

Impact of Microcredit on Economic Indicators of the Borrowers: An Empirical Analysis

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Abstract

This paper investigates the impact of microcredit on poverty alleviation by focusing on the economic indicators- income, savings, and assets- of the borrowers. Microcredit alleviates poverty through generating the income, savings, and assets of the borrowers. Thus, the main objective of this article is to examine whether the microcredit process can enhance income, savings and assets of the borrowers. A multiple regression model is employed to examine the impacts of microcredit on these factors. The model is estimated using primary data collected from 96 respondents, who are from six villages of Rajshahi district. Empirical findings indicate that microcredit has significant impact on poverty alleviation through generating income, savings and assets of the borrowers. Another interesting finding is that the impact of microcredit is not the same across higher and lower income borrowers. The impact of microcredit is found better on the higher income borrowers compared to the lower income borrowers.

1. Introduction

Microcredit in Bangladesh has drawn attention of the researchers all over the world because of its distinctive credit delivery system, high recovery rate and its special focus on women and vulnerable groups of people. It allows the poor people to protect, diversify, and increase their sources of income, the essential path out of poverty and hunger. The programme provides small loans to the poor people, mainly the women, for self-employment activities and thus, allow them to

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achieve a better quality of life (Hussain, 1988; Morduch, 2000). Its exceptionality is reflected in its collateral-free group-based lending system (Yunus, 1999; World Bank, 1994). In Bangladesh, Non-Government Organizations (NGOs) have emerged as an integral part of the institutional structure for alleviating poverty through microcredit programmes. These organizations mostly follow the target-group strategy under which the poor with similar socio-economic interests are organized into groups to achieve their objectives by using microcredit.

Bangladesh is described as one of the least developed countries in the world with per capita GDP \$482, (BBS, 2007). Based on poverty line constructed as less than \$1 per day per person, around one third of the total population are found as income-poor, whereas the proportion increases to three-fourth if the poverty line is raised to less than \$2 per day per person (UNDP, 2003). Poverty in Bangladesh is widespread mostly in the rural areas and in eradicating poverty government programmes are not that sufficient. Therefore, the role of NGOs in providing support to the poor in their struggle against poverty is very significant. There are hundreds of NGOs working in Bangladesh for poverty alleviation through their operation of microcredit. Among them BRAC, Grameen Bank (a specialized bank), RDRS, ASA, PROSHIKA and TMSS are worth mentioning. These NGOs provide small loans to their member borrowers to invest in income and employment generating activities.

The impact of microcredit on poverty alleviation is so far found to be controversial in the empirical studies. Several studies have found that microcredit programmes have a positive impact on eradicating poverty (Hossain, 1988; Khandker, 1998; Wahid, 1993; Yaron, 1994). However, there are some studies which reported a negative impact of microcredit on poverty eradication (Morduch, 2000). To verify such a controversy, further evaluation of microcredit programmes is needed. While the existing studies mostly relied on the assessment of the impact of microcredit on poverty, income, women empowerment, employment, education etc., this paper keeps an in-depth insight by focusing on the economic indicators of the borrowers. In doing so, first, it is necessary to identify factors that are essential measures and factors of poverty; and second, to find out whether these factors are ultimately affected by microcredit. In many studies level of income of the borrowers, their savings level, and the value of assets they own are considered economic indicators of the households (e.g. Khandker, 2000). In fact, a household is considered poor when it has less income, less savings and less assets. To our knowledge, scant attention has been given on this special area of research. This study should contribute to fill up this gap in the literature.

The paper is structured as follows. In Section 2, the background literature concerning the issue of microcredit is discussed along with the findings. Section 3 provides the methodology of the study which discusses the empirical model of the study and the data issues. Discussion of results and interpretation of those results are presented in Section 4. Finally, Section 5 provides the ending of this paper with concluding remarks.

