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RESEARCH ARTICLE

PARTICIPATION IN SAVING AND CREDIT COOPERATIVES (SACCOS) AND ITS IMPACT ON HOUSEHOLDS' WELLBEING IN GURAGE ZONE, SOUTHERN ETHIOPIA

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ABSTRACT

The purpose of this study was to examine impacts of saving and credit cooperative societies on household wellbeing in Gurage Zone, SNNPR, Ethiopia. Primary and secondary sources were used. The primary data source was collected through direct interviews based on semi structured questionnaires from 90 treated and 112 controlled group plus discussion with three informant group and extra with staffs of two unions. The study was used a cross-sectional survey research design, and the multistage sampling techniques was employed. The survey data were analyzed through quantitative method, and used descriptive statistics and inferentially statistics logit and propensity score matching econometrics model. The study finding shows age, education, training, loan, interest rate, income sources are the main factors affecting saving and credit cooperative membership participation. The impact evaluation finding based on household asset accumulation measurements shows saving and credit cooperative participants were more own asset than non-participants. However, there is no significant difference between income and consumption among membership participants and non-participants. Finally, researcher recommend saving and credit cooperatives should seriously work to develop members entrepreneurial talent and promoting members to investing on off-farm and non-farm rather than invest on fixed asset activities to improve household wellbeing.

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INTRODUCTION

In 1849 Schulze-Delitzsch Germany scholar was the first intellectual launched a campaign among German workers and artisans to establish cooperative societies and savings and loan institutions to eliminate poverty. These saving and loan institutions are recently present with more than 13,500 branch offices throughout Germany and employ 160,750 staff. Thus, the credit cooperatives have more than 30 million customers, there of approximately 16 million are also members. The movement of saving and credit cooperative in Africa, since 1955- 2015 covers 6.8% penetration rate (FCA, 2017). History of saving and credit cooperatives in Ethiopia counts above five decades. According to Federal cooperative Agency, report published in 2017, the establishment of formal saving and credit cooperatives in Ethiopia was dated back to the regime of Emperor Haile Selassie.

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In 1949 E.C the first Saving and Credit Cooperatives (SACCOS) was organized by Ethiopian Road Authority employees was being rotating saving and credit practice, and legally registered, while entire members asking a question of SACCOS should have a legal background. To answer this question and encounter the challenges of cooperative, the proclamation No 241/58 mainstreaming the ground of international cooperative principles declared for all types of cooperatives. Currently there are 18,959 primary and 115 secondary (union) saving and credit cooperative with 3,430,655 members in Ethiopia. These cooperatives are mobilized 7.9 billion birr members saving and 3.29 billion birr in the form of capitals (FCA, 2017). The International Cooperatives Alliance (2014), an apex organization that represents cooperatives worldwide, define a cooperative as an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. As proclamation No. 985/2016, Ethiopia people Federal Democratic republic (EPFDR) article 7, "saving

and credit cooperative society” means a society established to provide saving, credit and loan-life-insurance services to its members. According to Ayelew (2014), access to finance will enhance the economy and enable food Security. However, due to heavy transaction costs requirements, it is very hard to cover a highly dispersed rural population through commercial banks. Therefore, many countries have designed different strategies to solve the financial service problems of their poor and marginal population. The main arrangement towards this effort is the provision of microfinance services through deposit taking Microfinance Institutions (MFIs) often based on the group lending approach, and membership based micro financial cooperatives and mutual assistance associations. Saving and credit cooperatives, also known as financial cooperatives, or credit unions are a unique type of financial institution which emerged as an alternative solution to provide financial services in the presence of credit market failure (Nyankomo, 2015).

Saving and credit cooperatives are the financial institution formed by community alive together in order to solve their own financial problem for supportive role in the development of production and productivity others economic stream. Saving and credit cooperatives are geographical or organizational based foundation, non-political, non-religious & non-governmental organization formed by low and middle income community to having sustained livelihoods of the current and for the coming generation through contributing capital of SACCOs in the form share capital and members' capital in the form of saving products as well as registration fees as administration finance. In Ethiopia the delivery of financial products and services through micro-finance institutions is one of the policy instruments used to enable rural and urban households to increase their output and productivity, induce technology adoption, increase input supply, increase income thereby helping them reduce their poverty and attain food security (Wolday, 2002).

According to Thirlwall (1994) and Maina (2011), providing access to financial services will stimulate the independence and self-development of poor households and micro entrepreneurs. This will help not only to improve poor people's economic condition, but also to provide a way to maintain or improve their quality of life in the face of uncertainty. Kesebir and Diener (2008) and Alexandru (2016), defined the wellbeing as a measure of human life style which makes a positive assessment of their lives and their confident, emotions, satisfaction and engagement in day today activities. It is often tied to identify financial status of individuals as well. The literature is evident to prove that household saving and social capital have become key factors of socio-economic development. The thoughts of classical economists had emphasized on individuals' savings effects economic development and human well-being. In the theory, household's saving has been given prominence as savings can assist to bear economic shocks in various ways (Dew and Xiao, 2011). According to Agricultural Transformation Agency (ATA) (2017) reports since 1993, the overarching strategic framework guiding Ethiopia's development has been the Agricultural-Development led Industrialization (ADLI) strategy, Agriculture leads the national economy by 43% GDP, 85% exports and 77% employment. Agriculture has the share of approximately 7% annual growth over last 10 years, while industry is growing at 21% and service by 12%. Agricultural land of Ethiopia loss its fertility nature, due to less protection, long year cultivation, population growth and manmade deterioration in order to

