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Impact of Micro Credit on the Livelihood of Borrowers: Evidence from Mekelle City, Ethiopia

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Abstract

Micro credit has been found to be a critical instrument in order to improve the livelihood of poor people. It is prominently used to improve the livelihood of urban household borrowers where it is believed to be under exploited in research hence is indispensible to examine its real effectiveness. Therefore, the objective of this study was to assess the impact of Dedebit Credit and Saving Institution's (DECSI) micro credit service on the livelihood of household borrowers residing in Mekelle city. For the purpose of assessing the impact of DECSI microcredit on the livelihood of borrower households, a sample of 287 respondents (that is, 118 clients who have at least 3 years of attachment to the organization and 169 eligible non participants representing the characteristics of existing sample borrowers had they not been participating. Data were collected through semi-structured questionnaires that were prepared and distributed for both clients and eligible non clients and interview was conducted while the questionnaires were filled out by the respondents. The result of the study displayed that microcredit participation has a positive significant average effect on households' average monthly income, consumption expenditure, savings and housing improvements. However, the number of employment generated to and out of household members showed no difference. Whereas, the average effect on children education and medical care expenditure are positively changed in the study area and sample. Thus, government authorities, NGOs, aid agencies and other stakeholders who are concerned with microfinance as a means to poverty reduction should take in to consideration the results of these indicator variables for better promotion of microfinance in general and microcredit in particular.

Keywords: DECSI, household, impact, livelihood, microcredit, PSM

INTRODUCTION

The entire purpose of development issue is to fight against poverty which is a critical problem in the world both in rural and urban areas. This can be minimized through different intervention programs where micro credit is one of the major interventions. According to Reddy (2000), the micro credit program is highly successful that is evidenced by the high rate of repayment, awareness generated among target group and beneficial development impact created on the borrowers. However, some critics oppose that poverty cannot be eradicated with a small amount of money provided by micro finance institutions rather it implicates the poor in the long debt cycle (Ghalib, 2007).

Eventually, about 1000 to 2500 MFIs are serving 67.6 million borrowers around the world (Sengupta and Anbuchon, 2008) hence globally the outreach of micro credit showing the contributions made by the program to the poor (Ahmed, 2004). Thus, micro finance makes the socio-economic conditions better for the poor. According to Moll (1998), micro credit has emerged as an antipoverty instrument in many developing nations, targeting the poor, especially women, with financial services to help them become self employed. Similarly in Ethiopia, micro finance has been found to be a critical instrument in order to improve the livelihood of poor people. The prevalent of poverty in Ethiopia is high

because of lack of assets, employment opportunities, income, skill, education, nutrition, health, etc. (Wolday, 2000). As a result, it necessitates the use of micro credit as an intervention mechanism.

Micro credit started in 1980s by some NGO groups in Ethiopia as the relief and rehabilitation program. The establishment of formal microfinance counts on effort made by NGOs. When their participation grew in the wake of drought and famine in the past three decades, they provided credit and savings schemes to help the victims develop self employment opportunities, stability and enhancement in their lives (EEA, 2000 as cited Degife, 2009). In Ethiopia micro finance sector is relatively young as compared to other developing countries. They are established by the federal government proclamation no. 40/1996. Currently, there are 31 licensed micro finance institutions operating in the country where most of them have evolved either from the credit component of the governments or NGOs credit scheme. The microfinance sector now plays a major role in providing credit services to the poor in rural and urban areas. Therefore, it is important to measure the impact of micro credit program on borrowers.

Many studies have been undertaken on financial performance of micro finance but, they provide an incomplete picture of program performance because, methodologies that primarily focus on outputs (to measure performance) and those that aim at identifying outcomes (to assess impact) of the organizations' activities are different. Impact evaluation is understood as a systematic effort to identify the effects of activities on individuals, households, and institutions attributable to a policy or program. However, recent studies that shed doubts on microcredit's effectiveness suggest that the actuality of microcredit effectiveness may be less attractive than the promise (Adams & Bartholomew, 2010).

