 | 6.666 |
| PovertyLine_Local(2) | Moderate vs. above poverty | | 1.359 | *** | 3.893 | 2.033 | 7.455 |
| IsChildSchool(1) | Yes vs. no | | -1.772 | *** | .170 | .104 | .277 |
| DependRatio | | | .470 | * | 1.600 | 1.183 | 2.163 |
| Age_Child | | | .614 | ** | 1.847 | 1.210 | 2.821 |
| Age_Child_Square | | | -.023 | * | .978 | .957 | .999 |
| IndividualShocks(1) | Income & employment decreased vs. no shock | | -.210 | | .811 | .445 | 1.477 |
| IndividualShocks(2) | Illness vs. no shock | | .457 | * | 1.580 | 1.012 | 2.467 |
| AdvPayment(1) | Advanced vs. no advanced payment | | .580 | ** | 1.786 | 1.198 | 2.664 |
| Constant | | | -4.108 | *** | .016 | | |

***, **, *: Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 8: Logit regression (extreme poverty) results for the probability of child labour in different groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | Odds Ratio Estimates | | | |
|--|------------------------------------|----------|----------------------|-----------------|-----------------------|--------|
| Parameters | | Estimate | | Points Estimate | 90% Confidence limits | |
| DecMakerSchool | No education vs. primary education | 2.214 | *** | 9.156 | 4.741 | 17.679 |
| Gender_child | Male vs. female | .593 | | 1.809 | 1.016 | 3.221 |
| Categories (1) | Microcredit with | -.646 | * | .524 | .245 | 1.120 |

| | micro- insurance vs. non- participants | | | | | |
|---------------------|---|--------|-----|-------|-------|-------|
| Categories (2) | Microcredit with no microinsurance vs. non-participants | -.785 | * | .456 | .210 | .993 |
| CreditRationed | | .008 | | 1.008 | .338 | 3.007 |
| Exp_Month_Scaled | | .114 | | 1.120 | .881 | 1.425 |
| HH_IncGT14_Scale | | -.121 | | .886 | .762 | 1.030 |
| IsChildSchool(1) | Yes vs. no | -1.446 | *** | .236 | .112 | .497 |
| DependRatio | | .165 | | 1.180 | .757 | 1.840 |
| Age_Child | | -.084 | | .919 | .492 | 1.716 |
| Age_Child_Square | | .011 | | 1.011 | .978 | 1.046 |
| IndividualShocks(1) | Income & employment decreased vs. no shock | .421 | | 1.523 | .469 | 4.947 |
| IndividualShocks(2) | Illness vs. no shock | .295 | | 1.343 | .591 | 3.051 |
| AdvPayment(1) | Advanced payment vs. no advanced payment | .855 | ** | 2.352 | 1.171 | 4.726 |
| Constant | | -.491 | | .612 | | |

***, **, * : Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 9: Logit regression (extreme poverty) results for the probability of child labour in different sub-groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | Odds Ratio Estimates | | | | |
|--|---------------------------------------|----------------------|----------------------------|-------|-------|--------|
| Parameters | Estimate | Points | 90% Confid- ence Limits | | | |
| | | Estimate | | | | |
| DecMakerSchool | No education vs. primary education | 2.236 | *** | 9.358 | 4.765 | 18.378 |

| | | | | | | |
|---------------------|---|--------|-----|-------|-------|--------|
| Gender_child | Male vs. female | .688 | ** | 1.990 | 1.103 | 3.591 |
| SubCategories (1) | Microcredit with credit-life insurance vs. non-participants | -.580 | | .560 | .232 | 1.354 |
| SubCategories (2) | Microcredit quasi micro health and life insurance | -1.089 | * | .337 | .110 | 1.026 |
| SubCategories (3) | Microcredit with no micro-insurance vs. non-participants | -.496 | | .609 | .264 | 1.404 |
| SubCategories (4) | Co-operative vs. non-participants | -1.994 | *** | .136 | .034 | .545 |
| CreditRationed | | -.064 | | .938 | .303 | 2.899 |
| Exp_Month_Scaled | | .198 | | 1.219 | .938 | 1.583 |
| HH_IncGT14_Scale | | -.171 | * | .843 | .715 | .992 |
| IsChildSchool(1) | Yes vs. no | -1.298 | *** | .273 | .128 | .584 |
| DependRatio | | .073 | | 1.076 | .684 | 1.692 |
| Age_Child | | -.124 | | .883 | .465 | 1.6771 |
| Age_Child_Square | | .013 | | 1.013 | .979 | 1.049 |
| IndividualShocks(1) | Income & employment decreased vs. no shock | .427 | | 1.533 | .465 | 5.059 |
| IndividualShocks(2) | Illness vs. no shock | .267 | | 1.305 | .561 | 3.037 |
| AdvPayment(1) | Advanced payment vs. no advanced payment | .987 | *** | 2.682 | 1.302 | 5.526 |
| Constant | | -4.108 | *** | .016 | | |

