

The Impact of Microfinance Institutions on the Livelihood of Rural Households: The Case of Oromia Credit and Saving Share Company in North Shewa Zone, Oromia Region, Ethiopia

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Abstract

The study investigated the impact of participation in microfinance institutions on the livelihood of rural households. The study was conducted in Oromia credit and saving share company (OCSSCO) in North Shewa zone of Oromia regional state, Ethiopia. The study included 392 sample respondents from different Woredas. The required data was gathered using questionnaire and interviews. The logit model was used to estimate the determinants of participation in the Oromia Credit and Saving Share Company. The logistic regression result shows that the age of household head, family size, land size, distance, market access, perception of mandatory deposit, and evaluation of first-round loan size were significant factors that affected participation in OCSSCO. The PSM model was used to investigate the impact of participation in OCSSCO on livelihood variables. According to the ATT result, OCSSCO participants had higher average monthly income, average monthly savings, total equipment value, total crop production value, average monthly food expenditure, average monthly education expenditure, and average monthly health expenditure than non-treated households. Thus, rural households should participate in OCSSCO to solve their financial problem. The concerned body should work more for the expansion of OCSSCO.

Keywords: ATT, Impact, Livelihood, Logit, OCSSCO, Outcome, PSM

JEL classification: G20, G21, R51

1. Introduction

Since the mid-1990s, African countries have been enjoying positive economic trends. Despite the positive momentum in economic performance, the incidence of poverty remains a critical issue in most African countries. Africa's success in addressing its developmental challenges of improving the socio-economic livelihood of its people is closely tied to its private sector. Nevertheless, the private sectors are dominated by small enterprises that are engaged in largely informal activities. The exercise of this private sector is hampered by their limited access to formal financial services. This causes the foundation of microfinance (NEPAD, 2013).

The poor individuals cannot get financial services from larger financial institutions like banks. The larger financial institution requires physical collateral to provide financial services to its clients. The poor individuals are neglected from this service. Microfinance institutions (MFIs) are established to address the financial problems of the poor. They are established to provide financial services for those individuals who cannot provide physical collateral. These institutions provide financial services like: microcredit, saving, micro insurance, money transfer and other non-financial services (Badugu & Tripathi, 2016).

Previous studies were conducted by different scholars from different countries regarding the impact of microfinance institutions. Some findings show that microfinance improves the living standard of the poor. The findings of Habte (2016) reveal that participation in microfinance institutions has a significantly a higher average treatment effect on the treated (ATT) households. Similarly, Bhuiya et al. (2016), Diro and Regasa (2014), Sida (2014), Antoh et al. (2015) conducted a study on microfinance institutions, and their results show participation in microfinance institutions improve the livelihood of its beneficiaries.

In contrast, the result of Bateman and Chang (2012) shows the microfinance model may well generate some narrow positive short-run outcomes for a few lucky individuals, these positive outcomes are very limited in number and anyway swamped by much wider longer run downsides and opportunity costs in the community and national level. Similarly, the finding of Siyoum et al. (2012) shows that all households did not benefit from participation in microfinance. The livelihood of better-off and labor-rich households showed improvement, but the poorer households fell into the

cycle of indebtedness since these households use the credit for short-term consumption smoothing. The controversial result of previous studies requires further investigation.

The majority of the rural population in Ethiopia lives under the poverty line and also they are characterized by lower productivity, subsistence agriculture, highly food insecure, uneducated, lower health service, lower infrastructure, high infant mortality rate and so on. In order to tackle these problems, the government of Ethiopia has adopted many policies although its achievement is not fully effective. Among those policies, encouragement of the expansion of microfinance institutions is one.

In Ethiopia, the top five largest microfinance institutions (Amhara, Dedebit, Oromia, Omo & Addis Credit and Savings Institutions) accounted for 83.9 percent of the total capital, 91 percent of the deposits, 87.7 percent of the credit and 88.4 percent of the total assets of microfinance institutions (NBE, 2019). Oromia Credit and Saving Share Company (OCSSCO) is one of the largest and leading microfinance institutions in Ethiopia. Currently, OCSSCO has 339 branches operating mainly in the regional state of Oromia, Harar, Addis Ababa and Dire Dawa. Oromia Credit and Saving Share Company started its operation in North Shewa Zone in 1997. By expanding its operation from time to time, Oromia Credit and Saving Share Company have its own branches in all Woredas (North Shewa Zone Office of OCSSCO, 2019). But whether the institution improves the livelihood of its beneficiary or not were not studied.

Even though similar studies were conducted previously, they were limited to some livelihood variables like financial capital and physical capital. However, the current study was conducted by including additional livelihood indicator variables. The main rationale to conduct this study was that in the study area rural households were participating in microfinance institutions, but their contributions of their participation on the improvement of livelihood was not studied. Therefore, this study investigated the impact of microfinance institutions on the livelihood of rural households in North Shewa Zone by incorporating financial capital, physical capital, and human capital aspects.

