

Analysis of the Impact of Credit on Smallholder Farmers' Income, Expenditure and Asset Holding in Edja District, Guraghe Zone, SNNPR, Ethiopia

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Abstract

Smallholder farmers in Ethiopia cannot fully utilize improved agricultural technologies and recommended amount of inputs by using their own funds. They need credit to solve the liquidity constraint thereby to properly adopt new technologies. Therefore, the major concern of this study was to assess the impact of credit from MFIs on smallholder farmers' income, expenditure and asset holding. For the purpose of the study primary data were collected from three sample kebeles. A total of 120 households comprising 60 credit users and 60 non-users were selected randomly from the total number of households of each sampled kebeles. In addition, secondary data were collected from relevant organizations. Propensity Score Matching Technique was employed to analyze the impact of credit on smallholder farmers' income, expenditure and asset holding. The result of the study revealed that keeping other things constant, access to credit has significant impact on farmers' income, expenditure and asset holding. Therefore, promoting microfinance institutions in wider range of areas and providing farmers with other factors of production are critical factors that needs be practiced by stakeholders in the study area.

Keywords: Micro- finance, Credit, Impact, Propensity Score Matching.

1. INTRODUCTION

1.1. Background of the Study

Most developing countries depend on their agricultural sectors for economic growth, food security and poverty reduction. Gross domestic product (GDP) growth deriving from agriculture is twice as effective in reducing poverty compared to GDP growth associated with non-agricultural sectors (Miller *et al.*, 2010). Agriculture in developing countries generates on average 29% of GDP and also it employs 65% of the labor force (World Bank, 2008).

Ethiopia is predominantly an agricultural country with the vast majority of its population directly involving in the production of crops and livestock. Agriculture accounts for around 40 % of gross domestic product (GDP), 73% of the employment and around 80% of foreign exchange of the country (UNDP, 2014). Although its contribution to economic development has declined steadily during the past years due to the focus devoted to the industry and service sectors, agriculture remains to be an engine of growth for many years to come. Empirical evidences suggested that economic development in Ethiopia is possible only through investment in the agricultural sector due to availability of large amount of resources. Despite this potential, Ethiopian agriculture has remained underdeveloped because of many factors (Sisay, 2008). It is for this reason that Ethiopia's agricultural policy for the past two decades has concentrated on agricultural investment, such as improving access for production inputs and technology to farmers.

Adoption of new technology significantly influences agricultural productivity thereby income generation from agricultural activities (Fengxia *et al.*, 2010). In subsistence agriculture and low-income countries like Ethiopia where smallholders farming dominate the overall national economy, smallholder farmers are facing severe shortage of financial resources to purchase productive agricultural inputs. The price of inputs is going up every year. Farmers can't utilize inputs out of their own fund. Consequently, the dependence of the subsistent farmers on financial institutions for credit has become substantially increasing nowadays. Since smallholder farmers cannot fully utilize improved technologies by using their own fund, they used to go for credit. With limited access to credit, the budget balance within the year can become a constraint to agricultural production. When liquidity is a binding constraint, the amounts and combinations of inputs used by a farmer may deviate from optimal levels that in turn limit the optimum production or consumption choices. The marginal contribution of credit therefore brings input levels closer to the optimal levels, thereby increasing yield and hence income (Fengxia *et al.*, 2010).

In the past twenty years it has been witnessed that varied efforts have been exerted by different stakeholders including donor community, international organizations, government and non- government organizations (NGOs) towards promoting a vibrant microfinance sector worldwide (Daley, 2009). The promise of microfinance lays in its ability to empower people to work on their own to reduce poverty while avoiding dependency. Microfinance institutions were introduced and viewed as alternative source of financial services in the rural areas. It is believed that microfinance enables smallholder farmers to easily access to credit facilities

without collateral (IFAD, 2003). In 2007, more than 100 million of the world's poorest families received micro loans (Daley, 2009). It is, therefore, believed that investing in agricultural enterprises through microcredit services will continue to be seen as a potential option for improving income and food security of rural households in Ethiopia.

Recognizing the potential contribution of credit to enhance the productivity of farms, the government of Ethiopia has been pursuing a microcredit policy that seeks to provide essential business which improves the livelihood of poor people. To do so, the Government in the past engaged in the development of credit market by establishing the Development bank of Ethiopia, Savings and credit institutions, and Microfinance institutions (Sisay, 2008). The main objective of the government intervention in the promotion of rural financial institutions is to provide credit for rural farmers with the purpose of reaching the poor in a sustainable manner, especially the poorest of the poor who are mostly excluded from the formal financial systems like banks. Therefore, here is a study on the analysis of utilization and impact of Microfinance credit on the smallholder farmers' income, expenditure and asset holding in Edja District, Guraghe zone.