2. Literature

There is an extended body of literature on the impacts of microcredit on the poor. The literature has several dimensions in terms of examining different aspects of microcredit pertaining to poverty alleviation and they provide a mix picture in terms of findings. The studies also differ from the viewpoint of the methodologies followed and the data used. Important studies on the impact of microcredit on poverty eradication in the context of Bangladesh include Khandker (2000, 2003), Khandker et. al (1998), Rahman (2007), Key (2003), Majumder (2004), Develtere and Huybreshs (2005) and Nahar (2002). Khandker et al. (1998) have used data from three most important microcredit programmes in Bangladesh namely, the Grameen Bank, BRAC and RD-12 project run by the Bangladesh Rural Development Board (BRDB). The authors have attempted to quantify the village-level impacts of these programmes using OLS estimates. Their econometric analysis shows that these programmes have positive impacts on income, production and employment particularly in the rural non-farm sector. Rahman (2007) studied the impact of microcredit on different determinants of poverty using the data collected from three districts of Bangladesh and the respondents were from two largest microcredit institutions of Bangladesh, namely, BRAC, Grameen Bank. The study has come up with the finding that the impact of microcredit in reducing poverty is higher on the higher income borrowers than on the middle and lower income borrowers.

Microcredit borrowers have indeed reduced borrowing from the informal sources is the finding of the study by Khandker (2000). Based on the collected data during the period 1991-92, his econometrics estimation results asserted that with microfinance programmes the poor save regularly to build financial and physical capital and he concluded that microcredit has positive impact on the poor because poor people get facilities with microcredit and also encouraged to save. In another study, Khandker (2003) used panel data collected in 1991-1992 and 1998-1999 to estimate the long run impacts of microcredit on consumption, household income and non-land assets. He compared the impacts of microcredit on programme participants and non-participants. He found that on aggregate counts moderate

poverty has declined from 83 percent in 1991-92 to 66 percent in 1998-99 (17 percentage points overall reduction over seven years). At the same time, extreme poverty decreased by 19 percentage points among programme participants, 13 percentage points among target non participants and 5 percentage points among the non-target group. Develtere and Huybreshts (2005) reviewed several studies on the performance of Grameen Bank and BRAC and observed that although microcredit increases income it does not give long term sustainability. While most of the studies record, less or more, positive contribution of microcredit on different aspects of poverty, the regression results of Majumder (2004) indicate that after joining the Grameen Bank, the socioeconomic condition of borrowers did not improve significantly. He concluded that income is generated not due to microcredit but due to labor.

There are some studies which focused on evaluation of microcredit in the context of countries other than Bangladesh (Mathew, 2006; Sarangi, 2007; Hossain and Diaz, 1999; and Ahmed, 2007). Mathew (2006) used data set from Freedom from Hunger (FFH) programme in Ghana. His regression includes demographic characteristics, attitude, education, value of assets, number of children, etc. and he found that there is a significant positive relationship between microfinance programme participation and income. Sarangi (2007) made a study in India on the state of Madhya Pradesh on three microcredit institutions. His study includes both participant and non-participant (control) group of households, who were drawn through a multi-stage, stratified random sampling method. He estimated the impact of microcredit using a regression model and found that the gainer of microcredit is the better-off section of households with high per capita income. Hossain and Diaz (1999) evaluated a project named LPDF (Landless People Development Funds) of a non-government organization in the Philippines. They found operation of microcredit has enhanced employment, income and productivity significantly. They estimated that microcredit contributes 25% increases of income of the poor. Ahmed (2007) performed a study on the performance of microcredit on poverty alleviation in Pakistan using a bivariate analysis. His major finding was that there was a significant relation between age and economic situation of the microcredit user. Number of family members has a significant impact on the economic status of the borrowers and small family members have significant impact of income generation.

3. Methodology

3.1 The Empirical Model

Empirical literature mostly concentrated on the impact of microcredit on poverty alleviation. Rahman (2007) emphasized on assessing the impact of microcredit on economic indicators of the borrowers as these indicators have influence in eradicating poverty. In almost every literature income of the households has been considered as an indicator of whether they are poor or not. Khandker (2000) considers savings as an indicator and finds that this factor has an influence on eradicating poverty. He argues that credit programmes do stimulate savings because microcredit borrowers make mandatory savings every week, which they are entitled to withdraw at the end of their membership. In addition, he finds that microcredit has positive impact in generating not only compulsory savings but also additional savings (voluntary savings) among the borrowers. Apart from income and savings, it can be argued that there are other factors that may contribute towards eradication of poverty. For example, accumulation of assets by the households may be considered as an additional causal factor. So, it is likely that by receiving microcredit, borrowers can earn better income, have better savings and own more assets. In fact, microcredit influences these indicators of the households and thereby contributes to poverty reduction.