2. Methodology

2.1. Description of the Study Area

North Shewa Zone is one among the 18 zonal administrations of Oromia National Regional State, Ethiopia. The zone has an area of 8990 km². Administratively, it is boarded by the East-North of Amhara Regional National State, West Shewa in the West, Finfinnee surrounding Special Zone and East Shewa Zone in the East. Fiche is its capital town which is found 112 km away Addis Ababa, the capital of Ethiopia. In the North Shewa Zone, there are 13 rural districts consisting of 267 kebeles and 26 towns administration with 30 kebeles. According to CSA's population and housing census projection of 2010, total population of the zone was 1,594,720, in which 1,410,332 (708,490 male and 701,842 female) were found in rural areas while 184,338 (89,689 male and 94,699 female) were urban residents. This indicates that 88.44% of the population was rural when 11.56% were urban. The main economic activity in the zone is agriculture and the zone is also known for livestock production (North Shewa Zone Planning and Economic Development Office, 2019).

2.2. Source of Data and Method of Data Collection

The study used primary source of data. The data was collected using questionnaire and interviews. In order to collect relevant data through questionnaire, qualified data collectors were recruited and trained by the researcher. In addition to the questionnaire, the structured interview was used to collect data from the officials of the Oromia Credit and Saving Share Company in the sampled branches.

2.3. Sample Size and Sampling Techniques

The population of the study was all lists of OCSSCO clients that include both established clients and new clients. In order to get the sampled respondents, a multi-stage sampling technique was applied. In the North Shewa zone, OCSSCO has its branches in all woredas. Therefore, all woredas are clustered and out of these, four woredas were selected purposely for further processing. In these four woredas, OCSSCO has six branches. Respondents were classified into treated and non-treated households. The sampling frame was the list of all clients in the six branches (a total of 17,951). By applying equal proportion sampling, 392 households were included in the sample (by assuming one-to-one matching, 196 respondents were the treated households and the remaining 196 respondents

were the non-treated households). The sample size was determined proportionally for each branch by using Yemane's (1967) formula of sample size determination. The formula is presented below.

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

Where, n is the sample size

N is target population

e is the level of precision (the study uses 0.05 level of precision)

Based on the above formula:

$$n = \frac{17,951}{1 + 17,951(0.05)^2} \approx 392$$

Table 1: Sample Size Distribution of the Selected Branches

S/N	Branch name	Number of households	Percentage	Sample size
1	D/Tsige	1588	8.85	35
2	Abote	1471	8.2	32
3	G/Tsion	4088	22.77	89
4	Aleltu	4226	23.54	92
5	T/Milky	3727	20.76	82
6	Hidhabu	2851	15.88	62
Total		17,951	100	392

Source: Own calculation based on North Shewa Zone office of OCSSCO, 2019/20

2.4. Method of Data Analysis

Econometric analysis was used to identify determinants of participation in OCSSCO and to assess the impact of participation in OCSSCO on the livelihood indicators. Therefore, the Logit model was used to identify and examine those factors that affect participation in OCSSCO. The PSM model was also applied in order to investigate the impact of participation in Oromia Credit and Saving Share Company on the livelihood of rural households.

2.4.1. Econometric Model Specification

The study used two econometric models, the Logit Model, and the PSM Model. In order to identify and examine the determinants of household participation in OCSSCO, the Logit Model was used. In order to assess the impact of participation in OCSSCO on the outcome variables, the PSM Model

was applied. The study hypothesized that the decision to participate in OCSSCO was determined by demographic characteristics of households, socio-economic factors, and infrastructural facilities, and loan-related factors. These variables were estimated by using the logit model since it has the advantage of good approximation and convenience. The method of estimation in this study was a maximum likelihood.

The logit regression equation given by;

$$Prob(Y = 1|X) = \frac{e^{X'\beta}}{1 + e^{X'\beta}} \dots \dots \dots 1$$

$$Prob(Y = 0|X) = \frac{1}{1 + e^{X'\beta}} \dots \dots \dots 2$$

Where, e represents the base of natural logarithms

Y=1 is if the household is participant of OCSSCO

Y=0 is if the household is non-participant of OCSSCO

X's and β 's are vector of explanatory variables and coefficients

When the random assignment of treatments to subjects is not feasible, propensity scores are the alternative method to estimate the effect of receiving the treatment. Propensity score matching (PSM) refers to the pairing of treatment and control units with similar values on the propensity score, and possibly other covariates, and the discarding of all unmatched units (Rubin, 2001). The PSM needs the treatment and the comparison group to estimate the impact of a certain program. The study used households who have been beneficiaries of the OCSSCO for more than four years as a treated group. Those households who have applied to join OCSSCO and are waiting for approval and those households that were clients of OCSSCO for not more than three months were considered non-treated households.