1.2. Statement of the Problem

Agricultural development requires timely and adequate supply of essential farm inputs. The investment capacity of majority of smallholder farmers is low as they are poor and they cannot afford to meet increased demand for the purchase of improved seeds, recommended dose of fertilizer, hiring farm machinery etc. Therefore, lack of finance is one of the main reasons for low productivity in smallholder agriculture (Humayun, 2008). Majority of smallholder farm community comprises of subsistence farmers who are not in a position to use high quality seeds, sufficient fertilizers and improved farm implements due to the lack of finance available to them. The matter of enhancing agricultural productivity therefore largely depends on the availability of finance and credit facility available to the farmers in their respective areas (Mohammad, 2006).

However, achievement of credit is controversial. Explanations that point to a positive impact include the theory of credit evaluation, according to which lenders may partly base their credit evaluations on a firm's performance. In this case there exist a positive correlation between credit and technical efficiency as inefficient firms are less likely to receive credit. The theory of free cash flow asserts that large asset holdings and excess cash flow can encourage lack of discipline in management, leading to technical inefficiency compared with a situation in which a firm depends on credit (Rodrigo and Stephan, 2012). The embodied capital approach stresses the importance of credit as a means of making investments that are required to 'keep up' with the production frontier as it shifts upwards over time, and thus to maintain or improve efficiency. Finally, Liu and Zhuang (2000), argue that credit can mitigate consumption risk and thus encourage investment by risk-averse small farmers, promoting technical efficiency. Most of the time heavy investment cannot be made by the farmers out of their own funds because of their low level of incomes. Moreover, there exists no significant margin of income that can be channeled into the agricultural sector to undertake development activities. Thus, here comes the importance of capital and hence of credit.

Explanations for a negative relation between credit and technical efficiency include agency cost theory which asserts that lenders deal with the asymmetric distribution of information between themselves and borrowers by transferring higher costs to borrowers in the form of higher interest rates, higher collateral requirements and others (Fengxia *et al.*, 2010). As a result, more indebted farmers will bear higher costs and becomes less efficient, all other things being equal. According to the theory of adjustment, changing competitive environments, for example due to trade liberalization, oblige farmers to become more efficient in order to survive. However, since the ability to adjust is negatively related to indebtedness, farmers with lower credit burdens are able to adjust more easily and will thus be more efficient.

In the study area, one can observe these two contradictory facts practically. While some households use credit for production and thereby improve their income and livelihood in general, others made no improvement on their income and even lose their capital to repay their loan. This initiates the researcher to conduct a study on this issue. This study is concerned with the pattern of credit use and its impact on the smallholder farmers' income, expenditure and asset holding in the study area.

No such study in the area has so far been made with respect to the impact of credit on the living standard of the society and gross farm income of the farmers. In order to get a substantial increase in agricultural production, the provision of credit seems a must for smallholder farmers of the study area in particular and smallholder farmers of the country in general. Hence, we need to study the effect of credit on the users. Although there have been studies at the country level which deals with the impact of microfinance on rural development, a high proportion of them have been focusing on children's education, improving health outcomes for women and children, and empowering women by participation in microfinance programs. In contrast, there is inadequate empirical evidence to assess the impact of microfinance on agricultural productivity in rural areas where majority of the low income enset based farming system and subsistence farmers exist. This justifies the need for more research case by case to come up with a robust policy implication of the impact of microfinance industry

on small holder farmers' income and poverty alleviation.

1.3. Objective of the Study

To analyze the impact of credit on smallholder farmers' income, expenditure and asset holding

2. RESEARCH METHODOLOGY

2.1. Description of the Study Area

Edja woreda is located in the Guraghe zone. The average family size of the woreda is 4.4. The land use pattern of the woreda is divided into cropland, grazing land and forest. Crops grown in the area includes cereals, fruits, vegetables, coffee, chat and enset. The estimated land use figure of the woreda is that the cultivated land of the woreda to be 40.7 percent and cultivable land 33.7 percent, grazing land and land under forest or natural vegetation makes up 12.1 percent and 8.6 percent, respectively (WVIE, 2006) . The majority of the land owners possess land size ranges from 0.5 to 1 ha. There are two Micro finance institutions namely Omo Microfinance and WISDOM microfinance which provides credit service in the district.

