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Impact of Micro Finance Institutions on Livelihood of Borrowers Poverty Reduction: Evidence from Tigray, Ethiopia

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Abstract: ***The aim of the study is to assess the impact of Micro-Finance institutions in urban poverty reduction with special referenc of Dedebit Credit and Saving Institution, Tigray, Ethiopia. Primary survey data has been applied with an aggregate sample of 244 respondents (128 non-participant household head and 116 participated in micro-finance) selected using stratified random sampling. The self-administrative questionnaires was arranged and conveyed for both groups with the same question. Based on the logistic regression model; household heads who are older in their age, more education, religion (other than Muslim), single household head, absence of remittance, and pull motivation are more likely to receive financial service. In addition, based on the propensity score matching (four algorithms), the study found that being participated in micro-finance, the outcomes like sales, profit, income of households, capital asset, savings, expenditure on clothes of households, children schooling expenditure, food items has a positive and significant change except for employment creation and health care. The institution benefits on families' pay and consumption demonstrate a more positive flag of the significance, which intended for enhancing independent work openings.***

Keywords: Dedebit Credit and Saving Institution, Household, Impact evaluation, Microcredit, Propensity Score Matching.

I. INTRODUCTION

According to the World Bank (2002) report, poverty is a broad issue, multidimensional and multifarious concepts that entail social, political, economic and environmental safety of the people. In relative terms, there are no single standardized and absolute meanings of poverty. It is still a global problem in large proportions; to reduce, it requires greater attention As the world moves to the 21st century, low and middle-income countries facing challenges in the global development Bigsten et al. (1999), which is a strategic issue like in Asia, Africa, and Latin America. Ethiopia is placed in the Horn of Africa which is facing severe poverty with a population growth rate of 2.5 percent (CIA, 2017).

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Across the world both in rural as well as urban areas, poverty is the critical problem and the development issues proposed to struggle against poverty. It is a situation leads to high illiteracy rate, fewer health facilities and quality of life, generally unable to meet basic needs, these inculcates to suicide and committing monstrous crimes. To minimize the situation numerous interventions programs have adopted like Grameen Solidarity Group Model; Rotating Savings and Credit Associations and Village Banking Model are among more.

After the collapse of the Dergue regime, micro-finance introduced in Ethiopia following the policy of liberalization and transformation of governmental and Non-Governmental Organizations subsidize credit program to financial institutions. It can be characterized as promoting small business, targeting the poor, extending small loans without a pledge, building the capacity of poor, charging an interest rate, and combing credit with savings (Dejene, 1998). Currently, the suppliers of financial service are MFIs, Commercial Banks, informal channels (Iddirs, Equibs, Mahibers, moneylenders, relatives and friends). Molla (1998) stated that micro-finance has emerged as a tool to eradicate poverty in most developing countries, poor targeted (Women) to make self-employed via financial service. In the someway, Ethiopia is not marginalized it has been used as an instrument so as to improve the employment of poor society (economically active, low-income earners) commonly lack collateral, lack credit histories, or both. In Ethiopia, poverty is highly spread for a long period due to fewer employment opportunities, lack of access, income, education, skill, nutrition and health (Wolday, 2000).

II. STATEMENT OF THE PROBLEM

In Ethiopia, micro-finance institution is a recent phenomenon as compared to other countries with the purpose of relief and rehabilitation of the poor people built up by the Federal Government declaration no. 40/1996. In the nation, there are around 31 authorized micro finance institutions, which advanced either from the NGOs or governments credit framework. Currently, the sector plays a crucial role in urban as well as rural areas in serving the poor by providing micro-finance services.

However, aid donors insured whether the program has an impact on the aspects of development agency activity or not. Therefore, an impact assessment becomes an important issue to show a significant change in promoting households, enterprise, and individual or community levels to reduce poverty. Nevertheless, the knowledge for the achievements of these programs and inaugural remains only partial and contested. There is a controversial argument among researchers concerning the impact of micro-finance institutions on clients; some of them agree on a negative impact and others are the reverse. Therefore, there are no decisive results.

Certain empirical inquiries reveal, there is a positive impact on increasing clients' expenditure, improvement of health and education, accumulation of assets, nutrition, food security, poverty alleviation, and business growth of the poor people. Stewart, et al., 2010; Brannen, 2010; Kessy and Temu 2009; Kessy and Urio 2006; Kihongo, 2005; Chowdhury, et al., 2004; Daba, 2004; Teferi, 2000; Berhanu, 1999; Holcomb, 1995; and Hossain, 1988). Glazer, (2010); Swope, 2005; and Yunus, (2004). Gosa (2014) concluded that micro-finance has a positive impact on poverty alleviation and standard living of households.

On the contrary researchers like Kato and Kratzer (2013); Dean and Zinman (2010); Adams and Bartholomew (2010); Glazer (2010); Nghiem (2009); Frohberg and Müller (2007); Teferi (2000); Berhanu (1999); Holcome (1995); and Hossain (1988) argued a negative impact. Which is consist of exclusion of their possessions, which stimulate poverty, less attractive, excessive interest rate, the boost of stress and create high workloads for women participants. Hence, the Ethiopian government is very concerned; micro-finance conspicuously adopted to improve the livelihood of clients indispensably to examine its authentic viability, and to have sufficient information on the social and monetary effect parameters. Barely any contextual analyses uncover that entrance to fund can lessen destitution, yet broad effect evaluation utilizing treatment and control group to look into has not yet done to enhance it.