expansion of agricultural land. To maintaining land fertility and increase the mainstream economy of agricultural production purchasing agricultural inputs like fertilizers, pesticides and seed production need to satisfied rural and urban household wellbeing. Again ATA (2017), reported that Ethiopia ranked on 5th in Africa by foreign direct investment growth with 46%. Accessing financial resource is the main parameter to replace FDI by home country investment. Sustainable ways to finance infrastructure, support private investment through credit market, and tap into the growth potential of structural reforms can help the country maintain high economic growth. Formal financial intermediaries, such as commercial banks, usually refuse to serve poor households and micro-enterprises because of the high cost of small transactions, lack of traditional collateral, lack of basic requirements for financing and geographic isolation. By doing so, these institutions ignore the enormous potential in talents and entrepreneurship of this stratum of society. Providing access to financial services will stimulate the independence and self-development of poor households and micro-entrepreneurs. This will help not only to improve poor people's economic condition, but also to provide a way to maintain or improve their quality of life in the face of uncertainty. Moreover, gaining access to financial services is a critical step in connecting the poor to a broader economic life and in building the confidence for them to play a role in the larger community. Without sufficient financial services to meet the enormous demand, rural areas will remain underdeveloped. Therefore, dedicated financial institutions which understand the needs of the agricultural sector are needed to support rural and economic development (Robo Bank, 2011)

The major problem of poor households has been lack of flexible financial services on a sustainable manner, despite the high potential demand for the services, especially for micro-credit. Micro Finance Institutions are making their effort to fulfill this demand, but their limited financial and institutional capacities have become serious constraints to expand outreach to the bulk of the population. Hence, the unmatched high demand for finance and very limited supply necessitates intervention by member owned financial institution dedicated for the interest and wellbeing of the poor where by the relevance of RUSACCOs is unquestionable (Daniel, 2014). Recent estimates by the Global Findex (2014) of the World Bank highlight that only about 22 percent of the population of Ethiopia have access to formal financial services. However, the rise of new potential financial service providers, including micro finances and SACCOs provide a fresh optimism towards improving access to financial services in Ethiopia. Saving and credit cooperatives provide both the rural and urban lower and middle earner access to finance nearly cover 3.4% in Ethiopia and 1.7% in the study area. In addition, National Bank of Ethiopia (NBE), prepare national financial inclusion strategy plan to reach 60% access to finance in 2020, undergoing planned modernization reforms with the objective to supporting growing and vibrant economy and to create efficient, effective and enabling environment to the finance. The impacts of saving and credit cooperative societies in not yet studied in the study area. Therefore, the study answers the trained and practices of saving and credit cooperative societies by product (saving and credit) in improving the livelihoods of households, power of saving and credit cooperative in national financial inclusion, share of saving and credit in micro-credit of poor households. The main objective of the study was to investigate factors affecting the participation of households in

saving and credit cooperatives and to evaluate its impact on households' wellbeing in the study area.

RESEARCH METHODOLOGY

Description of the study area: The study was conducted in Gurage Zone, SNNP Regional state, Ethiopia. This zone was named for Gurage people, whose homeland lies in this zone. Gurage Zone was bordered on the south east by Hadiya and Yem Special Woreda, on the west, north and east by the Oromia Region, and on the south east by Silte zone. According to the Gurage Zone Finance and Economic Development (GZFED), (2017), published report, Zone has 13 woredas and two urban administrations with 412 rural and 50 urban kebeles. The Zonal center town wolkite found on the distance of 155 km and 259km from the capital city of the county Addis Ababa and Regional capital city of Hawassa respectively. Topographically lies within the elevation ranging from 1000 to 3,600 meters above sea level. Gurage Zone has four agro-ecological climates;- Wurchi 4.1%, Dega 27.5%, weyina Dega 65.3%, kola 3%. It covers 5893 square kare meter area of land and it had a total population size 1,724,324, from this male covers 836896(48.53%) and Female also shares 887428 (51.47%). Out of total population productive human power(15-64) coverage was 54.4%.



Figure 1. Location Map of Study Area

The livelihood of the majority of the population of Gurage zone was highly dependent on agriculture. Mixed farming was the predominant agricultural production, where Enset or false banana was the perennial staple crop, a back-breaking job for women as they laboriously indulge in most of the production process - harvesting, storing, and preparing for consumption. Generally, the agriculture base is poor; it is common reason people to migrate across the major towns of the country, in search of cash earning opportunities to generate remittance income. The high mobility of this ethnic group is not limited to men although the number of women remaining in the villages is greater than men. Married women often are the guardians of the households in the absence of adult men; and as the new head of the household, she becomes the major supply of labour (rented, exchanged, or otherwise) for activities that are associated with agriculture production, thus compounding the already unfavorable situation of women (GZBoFED, 2016/2017).

Data source and method of data collection: The study employed both primary and secondary data sources. The primary data was gathered through interviews based on semi structured questionnaires prepared by author used four enumerators after one day efficient training provision and researcher himself involved in data collection from

respondents. The group discussion held with three informant group formed at Butajira town administration, Ezha and Abeshge district cooperative promotion and from selective SACCOs, while discussion with Nestanet Fana and Agnot union staffs. The secondary data was collected from loan agreement, cooperative promotion office report, Accounting and financial (audit) report, published reports, thesis, books, SACCOs guiding by-laws and website.

Sampling techniques and sample size determination: The study area was geographically wide and covers 13 woredas and 2 city administrations have a huge numbers of 532 SACCOs. The sample households was selected both from Rural and urban SACCOs. Hence, Multi-stage sampling method was conceived to determine sample size. Firstly, the study area was classified into three cluster based on agro-ecology such as High land, Moderate and lowland. Currently the potential household from each agro ecology was varying due to the different livelihood characteristics in production and productivity. Lowland agro -ecology was more productive and commercial area due to soil fertility and accessible irrigation opportunity in addition to regular rainfall. Households in moderate agro ecology productivity found in medium agro ecology similarly own fertile land and non-use of irrigation mechanism. In the high land climate the community were inactive to easily adopt new technology due to whether condition and Acidic manner of soil. Therefore, they were engaged in subsistence agriculture like inset, Avocado, Mango, bean and barley production on small plot of land for home subsistence other than Market oriented. This cases leads researcher to collect data from each agro ecology to balance the research accuracy.