***, **, * : Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 10: Logit regression (moderate poverty) results for the probability of child labour in different groups of households., dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | Odds Ratio Estimates | | | |
|--|---|----------------------|-----------------|-----------------------|-------|
| Parameters | | Estimate | Points Estimate | 90% Confidence limits | |
| DecMakerSchool | No education vs. primary education | .150 | 1.162 | .726 | 1.860 |
| Gender_child | Male vs. female | .036 | 1.036 | .646 | 1.661 |
| Categories (1) | Microcredit with micro-insurance vs. non-participants | -1.127 ** | .324 | .146 | .718 |
| Categories (2) | Microcredit with no microinsurance non-participants | -2.143 *** | .117 | .053 | .260 |
| CreditRationed | | -.071 | .931 | .310 | 2.793 |
| Exp_Month_Scaled | | .352 *** | 1.422 | 1.196 | 1.690 |
| HH_IncGT14_Scale | | -.198 *** | .820 | .735 | .914 |
| IsChildSchool(1) | Yes vs. no | -2.695 *** | .068 | .027 | .166 |
| DependRatio | | 1.299 *** | 3.666 | 2.084 | 6.448 |
| Age_Child | | 1.315 *** | 3.725 | 1.813 | 7.655 |
| Age_Child_Square | | -.057 *** | .945 | .912 | .979 |
| IndividualShocks(1) | Income & employment decreased vs. no shock | 1.143 ** | .319 | .141 | .719 |
| IndividualShocks(2) | Illness vs. no shock | 1.018 | 2.768 | 1.392 | 5.503 |
| AdvPayment(1) | Advanced payment vs. no advanced payment | .745 ** | 2.107 | 1.179 | 3.764 |
| Constant | | -5.805 ** | .003 | | |

***, **, *: Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 11: Logit regression (moderate poverty) results for the probability of child labour in different sub-groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | Odds Ratio Estimates | | |
|--|--|------------|----------------------|-----------------------|-------|
| Parameters | | Estimate | Points Estimate | 90% Confidence limits | |
| DecMakerSchool | No education vs. primary education | .087 | 1.091 | .675 | 1.762 |
| Gender_child | Male vs. female | .051 | 1.052 | .652 | 1.700 |
| SubCategories (1) | Microcredit with credit-life insurance vs. nonparticipants | -.952 ** | .386 | .168 | .889 |
| SubCategories (2) | Microcredit with quasi micro health and life insurance | -1.571 *** | .208 | .077 | .558 |
| SubCategories (3) | Microcredit with no micro-insurance vs. nonparticipants | -2.083 ** | .124 | .054 | .290 |
| SubCategories (4) | Co-operative vs. non-participants | -2.250 *** | .105 | .042 | .267 |
| CreditRationed | | .070 | 1.072 | .355 | 3.238 |
| Exp_Month_Scaled | | .343 *** | 1.409 | 1.183 | 1.679 |
| HH_IncGT14_Scale | | -.198 *** | .820 | .734 | .916 |
| IsChildSchool(1) | Yes vs. no | -2.683 *** | .068 | .028 | .169 |
| DependRatio | | 1.291 *** | 3.637 | 2.061 | 6.419 |
| Age_Child | | 1.362 *** | 3.904 | 1.888 | 8.071 |
| Age_Child_Square | | -.059 *** | .943 | .909 | .977 |
| IndividualShocks(1) | Income & employment decreased vs. no | 1.142 ** | .319 | .140 | .728 |

| | shock | | | | | | |
|---------------------|--|--------|-----|-------|-------|-------|--|
| IndividualShocks(2) | Illness shock vs. no shock | .999 | *** | 2.717 | 1.351 | 5.464 | |
| AdvPayment(1) | Advanced payment vs. no advanced payment | .747 | ** | 2.111 | 1.179 | 3.779 | |
| Constant | | -6.051 | *** | .002 | | | |

***, **, *: Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 12: Logit regression (above the poverty line) results for the probability of child labour in different groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | | Odds Ratio Estimates | | |
|--|--|----------|-----|----------------------|-----------------------|---------|
| Parameters | | Estimate | | Points estimate | 90% Confidence limits | |
| DecMakerSchool | No primary education vs. primary education | 2.336 | ** | 10.335 | 2.678 | 39.894 |
| Gender_child | Male vs. female | .209 | | 1.232 | .399 | 3.800 |
| Categories (1) | Microcredit insurance vs. non-participants | .546 | | 1.726 | .022 | 134.730 |
| Categories (2) | Microcredit insurance vs. non-participants | -.121 | | .886 | .012 | 64.473 |
| CreditRationed | | .020 | | 1.020 | .007 | 151.478 |
| Exp_Month_Scaled | | .086 | | 1.089 | .886 | 1.339 |
| HH_IncGT14_Scale | | -.035 | | .965 | .842 | 1.107 |
| IsChildSchool(1) | Yes vs. no | -4.320 | *** | .013 | .001 | .172 |
| DependRatio | | -.033 | | .967 | .316 | 2.960 |
| Age_Child | | 2.095 | * | 8.125 | .953 | 69.298 |
| Age_Child_Square | | -.087 | | .916 | .827 | 1.016 |

| | | | | | |
|---------------------|--|-----------|-------|------|--------|
| IndividualShocks(1) | Income & employment decreased vs. no shock | .343 | 1.409 | .048 | 41.587 |
| IndividualShocks(2) | Illness vs. no shock | .239 | 1.270 | .333 | 4.841 |
| AdvPayment(1) | Advanced payment vs. no advanced payment | .488 | 1.629 | .177 | 14.978 |
| Constant | | -10.697 * | .000 | | |

***, **, * : Significant at 1%, 5% and 10%.

Source: Own regression result.