Even though elite research has done in improving, the financial sector and they are concentrated on institutional sustainability rather than client impact. Therefore, the study of impact assessment in the micro-finance intervention on clients can fill the gap and used to evaluate whether the intervention leads to change relative to incoming clients. In this study, the impact analyzed based on the political and socioeconomic indicators (sales, profit, income, savings, capital asset, employment, expenditure on clothes, health care, children schooling, and food items) at the household level.

Examining whether households access to Micro-finance service easing poverty reduction or not, if so, across which dimensional aspects of poverty are well-being and to what extent is the main focal point on the impact assessment of micro-finance institutions. Reason out how micro-finance program transforms livelihood of clients, indicating how the program is performing relative to non-clients, and lastly to indicate the impacts in urban household clients level believed to be unexploited research. Thus, in relation to impact assessment appropriate methodology is used.

III. OBJECTIVES OF THE STUDY

The primary objective of this study is to evaluate the impact of Micro-finance institutions in urban poverty reduction with special reference of Dedebit Credit and Saving Institution; Atsibi-womberta, Tigray, Ethiopia. To achieve the main objectives, the researcher attempt to dissect into the following specific objectives:

1. To determine the determinants of participating in micro-finance institutions
2. To measure the impact of micro-finance service intervention on socioeconomic indicators
3. To compare the socioeconomic indicators of clients and potential clients before and after matching

IV. RESEARCH METHODOLOGY

The study focused on the Easter zone of Tigray Region with special emphasis of Atsibi-Wemberta "Woreda", one of the 47th areas in Eastern Zone of Tigray Regional state, Ethiopia. It has around 70 kilometers a long way from Mekelle, the capital City of Tigray. The aggregate population of the town is 273,601 (142,273 Females and 131,328 people) according to the CSA report of 2007. Despite the fact that Dedebit Credit and Saving Institution has spread and worked everywhere throughout the region, three sub-urban communities chose for the investigation. the study used first-hand sources of data mainly self-administrative questionnaires. To determine the sample size, multiple stage sampling techniques applied. There are five zones in Tigray regional state. A multistage random sampling methodology was used to arrive at a total sample size of 244 small business participants. At the first phase, the eastern zone selected using simple random sampling. in the second phase between the dissected district Atsibi-womberta selected using convenience sampling based on the marginalized geographical areas. In the third stage among the six branches located in the district, three branches have chosen using lottery methods and in the last stage based on the list of clients, the researcher pass judgment on active and incoming (potential) borrowers.

Therefore, 244 respondents (116 participants of micro-credit and 128 non-beneficiaries) samples selected from three branches based on stratified random sampling with the k^{th} interval for more representative of the population from each group. In this examination, the rearranged recipe was given by Yamane (1967) connected to decide the required example measure at a significant level of 5 percent.

Sample (n) = $\frac{N}{1+N(e)^2} = \frac{630}{1+630(0.05)^2} = 244$

Where: n = sample size, N= population. e = Allowable error

This study adopts two sample groups, which is the control and experiment groups.

The control groups are the potential clients (incoming clients) of micro-finance institutions, which are, selected a sample from the list of both groups were obtained from the main branch of microfinance institutions. To pick out a sample unit of treated groups, systematic random sampling was adopted being clients of the micro-finance for more than three years excluding dropout clients. After the data has gathered via self-administered questionnaires from the fieldwork survey, the researcher would summarize, classified, coded, interpreted and make an analysis. To make analysis binary logistic regression model and propensity score matching using Stata software version 13 to indicate the improvement socioeconomic outcome is as the result of program intervention. And also used to make a comparison of improvements in the status of participant group before and after participating in DESCI by matching the government policy intervention of active client's and incoming client's.

V. LITERATURE REVIEW

Definition, Concepts, and Measures of Poverty

This part deals with the theoretical and empirical inquiries of micro-finance institutions impact on poverty reduction particularly it assessed poverty reduction as a general concept in the community as the impact of micro-finance institution's service.

According to Tendaro (1997), the word poverty can be distinguished as leading to suffering from a lack of decent, productive life and healthful and luxurious life. Among experts and policymakers, there is no clear consensus on how to eradicate and measure poverty (Meehan, 1990). Therefore, there is no precise, absolute and standardized meaning, it can define in terms of relative terms as such different people define and view in various ways. Traditionally it understood as material deprivation, which characterized, by poor living conditions and poor nutrition because of low income (income poverty) which is associated with low educational levels and low health. According to the World Bank (1990) declaration, poverty defined in terms of basic consumption needs (income requirements for their satisfaction) to accomplish the least standard of living. Similarly, it can be characterized by households, individuals or the whole community's failure to command adequate resources to satisfy necessity, it leads deprivation/absolute poverty i.e. Unable to have sufficient to eat or malnutrition. World Bank (2002) classified poverty as four dimensions of the low level of achievement in health and education, deficiency of income, insecurity, and exposure to risks. As the World Bank defined it, which is broad and widely acceptable incorporates political, Social, Economic, and environmental determinations of the people.

