Impact of Microfinance: An Examination in the North East India

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ABSTRACT: *Understanding the role of microfinance in reduction of poverty and inequality, the present paper investigates the impact of access to credit among the borrowing members as well as non-borrowing members, using primary survey data from Assam, a state of North East India. Based on statistical analysis, the study found that expenditure, which is considered as proxy of economic welfare differs positively in case of participant than to non-participant. Similarly, due participation in the programme; there exist positive difference to borrower's expenditure in compare to non-borrower. But the regression analysis rejects the hypothesis that increase in expenditure is due to programme participation.*
KEYWORDS:*Microfinance, Impact, Regression, ANOVA, Income, Welfare*

I. INTRODUCTION

Poverty and inequality remains a major challenge to the globe in general and developing countries in particular, and India is no exception to it. Despite injection of a plethora of developmental aids and various policies to uplift the economic conditions of poor since 1950s, it failed in reality (Khawari, 2004). It is due to diversion of loan towards unintended beneficiaries with mounting subsidies and low repayment rate (Morduch, 1999). Besides, there was also a divergence between the demand for credit by the poor particularly in terms of products and product delivery mechanism and supply of credit by conventional financial institutions (Jindal, 2008). A new form of institutional credit innovation, 'microfinance' emerged in late 1970s in Bangladesh to bridge the gap in accessing credit facilities for excluded sections of people. As of December 2010, it is reported that 3,652 MFIs reached about 200 million clients, of which 66.99% were among the poorest when they took their first loan and of these, 82.3% were women (Maes& Reed, 2012).

Enthused by the demonstrated success of Grameen Bank of Bangladesh, microfinance institutions have germinated worldwide due to higher repayment rate as compared to formal financial institutions (Armendariz&Morduch, 2007). But at the same time, it demands for microfinance impact assessment of the beneficiaries in view of high repayment.

There are a plethora of studies on the impact of microfinance, which demonstrate that in the presence of a supportive environment, targets like millennium development goals are achievable even through commercially-oriented microfinance (Montegomery& Weiss, 2011). However, studies also suggest that microfinance has become vulnerable to financial turmoil. In the global financial crisis, impact was more severe when institutions had been active in tapping domestic and international financial markets for funds and had operated in countries experiencing a severe post-crisis recession (Wagner & Winkler, 2013). In Bangladesh, referring to the study of Khandker(2003), it is found that program participation has positive impacts on household income, production, and employment, particularly in the rural non-farm sector, and that the growth in self-employment was achieved at the expense of wage employment, which implies an increase in rural wages.

There is also evidence of significant positive impact of commercial group-based microfinance services on business volume and profit (Brown, 2002). Besides, Sinha (2003) conducted a study to assess on a national scale the outreach and development impact of MFI programme in relation to different product designs and delivery systems in various parts of India. However some studies also project microfinance as an effective strategy for extending financial services to the poor and other disadvantaged groups not reached by formal sector finance (Hartarska&Nadolnyak, 2007).

MFIs also improve the credit market and alleviate credit constraints since enterprises in municipalities with three or more MFIs face less severe financing constraints (Mahjabeen, 2008). There is also evidence of positive impact of microfinance in enhancing income of households, increase of consumption, generation of employment, reduction of income inequality and enhancement of social welfare (Imai et al., 2010). Microfinance has a significant positive effect on welfare if MFI loans use productively. Besides loans for productive purposes were more important for poverty reduction in rural than in urban areas. However in urban areas, simple access to MFIs has larger average poverty-reducing effects than the access to loans from MFIs for productive purposes (Kaboski& Townsend, 2012).

There also exists evidence of mixed impact of microfinance. As for example, Rooyen et al. found in sub Saharan Africa that that microfinance does harm, as well as good, to the livelihoods of the poor. Similarly, microfinance possibly results in increased total short-term credit, consumption, agricultural investment, income growth, but decreased overall asset growth (Scully, 2004).