Secondary, from each agro-ecology three Woredas which have good performance in saving and credit and senior in saving and credit promotion practice was purposively selected, Ezha from High land cluster, Abeshge from Moderate cluster and Butajira from lowland/kola cluster. Totally, these three woredas own 91 SACCOs which have 10467 individual memberships. Thirdly, since the objective of the study was to investigate the impacts of SACCOs on Household wellbeing, from those three woredas 10 SACCOs which have good practice and recognized by authority body in implementing over all SACCOs Extension was screened based on Woredas proportion. Finally, to determine the sample size, SACCOs participants households who are eager in internalizing the doctrine of SACCOs in more saving, receive huge productive loan, more benefit from loan, repay loan on time 90 members was purposively selected and 112 non participants based on probability proportion was randomly selected. Additionally to consolidate the research result, having the idea of professional's commitment and response on the impacts of SACCOs on households' wellbeing relevance. Therefore, the study was involve 21 individuals into three informants groups in respective three woredas were formed. Group members includes one SACCOs expert, two process owners from promotion and audit department, heads of cooperative promotion and three individuals from model SACCOs. The discussion was takes one day for each informant group. Additionally one full day discussion held with the staffs of each two secondary SACCOs (union). First was held on Nestanet Fana SACCOs union which was found in Butajira town, his operational area was Butajira town administration and three woredas of eastern part of Gurage zone namely Meskan, Mareko and Sodo, and The second was Agnot

SACCOs union which was centered in wolkite town and provide financial service for ten woredas which were found at western part of Gurage Zone and wolkite town administration.

Method of data analysis: The field data was analyzed, deploying through quantitative method, and survey information was edited, cleaned and coded. Then, the data are analyzed by using descriptive statistics and inferential statistics. Households' decision to participate or not to participate in SACCO was analyzed by using binary logit Model (BLM). In most applications the logit and probit models are quite similar, the main difference being that the logistic distribution has slightly fatter tails. That is to say, the conditional probability P_i approaches zero or one at a slower rate in logit than in probit. In the logit model the slope coefficient of a variable gives the change in the log of the odds associated with a unit change in that variable, again holding all other variables constant. For the logit model the rate of change in the probability of an event happening is given by $\beta_j P_i(1 - P_i)$, where β_j is the (partial regression) coefficient of the j regressor. But in evaluating P_i , all the variables included in the analysis are involved (Gujirat 2004).

Propensity score Matching Model was used to evaluate the impact of SACCOs on households' wellbeing, because the PSM essential tools measure evaluate the effect SACCOs for participant and non-participants. For these purposes appropriate statistical software (Stata 13) was used. In addition, to simply show the result to readers, respondents' variability on those hypothesized socio-economic and demographic variables and to present the output of each quantitative research models tables and graphs analysis also was used.

Propensity Score Matching (PSM): PSM concerns with the implementation of randomized evaluation, the approach is still a perfect evaluation method in theory. Propensity score matching entails forming method sets of treated and untreated subjects who share a similar value of the propensity score (Rosebaum & Rubin 1983a, 1985). With matching methods, one tries to develop counterfactual or control group that is as similar to the treatment group as possible in terms of observed characteristics. PSM constructs a statistical comparison group by modeling the probably of participating in the program on the basis of observed characteristics unaffected by the program. A logit model was used to estimate propensity scores using a composite of pre-intervention characteristics of the sample households (Rosenbaum and Rubin, 1983) and matching was then performed using propensity scores of each observation. logit model for the propensity score would have to satisfy the conditional independence assumption by reflecting observed characteristics X that are not affected by participation.

In estimating the logit model, the dependent variable is SACCOs participation, which takes the value of 1 if a household participated in SACCOs institution and 0 otherwise. The mathematical formulation of the logit model is as follows:

$$d_i = \frac{1}{1 + e^{-y_i}} = \frac{e^{y_i}}{1 + e^{y_i}}$$

Where d_i , is the probability that i^{th} households participates in SACCOs,

y_i is a linear function of N independent variable (x) and expressed as

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \beta_N x_N + \varepsilon$$

Where $x_1 - x_N$ = is explanatory variable

β_0 = intercept

$\beta_1 - \beta_N$ coefficient of explanatory variable

ε = error term

The probability that a household belongs to the non-participant of SACCOs is given by:

$$1 - y_i = \frac{1}{1 + e^{D_i}}$$

Propensity score: The propensity score is the conditional probability of receiving the treatment given the pre-treatment variables: it is the probability of receiving treatment ($A=1$) given covariates X ,

$$P(X) = \Pr(T=1|X) = F(x'i\beta) \quad (1)$$

Assuming $0 < P(X) < 1$

There is a positive probability, if $P(X) > 0$, even no the probability of receiving treatment if $A=0$. (Rosebaum & Rubin 1983,) showed that conditioning on the propensity score allow unbiased estimation of treatment effect.

Estimate propensity score: PSM is that it does not necessarily require a baseline or panel survey, although in the resulting cross-section, the observed covariates entering on impact evaluation logit model for the propensity score would have to satisfy the conditional independence assumption by reflecting observed characteristics X that are not affected by participation. A preprogram baseline is more helpful in this regard, because it covers observed X variables that are independent of treatment status.