According to Heinrich et al. (2010), the average treatment effect on the treated can be written as:

$$ATT = E(Y_1 - Y_0 | D = 1) \dots \dots \dots 3$$

Since all of the parameters are not observable and they depend on the counterfactual outcomes, the ATT can be rewritten as:

$$ATT = E(Y_1 | D=1) - E(Y_0 | D=1) \dots\dots\dots 4$$

The second term, $E(Y_0 | D=1)$, is the average outcome that the treated individuals would have obtained in the absence of treatment, which is not observed. From equation 4 the term $E(Y_0 | D=0)$ was observed i.e. the value of Y_0 for the non-treated households. Thus, we can calculate:

$$\Delta = E(Y_1 | D=1) - E(Y_0 | D=0) \dots\dots\dots 5$$

By adding and subtracting the term $E(Y_0 | D=1)$:

$$\Delta = E(Y_1 | D=1) - E(Y_0 | D=1) + E(Y_0 | D=1) - E(Y_0 | D=0) \dots\dots\dots 6$$

$$\Delta = ATT + E(Y_0 | D=1) - E(Y_0 | D=0) \dots\dots\dots 7$$

$$\Delta = ATT + SB \dots\dots\dots 8$$

Where; SB represents the selection bias: the difference between the counterfactual for treated households and the observed outcome for the non-treated households. The ATT can be estimated by the difference between the mean observed outcomes for the treated and non-treated groups if the selection bias has zero value.

The average treatment effect on the treated households is defined as:

$$ATT = \frac{1}{N_1} \sum_{i:D=1} [Y_{1,i} - \sum_{j:D_j=0} w_{i,j} Y_{0,j}] \dots\dots\dots 9$$

Where, ATT is the average treatment effect on the treated, N_1 is the number of treated households in the sample, i represents the treated households, j represents non-treated households, $D_i=1$ if a household is a participant of OCSSCO, $D_j=0$ if a household not receiving the treatment, Y_1 is the outcome when the household participate in OCSSCO, Y_0 is outcome when the household doesn't participate in OCSSCO and $W_{i,j}$ is the weight assigned to each non-participant households.

The PSM model involves three steps. First, the propensity score is estimated using a standard logit or probit model for each sample household based on observable characteristics. Second, a check for balance between the observed characteristics of treated and controlled group is required to evaluate the overlap or common support based on the propensity scores. Third, a matching estimator is

selected to estimate the average effects of the program on outcome of interest is to identify the impact of the program or intervention variable. There are two important assumptions that need to be satisfied for the PSM model to correctly estimate the impact of participation in a certain program. These are the conditional independence assumption and the common support condition or overlap assumption.

The conditional independence assumption states that given a set of observable covariates X which are not affected by treatment; potential outcomes are independent of treatment assignment. The overlap assumption ensures that for each value of \mathbf{x} , there are both treated and non-treated cases. In that sense there is overlap between the treated and untreated subsamples. For each treated individual there is another matched untreated individual with a similar \mathbf{x} . If the assumption were to fail, then there could potentially have individuals with \mathbf{x} vectors who are all treated and those with a different \mathbf{x} who are all untreated.

Choosing a Matching Algorithm

Propensity score methods call for a good model to generate the scores. The interest was in estimating consistently the participation probability rather than the estimates of parameters in the propensity score function. In implementing matching based on propensity score, three issues are relevant: (1) whether to match with or without replacement, (2) the number of units to use in the comparison set, and (3) the choice of the matching method (Cameron and Trivedi, 2005). Matching without replacement means that any observation in the comparison group is matched to no more than one treated observation that which is the closest match; whereas, with replacement means that there can be multiple matches. The four matching methods were used in this study.

A. Nearest Neighbor Matching Method

In this method, the individual from the comparison group is chosen as a matching partner for a treated individual that is closest in terms of propensity score. The study used matching with replacement. Matching with replacement involves a trade-off between bias and variance. If replacement is allowed, the average quality of matching will increase and the bias will decrease. This is of particular interest with data where the propensity score distribution is very different in the treatment and the control group. For example, if there are a lot of treated individuals with high

propensity scores, but only a few comparison individuals with high propensity scores, there will be bad matches as some of the high-score participants will get matched to low-score non-participants. This can be overcome by allowing replacement, which in turn reduces the number of distinct non-participants used to construct the counterfactual outcome and thereby increases the variance of the estimator (Caliendo and Kopeinig, 2005).