But as against positive impact of microfinance on the poorest, some researchers also criticize the way as microfinance works and termed poplar faith as misconception (Hermes &Lensink, 2007). This is because; over-exaggeration to the power of micro enterprise credit and related assistance may possibly create ignorance on some more pertinent key structural issues to the long-term problem of women and poverty. Hermes and Lensink (2007) comprehensively reviewed both the positive and negative kind of impact in different perspective and they were blurred whether microfinance substantially contributes to a reduction of world poverty and urged for solid empirical research (Gelman, 2005). The extant sources of literature therefore depict a mixed response to the key issues of microfinance, which way out some critical questions on the holistic performance of microfinance sector.

With this backdrop, the present paper tries to examine the impact of microfinance on welfare of borrower, where income and expenditure are considered as proxy of welfare. The motivation of the paper is guided towards understanding of real image of microfinance repayment performance in view of its impact. The paper is divided in five sections. Apart from background and objective in section 1, section 2 depicts database and methodology. Section 3 elaborates empirical framework, which is followed by results and discussion regarding impact of microfinance in section 4. Finally, section 5 concludes the paper.

II. DATA BASE

The present study uses primary data to examine the impact of microfinance. In this connection a field study was conducted, which comprises 10 districts of Assam, a state of North East India. To address the empirical objective in this paper, experiment is conducted in two stages.

1. In the first stage, it is examined whether access to credit makes any difference to income and expenditure of the borrower's household along with some other control variables. In this endeavor, the experiment considers 414 borrowing members and 155 non-borrowing members of both the sample MFIs to examine the difference. Further, to compare both the group representatively, only those members are selected, who under the category of marginal land size[1] holder. Since different asset base impact income level differently, therefore only land holding size is considered in this analysis. Moreover, there are also other variables relate to income level of a household, but the problem of measurement may arise for those variables, since measurement differs by the nature of variables. In this situation self-estimated value may be biased and therefore due to tangibility in nature land is considered as representative variable. Moreover, land is also an important base of income generation. Therefore, adjusting for land size, finally 392 out of 414 borrowing members and 139 out of 155 non borrowing are considered. Analysis of variance (ANOVA) is applied to examine the differences.

2. In the second stage of experiment, it is tried to examine impact of microfinance on welfare of borrowing members and thus family expenditure of the borrower's household is taken as a proxy against the variable. The experiment considers 414 borrowing members.

III. METHODOLOGY

As discussed above, the empirical strategy developed in this paper is guided to comprehend impact of microfinance on the members particularly in two facets- welfare and inequality. The present study develops three different but related empirical frameworks to evince impact of microfinance on economic welfare and income inequality. The following sub-sections detail all empirical frameworks.

III.1. Impact ofMicrofinance: A Participant- Non Participant Approach

The empirical strategy is adopted to examine the difference of selected socio- economic variables between the borrowing members (participant) and non-borrowing members. The motive behind this strategy is to analyze whether participation in microfinance programme make difference to socio-economic conditions of borrowing members. In this attempt, Analysis of Variance (ANOVA) is applied to test the difference between the groups.

In general, ANOVA is a collection of statistical models used to examine the difference between group means and their related procedure. The concept has a varied use and interpretation (Barrow, 2006). ANOVA can be

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[1] In the NSS 48th Round of Survey, National Sample Survey Organisation under the Ministry of Statistics and Programme Implementation has merged "broad size classes" of land holding pattern in to five size groups along the lines adopted in Agricultural Census in India. These are marginal, small, semi-medium, medium and large size groups. According to this classification marginal land holding size group indicates land holding size of less than 1.01 hectare or around 7.475 *bigha* in India.