Poverty measurement is difficult and it has different measures in different countries. Conventionally, expenditures and income level of people can sustain a minimal measure of living standards which is commonly known as the poverty line from monetary estimates in a cross-cutting level (Getahun and Garber, 2007). Absolute poverty implies a circumstance the accessibility of food would be a matter of death or life which a critical for people living in meal relief, aid, scavenging, prostitution, barely income from homesteader agrarian without comparison with some-else (Todaro, 1997). In a given point in time, Poverty line expresses a minimal level of economic and social engagement of community/society and it judged using two approaches (relative and absolute poverty). Relative poverty reveals an individual is who has less than what other individuals have. It implies comparing relative income distribution of an individual or group of people or the whole economy in relation to others (Todaro, 1997).

According to Wolday (2003) explanation the association between income, saving and investment; to consequences of poor in Ethiopia have low income which results from low saving habit in return it leads to low investment. Productivity improved without investment and it tends to low income.

In developing countries like Asia, Africa and Latin America Poverty are mostly appearing as a manifestation. At a recent time, like other African countries Ethiopia also facing severe poverty. It is known that the mainstream of the inhabitants in Ethiopia is living in rural areas which are poverty is widespread, which is more than 45% below national poverty line whereas around 37% of the population in the urban area is below the poverty line but it is deeper in urban areas (Tassew, 2004).

Likewise, according to MoFED (2002b) estimated the severity of 3.9 and 4.6 percent, 36.9 and 45.4 percent poverty incidence, depth of 10 and 12 percent for urban and rural areas of Ethiopia respectively. AEMFI (2005) declares Extreme poverty evident in terms of various social, economic and cultural indicators, for instance backward, high illiteracy rates and dominantly rural population, repressed women, high fertility rates, overcrowded housing system, high dependency ratios, widespread of HIV/AIDS, unsafe drinking water, drought etc. The socioeconomic situations of the low investment country are characterized by inadequate social services, low growth of income, high population growth rate, high unemployment rate, and economic inefficiency (Tsehay and Mengistu, 2002; & Wolday, 2003).

In creating nations destitution decrease has endured a basic and complex uneasiness, or, in other words, established with different related attributes.

Everywhere throughout the world, expansive quantities of NGOs, administrative and financing organization occupied with assaulting neediness by applying distinctive instruments and techniques Rao and Ravaiah (2005) and it has been a motivation for approach creators. By understanding the many-sided quality of advancement, various methodologies developed to alliterative destitution in the course of the last six centuries. For example, in 1950's and 1960's viewed as venture of foundation and physical capital, in 70's works day for instruction and wellbeing and furthermore to advance needy individuals' wage, in 1980's the accentuation was move on enhancing monetary administration and advancing work intensives and rendering fundamental support of destitute individuals in training and wellbeing (World Bank, 2001).

Creating countries have home-created systems and ways to deal with lessen poverty, overall affiliations, and rich countries. Also have an unprecedented activity in progressing biological and overall cash related trustworthiness, cutting down the organization of poor countries and market limits to the things. World pioneers make an accord on quantifiable objectives, and an arrangement of time-headed for fighting destitution, infection, hunger, ecological corruption, the absence of education, and sexual orientation disparities i.e. thousand years Development Goals.

World pioneers make an understanding on quantifiable mufti-year's progression destinations and a game plan of time-set out toward battling desperation, disease, hunger, regular degradation, obliviousness, and sexual introduction irregular characteristics i.e. thousand years Development Goals. The thousand years’ destinations achieved in making countries can furnish the advantages for diminishing dejection including human poverty. As Assefa (2004) communicated, in spite of the way, that poverty diminishes is the central arrangement of the Ethiopian government; in any case, the degree is assessed 44 percent under the poverty line. To convey reasonable and supportable change and to diminish dejection a couple of changes endeavored in Ethiopia, for instance, social, political and money related points of view. The micro-finance institution is ascended after the movement of the cash related territory to serve the poor families in getting to money related necessities, make business, update their wage and use at long last to decreasing dejection Tsegaye (2005). The nearness of such an association gives an important in reducing poverty at the scaled downscale and full-scale levels (Wolday, 2003).

Improvement of poor population living standard conditions and eradicating poverty is an impressive one. In all sectors of the economy, improvement of poor people needs is not easy to achieve via economic growth, rather it requires improved financial service, which helps the poor people in enabling payment transactions.

Robinson (2001) stated two approaches of micro-finance development (poverty lending and financial sector). Throughout the world, both come up to contribute to the goal of making financial services to poor people.

The previous methodology's point of convergence is on diminishing destitution by means of credit and different administrations, which supported by government appropriations, givers and other concessional assets with the essential objective of achieving the poor more than ever the poorest of the poor with credit. Sparing is nothing but a noteworthy part yet precondition while getting the advance. This methodology acknowledged in Grameen bank in Bangladesh, which not concentrated on the miniaturized scale back, rather on smaller scale credit. The second methodology accentuation on money-related between intercession among poor savers and borrowers. Likewise, the spotlights are given on given institutional independence borrowers and savers.