Average treatment effect (ATE)

$$(ATE), \text{ which is defined as } ATE = E[Y(1) - Y(0)] \quad (2)$$

The additional challenge when estimating ATE is that both counterfactual outcomes $E[Y(1) | T=0]$ and $E[Y(0) | T=1]$ have to be constructed. The ATE is the average effect, at the population level, of moving an entire population from untreated to treated.

Average treatment effect on the treated' (ATT): The ATT is the average effect of treatment on those subjects who ultimately received the treatment, which is defined as:

$$ATT = E(T=1) = E[Y(1) | T=1] - E[Y(0) | T=1] \quad (3)$$

As the counterfactual mean for those being treated $E[Y(0) | T=1]$ is not observed, one has to choose a proper substitute for in order to estimate ATT. Using the mean outcome of untreated individuals $E[Y(0) | D=0]$ is in non-experimental studies usually not a good idea, because it is most likely that components which determine the treatment decision also determine the outcome variables of interest. Thus, the outcomes of individuals from treatment and comparison group

would differ even in the absence of treatment leading to a ‘ self- selection bias’. For ATT it can be noted as:

$$E[Y (1)|D = 1] - E[Y (0)|T = 0] = ATT + E[Y (0)|T = 1] - E[Y (0)|T = 0] \quad (4)$$

the difference between the left hand side of equation (4) and ATT is the so called ‘ selfselection bias’.

The true parameter ATT is only identified,

$$\text{if } E[Y (0)|T = 1] - E[Y (0)|T = 0] = 0$$

Assumption needed to apply PSM method

Conditional independence assumption: One possible identification is to assume that given a set of observable covariates x which are not affected by treatment, potential outcomes are independent of treatment assignment:

$$(\text{Unconfoundedness}) Y (0), Y (1) \text{ proportion to } T|X_i \quad (5)$$

This implies, that selection is solely based on observable characteristics and that all variables that influence treatment assignment and potential outcomes simultaneously observed. Clearly, this is a strong assumption and has to be justified by the data quality at hand. It should also be clear, that conditioning on all relevant covariates is limited in case of high dimensional vector x .

Common support or overlap condition: A further requirement besides independence is the common support or overlap condition. It rules out phenomenon of perfect predictability of T given X :

$$(\text{Overlap}) 0 < P(T = 1|X) < 1 \quad (6)$$

It ensures that persons with the same x values has positive probability of being both participants and non-participants (Heckman, and Smith 1999)

Matching Algorithms: Different matching criteria can be used to assign participants to non-participants on the basis of propensity score. Participants are Matched on the basis of this probability, or propensity score, to non-participants, using different methods. Matching methods for bipartite matching designs consist of two parts: a matching ratio and a matching algorithm. The matching ratio can be one to one from treatment and control, variables or fixed. The matching algorithm is where the matching actually takes place. one of the most popular algorithms is greedy matching, which includes

- Nearest Neighbour Matching:-Comparison units within a certain width of the propensity score of the participants units get matched, where the width is generally a fraction of standard deviation of the propensity score.
- Caliper and Radius Matching:-This procedure therefore involves matching with replacement, only among propensity scores within a certain range. A higher number of dropped non participants likely, however, potentially increasing chance of sampling bias.
- Stratification and interval Matching:-stratification on the propensity score involves stratifying subjects into

mutually exclusive subsets based on their estimated propensity score. Subjects are ranked according to their estimated propensity score. Subjects are then into subsets of the estimated propensity score.

- Kernel and local linear Matching:-one risk with the method just described is that only a small subset of non-participants will ultimately satisfy the criteria to fall within a common support and thus construct the counterfactual outcome. Non parametric matching estimator such as kernel matching and LLM use a weighted average of all non-participants to construct the counterfactual match for each participant. If P_i is the propensity score for participant i and P_j propensity score for non-participant, the weights for kernel matching are given by

$$w(i, j) = \frac{K \left(\frac{P_i - P_j}{a_n} \right)}{\sum_{k \in c} k \left(\frac{P_k - P_i}{a_n} \right)}$$

Where $k(\cdot)$ is a kernel function and a_n is a band width parameter. LLM, in contrast, estimates a non parametric locally weighted regression of the comparison group outcome in the neighborhood of each observation. Kernel matching is analogous to regression on a constant term, whereas LLM uses a constant and slope term, so it is “ linear.” LLM can include a faster rate of convergence near boundary points. The LLM estimator has the same form as the kernel-matching estimator, except for the weighting function:

$$w(i, j)_{LLR} = \frac{k_{ij} \sum_{k \in c} K_{ik}(P_k - P_i)^2 - [k_{ik}(P_j - P_i)] \sum_{k \in c} K_{ik}(P_k - P_i)}{\sum_{j \in c} K_{ik} \sum_{k \in c} K_{ik}(P_k - P_i)^2 - (\sum_{k \in c} K_{ik}(P_k - P_i))^2}$$

Variable Definitions and their Expected Signs

Treatment Variable

Y_i is equal to 1 if the household is participant in SACCOs and equal to zero (0) otherwise.

Outcome variable

Consumption expenditure (consump): Consumption expenditure of the household for different food and non-food purposes. Food consumption or nutrition was measured on daily based expense. Whereas, nonfood consumption expenditure like social participation, education related expense, medical treatment, potable water, telephone, Electricity (solar and rural based light), for home utensils and related durable materials evidence were monthly collected and converted to annual basis.

Household Income (Inco): Generating income from different sources like saving interest, dividend, crop products, animal products and by products, non-farm activities. It includes having high purchasing power and the ability to acquire the basic goods and services. The reports use disposable household income adjusted for household size and composition

Household Asset base (Ass): This consists cash and non-cash property like cash on hand, cash at Bank, farm and non-farm machinery, home equipment and properties, houses, stores and

its stock, livestock, vehicles in terms of money value by using current market price.