B. Radius Matching Method

Nearest neighbor matching method faces the risk of bad matches, if the closest neighbor is far away. This can be avoided by imposing a tolerance level on the maximum propensity score distance (caliper). Imposing a caliper works in the same direction as allowing for replacement. Bad matches are avoided and hence the matching quality rises. Dehejia and Wahba (2002) as cited by Caliendo and Kopeinig (2005), suggest a variant of caliper matching which is called radius matching. The basic idea of this variant is to use not only the nearest neighbor within each caliper but all of the comparison members within the caliper. The benefit of this approach is that it uses only as many comparison units as are available within the caliper and therefore allows for usage of extra (fewer) units when good matches are (not) available.

C. Kernel Matching Method

Kernel matching method is non-parametric matching estimators that use weighted averages of all individuals in the control group to construct the counterfactual outcome. Thus, one major advantage of these approaches is the lower variance which is achieved because more information is used. A drawback of these methods is that possibly observations are used that are bad matches. According to Smith and Todd (2005) as cited by Caliendo and Kopeinig (2005), kernel matching can be seen as a weighted regression of the counterfactual outcome on an intercept with weights given by the kernel weights. Weights depend on the distance between each individual from the control group and the participant observation for which the counterfactual is estimated.

D. Stratification Matching Method

The idea of stratification matching is to partition the common support of the propensity score into a set of intervals (strata) and to calculate the impact within each interval by taking the mean difference in outcomes between treated and control observations. This method is also known as interval

matching, blocking and sub classification. Clearly, one question to be answered is how many strata should be used in empirical analysis. One way to justify the choice of the number of strata is to check the balance of the propensity score (or the covariates) within each stratum.

2.4.2. Variables and Their Measurement

The study used three types of variables. They were treatment-dependent, independent, and outcome variables. The dependent variable was a dummy variable (“1” if the household is a participant of OCSSCO and “0” if the household is a non-treated household). The study used eight outcome variables and twelve explanatory variables as shown in Table 2.

Table 2: Outcome and explanatory variables

S/N	Outcome variables	Measurement
1	Average monthly income(continuous)	In birr ¹
2	Average monthly saving (continuous)	In birr
3	Total equipment values like plough, sickle, hoe, mattock etc. (continuous)	In birr
4	Total livestock value (continuous)	In birr
5	Total crop production value (continuous)	In birr
6	Average monthly expenditure on food(continuous)	In birr
7	Average monthly expenditure on education(continuous)	In birr
8	Average monthly expenditure on health (continuous)	In birr
Explanatory variables		
1	Gender (dummy)	“1” if the household head is male and “0” otherwise
2	Age(continuous)	Age of household head in years
3	Family size(continuous)	Family size in numbers
4	Marital status (dummy)	“1” if the household head is married and “0” otherwise
5	Education(categorical)	For household head “1” illiterate “2” primary education “3” secondary education “4” certificate & above
6	Land size (continuous)	In hectare
7	Transport access(dummy)	“1” if the HH had transportation access and “0” otherwise
8	Market access(dummy)	“1” if the HH had market access and “0” otherwise
9	Distance from home to the institution(continuous)	The number of hours it takes
10	PNAA(dummy)	“1” if the HH is participating in non-agri. activity 0 otherwise
11	PoMD(dummy)	“1” if the household perceive the mandatory deposit is fair and “0” otherwise
12	EoFRLS (dummy)	“1” if the household evaluate the amount of first round loan size is sufficient with his/her demand and “0” otherwise

Note: PNAA is participation in non-agricultural activity, PoMD is perception of mandatory deposit, EoFRLS is evaluation of first round loan size

¹ Birr is the unit of currency in Ethiopia

3. Results and Discussions

The main objective of the study was assessing the impact of participation in OCSSCO on the livelihood of rural households. The outcome variables show livelihood indicators. As a proxy for financial capital, the study used average monthly income and average monthly saving. As a proxy for physical capital, the study used total equipment value, total livestock value and total crop production value. As a proxy for human capital, the study used average monthly expenditure on food, average monthly expenditure on education and average monthly expenditure on health.

As shown in Table 3, the average monthly income of the treated households and non-treated households was on average birr 9,024.8 and 6,511.2 respectively. The mean difference between the average monthly income of the treated and the average monthly income of the non-treated households was statistically significant at 1% significant level. The mean value of the average monthly saving of the treated households was birr 612.87 and the non-treated households was birr 574.60. The mean difference value (38.27) shows the average monthly saving of the treated households was higher than the non-treated households, and it was statistically significant at 5% significant level.

