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IMPACT OF MICROFINANCE PROGRAMS OF ACSI ON ASSET OWNERSHIP

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Abstract: *A key characteristic of poor people all over the world is that they lack assets that can be used to secure loans and household durables. On the other hand, provision of microfinance services help individuals or households to protect, diversify and increase their income, and build assets. Hence, participation in microfinance credit programs leads to improvement in accumulation of assets over which the client has control. The main objective of the study was to investigateimpact of microfinance programs of ACSI on asset ownership. To do so, cross-sectional surveys of 400 questionnaires were administered to two groups of respondents which comprised of 200 established and 200 new clients. The study used frequency, percentages, means, t-test and chi-square in order to associate different individual characteristics, program and outcome variables with level of participation in ACSI. In addition, the study has employed propensity score matching method to control for self-selection and program selection bias. The research findings suggest thatparticipation in ACSI microfinance program played an important role in assisting participants to contribute towards the acquisition physical assets such as television and refrigerators. Therefore, there was much difference between established and new clients with respect to their contribution towards the acquisition of physical assets for their households. However, level of participation in ACSI has no significant effect on saving deposit for both stratification and kernel matching methods on average to established clients.*

Key words: *ACSI, assets, television, refrigerator, saving deposit, PSM, ATT*

1. INTRODUCTION

A key characteristic of poor people all over the world is that they lack assets that can be used to secure loans and household durables (Adjei et al., 2007; Adjei et al., 2009). On the other hand, provision of microfinance services help individuals or households to protect, diversify and increase their income, and build assets thereby reducing their vulnerability to shocks (Aghion and Morduch, 2005; Adjei et al., 2009; Daniel, 2009). Hence, participation in

microfinance credit programs leads to improvement in accumulation of assets over which the client has control (Barnes, 1996).

According to Barnes (1996), assets are the stock of wealth in a household or other unit and represent its gross wealth. Thus, accumulation or changes in household ownership of assets can be considered as an indicator of improvement in or changing living standards of households (Barnes, 1996; Adjei et al., 2007; Daniel, 2009; Ghalib et al., 2011; White and Alam, 2013). Barnes (1996) argued that assets may be categorized depending on different criteria including their ability to generate income, and to appreciate or depreciate in values. Accordingly, the categorization includes financial, physical and human assets[1] (Barnes, 1996; Ghalib et al., 2011; Mago, 2013).

There are ample empirical evidences to support the role of assets in changing the livelihood of poor people (Adjei et al., 2007).Assets can reduce vulnerability; improve creditworthiness, improve household stability, increase personal efficacy, and finally, a larger and more diverse asset base can reduce covariate risk (Grinstein-Weiss, 2007; Daniel, 2009; Ghalib et al., 2011; White and Alam, 2013; Oluyombo, 2014).Therefore, these emphasize the need for asset strengthening and accumulation to achieve livelihood enhancement.

Generally, evaluation of the effects of microfinance programs on clients' asset building is deemed to be a useful topic to research (Adjei et al., 2007). Therefore, this section has attempted to carry out an econometric analysis of the extent to which ACSI has contributed to build up of the asset bases of clients.

The remainder of the paper is organized into four sections. Section two examines methods of estimation such as descriptive statistics and propensity score matching method whilst section two examines about description of variables which were used in the descriptive statistics and econometrics model. Section three presents the empirical results of the study whilst the final section presents conclusion of the study.

2. METHODS OF ESTIMATION

2.1 Descriptive statistics

In this section, descriptive statistics was one of the techniques used to summarize the data collected from the sample respondents. In addition, it was used to the association between

[1] The definition of assets here includes property of any form that a borrower purchased after he or she joined ACSI.

different individual characteristics, program and outcome variables with level of participation in ACSI. For these reasons frequency, percentages, means, t-test and chi-square were used.

2.2 Propensity Score Matching (PSM) method

The primary target of this section was to measure the impact of microfinance programs of ACSI on asset ownership of old (established)[2] clients in the treated group[3] relative to new clients in the control group. Thus, it was reasonable to compare asset ownership of old and new clients with access to MFIs as long as MFIs programs are randomly distributed across the samples or there was no sample selection bias.