In writing, the terms microfinance and micro-credit regularly utilized reciprocally, however, the two terms confounded. Sinha (1998) states microfinance is proper where NGOs and Micro-Financial Institutions supplement the advances with other non-budgetary administrations, Whereas smaller scale credit alludes to little advances in this manner small-scale credit is a division of miniaturized scale back in that it includes giving credit to poor people.

Rotating Savings and Credit Associations:-These sorts of mediation demonstrate make normal repeating commitments to a typical reserve, or, in other words, the grouping of individuals together then after given to one individual from a group reliant on the single amount in each series (Yunus, 2007).

Grameen Solidarity Group Model:- Credits are given to people in a group, peer weight is the base and the grouping individuals ensure the advance reimbursement, overall, the effective advance reimbursement assumes a noteworthy job to get to the consequent advance. This model is properly utilized by DECSI the advance is given constructed guarantee in light of a grouping part particularly for micro-credit (DECSI, 2011).

Village Banking Mode:- this model is universal associations oversaw credit and sparing affiliations set up by Non-Governmental Organizations to render access to finance, manufacture network self-improvement groups and help individuals collect investment funds. The credits are firmly upheld by moralistic insurance; the dedication that the grouping supports behind each advance (Global Development Research Center, 2005).

The Microfinance Institutions loans credit money to the town bank, consequently the bank loans to the individuals. To offer an aggregate assurance with town banks all individuals consent to an arrangement and asked for 20% to spare of the advance sum per cycle (Ledgerwood, 1999). In this model, a premium paid on reserve funds yet they get an offer of benefits from the re-loaning exercises of the town bank. The focal point of Micro-credit and thrifty organizations in Ethiopia is assemble based loaning, deliberate and advance obligatory investment funds. Satisfactory access to the money related specialist organization is a device for improvement, as it backings to upgrade the pay and utilization of the recipients and ultimately to destroy the destitution.

Micro-finance and dwelling (house condition) house of households being members of small-scale back enhances the residence place of members; Guush and Gardebroek (2012) additionally demonstrate in their investigation, or, in other words, significance enhancing lodging condition. Miniaturized scale back administration investment enhances the abode place of the family unit (Abebe (2006, Copestake, Dawson, Fanning, McKay and Wright-Revolledo, 2005; Todd, 2001; Chen & Snodgrass, 2001; Mustafa, 1996) expressed it significantly affects neediness decrease. Diro and Regassa, 2014; Hailai, 2010 expressed in their investigation that, there is no importance contrast on spending use for therapeutic and individual consideration being customers of small-scale fund benefit or not. The asset tends to be stable over a long period, thus, it better indicator for well-being rather than expenditure and income and able to assist in case low and unstable income.

Participation in financial service institution has a positive impact on household's asset (Kondo, 2007; Sengsourivong, 2006); it also helps for the alleviation of poverty Henry, Sharma, Lapenu and Zeller, 2000). Among the key role of micro-finance is to empower women. Dedebit Credit and Saving Institution have a positive impact on income generating due to the development of businesses because of getting addition loan from the institution Diro and Regassa (2014). The intervention of micro-finance institution has a positive impact on consumption and income of the household, decrease income inequality and improves well-being (Mahjabeen, 2008). The intervention of Micro-finance program plays a significant role in poverty reduction and social capital formation via increasing household's income (Ben and Abel, 2011). Abebe (2006) in his study found that participation in micro-credit rose's average income of households than nonclients and leads to increase saving habits.

Micro-finance leads to boost family expenditures of the beneficiaries (Diro and Regassa, 2014; Hossain, 2012; Abebe, 2006) concluded family expenditure is significantly increased after participation in BRAC. The similar conclusion reached in Ethiopia (Guush & Gardebroek, 2012; Getaneh, Garber, 2007; Barnes, 2001; Chen & Snodgrass, 2001). Due to the intervention of the program active clients' expenditure shifted to higher categories from small category (Abebe, 2006).

Participation in micro-finance leads to enhancing the self-employment opportunities Diro and Regassa (2014). The intervention of Micro-finance program improves the employment opportunities for their families and the community (Abebe, 2006). Smaller scale fund benefit positively affects encouraging family unit youngster's instruction like on the capacity to purchase pens, practice books and other fundamental gear required for training contrasted with non-customers (Diro and Regassa, 2014; Hailai (2010). Balkenhol (2006) likewise showed family unit use subsidizes raised through a small-scale fund for youngsters school. It helps with Poverty decrease than non-customers (Psacharopoulos and Woodhall, 1985). Then again, Abebe (2006) found in his examination that, there is no relationship between youngsters training change with families support in the small-scale back. Participation in micro-finance leads to enhancing the self-employment opportunities Diro and Regassa (2014). The intervention of Micro-finance program improves the employment opportunities for their families and the community (Abebe, 2006).