The above understanding provides the basis of the empirical model for investigating the impacts of microcredit on poverty alleviation. The three indicators associated with poverty alleviation viz. income, savings and assets are modeled econometrically with microcredit and other determinants as follows:

$$Y=f(CR,X,V)..... (1)$$

Where, Y = economic indicators of the households- income, savings and assets,

CR = amount of microcredit borrowed,

X = vector of household specific characteristics such as family size (FS), age of the borrowers (AGB), number of earners in the family (ERNR), number of adult members in the family (ADLT), and education level of the borrower (ED).

V = vector of village level characteristics.

In the above model, amount of microcredit is set as an explanatory variable which determines the income, savings and assets level of the borrowers. However, poverty of the borrowers is also influenced by factors other than microcredit. These factors are borrowers' household level characteristics, some specific attributes of the borrowers and some location specific characteristics.

3.2 Model Specification

As the primary focus of this paper is to analyze the impact of microcredit on the economic indicators of the households, the econometric model is specified to facilitate the testing of the hypothesis that whether microcredit can generate income, savings and assets of the households. In specifying the model attention has been given on using cross section data. Moreover, model specification in the earlier studies is also taken into account. Thus, we have taken a multiple regression model (Gujarati, 2003) where amount of microcredit is set as the main explanatory variable and income, savings and assets of the borrowers are taken as dependent variables. Other explanatory variables, as mentioned, are added in the equations. Following Mathew (2006), the equations for income, savings and asset are specified in logarithmic forms as follows:

Income Equation:

$$\ln(INC) = a_0 + a_1 \ln(CR) + a_2 \ln(AGB) + a_3 \ln(FS) + a_4 \ln(ERNR) + a_5 \ln(ADLT) + a_6 \ln(ED) + a_7 D + \varepsilon_2 \dots \dots \dots (2)$$

Savings Equation:

$$\ln(SAV) = a_0 + a_1 \ln(CR) + a_2 \ln(AGB) + a_3 \ln(FS) + a_4 \ln(ERNR) + a_5 \ln(ADLT) + a_6 \ln(ED) + a_7 D + \varepsilon_2 \dots \dots \dots (3)$$

Assets Equation:

$$\ln(ASST) = a_0 + a_1 \ln(CR) + a_2 \ln(AGB) + a_3 \ln(FS) + a_4 \ln(ERNR) + a_5 \ln(ADLT) + a_6 \ln(ED) + a_7 D + \varepsilon_3 \dots \dots \dots (4)$$

In the equations,

CR = amount of microcredit taken by the borrowers, expressed in hundred taka,

AGB = age of the borrower, expressed in years,

FS = family size expressed by total number of members in the family,

ERNR = number of income earners in the family,

ADLT = number of adult members in the family,

ED = education index of the borrowers expressed as follows: 1 if no education or can sign his or her name, 2 for primary school

education, 3 for high school level education, 4 for intermediate level education, and 5 for graduate level education and above.

D = dummy variable, 1 if the village is close to town, has electricity connection and good communication; and 0 otherwise.

In the equations, a_0, a_1, \dots, a_1 are the coefficients of the explanatory variables to be estimated and ϵ_1, a_2, a_3 are stochastic disturbance terms capturing other factors which are not included in the model. It is assumed that each of these random terms is distributed normally with mean zero and variance a_2 .

As like income, microcredit should have positive effect on raising savings of the borrowers. There are provisions of both compulsory and voluntary savings in the microcredit programme. So, increased amount of microcredit increases the savings of the borrowers. It gives the borrowers a strong assets base which the borrowers use in case of economic crisis. After taking microcredit the borrowers use it in productive sectors and various literature on micorcredit revealed that micorcredit gives the borrowers an opportunity to accumulate assets. So there is a positive relationship between microcredit and asset generation by the borrowers. It is expected that age of the borrowers should play an important role in earning income, accumulation of assets and enhancing saving behavior of the borrowers. Family size would have a mixed impact on the income of the households although there is a negative relationship between family size and savings as well as asset holdings. As family size increases the household needs to spend more on necessities and it has less opportunity to save or accumulate assets. Other variables like education, number of earners in the family and number of adult persons in the family have positive impact on income, savings and asset holding of the borrowers.