Interestingly, there are inconclusive findings on the effectiveness of micro credit program. For instance, borrowers have been burdened with multiple loans at excessive rates of interest, often having to borrow from more than one MFI to make their microcredit payments (Glazer, 2010). In contrast, microcredit is considered an effective means of poverty alleviation (Chowdhury et al, 2004). Therefore, it is essential to further examine the real effectiveness of the program.

Moreover, most researches have been undertaken on rural households while little has been done on the urban borrowers. People are increasingly moving from rural to urban often for worse than better. Moreover, urbanization provides opportunities and also it can be the cause for deprivation and lack of access to basic needs that are all manifestations of urban households' livelihood (Mushtaq, 2009). Arguments supporting microfinance show that microcredit service has brought millions out of poverty and prompted economic sustainability being a host of positive impacts on families that receive it (Yunus,

2004; Swope, 2005; Glazer, 2010).

In general, since micro credit is prominently used to improve the livelihood of borrowers it is indispensible to examine its real effectiveness, to have sufficient information on economic and social impact indicators and objective reasoning of how micro credit program transforms livelihood, to examine the performance of the program, and to assess the impact of micro credit in urban household borrowers where it is believed to be under exploited in research. Further, it is vital to employ appropriate methodology to be used in relation to its impact assessment. Therefore, the main objective of present study is to assess the impact of Dedebit Credit and Saving Institution's (DECSI) micro credit service on the livelihood of household borrowers residing in Mekelle city through empirically justified research hypotheses.

LITERATURE REVIEW

Different microfinance intervention models are identified where three of them are considered in this context:

Rotating Savings and Credit Associations (ROSCA)- They are formed when a group of people come together to make regular recurring contributions to a common fund, which is then given as a lump sum to one member of the group in each cycle (Yunus, 2007).

Grameen Solidarity Group Model- This model is based on group peer pressure whereby loans are given to individuals in groups. Group members collectively guarantee loan repayment, and access to subsequent loans is dependent on successful loan repayment by all group members. DECSI has been following this model where loans are provided in group-based collateral particularly for micro credit. Borrowers in this case guarantee loan repayment and other requirements where most of borrowers have been performing well (DECSI, 2011).

Village Banking Model- Village banks are community-managed credit and saving associations established by NGOs to provide access to financial services, build community self-help groups and help members accumulate savings.

The microcredit program is an elite innovation of credit delivery technique to enhance income generating activities of the poor. The program provides small loans to poor people for self-employment activities hence allowing the clients to achieve a better quality of life (Hussain, 1998; Morduch, 2000; Rahman, 1995). It has been quite well recognized that micro credit smoothens consumption, reduces the vulnerability of the poor and leads to increase in their income. The theoretical frame work in this case is that credit increases income of households and as income of household increases more

Table 1. Characteristics of Semein and Ayder sub-cities.

No	Sub-city	Population	Sub-city area (ha)	Population density (pop/ha)
1	Ayder	32,095	1,305.7	24.58
2	Semein	64,044	3,183.6	20.12
	Total	96,139	4,489.3	

Source: Transformation plan and implementation strategy of Mekelle city (2011)

Table 2. The type and number of clients at Semein sub-branch.

No.	Clients	No. of clients	Remark
1	Withdrawn	446	
2	Savers	383	
3	Public servants or (those employed in private sector)	351	
4	< 3 years of attachment	1,118	
5	Clients having > 3years of attachment	894	N*
	Total	**3,192**	

Source: Researcher's own design based on clients' file (2013)

resources are available for expenditure, savings, and investment in assets. Within this context the impact of micro credit could be assessed at the household, the enterprise or community level (Khandker, 1999; Ledgerwood, 1999).