Table 13: Logit regression (above the poverty line) results for the probability of child labour in different sub-groups of households, dependent variable: 'ChildLab' (Yes/No), (Individual child level, N = 756)

| Analysis of Maximum Likelihood Estimates | | | Odds Ratio Estimates | | |
|--|---|-----------|----------------------|-----------------------|---------|
| Parameters | | Estimate | Points Estimate | 90% Confidence Limits | |
| DecMakerSchool | No education vs. primary education | 2.483 *** | 11.975 | 2.964 | 48.378 |
| Gender_child | Male vs. female | .153 | 1.165 | .362 | 3.753 |
| SubCategories (1) | Microcredit with credit-life insurance vs. non-participants | .680 | 1.974 | .024 | 163.099 |
| SubCategories (2) | Microcredit with quasi micro health and life insurance | -.707 | .493 | .004 | 55.505 |
| SubCategories (3) | Microcredit with no micro-insurance vs. non-participants | -.194 | .824 | .011 | 62.75 |
| SubCategories (4) | Co-operative vs. non-participants | -1.692 | .184 | .001 | 25.606 |
| CreditRationed | | -.726 | .484 | .003 | 77.081 |
| Exp_Month_Scaled | | .084 | 1.088 | .878 | 1.348 |

| | | | | | | | | | |
|---------------------|--|--|--------|-----|-------|------|--------|--|--|
| HH_IncGT14_Scale | | | | | | | | | |
| IsChildSchool(1) | Yes vs. no | | -4.166 | *** | .016 | .001 | .216 | | |
| DependRatio | | | .241 | | 1.272 | .386 | 4.189 | | |
| Age_Child | | | 1.828 | | 6.222 | .665 | 58.177 | | |
| Age_Child_Square | | | -.075 | | .928 | .834 | 1.033 | | |
| IndividualShocks(1) | Income & employment decreased vs. no shock | | .082 | | 1.086 | .028 | 42.383 | | |
| IndividualShocks(2) | Illness vs. no shock | | .212 | | 1.236 | .301 | 5.078 | | |
| AdvPayment(1) | Advanced payment vs. no advanced payment | | .033 | | 1.034 | .090 | 11.889 | | |
| Constant | | | -9.006 | | .000 | | | | |

***, **, *: Significant at 1%, 5% and 10%.

Source: Own regression result.

Figure 10: Detailed explanation of the poverty measurement in the survey area

| Consumable items (food) | Per capita normative daily requirements | | Average rural consumer prices, Nov-Dec, 2009 (Taka/kg) | |
|---|---|------|--|----------------------------------|
| | Calorie | gm | Chilmari (C) | Fulchari (F) |
| | Rice | 1386 | 397 | 28 |
| Wheat | 139 | 40 | 21 | 21 |
| Pulses | 153 | 40 | 100 | 100 |
| Milk (cow) | 39 | 58 | 20 | 28 |
| Oil (mustard) | 180 | 20 | 76 | 76 |
| Meat (beef) | 14 | 12 | 240 | 250 |
| Fish | 51 | 48 | 100 | 100 |
| Potato | 26 | 27 | 10 | 16 |
| Other vegetables | 26 | 150 | 10 | 10 |
| Sugar (gur) | 82 | 20 | 42 | 44 |
| Fruits (banana) | 6 | 20 | 12 | 12 |
| Total of food | 2112 | 832 | | |
| | | | For moderate poverty | For extreme poverty ^a |
| Poverty line expense on food per day (Taka) | | | 27.96 (C), 29.14 (F) | 16.49 (C), 17.05 (F) |
| Poverty line expense on non food goods per day (Taka) ^b | | | 8.38 (C), 8.74 (F) | 4.95 (C), 5.11 (F) |
| Poverty line expense per day (Taka) | | | 36.34 (C), 37.88 (F) | 21.44 (C), 22.16 (F) |
| Poverty line expense per month (Taka) | | | 1090.2 (C), 1136.40 (F) | 643.2 (C), 664.80 (F) |
| ^a Extreme poverty line is based on following food requirements: rice, wheat, pulse, potato and vegetables. | | | | |
| ^b Nonfood expense is based on 30% of food expense. | | | | |
| <i>Note:</i> Estimates (Khandker and Chowdhury, 1996) are based on FAO guidelines and village level prices. | | | | |