However, in the absence of an experimental design, assignment to microfinance program is frequently non-random (Heinrich et al., 2010). Hence, this results in biased program evaluation. There are two factors that could results in biased program evaluations which are self-selection in to programs and non-random program placement (Pitt and Khandker, 1998; Khandker, 2005; Dunford, 2006; Chemin, 2008; Imai et al., 2010; Alam, 2013). Hence, these issues must be addressed when evaluating the impact of microfinance programs.

Evaluation issues

If clients are not self-selecting in microfinance programs but are randomly picked by some observable mechanisms or qualities, one could control self-selection and examine the differences in asset ownership to obtain a valid estimate of the program effect. However, according to Khandker (2005), Imai et al. (2010), Alam (2013), some qualities are likely to be unobservable. For instance, entrepreneurial skills, persistence in seeking goals, organizational ability and access to valuable social networks are not readily observed but would affect both the program participation decision and welfare (Aghion and Morduch, 2004). Thus, if the clients that join programs are better entrepreneurs or are more willing to work than those who do not join, then a comparison of outcome variable between old and new clients would wrongly attribute to the microfinance and would cause the estimates of program impact to be biased upward.

On the other hand, non-random program placements may bias the results as well. If programs are randomly placed, then one can compare clients' outcome in program areas

[2]In this section old and established clients were used interchangeably.
[3] Treated groups wereold clients and control groups were new clients with both accesses to microfinance.

and non-program areas to obtain the impact on outcome variables. But, when the program placement is non-random, simply comparing the welfare indicators in both types of areas would lead to a downward or upward bias of the program effects (Morduch, 1998; Pitt and Khandker, 1998; Khandker, 2005; Alam, 2013). Thus, these may lead to the erroneous conclusion that credit programs are reducing or exacerbating poverty problem.

Therefore, evaluating asset ownership impacts of ACSI requires disentangling its role from the simultaneous roles of all of the attributes above. To do so, this section used Propensity Score Matching (PSM) method of impact evaluation. In addition, so as to check robustness of PSM estimates, the study had employed Heckman two stage estimations method.

Propensity score matching method

The propensity score matching method is one of the non-parametric estimation techniques that do not depend on functional form and distributional assumptions (Dehejia and Wahba, 2002; Heinrich et al., 2010).

According Heinrich et al. (2010), in absence of random program placement, units receiving treatment and those excluded from treatment may differ not only in their treatment status but also in other characteristics that affect both participation and the outcome of interest. Therefore, to avoid the biases that this may generate, matching methods find a new clients that is similar to old clients and allowing an estimate of the intervention's impact as the difference between old clients and the matched comparison case.

After all, the basic idea of PSM method is to match old with new clients of ACSI. However, matching in terms of covariates is very difficult since it is very difficult to find new client which are exactly the same but different only in terms number of loan facilities (Dehejia and Wahba, 2002; Khandker et al., 2010).To solve these problems, PSM constructs a statistical comparison group that is based on a model of the probability of participating in the treatment using observed characteristics. Old clients are then matched on the basis of this probability, or propensity score, to new clients (Khandker et al., 2010). Then, matching methods find a new client that is similar to old client, allowing an estimate of the intervention's impact as the difference in average of outcomes between established and the matched comparison case (Heinrich et al., 2010).

Assumptions

According to Rosenbaum and Rubin (1983), Heckman et al. (1997), Dehejia and Wahba (2002) and Caliendo and Kopeinig (2005), PSM has two basic assumptions:

a. Conditional independence assumption (CIA): selection is solely based on observable characteristics.

$$Y_{h1}, Y_{h0} \perp C_{hi} | W_{hi} \quad (1)$$

Where: C_{hi} denotes a dummy variable such that $C_h = 1$ if the i^{th} client is old client and $C_h = 0$, otherwise; W_{hi} shows observable characteristics of i^{th} client which affect both outcome and treatment; Y_{h1} and Y_{h0} denote potential observed asset ownership outcome for both clients respectively.

b. Sizable common support: this assumption ensures that clients with the same W_h values have a positive probability of being both old and new clients.