Independent variables and their relationship with the dependent variable: The independent variables of the model are those variables that are expected to have correlations with the SACCOs membership participation and the outcome variables selected in this study. The socio-economic, demographic and institutional factors affect the dependent variable and outcome variables are presented as follows

RESULTS AND DISCUSSION

Econometric Analysis: In this part the econometrics model reports results econometric analysis factors affecting participation in SACCOs and the impact micro finance services on household asset accumulation, income of household heads and consumption of sample households. From the estimation result of the Marginal effect of the logit model of the above table depicted that the statistically significant and economically meaning full variables that affect SACCOs participation were age of the household head, Educational level, access to credit services, interest rate, access to training opportunity, number of income source and market center distance. Table 5 shows the marginal effect estimation of the logit model with factor affecting SACCOs membership participation interpreted as follows. A one more year in the age of households, increases the probability of SACCOs participation by 11.5 %, keeping other factors constant. A one more increase in years of schooling, leads to increase in the likelihood of participating in SACCOs by 3.5 %, keeping other constant. Being marital status of household heads increases, the probability of marginal effect of SACCOs membership participation by 11.9 on average. A one more distance of financial institution increases, the probability of marginal effect of membership participation by 0.01 %, keeping other variables constant. The regression result depicted that having access to credit services increases the probability of membership in SACCOs by 58.5 %, on average. This finding is in line with the study by Solomon (2016). The explanation of this result is straight forward that as households borrowed more cash, the ability of purchasing productive assets also increased. In the case of sample treatment groups, Pitt and Khandker (1998) which found a significant association between women taking out loan and their accumulation of non-financial assets. In the same way Goldberg and Yang (2011) also found that in Malawi participation in micro finance (taking loan) increases savers accumulation of non-financial assets. Borrowers consist of those whom receive valuable assets on agreement or promise on paying the borrowed amount back in given time and cost related (Kon and Storey, 2003; Hodgman, 1960).

A one less percent loan interest rate increases, the probability of marginal effect of membership participation by 28.0%, *ceteris paribus*. SACCOs members enjoy low interest rates as compared to loans provided by other financial institutions like banks. Banks and other financial institutions charge high interest rates which are normally calculated on compound interest basis, when interest rates are low, encourage borrowing and ultimately promote investment in different sectors (Gasper 2013). According to Toli (2013) getting loan is the primary benefit that members expect after joining SACCOs.

Interest on loan is the source of income for SACCOs. Income for SACCOs is expense for members. Being access training opportunity increases, the probability of marginal effect of membership participation by 60.8%, on average. According to Khumalo (2014) endeavors to bring to light some of the possible solutions to the current challenges, among which is the need for establishing training institutions on cooperatives, the creation of an enabling environment for a strong cooperative movement to thrive, and provision of adequate funding.

A one extra source of income increases, the probability of marginal effect of SACCOs membership participation increases by 0.1904179, keeping other factors constant. It is in line with the study conducted by (Ayalew, 2014) also indicated that occupation is one of the basic factor that affect membership and also members participation. The rural poor who were involved in non agricultural activities are more likely to join a RUSACCO and participate more in borrowing activities than those involved in farming activities. It comprises of the various components of household income including; property income, income from enterprises (farm and off-farm), labour income (salaries and wages), and transfers plus other benefits. (UBOS – UNHS, 2009/10). The result of distance from market center tells that a one more kilometer distance increases, and decreases the probability of marginal effect of membership participation by 8.0%, keeping other variables constant.

Defining region of common support: Once a propensity score has been calculated for each observation, one must ensure that there is overlap in the range of propensity scores across treatment and comparison groups (called “common support”). No inferences about treatment effects can be made for a treated individual for whom there is not a comparison individual with a similar propensity score. Common support is subjectively assessed by examining a graph of propensity scores across treatment and comparison groups. Propensity scores only balance measured covariates, and balance in measured covariates does not necessarily indicate balance in unmeasured covariates. If unmeasured covariates are confounders, they can bias treatment effect estimates. This bias may increase as the relationship between measured and unmeasured covariates becomes stronger (Brooks and Ohsfeldt, 2013).

Algorithm to estimate the propensity score the treatment is membership, the frequency was 112 (55.45%) for non members and 90 (44.55%) members. Description of the estimated propensity score in region of common support was between 0.04812215 and 0.99621133. The final number of blocks ensures that the mean propensity score was 6 and not different for treated and controls in each block. The balancing property is satisfied. Next we need to define the common support region where distributions of the propensity score for treatment and comparison group overlap. For PSM to work, the treatment and comparison groups must be balanced in that similar propensity scores are based on similar observed X . The results of the restriction 24 respondents from treated group are discarded. This shows that the study does not have to drop many treated respondents from the sample in computing the impact estimator. Some literatures consider goodness of common region specification if the 75% sample household heads in overlap region, but the table 4.1 results shows the sample household in the common region above the standard 88.12%.

Table 1: Target population and sample size

Woreda	Total SACCOs	Sample SACCOs	Total Population from total SACCOs	Total Sample size from total SACCOs	Proportion	Sample size	
						Members	Non members
Butajira	17	Mesret	1874	347	0.18	10	12
		Rahi		224		6	8
Edja	44	EdjaMengistserategn	6877	305	0.66	12	14
		Shebraden		346		14	16
		Sheremo		380		15	17
		Gedeb		280		11	13
		Salech Mariam		230		9	11
Abeshge	30	AbehgeMamihian	1716	252	0.16	8	10
		Udad 5 enaA kebabi		60		1	3
		Kulit 2		145		4	8
Total	91	10	10467	2569	1	90	112