Many impact studies have explored the effects of microcredit on income, and, in general concluded that microcredit has beneficial effects. However, this is not always the case; others found that microcredit contribution not always there for everyone (Snodgrass & Sebstad, 2002; Hulme & Mosley, 1998; Coleman, 2002). In a nut shell, the existing empirical literature about the impact of micro credit is somewhat mixed.

RESEARCH METHODOLOGY

Description of the Study Area- The study area is Mekelle city, the capital of Tigray Regional State and the biggest city in northern Ethiopia. It is located 780 kms away from Addis Ababa, the capital of Ethiopia. As per CSA projection from 2007 census, currently the zone has an estimated total population of 273,601 (131,328 are males and 142,273 females). The city is structured into 7 sub-cities for administration purpose.

Though DECSI has been operating in all parts of Tigray, Mekelle city and the two sub-cities were selected based on the that the area is characterized by a high degree of unemployment (21%) and poverty incidence (41%), according to Regional Bureau of Plan and Finance (2010).

Sampling Design- The study applied systematic random sampling to select the sample unit by excluding those who have withdrawn from obtaining the service and have been using credit for less than three years. Therefore, in this study only clients having a minimum of 3 years of

attachment with DECSI microfinance were considered in the treatment group and the eligible non participants that are regarded as counterfactuals were surveyed for the matching purpose. Thus, DECSI microcredit borrower households living in Mekelle city are categorized into four branches such as Micro Finance 1 (MF-1), MF-2, MF-3, and MF-4. These branches operate in providing the Micro Finance (MF) service for the society dwelling in the city based on the collateral that can be held as a pledge. Of these MF branches, MF-1 branch has three sub-branches where two of them are providing the microcredit service for the poor (i.e, Semein sub-branch and Debub sub-branch) and the other sub-branch operates pension payment services for the retirees. Therefore, Semein sub-branch was selected for the sampling purpose on the basis of the number of clients it has.

N = Number of population

In this study the simplified formula provided by Yamane (1967), was applied to determine the required sample size at precision level of eight percent (e = 8%).

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= sample size
N=population
e= level of precision

Therefore, the number of sample size for clients and non clients was determined as follows where the population (N) is 894 for clients. $n = \frac{894}{1 + 894\,(0.08)^2} = 133$

The sample respondents are randomly selected using lottery method.

On the other hand, the sample respondents from the non-participant (control) group were selected and surveyed in two rounds from Ayder and Semein sub-cities based on the lists of non-clients of DECSI who are eligible and ready to take micro credit from Semein sub-branch.

Table 3. Number of eligible non-clients in Ayder and Semein sub-cities

No	Sub-city	No. of eligible non-clients in rounds			
		1st	2nd	Total	Remark
1	Ayder	46	41	87	
2	Semein	35	52	87	
	Total	**81**	**93**	**174**	**N***

Source: Researcher's own design (2013)

Hence, the questionnaire was administered for the total number of eligible non-clients (N=174) taken from the two sub-cities in two consecutive rounds.

Data Collection Procedure- The primary data were collected from respondents through questionnaires and interview. The semi-structured questionnaires were designed and distributed to sample respondents. Primary data were used to collect information on pre-treatment characteristics of respondents for matching purpose and outcome variables to assess the impact of micro credit on the livelihood of household borrowers. The data collection process using questionnaire followed the following approaches: firstly, the respondents were identified with respect to their participation in the microcredit program as participants and non participants, but, eligible where the same questionnaires were prepared and distributed for both. Next, the actual field survey was conducted to gather necessary data from the respondents using enumerators.

Several secondary data were also personally reviewed for the purpose of describing and demonstrating current profile of DECSI microfinance and issues related to the research topic.

Analytical Techniques- For the purpose of data analysis, descriptive statistics like the use of mean, standard deviation, t-values and percentage were used to interpret, summarize and conclude the result. The econometric model, which was the Propensity Score Matching (PSM) and Average Treatment Effect on the Treated (ATT) were employed to extensively assess the impact of participation in the micro credit program on average monthly income, household consumption expenditures, and employment generation for and out of family members, savings, house improvement, household medical care (heath) and children education of participant respondents. The PSM approach makes a comparison of the change in the status of participant group before borrowing and after borrowing for the time period in which the borrowers benefited. STATA 12.0 version was used for data analysis purpose.