performed with several procedures such as one way ANOVA, Multifactor ANOVA, Variance Component Analysis and General Linear Model. Basically the difference between means is calculated in terms of F statistic. The F statistic is based upon comparison between and within sums of squares (BSS and WSS). Some statisticians also take into account degrees of freedom for the test (Coleman, 2006). Therefore, considering degrees of freedom to adjust for the number of observations and for the number of factors, the formulae for F Test is:

$$F= (BSS/(k-1))/(WSS/(n-k))$$

Formally, the test statistic is which has $k - 1$ and $n - k$ degrees of freedom where kis the number of factors. In this estimation, seven instrument variables are tested against participation type. Participation type indicates participation in borrowing programme. Participation type is a dummy variable, where 0 indicates for non-participant members and 1 for participant members. Further, type of participation is derived from amount of micro loan received by the members. If a member received a loan amount from MFI then it is coded as 1 and 0 otherwise. The estimation of ANOVA involves six independent variables, such as average education level (MEDU), land size (LANDTOT), net agricultural income (AGRINET), total volume of debt (DEBTTOT), total income (YTOT) and total expenditure (XTOT) of borrower's household.

III.2. Impact ofMicrofinanceon Welfare of Borrowers

Welfare is a complex concept to comprehend, which is broadly categorized into social and economic welfare. The present study limits its sphere only to economic welfare, where consumption is taken as proxy to gauge the impact. The empirical strategy starts with categorizing members of MFI as borrowing and non-borrowing members. In this framework at first a comparison of income and expenditure between borrowing and non-borrowing member groups is made. Since, both income and expenditure of borrowing members group is relatively more than non-borrowing member group, therefore it implies positive impact of microfinance on the borrowers. But the critical question is whether impact is due to microfinance or some other factors. Therefore, a simple regression analysis is run to examine the factors affecting expenditure. In this endeavor, only borrowing members that were interviewed in the first round of data collection are considered.

The basic intention behind selecting borrowing members is to gauge the impact of microfinance on welfare of borrowers. Since borrowers receive credit from the MFIs, therefore, does it exert a positive impact on the welfare of borrowers or is welfare maintained with some other factors. Therefore, the basic objective of the paper is to examine the positive impact of microfinance on borrower. Impact of microfinance is a multidimensional facet. Because it may affect a number of areas related to welfare, income generation, reduction of inequality, providing better education and health and son on. This study is limited only to welfare impact of microfinance, where it is per capita expenditure proxies as an indicator of welfare. In this connection a cross section data is considered.

Since estimation of impact is a bulky task, the present study therefore considers a simple framework. A number of econometric tests were conducted in this endeavor, but the present study resort only to Ordinary Least Square (OLS) estimation. The econometric framework is deviate from Colemon (2006). While Colemon uses log linear model in his estimation, the present study uses simple OLS model (Gujrati&Sangeetha, 2007). Since, the motivation of present study is to estimate the impact of microfinance on borrower's consumption level, therefore a linear relationship is assumed between the regressand and regressor. The basic model is depicted in equation 1

$$Y = \alpha + \beta_0 X + u \qquad (1)$$

In equation 1 Y is the dependent variable of the model and X is the independent variable (s) of the model. Besides, α is the constant term of the function, β's are coefficient to be estimated and u is random error term of the function. Equation 1 can be extending to the estimate the impact of micro loan amount on consumption. The OLS regression form of the model is constructed in the following way.

$$PCX_i = \alpha_i + \beta_0 PCI_i + \beta_1 LNSZ_i + \beta_2 VOLCOV_i + \beta_3 AGE_i + \beta_4 SEX_i + \beta_5 DEPEND_i + \varepsilon_i \qquad (2)$$

Equation (2) contains six independent variables along dependent variables. PCX_i is the dependent or explained variable of the model. PCX_i is used as proxy for welfare, which indicates monthly per capita expenditure of borrowing household members. PCI_i is an independent variable of the model, which indicates monthly per capita income of borrowing household members. The variable bears a linear relationship with the dependent variable and thus a positive relationship is assumed in this estimation. Loan size ($LNSZ_i$) is also an independent variable of the model. It indicates amount of loan received by a borrower. The use of loan dictates the relationship with expenditure. If loan is use in productive activity, it generates income and thus it may increase family expenditure. On the other hand, if it is used in non-productive use; it does not generate income, but for a certain period of time increases expenditure. In this regard the present model assumes positive relationship with dependent variable.