Table 3 Descriptive Statistics for the Outcome Variables

Variables	Treated HH (N=196)	Non-treated HH (N=196)	Total (N=392)	Mean difference	t-value
AVMI	9024.8	6511.2	7768.05	2513.6	2.87***
AVMS	612.87	574.60	593.73	38.27	2.31**
TEV	7097.18	7006.88	7052.03	90.3	3.07***
TLV	60299.74	56518.13	58408.94	3781.61	0.73
TCPV	55245.93	49191.66	52218.8	6054.27	3.68***
AMEXFD	4163.88	3976.83	4070.36	187.05	2.03**
AMEXED	761.59	656.40	708.99	105.18	2.088**
AMEXHL	315.32	189.63	252.47	125.69	5.94***

** And *** shows significant at 5% and 1% significance level respectively

Source: STATA output from field survey (2020)

Note: AVMI is average monthly income

AVMS is average monthly saving

TEV is total equipment value

TLV is total livestock value

TCPV is total crop production value

AMEXFD is average monthly expenditure on food

AMEXED is average monthly expenditure on education

AMEXHL is average monthly expenditure on health

One proxy variable for physical capital, total equipment value for the treated households on average was birr 7,097.18 and birr 7,006.88 and for the non-treated households the mean difference between these two groups was birr 90.3 and it was statistically significant at 1% significant level. The mean value of total livestock was birr 60,299.74 and birr 56,518.13 for the treated and non-treated households respectively. The mean difference between the treated and non-treated households was birr 3,781.61, but it was statistically insignificant. Similarly, the mean of total crop production value of the treated households was higher than the non-treated households by birr 6,054.27, and it was statistically significant at a 1% significant level.

There was statistically significant mean difference on human capital variables between the treated and non-treated households. The average monthly expenditure on food of the treated households was higher by birr 187.05 than non-treated households. The average monthly expenditure on education for the treated households was higher than non-treated households by birr 105.18. Similarly, the mean difference value (125.69) of average monthly expenditure on health showed, the average monthly expenditure on health of the treated households was higher than non-treated households by birr 125.69.

To investigate the impact of participation in OCSSCO on the outcome variables, first, one should have some important variables that help him/her to create a better comparison between the treated and non-treated groups. All these variables were selected from the logistic regression result. The logistic regression result is reported in Table 4.

In the logistic regression result, as reported in Table 4, the dependent variable was dummy i.e. “1” for treated households and “0” for non-treated households. From the hypothesized variables, age of household head, family size, primary education, land size, market access, distance, perception of mandatory deposit, and evaluation of first-round loan size was the significant variables that affect

the participation in OCSSCO. On the other hand, gender, marital status, transportation access, and participation in non-agricultural activities were statistically insignificant to affect the participation in OCSSCO. In order to create a better comparison, all the significant variables in the logistic regression result were used in the PSM model.

Table 4 Logistic Regression Result for Determinants of Participation in OCSSCO

Dependent variable (HH category): dummy (1=for treated HH and 0=for non-treated HH)			
Independent variables	Coef.	Std. Err.	p-value
Gender	-0.277	0.360	0.443
Age	0.024	0.012	0.048**
Family size	0.208	0.078	0.007***
Marital status	0.220	0.409	0.591
Education			
Primary	-0.793	0.307	0.010**
Secondary	0.019	0.481	0.968
Cert & above	1.335	1.657	0.420
Land size	-0.272	0.108	0.012**
Transport Acc	0.259	0.320	0.418
Market access	0.647	0.359	0.072*
Distance(hrs)	-0.593	0.231	0.010**
PNAA	-0.535	0.361	0.138
PoMD	2.988	0.383	0.000***
EoFRLS	0.971	0.272	0.000***
Constant	-3.246	0.878	0.000***
Mean dependent var	0.500	SD dependent var	0.501
Pseudo r-squared	0.321	Number of obs	392.000
Chi-square	174.572	Prob > chi2	0.000
Mean VIF	1.43	Link test, p-value	0.832
Hosmer Lemeshow p-value	0.7488		

*, ** and *** is significant at 10%, 5% and 1% significant level respectively

Source: STATA output from field survey (2020)

To investigate the impact of participation in OCSSCO on the livelihood of rural households, the study applied several steps. In the initial stage, the propensity score value of the treated and non-treated households was assigned to compare the outcome variable of the treated households and non-treated households. Then the two assumptions: conditional independence and overlap assumptions

were checked in order to have the best match between the two groups. After establishing the best matches between treated and non-treated households, the average treatment effect on the treated was estimated as shown in Table 5 by using four matching methods (nearest neighbor, radius, kernel and stratification matching method).

Table 5: Descriptive Statistics for the Propensity Score

Variable	Obs	Mean	Std.Dev.	Min	Max
Pscore	392	0.5	0.2985357	0.0051188	0.95865

Source: STATA output from field survey data, 2020

As shown in Table 5, the minimum propensity score value was 0.0051188, and the maximum value was 0.95865 with the mean score of 0.5. However, the STATA output tells us the common support region lies between 0.01091176 and 0.95865003. Therefore, two non-treated households were excluded from the procedure because their propensity score lied outside the common support region.

