

# The Effect of Micro-Credit on Rural Households' Income in the Case of Sinana District, Bale Zone, Oromia National Regional State, Ethiopia

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**Abstract:** Rural credit is one of the tools used to combat poverty. Credit enables smallholder farmers to purchase agricultural tools and inputs when cash is scarce. Therefore, the main objective of this study was to investigate the effect of access to credit on household's income. Both primary and secondary data were utilized in this study. Primary data was collected using semi-structured questionnaires. Descriptive, inferential, and econometric techniques were applied for data analysis. The mean comparison test revealed that on average the total annual income of smallholder farmers who received credit was better than non-beneficiaries by 26,878.46 Ethiopian Birr per annum. Heckman's two-stage econometric model was fitted. The Wald chi-square test of independency of access to credit and total household income per annum ( $\rho = 0$ ) was tested and showed that there is a strong relationship between the two equations at a 1% significance level. Landholdings, membership to cooperatives and education attainment of household head were among the common underlying factors which affect access to credit and the level of household income statistically significantly at less than 5% significance level. Therefore, government and non-governmental institutions must expand credit services and solve the problem of credit rationing facing smallholder farmers in Ethiopia.

**Keywords:** Credit, Effect, Income, Heckman Sample Selection, Ethiopia

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## 1. Introduction

With about 115 million people (2020), Ethiopia is the second most populous nation in Africa after Nigeria, and still the fastest growing economy in the region, with 6.3 percent growth in FY2020/21. The Ethiopian economy registered an average annual real GDP growth rate of 8.2 percent during GTP II implementation period (2015/16-2019/20). The agriculture, Industry, and Service sectors saw 4.1 percent, 13.5 percent, and 8.2 percent annual average growth rates, respectively [10]. However, it is one of the poorest, with a per capita gross national income of \$890 [24].

Ethiopia's economy is highly dependent on the performance of agriculture. The share of agriculture in Ethiopian Gross Domestic Product is estimated at 39.9 percent in the 2020/21 fiscal year [14]. Around 80.0-85.0% of Ethiopians are engaged in agriculture, mainly in subsistence and rain-fed farming and livestock production. The majority

of them are smallholder farmers practicing subsistence farming on less than one hectare of land. The dominance of agriculture in the lives of rural poor people means that future poverty reduction will be driven by improvements in this sector.

Predominantly smallholder farmers produce cereal crops, which account for 95.0% of the agricultural production in Ethiopia [1]. In 2021, the government of Ethiopia (GOE) embarked on a 10-year economic development plan (2021-2030) where agriculture is the top priority sector, and enhancing agricultural production and productivity is one of the major strategic pillars. The 10-year development plan also aims at boosting agricultural export revenues and substituting imports by reducing production costs. However, the sectoral distribution of credit to the sector is very low. In terms of the sectoral distribution of outstanding loans credit to industry accounted for 37.1 percent followed by international trade (18.0 percent), housing and construction (10.9 percent),

domestic trade (9.0 percent) and agriculture (8.7percent) [14].

Although progress has been made in reducing food insecurity and improving agricultural production and productivity, the progress has been slow and food insecurity has remained a challenge. The number of food insecure population is increasing over the years due to multiple factors, including drought, COVID-19, displacement, locust infestation, rising food prices, rising cost of inputs and inadequate supply of improved seeds which could reverse or stagnate some of the gains in reducing food insecurity [11].

Rural poor are usually excluded from formal credit due to lack of collateral. This day the government of Ethiopia has been due emphasis on expansion of micro-financial institutions into rural areas. Microcredit is designed to fight against chronic poverty, but recent research from across seven countries has shown that giving poor people access to microcredit does not lead to a substantial increase in household income.

Different researchers have found strong evidence that access to credit have a positive impact on the level on the incomes of credit users. Some researchers found that provision of credit leads to more education, better health, improved diet, and nutrition, and greater resilience to disasters for poor families. The authors [4, 6] found that access to microfinance credit services has enabled households to educate their children, afford the food needs of their family, and enable them to get adequate medical services.