Estimated amount of loss due to covariant risk (VOLCOV$_i$) is a control variable of the model. Idiosyncratic or covariant risk, such as natural calamities, death of some relatives, etc. make leakage to the income flow of a household. Because, it entails a cost of rehabilitation in subsequent period and thus working capital is affected, which in a later stage effect income generation. Thus, a negative relationship is assumed in this analysis.

DEPEND$_i$ is also an independent variable of the model. It is a ratio level variable, which is calculated as a ratio between non-earning members of borrowing household to total number of members. AGE indicates mean age of borrower's household. It is assumes that as age of the family members increases, it demands a variety of requirements mainly in terms of consumption expenditure. Therefore a positive relationship is assumed in this analysis. SEX indicates mode sex of borrower's household, which is basically a dummy variable. In this estimation it is assumed that expenditure of a male dominant household is comparatively more than female dominant household. The model is tested and adjusted for multicollinearity and heteroscadasticity.

IV. IMPACT OF MICROFINANCE
On the basis of the empirical framework developed in the preceding section, in the present section, a discussion of all the results of empirical estimation pertaining to the objective is made.

IV.1. Impact ofMicrofinance: A Participant- Non Participant Approach
In this section the impact of microfinance on welfare via consumption expenditure is devised through ANOVA Analysis. It is tried to understand whether participation in microfinance leads to increased expenditure and increased income. The summary of descriptive statistics and ANOVA is presented in table 1.

Table 1: Comparison of Descriptive Statistics and ANOVA between Participant and Non-Participant Members

Variable	Participant		Non- Participant		ANOVA
	Mean	Std. Dev.	Mean	Std. Dev.	F Statistic
MEDU (year)	6.57635	2.347614	5.26942	3.989427	20.179***
LANDTOT (bigha)	5.8771	3.996554	3.13566	3.623789	44.716***
AGRINET (INR)	9937.08	10568.05	4910.72	9930.021	23.330***
DEBTOTPM (INR)	1461.75	947.9119	729.317	1695.81	36.760***
YTOT (INR)	24306.6	33519.95	18173.9	16925.59	4.225**
XTOT(INR)	21079.7	31551.7	15924.7	15856.66	3.372*

***= significant at 1 % level; **= significant at 5 % level; *= significant at 10 % level;
Source: Field Study

Table 1 above indicates that due to the participation in microfinance, consumption expenditure and income of participant is comparatively appears better than non- participant. The above table reveals that mean size of land is significantly differs from participant to non-participant and statistics indicates that it is due to programme participation. Similarly, mean size total debt is significantly differs from participant to non-participant as indicated by F statistic.

The results depicted in table 1 indicate all instrument variables differ positively for participant relatively to non-participant. Considering welfare level variable such as total family expenditure, it is observed that mean family expenditure of participant household is higher by on an average amount of INR 5155. Therefore, it is an indication of economic welfare and in view of present analysis; this is due to programme participation.

Although, the analysis hints positive impact on welfare of borrowers, but with the only use of ANOVA, it is difficult to confirm the result. It thus demands econometric treatment to examine the affect. The subsequent section, analyses this vary aspect of the issue.

IV.2. Impact ofMicrofinanceon Welfare of Borrowers
Discussion on the previous sub-section indicates programme participation make a positive change on the welfare of participant members. Since, ANOVA alone cannot confirm a relationship, therefore in this section; the relationship of expenditure is examined with six independent variables including loan size (LNSZ). Table 2 reveals that mean PCX$_i$ is calculated at INR 4743.78 with a higher degree of dispersion. Similarly, mean PCI$_i$ is INR 5560.28 with a higher variation. The average loan size is INR 12106.28, which indicates thaton an average the borrowers on 3rd cycle of loan.

Estimated amount of loss due to covariant risk (VOLCOV$_i$) is a control variable of the model. The descriptive statistics indicates that mean amount of covariant loss is widely dispersed. Similarly, AGE and SEX are also independent variables of the model, which indicate age and sex of borrowing members respectively. The descriptive statistics indicates that the average numbers of borrowers are in the young age bracket and most of the borrowers are female. DEPEND$_i$ is also an independent variable of the model. The descriptive statistics

indicate that dependency is more among the sample borrowers, but with lower degree of variation. It indicates the large presence of non-earners.