Table 6: Distribution of Propensity Scores between Treated and Non-Treated Groups

Inferior of block of pscore	HH category				Total	
	Treated households		Non-treated households			
	Frequency	%	Frequency	%	Frequency	%
0 .0109118	5	2.55	93	47.94	98	25.13
0.2	16	8.16	25	12.89	41	10.51
0.4	38	19.36	30	15.46	68	17.44
0.6	30	15.31	26	13.40	56	14.36
0.7	37	18.88	12	6.19	49	12.56
0.8	70	35.71	8	4.12	78	20.00
Total	196	100	194	100	390	100

Source: STATA output from field survey, (2020)

Table 6 shows the total of 390 respondents were distributed into 6 blocks in which the mean propensity score was not different for treated and controls in each block. Block 1 ranges from 0.01091176 to 0.2, block 2 ranges from 0.2 to 0.4, block 3 ranges from 0.4 to 0.6, block 4 ranges from 0.6 to 0.7, block 5 ranges from 0.7 to 0.8 and block 6 ranges from 0.8 to 0.95865003. The propensity score distribution of the treated and the non-treated households was also depicted in Figure 1. The propensity score distribution shows there was sufficient overlap between the treated

and non-treated households. The result proved balancing property was satisfied and it implies the propensity score matching estimator fulfills the conditional independence assumption and overlap assumptions. Once the assumptions are satisfied, it is possible to make a comparison between the outcome of the treated and non-treated households to investigate the impact of participation in OCSSCO on the livelihood of its beneficiaries.

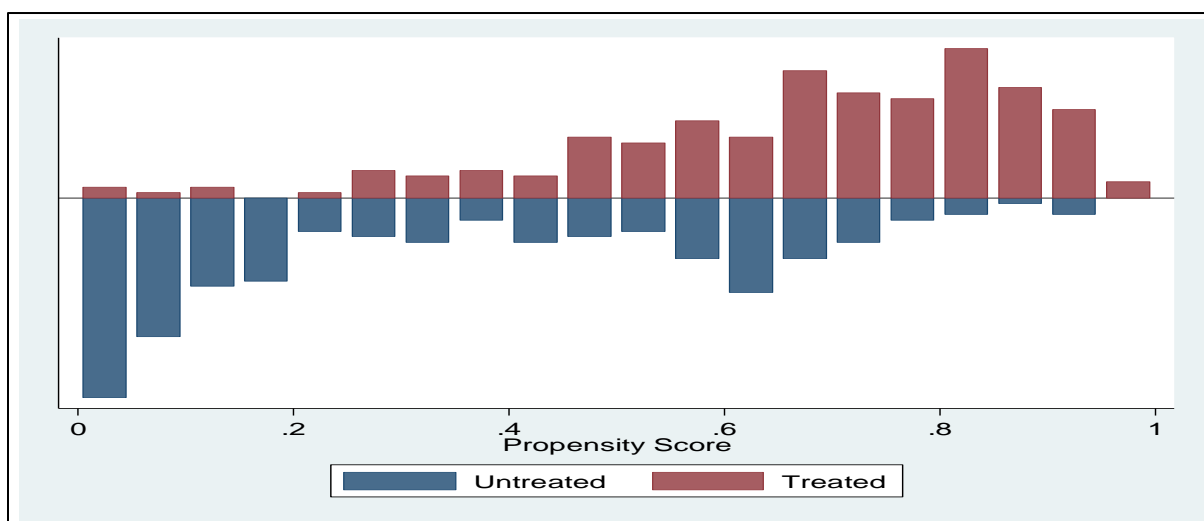


Figure 1: Propensity Score Distribution

Source: STATA output from field survey, 2020

As shown in Table 7, for each of the outcome variables, the four types of the matching methods were used. For all matching methods, 196 treated households were selected. Among the four matching methods, the nearest neighborhood matching method selected 72 non-treated households, and the remaining three matching methods selected 194 non-treated households. The result of Table 7 shows participation in OCSSCO had a positive and significant effect on all the outcome variables except for the total value of the livestock variable. The result was consistent in all matching methods. According to Bryson et al. (2002) if all the matching methods give similar results, the choice may not be important. If the results differ further investigation may be needed in order to reveal more about the source of the disparity.

i. Impact on Financial Capital

In this study, average monthly income and average monthly savings were used as a proxy for financial capital. Participation in OCSSCO had a positive and significant effect on the average

monthly income and average monthly saving in all of the matching methods as shown in Table 7. The average monthly incomes of the treated households were higher than the non-treated households by the range of birr 1,578.70-3,176.66 by using all matching methods. Similarly, the average monthly saving of the treated households showed improvement. The results of all matching methods showed the average monthly saving of treated households were higher than non-treated households by the amount of birr 233.68-262.39. This result is in line with the findings of Adjei et al. (2009), Alemu et al. (2018), Bhuiya et al. (2016), Diro and Regasa (2014), Khandker and Samad (2013) and Sida (2014) in which their results conclude participation in microfinance has a positive impact on income and saving of participants.