Source: From respective woredas' Cooperative Office 2019

Table 2. Variables Measurement and their expected signs

Variables	Measurement	Expected Sign
Treatment Variable		
Participation in SACCOs	1 for participant, 0 otherwise	
Outcome variables		
Consumption expenditure	In Ethiopian birr	
Household income	In Ethiopian birr	
Household asset base	In Ethiopian birr	
Independent variables		
Age of the Household	Years a person lives on earth	(-/+)
Marital status	1 for married, 0 otherwise	(+)
Education level	Final Grade completed	(+)
Family size	Number of family members	(-/+)
Sex of respondent	1 for male, 0 otherwise	(+)
Distance to the nearest market	Kilo meters (km)	(-/+)
Source of income	1=onfarm, 2=offfarm, 3= nonfarm, 4= civil servant, 5=retirement, 6=labor.	(+)
Access productive asset	In Ethiopian birr	(+)
Training/information	1 if attain 0 otherwise	(+)
Interest on borrowing	Percentage	(-/+)
Proxy to other financial institutions	Kilo meters (km)	(-/+)

Table 5: Estimated logit result with Marginal effect

Logistic regression		Number of obs= 202			
LR chi2(11) = 112.09 Prob> chi2 = 0.0000		Pseudo R2 = 0.4038			
Log likelihood = -82.767872					
Mership	Coef	dy/dx	Roubust Std. Err	Z	P> z
Age	.0479022	.0114626	.02312162	2.06	0.039**
sex	.4424026	.1041878	.45007	0.98	0.326
Edu	.1464105	.035035	.0574058	2.55	0.011*
MarS	.5245503	.1185317	.7918303	0.66	0.508
MFLdis	.0005893	.000141	.0229696	0.03	0.980
Cred	4.021717	.5845764	1.057602	3.80	0.000*
Interest	.116977	.0279918	.0412735	2.83	0.005**
Tra in	3.016612	.6079809	.8651387	3.49	0.000*
Fmly size	-.0806873	-.0193079	.1100636	-0.73	0.463
sincome	.7957525	.1904179	.4425171	1.80	0.072***
Mkdis.	-.3325792	-.0795838	.2008144	-1.66	0.098***
_cons	-9.929421	.0000487	2.116221	-4.69	0.000

Note: *, **, *** probability level of 1%, 5% and 10%.

Source: Own model result (2019)

Table 6: Common support region specification

Psmatch2: Treatment assignment		Psmatch2: common support		Total
Off Support		On support		
Untreated	0	112	112	112
Treated	24	66	90	90
Total	24	178	202	202

Source: Own result (2019)

Table 7. Comparison of three matching estimators

Matching estimator	Performance criteria								
	Asset			Income			Consumption		
	Balancing test*	Pseudo R ²	Matched sample size	Balancing test*	Pseudo R ²	Matched sample size	Balancing test*	Pseudo R ²	Matched sample size
NN									
Neighbot (1)	21	0.117	178	21	0.117	178	21	0.117	178
Neighbot (2)	10	0.056	178	10	0.056	178	10	0.056	178
Neighbot (3)	9	0.049	178	9	0.049	178	9	0.049	178
Neighbot (4)	12	0.062	178	12	0.062	178	12	0.062	178
Neighbot(5)	13	0.071	178	13	0.071	178	13	0.071	178
Caliper									
0.1	8	0.045	178	0.1	8	0.045	0.1	8	0.045
0.25	7	0.039	178	0.25	7	0.039	0.25	7	0.039
0.5	24	0.130	178	0.5	24	0.130	0.5	24	0.130
Karnel									
Band width 0.1	21	0.117	178	21	0.117	178	21	0.117	178
Band width 0.25	21	0.117	178	21	0.117	178	21	0.117	178
Band width 0.5	21	0.117	178	21	0.117	178	21	0.117	178

Source: Model result (2019)

Table 8. Covariates before and after on treatment and control group

Variable	unmatched	Mean		%reduct /bias/	t-test	V(T)/ V(c)		
	Matched	Treated	Control					
Age	U	42.656	41.545	10.7	t	p>/t/		
	M	42.697	42.842	-1.4	87.0	-0.08	0.453	0.88
Sex	U	.67778	.58929	18.4		1.29	0.198	
	M	.63636	.57482	12.8	30.4	0.72	0.940	
Edu	U	8.3	7.1161	24.6		1.74	0.084	0.91
	M	7.9242	8.0872	-3.4	86.3	-0.19	0.848	1.00
Mars	U	.92222	.875	15.6		1.09	0.084	0.91
	M	.90909	.88754	7.1	54.4	-0.19	0.848	1.00
Mfdis	U	13.222	14.223	-9.7		-0.68	0.496	0.97
	M	13.621	13.885	-2.5	73.6	-0.14	0.888	0.88
Cred	U	.98889	.61607	105.5		7.10	0.000	
	M	.98485	.93562	13.9	86.8	1.45	0.150	
Interest	U	21.311	19.08	39.6		2.96	0.003	62.96*
	M	20.606	19.439	20.7	47.7	1.24	0.216	13.78*
Tra in	U	.36667	.01786	89.2		7.29	0.000	
	M	.13636	.08996	13.1	86.7	0.84	0.404	
Fmy size	U	4.2333	4.3393	-4.6		-0.32	0.748	0.80
	M	4.4091	4.563	-6.6	-45.3	-1.03	0.702	0.83
scincome	U	1.4222	1.2589	33.9		2.42	0.016	1.39
	M	1.3636	1.4521	-18.4	45.8	-1.03	0.304	0.93
Mkdis	U	3.2	3.4464	-23.6		-1.66	0.099	0.87
	M	3.2727	3.361	-8.4	64.2	-0.48	0.634	1.00