$$P(W_{hi}) = Pr(C_h=1 | W_{hi}) \quad (2)$$

Here, the paper main goal is to identify the average treatment effect on the treated (ATT). Then ATT (τ) is given by:

$$\tau = E(Y_{h1} - Y_{h0} | C_h = 1)$$

$$\tau = E(Y_{h1} | C_h = 1) - E(Y_{h0} | C_h = 1) \quad (3)$$

Hence, ATT (τ) is given as average difference between outcome of old clients $E(Y_{h1} | C_h = 1)$ and the outcome for old clients that would have been resulted had they not been old clients of ACSI $E(Y_{h0} | C_h = 1)$.

However, according to Heinrich et al. (2010), the evaluation problem is that we only observe Y_{h1} or Y_{h0} but never both. $E(Y_{h1} | C_h = 1)$ could be constructed from the data. Missing is the information required to identify $E(Y_{h0} | C_h = 1)$, referred to as the counterfactual outcome (what would have been asset ownership outcome for clients had they not been old clients). If program placement is non-random, we can substitute the unobservable $E(Y_{h0} | C_h = 1)$ for the observable $E(Y_{h1} | C_h = 1)$ when estimating ATT.

Hence, we end up with:

$$Bias = E(Y_{h0} | C_h = 1) - E(Y_{h0} | C_h = 0) \quad (4)$$

But, according to Heckman et al. (1997), the method of matching solved the evaluation problem by assuming CIA: conditional on W_{hi}, Y_{h1} and Y_{h0} are independent of $C_{hi.}$

$$Y_{h1}, Y_{h0} \perp C_{hi} | W_{hi} \quad (5)$$

This is referred to as CIA. The CIA required that all sets of W_{hi} affecting both the outcome and treatment be included in the matching. When CIA held, we could therefore use the outcome of new clients as an approximation of the counterfactual outcome.

$$E(Y_{h0} | C_h = 1) = E(Y_{h0} | C_h = 0) \quad (6)$$

The basic idea of matching is to pair treated and control group clients on the basis of their observable characteristics (Dehejia and Wahba, 2002). But, matching on covariates is difficult to implement when the set of covariates is large. To overcome the curse of dimensionality, Nannicini (no date) showed that if matching on W_h is valid, so is matching on the propensity score P (W_h).

Propensity score (response probability) is defined as the conditional probability that i^{th} client being established one given covariates.

$$P(W_{hi}) = Pr(C_h=1 | W_{hi}) \quad (7)$$

Hence, ATT can be estimated as follows:

$$\tau = E(Y_{h1} - Y_{h0} | C_h = 1, P(W))$$

$$= E(Y_{h1} | C_h = 1, P(W)) - E(Y_{h0} | C_h = 1, P(W))$$

$$= E(Y_{h1} | C_h = 1, P(W)) - E(Y_{h0} | C_h = 0, P(W)) \quad (8)$$

When applying PSM, the question was which estimating model and variables to use. According to Ghalib et al. (2011), logit or probit can be used to estimate the propensity score. In this section, the probit model was used in calculating propensity score. But, selecting covariates requires choosing a set of variables that will plausibly satisfy the CIA. Thus, the study has incorporated different variables which simultaneously affect both level of microfinance participation and asset ownership.

Matching methods

However, the estimation of the propensity score is not enough to estimate ATT; there is a need to search for matching algorisms or methods to match old with new clients. Different matching mechanisms can be used to assign old to new clients of ACSI based on the propensity score. Here, the study used stratification and kernel matching methods. Stratification procedure partitions the common support into different strata (or intervals) and calculates the program's impact; whereas, kernel matching techniques is a non-parametric matching estimator and uses a weighted average of all new clients to construct the counterfactual match (Caliendo and Kopeinig, 2005; Khandker et al., 2010).

3. DESCRIPTION OF VARIABLES

The survey, cross-sectional in nature, was carried out from April to July, 2016. In all, 400 questionnaires were administered to two groups of respondents. Thus, two sample groups

were selected and this comprised of 200 established clients, who had borrowed and utilised at least three loan facilities for periods of over two years, and 200 new clients, who had either not benefited from any loan facility from ACSI before or had benefited from one loan facility which is being serviced.