2.2. Types, Sources and Methods of Data Collection

2.2.1. Types and sources of data

Data on the farmers' circumstances, resources, enterprises, expenditures, production, consumption, etc are collected. The data include both primary and secondary types. The primary data was collected from sample farmers and secondary data from concerned government organizations or public sectors like woreda Finance and Economic Development Office; microfinance institutions like Omo microfinance and Wisdom microfinance institutions.

2.2.2. Sampling procedure and sample size determination

The population of the study was farm households of the district. According to Edja woreda Finance and Economic Development office, the number of households in the woreda is 14380. Because of time, finance and other constraints the researchers limited the sample population in the three representative kebeles of the district. In the study, samples were selected by stratifying the population in to two groups in each kebele, i.e., credit users and non-users, and samples were selected randomly in each stratum. Households were selected randomly from each group according to their list in the frame from each kebele office for the non-users and in the microfinance offices for credit users. The unit of analysis in this research was households who were selected randomly from the total households of the three kebeles.

In the study, both probability and non-probability sampling techniques were used. Probability sampling technique was used because it gives equal chance to the households in each group. Regarding selecting sample kebeles from the woreda non- probability (purposive) sampling method was used. Sample size depends on sampling error, population size, and variation in the population, with respect to the characteristics of interest. This study applied a simplified formula provided by Yamane (1967) to determine the sample size at the level of precision of 0.09 as:

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

Where, n is the sample size, N is the population size and e is the level of precision. The above formula provided approximately 120 sample households.

2.2.3. Methods of data collection

Key informants interview and structured questionnaire were the main data collection instruments employed to collect the data. The researcher used enumerators to collect data from farmers by providing training on how to conduct the interview. In addition to interview type of data collection technique, secondary data from public sectors and microfinance institutions were collected. Concerning selection of sample respondents, probability sampling technique was used. First, the target population is stratified in to two groups i.e., credit users and non-users, and then simple random sampling was used to select respondents in each group.

2.3. Methods of Data Analysis

Propensity Score Matching Technique was employed to analyze the impact of credit on farmers' income, expenditure and asset holding.

Model Specification

A Logistic regression model was used to estimate Propensity Scores for each observation. Following Pindyck and Rubinfeld (1981) the cumulative logistic probability function is specified as:

$$P_i = F(Z_i) = F(\alpha + \sum \beta_i X_i) = \frac{1}{1 + e^{-z_i}}$$

Where, P_i is the probability that an individual would use formal credit or does not use given X_i ;
 e denotes the base of natural logarithms, which is approximately equal to 2.718;

X_i represents the i^{th} explanatory variables; and

α and β_i are parameters to be estimated

Following Smith and Todd (2005), let Y_1 be a household's outcome if it is participate in credit and let Y_0 be an individual's outcome if he/she does not use credit. The impact of credit is the difference in the outcome caused by using credit. To construct an estimate of the average impact of credit on those that running it the average impact of the treatment on the treated (ATT): $ATT = E(Y_1 - Y_0|S = 1)$

$$E(Y_1|D = 1) - E(Y_0|D = 0)$$

2.4. Variables Measurement and Hypothesis

It is necessary to identify the potential explanatory variables and describe their measurement and represent them in symbols.

Table1: Summary of measurements and hypothesis of explanatory, treatment and outcome variables

Variable	Definition	Expected sign /measurement
Participation in MFIs	Borrowing money from MFIs	1 if participant, otherwise 0
SHH	Sex of the household head	+/-
EDUHH	Education of the HH head	+
FSHH	Total members in the HH	+/-
CLS	Land owned and cultivated	+
FEC	Extension service	+
AHH	Age of HH head	+
AVSN	Availability of social network	+
MSSH	Marital status of HH	-
DRHH	Age of member[<15and>64]/ No of productive HH member	-/+
HHGLP	Perception to group lending HH	-
DCR	Distance to Cr source from the HH	-
TAHHY	Total income of household	Ethiopian birr
HHAH	Different asset change into birr	Ethiopian birr
TEXPHH	Different expenditure change in to birr	Ethiopian birr

Source: own definition

3. RESULTS AND DISCUSSION

3.1. Estimation of Propensity Scores

The logistic regression model was used to estimate propensity score matching for treatment and control client households. As indicated earlier, the treatment variable is binary that indicate households' participation decision in the microfinance services. Results presented in (Table 2) below shows the estimated model appears to perform well for the intended matching exercise. The pseudo- R^2 value is 0.2793 which is fairly low. A low R^2 value shows that program households do not have many distinct characteristics overall and as such finding a good match between treatment and control clients becomes easier. The pseudo- R^2 indicates how well the regressors explain the participation probability.