Variables and Hypotheses- After extensive review of related literature, the commonly used indicators of micro

credit participation (treatment) and impact (outcome variables) were selected.

Treatment variable (Participation in microcredit): It is a dummy variable that takes either *1* or *0* values: 1 for *Treated* group and 0 for *Control* group. Thus, variables like age of the household, sex, educational status, family size, number of dependents, spouse household head and credit access were used in PSM for matching purpose. Therefore, the underlying characteristic of these variables is expected to affect both placement to the program (being the micro credit beneficiary) and the outcome of interest.

The Outcome variables- the main outcome variables included in this study were economic variables (income, expenditure, employment generation, savings, and house improvements) and variables related to the development of human capital like expenditure on children education in the households and medical care (health).

Thus, literature driven hypotheses were formulated regarding these variables as follows:

H1: Micro credit participation increases income of borrowers

H2: The participation into microcredit shall boost the average family consumption expenditures of borrowers

H3: Micro credit program participation increases the number of income earners in and out of the household

H4: Participation in micro credit increases savings of borrowers

H5: Participation in microcredit improves the dwelling house of borrowers

H6: Microcredit borrowers are more likely to spend on their children education

H7: The average cost of health decreases with the micro credit borrowers.

Model specification- For the purpose of examining the effect of treatment variable on the outcome variables propensity score matching model is used. In line with PSM, the binary logit is used to examine the probability of micro credit participation and specified as; $P_i = \dfrac{e^{z_i}}{1+e^{z_i}}$ 1

Table 4. Logit estimates for determinants of participation in micro credit.

Covariate	Coeff.	p>|z|	Marginal effect (mfx)
Gender	- .061	0.081***	- .018
Age	- .487	0.024**	- .105
Age2	.006	0.027	.001
Education	.119	0.410	.025
family size	- .165	0.379	- .015
No. of dependents	.395	0.084***	.057
Spouse status	- 2.159	0.000*	- .488
Credit access	- .057	0.843	- .013
Constant	9.737	0.012	

Statistics:
Number of Obs = 287
LR Chi^2 (8) = 71.10
Prob > Chi^2 = 0.0000
Log likelihood = - 158.826
Pseudo R^2 = 0.4129

Source: Stata output from survey data 2013)
*** Significant at 10% level; **Significant at 5% level; and * Significant at 1% level.

Where, Pi - is the probability of participation in the micro credit. The average treatment effect on treated would be,

ATT =   E (Y1i | D = 1) − E (Y0i | D = 0)
= E (Y1i -Y0i | D = 1) + E (Y0i | D = 1) − E (Y0i | D = 0)
…………………2

The PSM in this study employed four methods of matching techniques, namely, nearest neighbor, kernel, radius, and interval matching to match the treated and untreated observations.

RESULTS AND DISCUSSIONS

The first stage in the propensity score matching is to compute the probability of being a DECSI micro credit participant. With this purpose the researchers included variables that could influence the likelihood of borrowing from DECSI micro finance. The reason behind this is that if a variable influences participation but not the outcome, there is no need to control for differences with respect to this variable in the treatment group versus the control group. Similarly, if the variable influences the outcome but not the treatment likelihood, there is no need to control for that variable since the outcome will not significantly differ in the treatment versus the control groups. Thus, among the covariates, gender of household head, age of household head, education level of household head, family size, number of dependent household member, spouse status of household head and access to other credit source were used in determining the probability of participation in micro credit. Therefore, the binary logit regression was used to show the effect of each of these variables in determining the probability of micro credit participation. The following table shows the result of binary logit regression,

The results of binary logit model highlights that out of the main variables included in the model, gender of household head, age of household head, number of dependent in the household member, and spouse status of household head were found significant factors determining micro credit participation.