The possible reason for the positive and significant impact of participation in OCSSCO on average monthly income could be that the treated households used the borrowed money for the improvement of agricultural and non-agricultural activities. By using the borrowed money for productive purposes, they can increase their income from both agricultural and non-agricultural activities. Another reason could be households were forced to sell the existing assets at the time of difficulty. They can solve the financial problem by participating in OCSSCO without selling their assets.

Comparing treated households with non-treated households, treated households had higher possibility to save. Whenever they take loans from OCSSCO, clients have mandatory deposits. The amount of mandatory deposit is determined by the loan amount. They were forced to save 5% of the loan amount and 25 birr monthly. Whether they had the willingness or not this much money was mandatory for clients in addition to their voluntary savings. This could be the possible reason for higher average monthly savings in the case of treated households. The other reason for the higher savings of the treated households could be the increase in income of households by their participation in OCSSCO.

Table 7: Estimation of ATT Using Propensity Score Matching

Outcome variables	Matching method	No. of treated HHs	No. of non-treated HHs	ATT	t-statistics
Average monthly income of HHs (in birr)	Attnd	196	72	2572.02	2.46**
	Attr	196	194	3176.66	3.13**
	Attk	196	194	2144.30	3.78***
	Atts	196	194	1578.70	2.02**
Average monthly saving of HHs (in birr)	Attnd	196	72	233.68	2.43**
	Attr	196	194	254.62	3.04**
	Attk	196	194	262.39	2.53**
	Atts	196	194	233.83	3.47***
Total commodity asset value (in birr)	Attnd	196	72	3489.37	5.58***
	Attr	196	194	1579.06	2.82**
	Attk	196	194	2466.86	3.73***
	Atts	196	194	2497.68	2.10**
Livestock value (in birr)	Attnd	196	72	-4106.78	-0.31
	Attr	196	194	-571.93	-0.09
	Attk	196	194	-3052.67	-0.40
	Atts	196	194	-4848.23	-0.67
Total crop production value (in birr)	Attnd	196	72	23862.8	6.71***
	Attr	196	194	18818.1	3.62***
	Attk	196	194	20125.8	2.16**
	Atts	196	194	19165.3	4.52***
Average monthly expenditure on food (in birr)	Attnd	196	72	958.99	3.36**
	Attr	196	194	683.41	2.46**
	Attk	196	194	660.63	4.88***
	Atts	196	194	591.91	3.56***
Average monthly expenditure on education (in birr)	Attnd	196	72	132.76	8.14***
	Attr	196	194	173.21	6.24***
	Attk	196	194	118.78	4.21***
	Atts	196	194	92.76	2.83**
Average monthly expenditure on health (in birr)	Attnd	196	72	99.32	4.59***
	Attr	196	194	139.04	3.47***
	Attk	196	194	110.88	4.21***
	Atts	196	194	99.99	7.76***

And* shows significant at 5% and 1% significance level respectively

Source: STATA output from field survey data, 2020

Note: Attnd represents for the nearest neighbor matching method

Attr represents for the radius matching method

Attk represents for the kernel matching method

Atts represents for the stratification matching method

ii. Impact on Physical Capital

In this study total equipment value, total crop production value, and total livestock value were used as a proxy for physical capital. As shown in Table 7, the result of all matching methods shows participation in OCSSCO had a positive and significant effect on the total equipment value and total crop production value, but it had an insignificant effect on the total livestock value. This result is in line with the findings of Adjei et al. (2009), Alemu et al.(2018) and Stewart et al. (2010) in which their findings conclude participation in microfinance has a positive and significant effect on physical capital. The average treatment effect on the treated result showed total equipment value and total crop production value of the treated households were higher than non-treated households. Participation in OCSSCO enhanced the treated households to have higher total equipment value than the non-treated households between birr 1,579.06 and birr 3,489.37. The result of all matching methods shows that treated households had higher crop production value than non-treated households by the range of birr 18,818.1- birr 23,862.8.

As known, human beings in their day-to-day activities want to acquire and use more equipment. In order to acquire more equipment, their income level is their constraint. The possible reason for the higher total equipment value of the treated households than the non-treated households could be that participation in OCSSCO improves the income and saving capacity of clients, and this enhances them to buy different equipment.