Table 2: Descriptive Statistics for Regression Variable on the Impact of Welfare

Variable	Description	Unit	Mean	Std. Dev
PCX_i	Per capita expenditure of borrowing household per month	INR	4743.78	5069.894
PCI_i	Per capita income of borrowing household per month	INR	5560.28	5450.784
$LNSZ_i$	Amount of MFI loan	INR	12106.28	5468.227
$VOLCOV_i$	Amount of loss due to covariant risk	INR	16828.74	53265.91
AGE_i	Age of borrower	In years	33.95	11.03
SEX_i	Sex of borrower is a dummy variable. (1=male, 0= female)	Number	0.47	0.49
$DEPEND_i$	Dependency ratio, which is defined as number of dependent divided by total number of family member.	Ratio	0.68	0.14

Source: Field Study

The regression result is depicted in table 3. The result indicates that all the variables except loan size (LNSZ) and mean age of borrower's household (AGE) are in the line of expectation.

Table 3: Determinants of Family Expenditure

Linear regression (Robust, hc3) Prob> F = 0.0000 Dependent Variable= PCX	Number of obs = 414 F(6, 407) = 13803.91 R-squared = 0.9800	
Explanatory Variable	Coefficient	t-value
PCY	0.906362***	171.6
LNSZ	-0.039793***	-6.13
VOLCOV	0.002101***	5.32
AGE	-24.39516***	-4.87
SEX	490.395***	6.01
DEPENDENCY	2898.824***	6.01
CONS	-1224.668***	-4.53

*** = Significant at 1 percentage level
Source: Field Study

It is found in the estimation that increase of loan amount by INR1000 decreases per capita expenditure by INR397. It thus implies that increasing microloan may not results in enhancement of welfare, which may be due to a multiplicity of causes, of which idiosyncratic risk and repayment of previous loan are possible threat. However, the relationship of increase in per capita income is linear to per capita expenditure. Besides, table 3 depicts that increase in dependency considerably increases per capita expenditure.

The regression test is adjusted for heteroscedasticity and multicollinearity. Table 4 portrays test of multicollinearity among the independent variables and confirms lesser degree of the presence of multicollinearity among the explanatory variables. In addition, heteroscadisticsty is adjusted by considering robust estimation.

Table 4: Test of Multicollinearity among explanatory variable

Variable	VIF	Tolerance (1/VIF)
SEX	1.43	0.699732
LNSZ	1.31	0.761326
VOLCOV	1.21	0.826048
AGE	1.18	0.849163
YPAD	1.13	0.887633
DEPENDENCY	1.05	0.953055
Mean VIF	1.22	0.8196

Source: Calculation done by author

The results depicted in table 3 indicate that participation in microfinance programme has a negative impact on the expenditure of borrowers' family. Therefore it may be maintained that microfinance is not able to increase the level of welfare in terms of consumption. However the traditional relationship of income with expenditure is maintained in this analysis.

V. CONCLUSION

Microfinance now-a-days is treated as strategic policy importance as development tool coupled with the limited availability of funds for financing the unbanked and productive poor. In addition, it is theoretically expected that credit provided at market rate of interest results in marginal benefits to credit constrained section, but it has no welfare enhancement for unconstrained section (Simtowe, 2008). Moreover, in view of high repayment rate, examining the impact of microfinance is a crucial issue. Therefore, the policy makers should be more cautious in designing microfinance credit portfolio so as it is equally beneficial for credit constrained as well as credit unconstrained borrowers.

The paper investigates the impact of access to credit among the borrowing members as well as non-borrowing members. As a test of causal difference, ANOVA technique is devised in addition to OLS estimation. Further, the analysis has extends its sphere in examining the impact of microfinance on inequality.