Hence, these variables were used to match participants with the pretreatment characteristics of non participants (counter factual information).

The Table below provides ATT value for different impact indicator variables which are estimated via matching of treated and control observations. In all of the matching methods used, the treated group comprises of 118 observations, whereas, the number of control group for the nearest neighbor is 61, for the kernel matching 169, for the radius matching 168 and it is 155 for the stratification matching approach. The table depicts the quantitative results that used boot strapped standard errors.

Participation in the micro credit service of DECSI has highly significant average effect on households' average monthly income. This is obvious that the average monthly incomes of households that get access to micro credit are fairly higher than those of households in all propensity score matching methods. Therefore, the first research hypothesis which says *micro credit participation increases income of borrowers* is accepted at 1% level of significance (with t-statistics ranging from 3.27 – 4.71 for all ATT methods employed). This result is consistent with the findings of Hossain (2012) who discussed that borrowers' income increased after joining BRAC in Bangladesh. Likewise, Meller and Zeller (2002) concluded that micro credit has overall positive effect on income, though results differ substantially across countries and programs both in magnitude and statistical significance. Bebczuk and Haimovich (2007) too found that micro credit increased the hourly labor income of poor individuals compared with a comparable population without access to credit by 4.8 times in Bolivia, 12.5 times

Table 5: Estimation of ATT using propensity score matching

Impact Indicators	Matching Method	DECSI MC Participants	DECSI MC Nonparticipants	ATT	t-statistics
Income of HH/ month	Attnd	118	61	346.5	3.27*
(in Birr)	Attk	118	169	392.2	3.41*
	Attr	118	168	412.2	4.70*
	Atts	118	155	446.4	4.71*
Expenditure /month	Attnd	118	61	35.9	0.48
(in Birr)	Attk	118	169	125.3	2.35**
	Attr	118	168	132.8	2.42**
	Atts	118	155	130.3	2.86**
Employment gen.	Attnd	118	61	0.37	2.65**
(in #)	Attk	118	169	0.42	2.86**
	Attr	118	168	0.48	3.46*
	Atts	118	155	0.58	4.53*
	Attnd	118	61	66.4	1.29***
Savings of HH/month	Attk	118	169	96.9	2.95**
(in Birr)	Attr	118	168	86.5	2.71**
	Atts	118	155	81.7	2.14**
Housing improvements	Attnd	118	61	866.5	0.82
(in Birr)	Attk	118	169	1499.2	2.67**
	Attr	118	168	1442.7	2.60**
	Atts	118	155	1439.9	1.98***
Cost of education/sem.	Attnd	118	61	42.2	1.08***
(in Birr)	Attk	118	169	31.2	0.99
	Attr	118	168	154.4	1.44***
	Atts	118	155	82.9	4.09*
Cost of health/ annum	Attnd	118	61	160.5	1.03***
(in Birr)	Attk	118	169	131.3	1.60***
	Attr	118	168	154.4	1.43***
	Atts	118	155	198.5	1.91***

Source: Stata output from survey data (2013)
Note: attnd= estimation of ATT using nearest neighbor method
attk= estimation of ATT using kernel matching method
attr= estimation of ATT using radius matching method
atts= estimation of ATT using stratification method
*** Significant at 10%; ** Significant at 5% and * Significant at 1%

in Guatemala and 4.5 times in Haiti. Also, some impact studies on micro credit in Ethiopia (Daba, 2003; Asmelash, 2003; Ayelech, 2010) have found positive significant effects.