The possible reason for higher total crop production value for participants of OCSSCO could be that it solves their financial problems to improve their productivity. The borrowed money was used to buy fertilizers, different equipment, ox, and other materials that can improve crop production. What was observed in the study area was that some poor rural households had land, but did not have an ox, manpower, ability to buy fertilizer and other essential equipment. Participation in OCSSCO enables them to solve these problems by getting loans. Therefore, the increase in accessibility of input improves their productivity and the increase in their productivity results in higher production.

iii. Impact on Human Capital

In this study, as a proxy for human capital, average monthly expenditure on food, average monthly expenditure on education, and average monthly expenditure on health were the variables used. The result of Table 7 shows that by using the four matching methods participation in OCSSCO had a positive and significant effect on average monthly expenditure on food, education, and health. The result is consistent with the study of Adjei et al. (2009), Antoh et al. (2015) and Nichols (2004) in which their findings show participation in microfinance increases expenditure on health and education. The ATT result shows that treated households had higher expenditure than non-treated households. Comparing the estimated average monthly expenditure on the food of the treated households with non-treated households, the result of Table 7 shows the estimated average monthly expenditure on food for the treated households were significantly higher than the non-treated households by the amount of birr ranges from 591.91 to 958.99. Treated households had a higher average monthly expenditure on education than non-treated households by the amount ranging from birr 92.76-173.21 by using all matching methods. By using all matching methods, treated households had a higher average monthly expenditure on health than the non-treated households by the range of birr 99.32 to 139.04.

The possible reason for higher estimated expenditure on food for the treated households could arise from the improvement in crop production. Getting a loan solves the financial problems of households then, agricultural productivity improves and hence, crop production improves the increase in crop production enhances them to consume more. In addition, as observed in the study area, poor rural households were selling their crop production in order to cover different expenditures. Participation in OCSSCO enhanced these households to produce cash crops and engaged in non-agricultural activities that can support their expenditure.

The higher expenditure on education, showed the highest attendance of school-aged children. The possible reason for higher attendance of education for the treated households could be the increase in income of the households. Those households who could not send their school-aged children to school were asked the reason. They answered, “Since we are financially weak, our children are engaged in income-generating activities”. Expenditure on education is an asset because it has a future return.

Healthy households had better productivity as compared to unhealthy households. The increase in expenditure on health, showed the effort to build a healthy family. The possible reason for higher expenditure on the health of the treated households could be the increase in income. The increase in income of households enhanced their worry about quality. In order to have a better living standard, the households spent a higher amount of money on sanitation purposes and preventive mechanisms for diseases.

4. Conclusion and Recommendation

4.1. Conclusions

The study investigated the impact of participation in Oromia Credit and Saving Share Company on the livelihood of rural households. The PSM model was used in order to investigate the impact of participation in OCSSCO on the outcome variables. In order to find the true impact of the program on the livelihood of its participants, matching was applied by using their propensity scores. Four matching methods such as nearest neighbor, radius, kernel, and stratification matching method were used. This matching method helps to form a good match between the treated and non-treated households based on their propensity score values given their observed characteristics.

The result of ATT shows that the treated households had a significant higher value than the non-treated values for all outcome variables except total livestock value. In this study, financial capital, physical capital, and human capital were used as livelihood variables. The study used average monthly income and average monthly savings as a proxy of financial capital. Total equipment value, total livestock value, and total crop production value were used as a proxy of physical capital. As a proxy for human capital, the study used average monthly expenditure on food, average monthly expenditure on education, and average monthly expenditure on health.

The average monthly incomes of the treated households were higher than the non-treated households by the range of birr 1,578.70-3,176.66 by using all matching methods. Similarly, participation in OCSSCO had a significant and positive effect on the average monthly saving. According to the result of all matching methods, the average monthly saving of treated households was higher by the amount of birr 233.68-262.39. Participants of OCSSCO were benefited by acquiring more equipment than the non-treated households. The total equipment values of the treated households were higher than non-treated households by the amount ranging from birr 1,579.06 to birr 3,489.37.

Participation in OCSSCO enhanced the treated households to have a higher total crop production value than its counterpart by the amount of birr 18,818.1- birr 23,862.8. The average monthly expenditure on food, education and health of the treated households were higher than non-treated households. Therefore, this study concludes that participation in OCSSCO improved the livelihood of rural households in the study area.

4.2. Recommendations

Based on the findings of the study, the following recommendations are forwarded to the government, the institution, and the rural households. The result of this study shows that OCSSCO improved the livelihood of the majority of its participants. Thus, there should be encouragement on the expansion of OCSSCO from the concerned body. Officials of the sampled branches raised great constraints, which is a financial problem. They could not provide loans to the demand of the clients. Thus, the government and other concerned bodies should subsidize the institution more than what was done previously.

There was exciting work done by OCSSCO. Training has been given to the clients as well as to non-clients. However, some of the clients could not pay the loan amount on time and their living standard was not improved due to a lack of knowledge on how to use the money and using the money for the unproductive purposes. Therefore, there should be strong follow-up from the institution more than what was done. In addition, the institution should expand its branch up to the Kebele level.

Those rural households who have financial problems should participate in microfinance institutions. Once clients of OCSSCO take their loan, they should use the money for productive purposes. Using the money for productive purpose enhances them to improve their livelihood and repayment capacity. In contrary, if they use the money for unproductive purpose, they fall into debt and they are enforced to sell their existed asset in order to repay the loan.

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