Nevertheless, this section has incorporated different variables which simultaneously affect both clients' level of participation in ACSI and asset ownership outcomes of interest. Generally speaking, the variables used in the model were classified into outcome variables, treatment variable and independent variables.

Outcome variables

Physical assets: The study has identified two main items of physical assets, television and refrigerator, that were valuable and appreciated by clients of ACSI at time of pilot test. Hence, respondents were asked about purchases they made on such physical assets.To avoid aggregation bias in the analysis, the study used market prices of these assets owned by clients. On the other hand, these outcome variables were measured in Ethiopian Birr (ETB).

Saving deposits: Amount of saving deposits by clients is classified as financial assets of the individuals (Barnes, 1996). Saving deposit was the total amount of money deposited by both client types in their account at ACSI during time of data collection. Further, this outcome variable was measured in ETB.

Treatment variable

Level of participation in ACSI: The treatment variable employed in the model was reduced to dichotomous one taking the value of 1 if the client was old (established client) and 0 otherwise.

Independent variables

Independent variables which were used in the analysis of the model were categorized under a list of individual characteristics and program variables.

Individual characteristics

Sex of the respondent: There is a belief that female clients of MFIs have less opportunity to own valuable asset due to the reason that having little or no say in major household decisions(Daniel, 2009; Anang et al., 2015). This variable was measured as a dummy variable taking the value 1 if the respondent is male and 0 otherwise.

Age of the respondent: Young people have more strength to engage in different kinds of work than the elderly which may give them more income to increase asset holdings(Oluyombo, 2014).This variable was measured on a continuous scale in terms of the respondent's number of years of age at time of data collection.

Marital status of the respondent: Borrowers with high levels of education and who are married tend to be more economical and, therefore, acquire items (Adjei et al., 2007; Adjei et al., 2009). Marital status here was measured as a dummy variable taking the value of 1 if the respondent is married and 0 otherwise.

Education level of the respondent: Higher levels of education are associated with increased asset ownership (Grinstein-Weiss et al., 2007). This variable was a categorical variable indicating the value 1 if the respondent attended secondary high school education and above, and 0 otherwise.

Family size of the respondent: Is assumed to affect both level of participation in ACSI and asset ownership of clients. Grinstein-Weiss et al. (2007) argued that less family size respondents are found to be wealthier than families with large number of members.

Distance from nearby ACSI branch offices: This variable was an important one which affects level of participation in microfinance and in turn asset ownership. In addition, this variable was measured in terms of minutes that it takes from clients' business premise with lender office.

Programme variables

The effects of participation could be well measured if both the loan amount granted to a participant and the lengths of time were considered (Adjei et al., 2007; Adjei et al., 2009).

Months with ACSI: The longer membership duration or the number of months with MFIs, the more assets the client is likely to purchase (Garikipati, 2008; Oniyana and Turnell, 2013). Thus, this variable was measured in terms of number of months since the first loan.

Amount of Loan: Amount of loan also played an important role in assisting participants of the programme to contribute towards the acquisition of assets (Adjei et al., 2007; Adjei et al., 2009). Hence, the higher the total loan received the higher probability of borrowers to own assets. On the other hand, this variable was measured in ETB.

4. RESULT AND DISCUSSION

4.1 Descriptive statistics analysis

The share of female respondents was 58.5 % of the new clients and 51.5 % of established clients of ACSI. As has been shown below, there was no statistically significant association between sex of the respondents and level of participation in ACSI. With regard to marital status, 52.5 % of new clients were married compared to 53.5 % for established clients; meaning that majority of sample respondents were married.

On the other hand, with respect to education background, the educational achievements of new clients of ACSI were primary school, and secondary high school and above with the percentages of 31.5 and 68.5 whereas the educational backgrounds of old clients were primary school 27.5%, and secondary high school and above with the percentage 72.5 respectively.