After an extensive literature review, the following 10 null hypotheses have been formulated and tested using propensity score matching with the help of binary logistic regression.

Ho1: Participation in Micro-finance program does not help to increase the income of the household

Ho2: Being participating in micro finance program does not lead to improve sales volume of business owners

Ho3: Participation in Micro-finance program does not help to improving the profitability of the business.

Ho4: Participating in microfinance program intervention does not help in mobilizing savings of enterprise owners.

Ho5: Participation in financial service program intervention cannot improve capital assets of owners business.

Ho6: Participation in Micro-finance program does not help to create more employment

Ho7: Being participation in Micro-finance program household borrowers is more likely to spend on their children education.

Ho8: Participating in micro-finance more likely to spend family consumption (food items) expenditure of households

Ho9: Being participation in Micro-finance program household borrowers is more likely to spend on their health care facilities.

Ho10: Participation in Micro-finance program does not lead to increase the annual expenditure of clothes.

Binary outcome dependent variable, the two values, 1 for micro credit participated in the support service program, otherwise 0.

$$Y = \begin{cases} 0\, if\ treated \\ 1\, if\ \ untreated \end{cases}$$

The probability of participants can be stated as follows; e^{zi}

$Pi = \frac{1}{1+e^{-Zi}} = and\ 1 - Pi = \frac{1}{1+e^{-Zi}}$

Where

$$Zi = B_o \sum_{i=1}^{n} BiXi + Ui$$

$$Now\ the\ odds\ ratio\ [\frac{Pi}{1-Pi}]$$

$$\frac{Pi}{1-Pi} = \frac{1+e^{zt}}{1+e^{zt}}$$

$$= e^{zt} the\ natural \log^{of\ this\ equation\ is\ logit, which\ is\ expressed\ below}$$

$$Li = \ln\left[\frac{Pi}{1-Pi}\right] = Zi = \beta_O + \sum_{i=1}^{n} \beta iXi + Ui -------------- (1)$$

Where;

Li = is a function of an explanatory variables (X) or P(X) = Probability of individual program participants.

i=1, 2, 3, 4, 5, 6………… n; βi = Intercept or intercept; βi = Regression coefficient to be estimated

Xi = the characteristics of respondent's Pre-intervention (covariate)
Ui = Disturbance term;
Where Pi refers the probability of participants in micro credit.

$$ATT = E(Y1i \mid D = 1) - E(Y0i \mid D = 0)$$
$$= E(Y1i - Y0i \mid D = 1) + E(Yoi \mid D = 1) - E(Y0i \mid D = 0) - - - - - - - - (2)$$

Where ATT stand average treatment on treated; D stands for treated and control groups; Yoi stands for the outcome variable of non-treated groups; Y1i refers to treated groups; E stands for estimated.
E (Y1i │D=1) represents the expected outcome for program participants.
E (Y0i │D=0) represents expected outcome for non-participants of program

VI. RESULTS AND DISCUSSION

The results of this study had presented in to three phases, the first one is concerning results obtained using logistic regression model, in the second section concerning impact of micro-finance institution on some selected outcome indicators and the third section is concerning comparison of outcome indicators before and after matching.

Determinants of micro-credit Participation

Along these lines, if the variable affects the outcome in any case, not the treatment likelihood, there is no convincing motivation to control for that variable since the outcome won't in a general sense differentiate in the treatment versus the control social events. As table 1 shown below, among the covariates, age, sex of household head, marital status, religion, educational level, family background of household head, experience, number of family, remittance, motivation of the owners of a business to enter in to business, and number of sources of income were applied to understand the determinants of participating in the program.

In accordance to characteristics used to captured the relevant difference between treated and controlled groups, results from the logit model, with estimated expressed in terms of odds ratio. The logit regression gave a Pseudo R2 about 16.31 which implies all the explanatory variables included in the model are able to explain 16.31 per cent of the probability of participating micro-credit program intervention. The overall model is statistically significant at p-value of .0000. Therefore, the result of the model found significant factors determining micro-credit participation such as age, religion, educational level, family background, and remittance. This result implies, each increases in year of schooling, year of age is associated with 1.208 and 1.012 odds of participation in the program respectively. It demonstrates higher educational level and maturity of age posters to participate in the program.

Table. 1 logistic regression estimation for determinants of participation in Dedebit saving and credit institution

Covariates	Odds ratio	T-statistics	Number of obs	244
Gender	.899	0.29	LR chi2(7)	44.56
Age	1.012***	2.59	Prob > chi2	0.000
marital status	1.061	0.19		
Religion	.6154***	-2.76	Log likelihood	148.054
			Pseudo R2	50.1631
Year of education	1.208***	3.87		
Family background	.679**	-1.95		
Experience	.964	-0.75		
Number of household	.967	-0.37		
sources of income	.999	-0.01		
Remittance	.522**	-2.07		
Motivation	1.216	0.67		

Sources: survey data 2018
****Significant at 1% level; **Significant at 5% level*

Individuals household heads religious belief also affect participation's of the program, as such, except Muslim, other religion followers increase the likelihood odds ratio 0.6154 of participation. The odds ratio family background is 0.679, as the families back ground is not from business (like from agrarian, civil servant etc…) are less likely to receive micro-credit than those individual born from business background families. From this, it can be observed, the odds of non business family background is 0.679 time lower in participating the financial service than those who have business back ground family. The odds ratio for household heads motivation to start a business is 0.552; this ratio indicates individual business owners who entered in the business due to pull motivation have the intensity of more likely to receive micro-credit than those who entered due to push motivation. This shows the odds of pull motivation is 0.552 times higher in participating the program in comparison with business owners who enter in the business because of push motivation, with 95% confidence interval for the odds ratio.