It is to note that according to theory, income of the households is one of the determinants of savings and assets of the households. However, in this study, income is not included in the savings and assets functions as an explanatory variable. Since income of the borrowers is determined by amount of credit, we used the variable 'credit' as a proxy for income in the savings and assets equations. Moreover, for the microcredit borrowers, a portion savings is mandatory, which arises as a conditionality requirement of getting microcredit and is not dependent of income of the borrowers. Although there is provision of voluntary savings, the amount savings is usually very small as the borrowers are very poor. The same explanation can be put forward for assets also. Moreover, inclusion of the variable 'income' might create multicollinearity problem. All these justify the exclusion of income variable from the savings and assets equation.

Table 1 : Correlation Matrix of the Variables

	INC	ASST	SAV	CR	ERNR	FS	AGB	ADLT	ED	D
INC	1.00									
ASST	0.22	1.00								
SAV	0.63	0.07	1.00							
CR	0.45	0.32	0.24	1.00						
ERNR	0.27	0.03	0.15	-0.03	1.00					
FS	0.36	0.08	0.32	0.09	0.44	1.00				
AGB	0.01	0.10	0.21	-0.10	0.26	0.28	1.00			
ADLT	-0.02	0.08	0.01	-0.15	0.13	-0.18	0.19	1.00		
ED	0.02	0.20	0.11	0.09	-0.17	-0.11	-0.41	-0.19	1.00	
D	0.24	0.08	0.23	0.20	-0.06	0.04	-0.03	-0.14	0.27	1.00

Source: Author's own calculation

Equations (2), (3) and (4) are set for the data collected from our sample villages and estimated using Ordinary Least Squares (OLS) method. In the estimation, it is necessary to check whether the data contains the problems of heteroscedasticity, autocorrelation and multicollinearity. The econometric software EViews provides the value of Durbin-Watson d statistic for autocorrelation, and Lagrange Multiplier (LR) test for heteroscedasticity. We found no problems of autocorrelation in the data as it consists of cross-section data. Using the model in logarithms has reduced the problem of heteroscedasticity. Moreover, EViews provides White heteroscedasticity consistent coefficients. The correlation matrix provided in Table 1 indicates that the explanatory variables are not highly correlated to one another and thus reduces the possibility of multicollinearity occurring among the explanatory variables.

3.3 Data

The empirical analysis in this paper is mainly based on primary data. Primary data has been collected from the selected sample villages from June to August, 2007 using a well-structured questionnaire. However, for this research secondary data

have also been collected from published documents and reports and also by directly contacting the regional and branch offices of the concerned NGOs (BRAC, GB, ASA and TMSS). Primary data has been collected from six villages in two *Upazillas* of Rajshahi district. The *Upazillas*, one is central and the other is remote, are purposively chosen to avoid any bias in the sample. From each *Upazilla*, one union is selected randomly and then from each union, three villages are selected at random. The selected villages are *Lalitahar, Porapukur, Balamaghar, Jele Para, Muslim Para and Bilpon*. In the villages it is found that there are many microcredit borrowers under different NGO groups containing 5 to 15 members. So, in selecting the respondents we have tried to ensure that respondents from different NGOs come into the sample. For the present study data have been collected from 96 borrowers all of whom are female.

3.4 Features of the Data

It is observed from the collected data that there have been significant variations in the variable values and other characteristics of the households across villages and respondents. Table 2 shows the basic characteristics of the collected data which are in general called the descriptive statistics of the data. The table shows that the average age of the borrowers (female) in the study is 32.19 years with the highest age 55 years and the lowest age 17 years. The average education index for the respondents is 1.44, which means that they have on the average primary level of schooling, with the highest of index 4 (higher secondary level) and the lowest index 1 (fully illiterate but can sign only). About 86.45% house is headed by male and the remaining by female.