Table 1: Frequency, percentages and chi-square results for dummy variables

Variables		New clients N = 200		Established clients N = 200		χ2
		N	%	N	%	
Sex	Female	117	58.5	103	51.5	1.980
	Male	83	41.5	97	48.5	
Marital status	Not married	95	47.5	93	46.5	0.040
	Married	105	52.5	107	53.5	
Education	Primary	63	31.5	55	27.5	0.769
	Secondary and above	137	68.5	145	72.5	

Source: Own computation, 2017.

The mean age of established clients was higher than the mean age of new members of ACSI. In this regard, the mean age for the established and new clients was 34.6 and 34.12 years respectively. Regarding family size, sample respondents had average family size of 3.07 with standard deviation of 2.023. Of these, the average family size of the new clients was 3.12, while the mean size for old clients was 3.02.

In terms of distance of business premise of borrowers with the nearby ACSI branch offices, it took established clients 32.82 minutes on average to reach the nearby branch office which was found to be statistically higher than the average distance of new clients which was 26.15 minutes.

On the other hand, length of time as clients of ACSI for both clients type ranges from zero to 144 months with mean membership length of 40.8 months. Accordingly, the mean lengths of months as a client for new and established clients was 29.05 and 52.5 months respectively, which was statistically significant at 1%. On the other side, the mean loan size for established clients was ETB 20897 which was higher than the mean loan amount received by new clients with about ETB 18884. But, this difference was not statistically significant among both groups.

Nevertheless, the average expenditure of respondents on television was ETB 2882.5. Of this amount, the average expenditure of new and old clients was ETB 2212.9 and ETB 3552.2 respectively. Therefore, based on these, the average expenditure of established clients for acquisition of television was statistically greater than the average expenditure of new clients with 1% level of significance. On the other hand, the mean expenditure of old clients on refrigerator was higher than the mean expenditure of new clients on refrigerator. The mean expenditure of old clients was ETB 2865.3 and the same expenditure for new clients was ETB 1204.7 respectively. In addition, this difference was statistically significant with 1%.

On top of these, the survey results showed that the average amount of saving deposited by established clients was ETB 4802.0 with maximum saving deposit of ETB 42000. To the contrary, the average saving deposit of new clients was ETB 4199.1 with maximum saving deposit ETB 40000 respectively. In addition, the study has identified that about 78% of respondents had deposited money in their account with ACSI.

Table 2: Mean, Std. Dev., and t-values for continuous independent and outcome variables

Variables	Participation	N	Mean	St. Dev.	Mean difference	t-value
Age	New	200	34.12	8.568	-0.48	-0.555
	Old	200	34.60	8.745		
	Total	400	34.36	8.645		
Family size	New	200	3.12	1.968	0.095	0.469
	Old	200	3.02	2.081		
	Total	400	3.07	2.023		
Distance	New	200	26.15	39.046	-6.67	-1.405***
	Old	200	32.82	54.646		
	Total	400	29.49	47.549		
Months with ACSI	New	200	29.05	25.021	-1.95	-8.815*
	Old	200	52.50	28.096		
	Total	400	40.76	29.047		
	New	200	18883.5	17236.14		

Loan amount	Old	200	20897.0	28954.24	-2013.5	-0.845
	Total	400	19890.3	23818.26		
	New	200	2212.9	2687.61		
Expenditure on TV	Old	200	3552.2	3164.42	-1339.3	-4.562*
	Total	400	2882.5	3007.71		
	New	200	1204.7	3188.65		
Expenditure on refrigerator	Old	200	2865.3	4551.74	-1660.7	-4.222*
	Total	400	2032.9	4010.24		
	New	200	4199.1	6471.27		
Saving deposit	Old	200	4802.0	5984.21	-602.9	-0.967
	Total	400	4500.6	6232.00		

* = significant at 1%; *** = significant at 10%

Source: Own computation, 2017.

4.2 Econometrics results analysis

This section presented estimation of propensity score of the whole model, Average Treatment effect on Treated (ATT), region of common support as well as assessment of matching quality for the three outcome variables. In addition, Heckman two-stage selection model results were discussed so as to check robustness of PSM estimations.