Estimations of average treatment effect using propensity score matching

The second section of results and discussion is estimating the average treatment effect on treated using propensity score matching. Based on this, table 2 below, presented to provide the average treatment

effect on treated (ATT) for various impact indicators, which anticipated via matching of, exposures and non-exposures of financial service. This method is applied after pre-intervention characteristics of both treated and control group is matched using pscore within the common support region [0.14419146, 0.91190418], below the minimum and maximum of the interval is discarded. Within the common support, both groups were matched on the pre-intervention characteristics. A it can be observed from table below, in each of the matching type applied, the number of matched respondents is not the same in both groups. The table depicts the quantitative results that used bootstrapped standard errors.

After matched the treated and controlled individuals, the effect of financial service intervention increases the income of the household with an interval of 5,248 to 7,411.18 ETB using four matching algorithms one period of data. A person who receives financial service from micro-credit earns income higher than those did not get treatment. In this manner, the principal inquires about hypotheses, which says micro-credit investment expands the income of borrowers acknowledged at a 1% level of significance in all methods (attnd, attr, attk and atts). This outcome is reliable with the findings of Hossain (2012) who talked about that borrowers' income expanded subsequently to combining Bangladesh Rural Development Committee (BRAC) in Bangladesh. In like manner, Meller and Zeller (2002) presumed that micro-credit has a general beneficial outcome on pay; however, results vary significantly crosswise over nations and projects both in extent and in measurable importance. Bebczuk and Haimovich (2007) excessively found that micro-credit stretched the hourly work pay of poor people contrasted and a similar population without entrance to credit by 4.8 times in Bolivia, 12.5 times in Guatemala and 4.5 times in Haiti. In addition, some impact studies on micro-credit in Ethiopia (Asmelash, 2003; Daba, 2003; Ayelech, 2010) have found positive significant effects.
Profitability is among the objectives of the business enterprise, and participation of the program improved their profit in the four methods with the range of 31,781.1 to 43,719.46 ETB.

This indicates Participants of the program were able to generate more profit; this implies the difference between the two groups is positive and significant at the level of 1%. In addition, Enhancing the high volume of sales is a means for improving profitability and income of business owners. In this case, in all methods of impact measurement, the study founds a positive and significant impact of program intervention. The impact of the program on micro-credit participants ranges from 23,464.74 to 38,252.78 ETB, which is a positive and significant impact at 1% level.

Household saving is another effect utilized in this study. In light of the estimation results, the normal impact on saving is reasonably enhanced in all Average treatment on the treated (ATT) techniques (t-statistics ranges from 5.57 to 9.168). Hence, participation in financial service intervention, enhances savings of borrowers, accepted at the 1% level of significance. Participants of micro-credit provided by Dedebit Credit and Saving Institution helps to save and mobilize money within a range of 243,000 to 294,000 ETB in 8.25 average years compared to control groups. Mushtaq (2009) found that the course of effect of small-scale credit enhanced the funds of borrower family units following 2 to 3 years of investment in the program, and this point is consistent with the finding this study.

Business enterprises owners capital balance is another outcome variable used to evaluate the impact of the program. Similarly, the number of participants in both groups varies according to the techniques applied. There is a difference in the average mean value in both groups of all methods; there is a difference in the capital balance, which ranges from 33,268.71 to 53,713.39 ETB at a significance level of 5% in attnd, attr and atts and at 10% in attk. We have evidence to reject the null hypothesis and accept alternatives hypothesis. People who receive micro-credit accumulate more capital than those that did not participate in the program.

Estimation results show that Average Treatment on Treated for family units' expenditure utilization use is decently huge in all estimation techniques. Four items have been used to measure the expenditure of household consumption; clothing expenditure on four methods ranges from 1,540.67 to 1,974.8 ETB, annual expenditure on health care varies from -295.65 to 840.263, monthly children ranges from 180 to 335 ETB, and average monthly expenditure on food items ranges from 674.396 to 1010.88 ETB. Generally, being participants of the program has an impact on the average expenditure of clothes compared to non-participants in all methods significantly at the 1% level.

Employment creation and family members by participants of the micro-credit is another point, from the result the researcher observes the Average Treatment effect on Treated esteems are enormous in every single support technique through the normal impacts isn't the same, just ranges from 0.278 to 0.419 in average. The impact of the intervention does not create employment compared to nonparticipants, in the reverse even if the result is insignificant but non-treated individuals found a little bit better. Notwithstanding, this outcome is conflicting with the discoveries of Hossain (2012) who endeavored to measure the effect of BRAC on the employment of borrowers in Bangladesh. The researcher made reference to that there were moderate effects saw in the production of business open doors for and out of family unit individuals.