Table 2: Maximum likelihood estimates of logit model and the effects of explanatory variables on the probability of access to formal credit from MFIs

Explanatory variables	Estimated coefficient	Z statistics
Constant	1.445	0.60
Age of HH head	-0.154	-3.29***
Sex of HH head	0.912	1.49
Education level	0.120	1.69*
Household size	0.460	1.94*
Cultivated land holding	1.125	1.92*
Extension contact	0.056	0.52
Availability of social network	0.259	0.38
Marital status of the HH	0.070	0.13
Dependency ratio	-0.496	-0.31
HH perception of group lending	0.514	1.04
Distance to credit institution	0.097	1.53

Source: Computed from the field survey data, 2007

***, ** and represent level of significant at 1%, and 5% respectively

LR chi2 (11) = 49.91, Prob > chi2 = 0.0000 Log likelihood = -83.826002

Pseudo - R² = 0.2775

3.2. Estimating Average Treatment Effect on Treated (ATT)

In order to attain the stated objective, the following impact indicators of the treatment effect have been performed using the already mentioned PSM model. The estimation result presented in the following table (Table 3) below provides a supportive evidence of statistically significant effect of the program on households' income, expenditure and asset holding. A positive value of average treatment effect on the treated (ATT) indicates that the households' income, expenditure and asset holding have been improved as a result of microfinance program intervention in the study area. By controlling statistically the differences between participants' and non- participants' demographic, and asset endowment characteristics of the treatment and new potential households, it has been found that the program has increased annual income, annual expenditure and asset holding of the participating households by 3342, 4831 and 17115 respectively. This is in line with the objective of MFIs, which is improving income level at the household level. Participation in the micro finance service has highly significant average effect on households' average monthly income. This is obvious that the average monthly incomes of households that get access to micro credit are fairly higher than those of households in all propensity score matching methods. Therefore, the research hypothesis which says micro credit participation increases income, expenditure and household asset holding of borrowers is accepted at 1% level of significance for all with t-statistics of 4.65, 5.42 and 8.12 respectively (Table 3).

This result is consistent with the findings of Hossain (2012) who discussed that borrowers' income increased after joining BRAC in Bangladesh. Likewise, Zeller (2002) concluded that micro credit has overall positive effect on income, though results differ substantially across countries and programs both in magnitude and statistical significance. Bebczuk and Haimovich (2007) too found that micro credit increased the hourly labor income of poor individuals compared with a comparable population without access to credit by 4.8 times in Bolivia, 12.5 times in Guatemala and 4.5 times in Haiti. A research conducted in Ghana showed that women operating small businesses with microcredit had statistically significant higher income compared with their non-microcredit participating counterpart (Ferka, 2011). Also, some impact studies on micro credit in Ethiopia Daba (2003), Asmelash (2003), and Ayelech (2010) have found positive significant effects.

Table 3: Average treatment effect on the treated (ATT) estimation results

Outcome variable	Matching method	Treated mean	Control mean	ATT	t value
Total HH income	Kernel(0.5)	25504.3	22161.8	3342	4.65***
Total HH expenditure	Kernel(0.5)	25338	20506.8	4831	5.42***
Total HH asset holding	Kernel(0.5)	50988.7	33873.5	17115	8.12***

Source: Model result, 2015

***, shows significant at 1% level

4. CONCLUSION AND RECOMMENDATIONS

The intention of the paper was to analyze the impact of microfinance credit on the farmers' income, expenditure and asset holding in the Edja District of Guraghe zone Ethiopia. Stratified and simple random sampling techniques were used to select the respondents in the study area. Propensity Score Matching Technique was

applied to analyze the data.

The result of the study revealed that participation in Micro finance credit service have had a positive and significant impact on the livelihood indicator variables such as total household annual income, total household annual expenditure and total household asset holding. The microfinance promise was alleviating poverty through the provision of financial services previously unavailable to the poorest population. By expanding the economic opportunities and involvement of the poor, micro finance endeavors to reduce economic vulnerability of its beneficiaries. Therefore, it is advisable to further extend Microfinance service to wider range in area coverage and number of farmers.

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