4.2.1 PSM result analysis

Estimation of propensity score

The main goal of this section was to identify average treatment effect (ATT) of level of participation in ACSI on asset ownership of clients. To identify ATT, the model matched established clients with new clients using estimated propensity score of probit regression. Hence, in the probit regression from which the model brought propensity score and in the entire matching process, the study included only those variables which influence both treatment and outcome variables.

The model was well specified as LR statistics was 75.97 whose *p* value was 0.000 which would lead to conclude that at least one of the regression coefficients in the model was not equal to zero and hence, the model as a whole fits significantly better than an empty model. In addition, the pseudo R-squared of the probit regression which was approximately 14% suggests satisfactory predictive power.

Estimation of ATT

Accumulation or changes in household ownership of assets can be considered as an indicator of improvement in or changing living standards of households (Barnes, 1996; Adjei et al., 2007; Daniel, 2009; Ghalib et al., 2011; White and Alam, 2013).One of the merits of

asset based indicators is the ease with which they can be measured compared to other indicators of livelihood (Adjei et al., 2007; Adjei et al., 2009; Ghalib et al., 2011). Furthermore, an increase in the number of assets purchased for the household is regarded as potentially strong indicator of the effect of microfinance programme on clients (Barnes, 1996).

On the other hand, all analyses of stratification and kernel matching methods estimations of ATT for all outcome variables were based on the implementation of common support condition. In addition, the standard errors for ATT estimations were calculated using bootstrapping with 100 replications.

a. Estimation of ATT for expenditure on television

The outcome variable here was expenditure made by clients on purchase of television. The analysis of ATT in table 3 shows the existence of a significant positive impact of level of participation in ACSI on purchase of television by clients. Hence, level of participation in ACSI has increased the expenditure on television by about ETB 852 for stratification and ETB 868 for kernel matching methods on average to established clients compared to new clients; which are both significant at 1%. Therefore, the results revealed that participation in ACSI's microfinance programme was strongly associated with increased expenditure by established clients for the acquisition of assets. This finding of the study was consistent with findings of Adjei et al. (2007), Onyina and Turnell (2013) and Oluyombo (2014).

When interpreting ATT results, it is important to evaluate the robustness of the estimations by changing the matching algorithms. In this regard, robustness check helps to increase the reliability of the results by showing that the estimations do not depend crucially on the particular methodology chosen (Heinrich et al., 2010). Since stratification and kernel matching methods estimations were quiet consistent, it was possible to conclude the robustness of PSM estimates.

Table 3: Estimates of the ATT (Television)

Matching methods	Number of treated	Number of controls	ATT (ETB)	Std. Err	t-value
Stratification	200	196	851.839	365.137	2.333*
Kernel matching	200	196	868.281	367.351	2.364*

* = significant at 1%

Source: Own computation, 2017.

b. Estimation of ATT of expenditure on refrigerator

The ownership of refrigerator is associated with a better standard of living (Adjei et al., 2007). Table 4 shows the average treatment effects of acquisition of refrigerator while participating in microfinance programs of ACSI. In this instance, significant acquisition of refrigerator to established clients was observed. As has been shown below in the table, level of participation in ACSI has increased the expenditure on refrigerator by about ETB 1296 for stratification and ETB 1237 for kernel matching methods on average to established clients compared to new clients; which are both significant at 1%.Incidentally, the result on the sign and size of refrigerator acquisition effect for old clients was very similar to those derived by kernel matching method. Hence, this would support results of stratification matching method. Furthermore, this finding was consistent with the finding of Onyina and Turnell (2013) and Oluyombo (2014).

In general, participation in ACSI microfinance program played an important role in assisting participants to contribute towards the acquisition of refrigerators in improving their living standards. Therefore, there was much difference between established and new clients of ACSI with respect to their contribution towards the acquisition of refrigerators for their households.

Table 4: Estimates of the ATT (Refrigerator)

Matching methods	Number of treated	Number of control	ATT (in ETB)	Std. Err	t-value
Stratification	200	196	1295.594	507.861	2.551*
Kernel matching	200	196	1237.345	518.068	2.388*

** = significant at 5%

Source: Own computation, 2017.

c. Estimation of ATT of saving deposit

ACSI accepts savings collected from loan clients as well as the public. At the same time, all members who had benefited from loan facilities of the programme must have 3-5% of such loan amounts in the form of savings deposits prior to the disbursement of their loans. In addition, after taking the credit, it is mandatory to save 1% of the loan per month (Sebstad, 2003; ACSI, 2004; USAID, 2006).