The other impact indicator used in this research is the average monthly expenditure on household consumption. Estimation results displays that ATT for households' average monthly consumption expenditure are fairly significant in all ATT estimation methods, except in the nearest neighbor method, ranging from 125.3 - 132.8. Hence, the hypothesis which says *the presence of microcredit shall boost the average family consumption expenditures of borrowers* is accepted at 5% level of significance. This is consistent with the findings of Hossain (2012) who concluded that the contribution of family consumption expenditure increased significantly after joining BRAC. Other studies in Ethiopia (Getaneh & Garber, 2007; Guush & Gardebroek, 2012) also reached the same conclusion.

Considering the number of employment generated to and out of household members as another indicator, we notice that the ATT values are significant in all matching methods though the average effects are not as such significantly different from each other, ranging just from 0.37 – 0.58. However, this result is inconsistent with the findings of Hossain (2012) who attempted to measure the impact of BRAC micro finance operation on the livelihood of borrowers in Bangladesh. The scholar mentioned that there were moderate impacts observed in the creation of employment opportunities for and out of household members.

Household average monthly savings is another impact indicator used in this study. Based on the estimation results, the average effect on household average monthly savings is moderately improved in all ATT methods (from 66.4 for attnd at 10% significant level to 96.9 using attk at 5% significant level). Therefore, the hypothesis which says *participation in micro credit increases savings of borrowers* is accepted at 10% and 5% level of significance (t=1.29 for attnd and t >2 for others). Mushtaq (2009) suggested that the direction of impact of micro credit improved the savings of borrower

households after 2 – 3 years of participation in the program, and this point is consistent with the findings of the study.

The housing improvement of respondents is highly significant in all ATT methods and it is insignificant when applying the nearest neighbor method where t= 0.82 hence the average positive effect ranges from Birr 1,440 using atts to 1,499 using attk. This can be true because some of participants take the loan explicitly for the purpose of housing improvements. Thus, the researcher's hypothesis that says *participation in microcredit improves the dwelling house of borrowers* is accepted at 5% and 10% levels of significance. This result is consistent with a study made by Guush and Gardebroek (2012) that found micro credit to significantly raise the probability of improving housing (roofs) with increased frequency of participation.

The researchers also used the human capital development variable as indicator to assess the impact of DECSI's microcredit service on beneficiaries. With regard to investment in human capital development, expenditure on children education is moderately improved expressed by moderate average effect using all ATT methods but not the attk, which is insignificant. Then, the hypothesis which says *participation in microcredit increases the expenditure on children education* is accepted at 10% and 1% levels of significance. The result of this study is consistent with the findings of Hailai (2010) who concluded that micro credit has significant effect on capacitating client parents to spend more items such as exercise books, pens, and others for their children as compared to comparable non clients.

Cost of health (expenditure on medical care) incurred by participants, as another human capital variable, was greatly affected by the micro credit service in all ATT methods at 10% level of significance. Again this can be true in that borrowers may take credit for medical care expenditure if they are likely to face fatal injury in their health status. So, the research hypothesis which says *the average cost of health decreases with the micro credit borrowers* is rejected. This finding is inconsistent with the study conducted by Hailai (2010) that found no significant average effect on expenditures for medical and personal care.

CONCLUSION AND POLICY IMPLICATION

This paper assessed the impact of microcredit on the livelihood of borrowers, as measured by some livelihood indicator variables at DECSI microfinance, Mekelle City. The result of the study showed that participation in microcredit have had significant impact on the livelihood indicator variables such as average monthly income, consumption expenditure, savings of borrower households, expenditure on housing improvements, and investment on human capital development, particularly

expenditure on children education and medical care (health) of borrower households.

Moreover, the findings of this study have several policy implications. The significant impact of DECSI microcredit service on households' income and expenditure shows more positive signal of importance which can be geared towards improving self employment opportunities. Furthermore, the savings' of household clients increases along with the period of attachment of the clients to the institution. Therefore, this trend of saving behavior should continue so that clients would be able to expand their business. In general, government authorities, NGOs, aid agencies and other stakeholders who are concerned with microfinance as a means to poverty reduction should take in to consideration the results of these indicator variables for better promotion of microfinance in general and microcredit in particular.

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