The average number of adult male in the household is found to be 1.3 while in case of female it is 1.29. Average number of earners in each family is 1.2 persons and average family size is 4.05. Average borrowing from NGOs is Tk. 11,292.7 with the highest of Tk. 150,000 and the lowest of Tk 2,000. Average land size (homestead plus cultivable land) is 27.67 decimal with the highest of 276 decimal and the lowest of zero decimal (in most cases). Average monthly income of the borrowers is found to be Tk. 4,462.05 with the highest of Tk. 24,000 and the lowest of Tk.1,000. Average accumulated saving (amount of money in bank account and saved at home) is found to be Tk.3, 235.18. The average value of assets (including furniture, television, radio, cattle, transport items, items related to profession and household items others than land and house) is Tk. 30,090.73 with the highest value of Tk. 2,31,100 and the lowest of Tk. 800. About 75% of the houses of the borrowers' houses are made of mud and tin, 19.79% and 5.2%

borrowers' have houses made of brick-tin and brick roof respectively. Out of the total sample 65% women are found to be empowered. Out of the total households, 47.9% households have electricity connection.

4. Results discussion

In this study estimation of the Equations (2), (3) and (4) is performed in two stages. At the first stage, all the collected data are considered together and the

Table 2 : Descriptive Statistics of the Data

Variables	Mean	Max.	Min.	SD	Variance
age of borrowers (in years)	32.19	55	17	8.68	75.39
education of the borrowers (index)	1.44	4	1	0.87	0.75
age of husbands (in years)	38.16	60	20	10.6	112.43
education of husbands (index)	1.87	5	0	1.32	1.75
number of adult male in family	1.3	4	1	0.58	0.33
number of adult female in family	1.29	4	0	0.67	0.45
percentage of adult male in family	30.96	66.6	0	12.67	160.45
percentage of adult female in family	33.07	100	12.5	12.99	168.65
number of earners in the family	1.2	4	1	0.54	0.29
family size (persons)	4.05	10	1	1.37	1.88
amount of borrowing (in Tk.)	11,292.7	1,50,000	2,000	17,983.2	32,33,94,627
land size (in decimal)	27.67	276	0	40.64	1,651.85
per month income (in Tk.)	4,462.1	24,000	1,000	3,679	1,35,41,776
accumulated saving (in Tk.)	3,235.2	50,700	20	6,120.52	37,46,0826
value accumulated assets (in Tk.)	30,090.7	2,31,100	8,00	37,163.	138,11,37,556
Number of observations: 96					

Source: Author's own calculation

regression equations for income, savings and assets are estimated. At the second stage, respondents are divided equally to fall into higher and lower income groups and the regressions are run separately for both the groups.

Estimation results for the income equation, which is specified by Equation (2) are provided in Table 3. The results show that the variable microcredit is found to have positive (0.24) and significant ($p < 1\%$) relationship with income of the respondents. Since the model is specified in logarithmic form the value of the

coefficient shows the credit elasticity of income generation. This can be taken to explain that a one percent increase in the amount of microcredit will raise the income of the respondents by 0.24 percent. This result agrees with our earlier expectation that microcredit has positive impact on income growth. Other explanatory variables, except education, also have significant impacts on the income growth of the respondents and all of them bear expected signs.

Among them, age of the borrowers has negative relationship with their income levels. The coefficient value is -0.33 and is significance at 10% level of significant. This result is expected. It is known that NGOs give loan to people whose age is generally 20 to 50 years. People within the age range 20-30 years are

Table 3 : Ordinary Least Square Estimation Results for Income Equation

Variables	Coefficient	t-Statistic	
Probability			
Constant	2.03**	2.17	0.03
log(CR)	0.24***	3.44	0.00
log(AGB)	-0.33*	-1.74	0.08
log(FS)	0.39*	1.86	0.06
log(ERNR)	0.50***	2.72	0.00
log(ADLT)	0.29*	1.70	0.09
log(ED)	0.099	0.71	0.48
D	0.24**	2.31	0.02

Number of Observations = 96; R-Square= 0.38

Durbin-Watson = 1.99

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

more energetic and active than the elders, and they are able to utilize their loan money properly. Although expected, education did not appear to have any significant effect on the income earnings of the borrowers. It is also seen that villages in good location with electricity connection and good communication can play special roles for the inhabitants to lift their incomes.