As has been shown in table 5, level of participation in ACSI has no significant effect on saving deposit for both stratification and kernel matching methods on average to established

clients. In other words, there was no much difference between established and new clients of ACSI with respect to their contribution towards saving deposits. Therefore, being a member of ACSI for a longer period was not a significant contributory factor towards the acquisition of saving deposit.

Table 5: Estimates of the ATT (Saving deposit)

Matching methods	Number of Treated	Number of control	ATT (ETB)	Std. Err	t-value
Stratification	200	196	-1124.714	1168.741	-0.962
Kernel matching	200	196	-848.922	1092.211	-0.777

Source: Own computation, 2017.

Region of common support

It is important to check the overlap or common support region for the treated and control groups of the model. Several ways are suggested in the literature, where the most straightforward one is a visual analysis of the density distribution of the propensity score in both groups (Caliendo and Kopeinig, 2005). Figures 1, 2 and 3 show the distribution of propensity scores and the region of common support (see the appendix part). The bottom half of the figures indicate the propensity scores distribution for the control group (new clients), while the upper-half refers to the treated groups. As has been indicated in those figures, the common support condition was satisfied as there was overlap in the distribution of the propensity scores of both treated and control clients.

Assessment of matching quality

Here the matching procedure was checked so as to balance the distribution of the observed variables in both treated and control clients. Therefore, the basic idea of all approaches is to compare the situation before and after matching and check if there remain any differences after conditioning on the propensity score. If there are differences, matching on the score was not successful and remedial measures have to be done (Caliendo and Kopeinig, 2005).

In this regard, t-test was used to check if there were significant differences in covariate means for both groups. Before matching differences are expected, but after matching the covariates should be balanced in both groups and hence no significant differences should be found (Heinrich et al., 2010). Accordingly, after matching most of the covariates are balanced in both treated and control clients of ACSI. Therefore, no significant differences

were found between the two groups which indicate successful balances in the distribution of observed variables for both groups of the three outcome variables.

5. CONCLUSION

Provision of microfinance services help individuals or households to protect, diversify and increase their income, and build assets thereby reducing their vulnerability to shocks (Aghion and Morduch, 2005; Adjei et al., 2009; Daniel, 2009). In addition, there are ample empirical evidences to support the role of assets in changing the livelihood of poor people (Adjei et al., 2007).Assets can reduce vulnerability; improve creditworthiness, improve household stability, increase personal efficacy, and finally, a larger and more diverse asset base can reduce covariate risk (Grinstein-Weiss, 2007; Daniel, 2009; Ghalib et al., 2011; White and Alam, 2013; Oluyombo, 2014).Therefore, there is a need for strengthening and accumulation of assets.

The survey, cross-sectional in nature, was carried out from April to July, 2016. In all, 400 questionnaires were administered to two groups of respondents. Thus, two sample groups were selected and this comprised of 200 established clients, who had borrowed and utilised at least three loan facilities for periods of over two years, and 200 new clients, who had either not benefited from any loan facility from ACSI before or had benefited from one loan facility which is being serviced.

To achieve the main objective of the study, the study used modern impact assessment method

Propensity Score Matching (PSM) to control for self-selection and program selection bias. As indicated in the main body, the study estimated ATT for all asset types using stratification and kernel matching methods so as to check robustness of ATT estimation with respect to unobserved confounder.

When analyzing the impact of microfinance program of ACSI, ATT estimates suggest that the existence of a significant positive impact of level of participation in ACSI on purchase of television by clients by about ETB 852 for stratification and ETB 868 for kernel matching methods on average to established clients which was significant at 1%. This finding of the study was consistent with findings of Adjei et al. (2007), Onyina and Turnell (2013) and Oluyombo (2014).In addition participation in ACSI has increased the expenditure on refrigerator by about ETB 1296 for stratification and ETB 1237 for kernel matching methods

on average to established clients compared to new clients; which are both significant at 1%.Furthermore, this finding was consistent with the finding of Onyina and Turnell (2013) and Oluyombo (2014). However, there was no much difference between established and new clients of ACSI with respect to their contribution towards saving deposits.