In the case of annual expenditure on health care, there is a mix of positive and negative results and insignificant impact in all methods (attnd, attr, attk, and atts).

Related to monthly schooling expenditure, in all methods except in attr the result is positive and significant, this show, there is a significant and positive impact of participation ranges from 117.317 to 131.86 ETB. Concerning average monthly expenditure on food items, the expenditure varies from 674.396 to 1,010.88 ETB. This result indicates the intervention has a positive and significant impact at the 10% leve (attnd, attr, and attk) and atts at 5%. This is sound with the discoveries of Hossain

(2012) who inferred that the commitment of family utilization expenditure expanded fundamentally in the wake of joining BRAC, findings in Ethiopia (Guush and Gardebroek, 2012; Getaneh and Garber, 2007) additionally came to a similar end.

Table. 2 Estimations of average treatment effect using propensity score matching

Outcome variables	No. of Treated	No. of Control	Matching techniques	ATT	Standard error	t-statistics
Income of household owners (ETB)	114	53	Attnd	5248.52	1858.424	2.824***
	112	117	attr	7411.18	653.635	7.38***
	114	117	Attk	6843.37	1494.10	4.58***
	101	130	atts	6645.50	1404.86	4.73***
Profit (ETB)	114	53	Attnd	43719.9	13249.46	3.3***
	112	117	attr	31781.1	4164.163	3.229***
	114	117	Attk	36261.8	5272.486	6.877***
	101	130	atts	41173.3	9835.98	4.186***
Sales volume (ETB)	114	53	Attnd	197000	38252.78	5.147***
	112	117	attr	139000	26383.65	5.07***
	114	117	Attk	167000	23464.74	7.11***
	101	130	atts	172000	27100.66	6.35***
Savings mobilization (ETB)	114	53	Attnd	294000	52739.16	5.57***
	112	117	attr	242000	29855.00	7.591***
	114	117	Attk	272000	30990.92	8.77***
	101	130	atts	271000	29536.73	9.168***
Capital assets	114	53	Attnd	130000	53240.21	2.449**
	112	117	attr	74358.9	33268.71	2.191**
	114	117	Attk	92494.7	53713.39	1.722*
	101	130	atts	89120.6	40451.42	2.203**
Employment creation	114	53	Attnd	-0.447	0.419	-1.067
	112	117	attr	-0.096	0.278	-0.396
	114	117	Attk	-0.232	0.280	-0.83
	101	130	atts	-0.142	0.314	-0.452
Clothing expenditure per annul	114	53	Attnd	1974.8	719.488	2.745***
	112	117	attr	1540.67	516.025	3.571***
	114	117	Attk	1718.10	625.150	2.748***
	101	130	atts	1916.03	46.59	4.29***
Annual expenditure on health care	114	53	Attnd	840.263	1167.68	0.720
	112	117	attr	-295.63	632.239	-0.381
	114	117	Attk	377.028	470.172	0.802
	101	130	atts	-54.986	85.456	-0.080
Monthly children schooling expenditure	114	53	Attnd	335.00	131.86	2.54**
	112	117	attr	180.00	91.81	1.55
	114	117	Attk	246.789	120.356	2.051**
	101	130	atts	253.045	117.317	2.157**
Average monthly expenditure food items	114	53	Attnd	1010.88	529.082	1.911*
	112	117	attr	674.396	460.296	1.739*
	114	117	Attk	818.41	448.766	1.824*
	101	130	atts	803.96	380.04	2.115**

Clue: ATT stand average treatment effect on treated
attnd stands for estimation of ATT using nearest neighbor matching
attr stands for estimation of ATT using Caliper/radius matching
attk stands for estimation of ATT using Kernel matching
attns stands for estimation of ATT using Stratification method
*** significant at 1%, ** significant at 5%, and * significant at 10%

Sources: survey results, 2018

Comparing outcomes before and after matching (using logistic regression and propensity score matching)

In this study, we apply propensity score matching to correct for self-selection bias and estimate the impact on the financial service. The results on the selected comparable variables presented below table 3. There are some common findings on some variables' impact, but the degree of significance is not the similar. At the same time, the findings on certain variables' impacts are directly opposite.

In both binary logistic regression and propensity score matching, the impact of the intervention in income of household is positive and significant at the 1% level. In binary logistic regression, the study found that the intervention of the program has a negative effect on profits and insignificant. However, In the case of propensity score matching, the program affects the profit positive in all methods at 1% significant level. In binary logistic regression, the study found that the intervention of the program has a positive effect on the sales volume of an individual's business owners but the impact is not significant. In the case of propensity score matching, the program affects the sales volume positive in all methods at 1% significant level.