*if variance ratio outside[0.66;1.52] foUand[0.61;1.63] for M

Sample	Ps R2	IR chi2	P>chi2	Meanbias	B	R	%var
unmatched	0.406	112.63	0.000	34.9	171.3*	1.08	14
Matched	0.039	7.05	0.795	9.9	45.9*	1.44	14

*if B>25%, Routside[0.5;2]

Source: Own result (2019)

Table 9. ATT estimate of participation in SACCOS on Household Asset Accumulation

Variable Sample	Treated	Controls	Difference	S.E.	T-stat
Ass Unmatched	29472.9889	10631.875	18841.1139	3662.62215	5.14
ATT	27647.3485	12076.8455	15570.503	5084.50265	3.06

Table 10. ATT estimate of participation in SACCOS on Households' Income

Variable Sample	Treated	Controls	Difference	S.E.	T-stat
Inc o Unmatched	41339.0444	39163.7857	2175.25873	3479.51892	0.63
ATT	40879.7121	43761.3376	-2881.62548	4891.37896	-0.59

Table 12: Sensitivity Analysis test Rosenbaum bounds for Ass (N = 202 matched pairs)

Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0	0	12350	12350	11250	13500
1.25	0	0	11590	13052.5	10608	14805.5
1.5	0	0	10984	14005	10124	15858
1.75	0	0	10595	14850	9536	17132.5
2	0	0	10300	15591	9044	18654.5
2.25	1.1e-16	0	9920	16285	8675	20485
2.5	3.2e-15	0	9500	17209.5	8500	22445
2.75	5.4e-14	0	9188	18225	8367	24553
3	5.6e-13	0	8886	19437.5	8270	27050

Note: gamma -log odds of differential assignment due to unobserved factors

sig+ - upper bound significance level

sig- - lower bound significance level

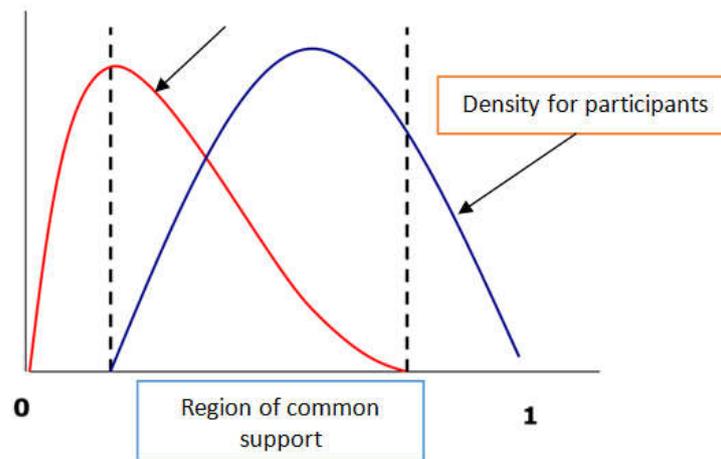
t-hat+ - upper bound Hodges-Lehmann point estimate

t-hat- - lower bound Hodges-Lehmann point estimate

CI+ - upper bound confidence interval (a= .95)

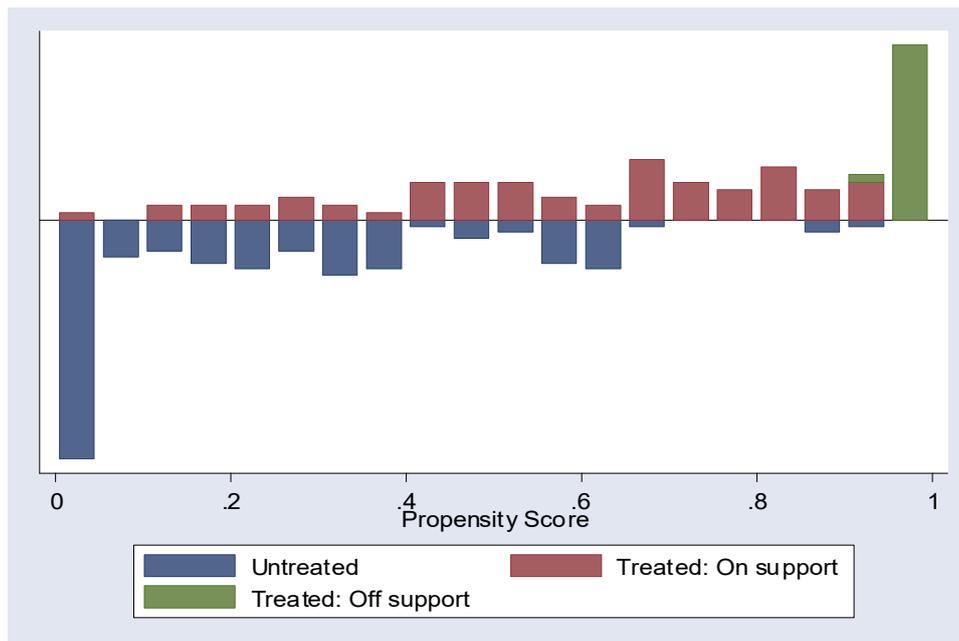
CI- - lower bound confidence interval (a= .95)

Source: Own computation (2019)



Source: Heckman and Smith (1999)

Figure 2. Region of common support



Source: Model result (2019)

Figure 3. Distribution propensity score across treated and untreated group

Besides overlapping, the propensity score should have a similar distribution ("balance") in the treated and comparison groups. A rough estimate of the propensity score's distribution can be obtained by splitting the sample by quintiles of the propensity score. A starting test of balance is to ensure that the mean propensity score is equivalent in the treatment and comparison groups within each of the five quintiles (Imbens 2004). If it is not equivalent, one or more of the quintiles can be split into smaller blocks. If balance within smaller blocks cannot be achieved, the covariates or functional forms of covariates included in the score can be modified. In this it also tested by ensuring that mean propensity score is equivalent in both treatment and comparison.