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APPENDIX:

Figure 1: Common support region for television

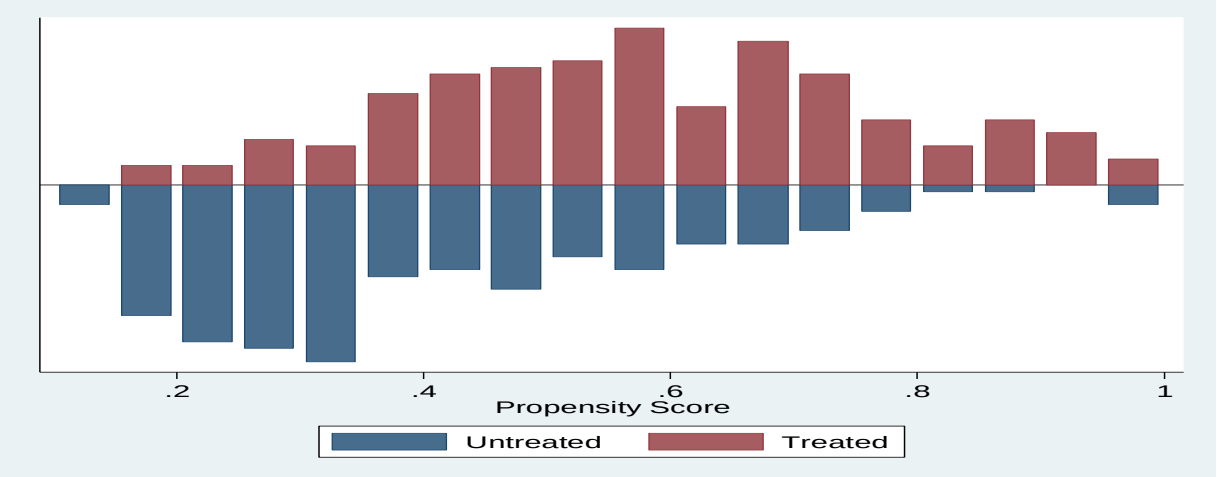

Figure 2: Common support region for refrigerator

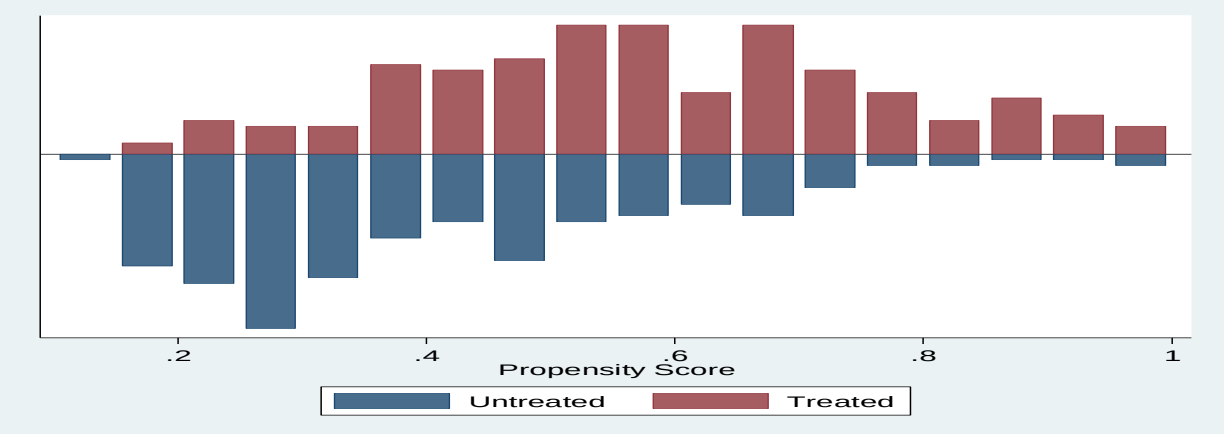

Figure 3: Common support region for saving deposits