The results and discussion reveal that expenditure, which is considered as proxy of economic welfare differs positively in case of participant than to non-participant. Similarly ANOVA also indicates the due participation in the programme; there exist positive difference to borrower's expenditure in compare to non-borrower. But the regression analysis rejects the hypothesis that increase in expenditure is due to programme participation.

REFERENCES

[1].   Khawari, "Microfinance: Does it hold its Promises? A Survey of Recent Literature", HWWA Discussion Paper No. 276, Hamburg: Germany, 2004.
[2].   J. Morduch, "The Microfinance Promise", Journal of Economic Literature, 37(4), pp. 1569-1614, 1999.
[3].   K. Jindal, "Regulatory Framework for MFIs" in Karmakar, K.G. (ed), Microfinance in India, Sage Publications, New Delhi: Sage India Publications, 2008, pp. 57-66.
[4].   J.P. Maes and L.R. Reed, State of the Microcredit Summit Campaign Report, Washington, D.C.: Microcredit Summit Campaign, 2012.
[5].   B. Armendariz and J. Morduch, The Economics of Microfinance, Prentice Hall of India:New Delhi, 2007.
[6].   H. Montgomery and J. Weiss, "Can Commercially Oriented Microfinance Help Meet the Millennium Development Goals? Evidence from Pakistan", World Development, vol. 39, pp. 87-109, 2011.
[7].   Khandker, Shahidur R, "Micro-Finance and Poverty: Evidence Using Panel Data from Bangladesh", Policy Research Working Paper;No. 2945. World Bank, Washington, DC, 2003.
[8].   C. Wagner,and A. Winkler, "The Vulnerability of Microfinance to Financial Turmoil: Evidence from the Global Financial Crisis", World Development, vol. 51, pp. 71-90, 2013.
[9].   M.   Brown,   "Economic   and   Social   Impact   of   Solidarity   Group   Lending".2002.   Available: http://www.microfinancegateway.org/content/article/detail/3785
[10]. F. Sinha, Impact Assessment of Microfinance in India: Interim findings from a national study of MFIs in India, Gurgaon: EDA Rural Systems Pvt Ltd, 2003
[11]. V.   Hartarska   and   D.   Nadolnyak,   D,   "An   Impact   Analysis   of   Microfinance   in   Bosniaand Herzegovina".2007.Available:http://ssrn.com/abstract=1105052.
[12]. R. Mahjabeen, "Microfinancing in Bangladesh: Impact on Household Consumption and Welfare". Journal of Policy Modeling. 2008. Available: doi:10.1016/j.jpolmod.2007.12.007
[13]. K.S. Imai, T. Arun and S. K. Annim, "Microfinance and Household Poverty Reduction: New Evidences from India", World Development, vol.38, pp. 1760-1774, 2010.
[14]. J.P. Kaboski, and R.M. Townsend, "The Impact of Credit on Village Economies", American Economic Journal: Applied Economics, vol. 4, pp. 98-133, 2012
[15]. N.D. Scully, "Micro-credit no Panacea for Poor Women". 2004. Available: http://www.gdrc.org/icm/wind/micro.html.
[16]. N. Hermes and R. Lensink, "The Empirics of Microfinance: What Do We Know?",The Economic Journal, vol. 117, pp. F1-F10, 2007.
[17]. Gelman, "Analysis of variance? Why it is more important than ever", The Annals of Statistics, vol. 33, pp.1-53, 2005.
[18]. M. Barrow, Statistics for Economics, Accounting and Business Studies, New Delhi: Prentice Hall, 2006
[19]. Brett E. Colemon, "Microfinance in Northeast Thailand: Who benefits and how much?",World Development, vol. 34, pp. 1612-1638, September 2006.
[20]. D.N. Gujrati, and Sangeetha, Basic Econometrics, New Delhi: Tata McGraw Hill Publishing Company Limited, 2007.
[21]. F. Simtowe, F, Performance and Impact of Microfinance: Evidence from Joint Liability Lending Programs in Malawi, Frankfurt: Peter Lang, 2008.