In both binary logistic regression model and propensity score matching, the impact of the intervention in mobilization of savings is positive and significant at the 1% level. As in the same table shown, in binary logistic regression, the study found that the intervention of the program has a negative effect on the capital asset of an individual's business owners but the impact is insignificant. In the case of propensity score matching, the program affects the capital assets positive in all methods at 5% significant level. In both model, the impact of the intervention in employment creation is positive but insignificant. The logistic regression estimate showed a positive but insignificant impact on capital assets of a business, while the propensity score showed a positive and significant impact at the 1% level in all methods. On the other hand, both models estimated in four methods showed a significant positive effect at the 1% level on owners saving mobilization,

As the same table shown below, the impact of the intervention on the expenditure of clothes reveals a positive but insignificant while using logistic regression, whereas, in case of propensity score result in all methods showed, the intervention has a positive impact and significant at the 1% level. In both binary logistic regression and propensity score matching, the impact the intervention on annual expenditure of health care is positive but insignificant. Based on the logistic regression, the impact of the intervention on monthly children schooling expenditure is negative, where as in case of propensity score matching, the impact is positive and significant at 5% except in attr is insignificant. On the average monthly expenditure on food items, result of logistic regression shows positive but insignificant, where as in case of propensity score matching, the impact is positive and significant at 10% except in attr at 5%.

Table. 3 Comparison of on the selected variables before matching and after matching

Outcome variables	Binarly ligistic regression		Propensity Score Matching							
			attnd		attr		attk		atts	
	Effect	Sign.	Effect	Sign.	Effect	Sign.	Effect	Sign.	Effect	Sign.
Income of household owners (ETB)	+ve	1%	+ve	1%	+ve	1%	+ve	1%	+ve	1%
Profit (ETB)	-ve	no	+ve	1%	+ve	1%	+ve	1%	+ve	1%
Sales volume (ETB)	+ve	no	+ve	1%	+ve	1%	+ve	1%	+ve	1%
Savings mobilization (ETB)	+ve	1%	+ve	1%	+ve	1%	+ve	1%	+ve	1%
Capital assets	-ve	no	+ve	5%	+ve	5%	+ve	10%	+ve	5%
Employment creation	+ve	no	+ve	no	+ve	no	+ve	no	+ve	no
Clothing expenditure per annul	-ve	no	+ve	1%	+ve	1%	+ve	1%	+ve	1%
Annual expenditure on health care	+ve	no	+ve	no	+ve	no	+ve	no	+ve	no
Monthly children schooling expenditure	-ve	no	+ve	5%	+ve	no	+ve	5%	+ve	5%
Average monthly expenditure food items	+ve	no	+ve	10%	+ve	10%	+ve	10%	+ve	5%

Clue: attnd stands for estimation of ATT using nearest neighbor matching
attr stands for estimation of ATT using Caliper/radius matching attk stands for estimation of ATT using Kernel matching
attns stands for estimation of ATT using Stratification

method

Sources: survey result, 2018

VII. CONCLUSIONS AND POLICY IMPLICATION

This paper examines the impact of micro-finance institutions on borrowers poverty reduction in Atsibi-wenberta, Tigray.

Especially the emphasis was on some impact indicators such as income, profit, sales, savings, capital asset, employment creation, on the improvement of household's health care, children school facilities, clothing, and food items expenditures. In addition, pre-intervention characteristics were selected around seventeen covariant variables. Consequently, the researcher founds; age, religion, educational level, family background, and remittance are significant factors determining micro-credit participation.

Both groups within the common support region [0.14419146, 0.91190418] are matched. The commonly used methods applied in this study to determine the propensity score matching is the nearest neighbor, radius matching, kernel matching, and stratification matching.

After matched the treated and controlled groups, the effect of financial service intervention; from the study we can drive that the intervention of the program is able to increases the income of the household, generate profit, enhancing sales volume, enhancing mobilization of savings, which is a positive and significant impact at 1% level. Similarly, at different level of significant, the program intervention helps to accumulate more capital asset (at 5% and 10% level of significant), increased the average expenditure of clothes at 1% significant level, monthly schooling expenditure at 5% except in attr, average monthly expenditure on foods items significant at 1% and 10% significant level.

While comparing the results of logistic regression and propensity score matching on some selected comparable variables, we found some common findings in different degree of significant and direction. Before and after matching, the income, savings of both groups of micro-credit participants were more than that of non borrowers in which the result is positive and significant at 1% level. Before matching, profit and sales volume of both groups were similar, but after matching due to the intervention, the outcome becomes improved which positive and significant impact. Before matching, the intervention was not significant on capital assets, but after matching, the intervention has a positive and significant impact at 5%. Before matching, the impact of the intervention on monthly children schooling expenditure is negative and significant, whereas in the case of propensity score matching; the impact is positive and significant at 5%.

The findings of this investigation have a few strategy suggestions; the vast effect of Dedebit Credit and Savings Institutions micro-credit observed a positive impact on some socioeconomic outcome variables, this demonstrates a more positive flag of the significance. But it needs to distribute in a wide range of needy potential customers. Along these lines, this pattern of sparing conduct should proceed with the goal that customers would be ready to grow their business and escape from poverty. Largely, government experts, NGOs, help organizations and different partners who are worried about micro-finance as a way to neediness decrease should think over the aftereffects of these marker factors for the better advancement of micro-finance overall and micro-credit specifically.

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