Table 4 shows the results of the savings equations. From the table it is evident that microcredit has positive and significant relationship with savings of the respondents. The value of the coefficient of microcredit (2.06) indicates that the proportionate rate of increase in savings is higher than the proportionate rate of increase in microcredit. It is learnt from the field survey that microcredit

borrowers have to maintain a weekly savings as members of NGOs and they also have voluntary savings based on their income. The variable family size plays negative influence on the savings level of the borrowers which is expected. The dummy variable is also found significant in determining the savings level of the borrowers. Other variables are found to be insignificant in determining the level of savings of the borrowers.

Table 4 : Ordinary Least Square Estimation Results for Saving Equation

Variable	Coefficient	t-Statistic	
Probability			
Constant	-252.88***	-2.773	0.00
log(CR)	1.06***	2.594	0.01
log(ED)	-0.53	-1.55	0.12
log(FS)	-0.64***	-3.078	0.00
log(ERNR)	5.22	0.241	0.80
log(ADLT)	31.31	1.608	0.11
Log(AGB)	2.33	0.220	0.82
D	2.84**	2.338	0.02

Number of Observations = 96; R-Square = 0.36

Durbin-Watson = 1.85

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

Regression results for the assets equation are provided in Table 5. It is seen from the estimation results that microcredit has significant and positive impact on the accumulation of assets by the respondents. However, compared to the income and savings equation, it is not highly significant as the coefficient is significant at 10% only. In addition, accumulation of assets by the borrowers is found to be determined by family size, number of earners, education of the borrowers and number of adult members in the families. Age of the borrowers and the location dummy are seen to have no effect on the assets level of the families.

Table 5 : Ordinary Least Square Estimation Results for Assets Equation

Variable	Coefficient	t-Statistic	Probability
Constant	2.22	1.050	0.296
log(CR)	0.24*	1.862	0.6
log(AGB)	-0.28	-0.859	0.392
log(FS)	1.53***	3.776	0.000
log(ERNR)	0.93***	2.704	0.008
log(ADLT)	0.83***	3.242	0.001
log(ED)	0.36*	1.693	0.093
D	0.12	0.554	0.580

Number of observations =96; R-Square= 0.35

Durbin-Watson = 2.01

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

Many studies tried to indicate that the impact of microcredit might be different on various groups of microcredit users. It is usual to hypothesize that income, savings and assets accumulation behavior with respect to increase in microcredit borrowing of the higher income poor is different from that of the lower income poor. Thus, this study performed separate regressions for the higher and lower income poor borrowers and tried to compare the results obtained in the regressions which are presented in Tables 6, 7 and 8.

Table 6 : Comparison: The Income Equation

Variable	Coefficient (All Respondents)		Coefficient
(Higher Income Group)	Coefficient (Higher Income Group)	Coefficient (Lower Income Group)	
Constant	2.03**	2.131**	4.960***
log(CR)	0.24***	0.20***	0.029
log(AGB)	-0.33*	-0.145	-0.303**
log (FS)	0.39*	0.507**	0.018
log (ERNR)	0.50***	2.047	2.291
log (ADLT)	0.29*	0.223	-0.267**
log(ED)	0.099	-0.255	0.181**
D	0.24**	0.007	0.111
	N _H =96	N _L =48	N _L =48

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

The obtained results for the income equation with regard to the whole data set, the higher income group and the lower income group show that while microcredit appears as a significant determinant of income for the overall poor and the higher income poor, it is not a significant determinant of income for the hardcore poor section of the respondents. The reason may be that the lower income poor are not able to invest their credit money into income generating activities properly. Age of the borrowers is also significant in income generation of the microcredit borrowers as a whole and the lower income borrowers, but it does not play any significant role in income generation of higher income borrowers.

Family size is significant in income generation of overall borrowers and the higher income borrowers. However, it appeared to be insignificant for the lower income group people. Number of earners is highly significant in income generation of the overall borrowers, but when considered for the higher and lower income borrowers separately, it becomes insignificant. Number of adult members is significant for income generation of the overall respondents and the lower income borrowers. However, in case of lower income borrowers the impact is negative. Education level of the respondent plays a vital role in income generation of the lower income borrowers only. But it has no any effect on the income generation of higher income borrowers. The dummy variable is significant for income generation of the overall borrowers but it has not any effect on the income generation of lower and higher income group.