Choice of matching algorithms: Different matching estimators had been tested in matching the SACCOs membership participants and non-participant as a control group study area, in the common support region. To choose the best matching estimator for the analysis, different guiding criteria, such as equal means test referred to as the balancing test (Dehejia and Wahba, 2002), low Pseudo R2 and matched sample size were taken into consideration. Matching estimators like nearest neighbor, caliper radius matching and kernel with different band width were tested. Thus, a matching estimator which balances all the explanatory variables that results insignificant mean differences between the two groups, bearing low pseudo R2 value and also results in large matched sample size was taken as the best estimator. Results show that among estimators, caliper radius matching (0.039) was found to be the best estimator for the collected data (Table 7).

After the propensity score is balanced within blocks across the treatment and comparison groups, a check for balance of individual covariates across treatment and comparison groups within blocks of the propensity score should be performed. This ensures that the propensity score's distribution is similar across groups within each block and that the propensity score is properly specified (Imbens, 2004). There is no rule regarding how much imbalance is acceptable in a propensity score. Proposed maximum standardized differences for specific covariates range from 10 to 25 percent (Austin 2009a; Stuart, Lee, and Leacy 2013).

Balance of Covariates after Matching by a Propensity Score: After choosing a matching or weighting strategy, it is important to evaluate how well the treatment and comparison groups are balanced in the matched or weighted samples. If the treatment and comparison groups are poorly balanced, the propensity score needs to be re-specified (Ho et al., 2007; Austin, 2009a). As with the balancing steps outlined earlier, a common first test is comparing standardized differences. Smaller differences in means and higher order moments are better (Ho et al., 2007), especially in confounders hypothesized to be strongly related to the outcome. Table 9 above indicated that the asset accumulation between SACCOs participants and non-participants before and after propensity score matching comparatively SACCOs participants prosperous than non-participants before and after matching. Accordingly, participants gained 15,570.50 birr because of membership in SACCOs as compared to the non-participants. Available studies on ASCA usually take asset accumulation as a proxy indicator for income, because the latter is difficult to measure and asset accumulation is seen as the higher goal (Matthews et al., 2010). SACCOs have notable contribution in terms of providing loans to facilitate growth of business and ultimately

enable members to accumulate capital by reinvesting profits (Gasper, 2013).

Income of House hold heads: Households' income is a measure of the combined incomes of all people sharing a particular household or place of residence. It includes every form of income, salary, wage, retirement income, investment gains, agricultural income and trade. However, the impact of participation in SACCOs on households' income was found to be insignificant (Table 10). Consumption of house hold heads. The result of ATT indicated in Table 11 showed that there is no significant difference between the participants and non-participants in terms their consumption. Under the condition of non-experimental data analysis the problem of unobservable bias would be checked by sensitivity analysis test. The best thing to examine the unmeasured biasness of outcome variables in the selection process is to check the sensitivity of estimated ATT with respect to changes in Conditional Independence Assumption (CIA). Accordingly, the estimated ATT is not sensitive to unobserved factors. This means the CIA assumption holds. As stated by Rosenbaum (2002) the use of Rosenbaum bounding is the best approach to check the sensitivity responses on the statistically significant outcome variables. Rosenbaum bounds provide evidence on the degree to which any significance results show on untested assumptions. So, if the result of test showed sensitive the researcher should have to remind about the solution of this problem and design other estimating strategies.

Conclusion

The finance collected by saving and credit cooperatives (SACCOs) involve in economic scales. Accordingly, the SACCOs participants had more accumulation of current asset; cash on hand, cash on saving account, cash at bank, and fixed asset like Cattle, Machineries, Vehicles, house and house furniture, stores and stocks than non-participants. SACCO participation have positive and significant impact on household asset accumulation. However, participation in SACCOs does not have significant impact on income of members or participants. And also SACCOs participants less sound in adult equivalent consumption includes medical and treatment cost, educational cost, food and non-food consumption, electricity and water, social service cost, solar purchase comparatively with non-participants. SACCOs should attract members using different promotion mechanisms like preparing anniversary year of foundation with low cost, invite media and radio, participating on annual cooperative exhibition, compiling and publishing scale up experience among role model members, distribution brochure to members and nonmembers to enhance the soundness of SACCOs on household wellbeing. A necessarily brainstorm training should be delivered for all types of committee, participants and non-participants of SACCOs on different stream, such as on financial literacy campaign, community participatory approaches, book keeping and financial management, governance in cooperative, monitoring and evaluation, entrepreneurship, financial product and management, gender and nutrition, HIV mainstreaming to enhance the contribution of each on management capacity, on saving amount and on loan benefit. SACCOs has shortage of loanable fund, therefore this primary solve by using internal source finance through promotion financial products includes:- upgrade compulsory saving, voluntary saving, child saving and search external fund from institutional saving.

(Idir, Church, Meskid, school, Tenakela), leveraging monthly saving (proportion saving and share), revolving fund from government and development sectors. There was a weak government support for SACCOs. Therefore, researchers recommend here is institutionally the government support clearly stated on the proclamation help organizing this organization in prepare training and conduct research that solve SACCOs problem, since they are financial institution they should obtain land of an office construction free from lease, it shall be free from any court fees that is payable in connection with its property for dispute entertained by courts, be exempted from income tax and the government undertake the quality and coverage of auditing services should be applicable. SACCOs should seriously work to develop members entrepreneurial talent and promoting members to investing on off-farm and non-farm rather than invest on fixed asset activities to improve household wellbeing. Since family size of households inversely affecting household membership, SACCOs should closely work with Ministry of health found at different levels on household family planning. Multipurpose cooperative in rural part of the study area should be functional to solve the market problem that discourages household heads participates in SACCOs.

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