Table 7 : Comparison: The Saving Equation

Variable	Coefficient (All Respondents)	Coefficient (Higher Income Group)	Coefficient (Lower Income Group)
Constant	-252.88***	-473.462**	-99.993**
log(CR)	2.06***	2.290*	1.486**
log(ED)	-0.53	-5.342	6.425
log(FS)	-0.64***	-7.506*	16.230
log (ERNR)	5.22	-10.853	3.059*
log(ADLT)	31.31	32.813	13.495
log(AGB)	2.33	50.988	3.281
D	2.84**	39.045	5.126
	N _T =96	N _H =48	N _L =48

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

Table 7 provides the comparison for the savings equation where it is shown that credit is significant as a determinant of savings of the overall borrowers as well as the higher income borrowers and the lower income borrowers. The positive coefficients of the variable microcredit indicates that savings of the borrowers increases when they borrow higher amount of microcredit from the NGOs. Family size plays significant negative role on savings of the borrower when the whole data and the higher income data are considered. It is seen that number of earners plays significant role on the savings of the lower income group borrowers, while it has no impact other wise. The variables like age of the borrower, number of adults and education of the borrower do not appear to have any significant role to enhance savings of the borrowers in any case.

Comparison of results for the savings equation for all respondents, higher income respondents and lower income respondents are provided in Table 8.

Table 8 : Comparison: The Assets Equation

Variable	Coefficient (All Respondents)	Coefficient (Higher Income Group)	Coefficient (Lower Income Group)
Constant	2.22	4.060	0.027
log(CR)	0.24*	0.184	0.178
log(AGB)	-0.28	1.168**	0.243
log (FS)	1.53***	1.394**	1.413**
log (ERNR)	0.93***	0.829*	0.310
log (ADLT)	0.83***	0.728	0.457
log(ED)	0.36*	0.354	0.335
D	0.12	0.171	0.129
	N _T =96	N _H =48	N _L =48

(N.B: ***, ** and * indicate significance at 1 percent, 5 percent and 10 percent, respectively)

Considering the regression with respect to the whole data set, data for the higher income group and lower income group, it is found that microcredit plays very weak role in determining the assets accumulation of the borrowers. It appeared significant at 10% level when the whole data set is considered. In the separate regressions for the higher and lower income groups microcredit has no significant impact on the accumulation of assets of the borrowers. The only factor that appeared significant in all three cases is the size of family. This result is expected. Large families always have higher level of assets compared to smaller families if income is the same.

Age of the borrower is important for assets generation of higher income borrowers only. However, in case of all the borrowers or the lower income borrowers, assets generation does not depend upon their age. Number of earners contributes to assets build up for higher income borrowers. This is shown by the positive and significant coefficients of the variable in the first and second regressions. But in case of the lower income borrowers this variable turned insignificant. Adults in the family and education of the borrower significantly effect assets generation of the borrowers for the whole data set only. However, their impact on higher income and lower income borrowers is not significant. There is no effect of the dummy variable for location on the assets generation by the borrowers at any level.

5. Conclusion

The present study has evaluated the impacts of microcredit programmes by non-government organization in Bangladesh on different factors of poverty, namely income, savings and assets of the borrowers. From the empirical analysis, it may be concluded that microcredit programme is effective in generating higher income, savings and assets level of the borrowers. Besides microcredit, family size and number of earners in the family also determine the income, savings and assets of the borrower. As expected, larger family size results in lower propensity to save. Other determinants such as age of the borrowers, number of adult persons in the family and education level of the borrowers are seen to play no systematic effect on the level of income, savings and assets of the borrowers.

One interesting finding in this paper is that the household outcomes due to microcredit programme are found different across income groups. Microcredit programme helps bringing better outcomes for the high-income group borrowers compared to the low-income group borrowers. This is a very important finding in terms of impact of microcredit as it shows that the microcredit programme is only effective for the high income group borrowers. Thus, in the final conclusion, this study suggests that even though microcredit is an attractive tool to produce better outcomes in the generation of income, savings, and assets of the borrowers, it is more effective for relatively higher income poor only compared to the hardcore poor. Therefore, to achieve intended outcomes, it is required to bring some adjustments in the existing system of microcredit programmes towards serving those people who are severely stricken by poverty.

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