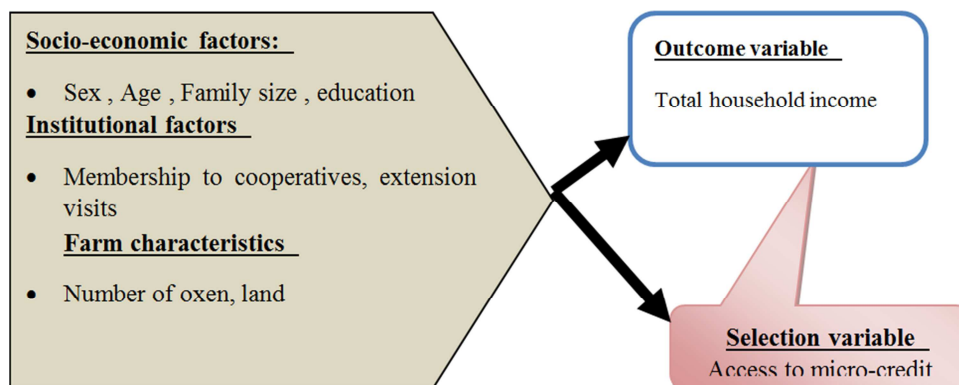
Tran Thi Giang et al. [22] used Difference-In-Difference approach from panel data and Ordinary least square method and found that access to credit has helped raise the incomes of the poor by contributing to improving their lives whether it is formal or informal credit. The authors [8, 5] concluded that the credit members of Oromia credit and saving Share Company were better in terms of living standards and poverty reduction. However, the author [15] found that positive correlations between access to credit and acquisition of business asset. The researchers [9, 7, 18] applied propensity score techniques to estimate the impact of microfinance on the rural clients' income and found that the mean yearly income of participants was greater than that of non-participants. Tegar Rismanuar Nuryitmawan [20] also estimated using propensity

score matching technique that credit recipient households have a greater probability of escaping poverty than those who do not receive credit.

Similarly, the researcher [19] found that access to agricultural credit had improved maize productivity in Rwanda. Others found that access to credit improves a household's asset accumulation. For instance, the author [21] revealed that participation increases household physical asset holdings per adult equivalent. Similarly, the author [2] found that access to credit improves both household incomes and dietary diversity in Ghana. Furthermore, the author [16] added that participation in micro finance programs improves household Savings. Contrary to these views, the author [12] found that microfinance institutions' clients could not generate income for the poor sections of the people [17] also found that village funds do not improve the savings, income, consumption, and asset of Village and Urban Community Funds (VFs) s' members, although such funds have a higher financial performance. This finding indicated that microfinance does not change the economic well-being of the poor.

Due to such inconclusive evidences, microfinance does harm, as well as good, to the livelihoods of the poor. Oromia Credit & Saving S.C. (OCSSCO) is one of the largest & leading Microfinance Institutions in Ethiopia. The company was first established as Oromia Credit & Saving Rural Schemes Development Project/OCSRSDP/ under Oromo Self Help Organization/OSHO/on January 1, 1996, and later grew to a microfinance institution on August 4, 1997, getting its current name - Oromia Credit & Saving Sc. Oromia Credit and Saving Share Company is currently operating largely in rural areas to complement the agriculture lead and rural-centered development effect of the Federal Government of Ethiopia in general and Oromia Regional National State (ORNS) in Particular. Sinana District is also one of the places where OCSSCO is giving credit for the smallholder farmer households.

Therefore, the major objective of this study was to examine the effect of Micro-Credit on Rural Households' Income in the Case of Sinana District, West- Bale Zone, Oromia National Regional State, Ethiopia.



Source: Adapted from different literatures

**Figure 1.** Conceptual framework.

## 2. Methodology

### 2.1. Location of the Study Area

This research was conducted in the Sinana district of Bale Zone. Goro and Ginnir bound Sinana district to the east, to the west by Dinsho, to the north by Agarfa and Gasera, and to the south by Goba and Barbere. The district's total area is approximately 1168km<sup>2</sup>, and Robe town serves as its administrative center.

The lowest and highest altitude of the district is extended from 1650m to 2950m above sea level, respectively. The highest elevation is located around the border area of the southeast of Goro, namely Gerado Mountain, whereas the lowest elevation is located around south east of boarder area. From the total area of the district, about 73.54% is plain land, 3.7% is hills, 9.6% is mountains, 12.3% is rugged and .86% is gorge.

The annual average temperature is 16.5°C whereas the minimum and maximum temperature is 9°C and 23°C, respectively. The annual average rainfall is 1105 mm whereas the minimum and maximum rainfall is 1060 and 1150 mm, respectively.

There are 20 kebeles having a member of 15546 farmers, out of this, 14593 are male, and 953 are females. The members have 139,796 families, out of this 69,101 is female and 70,695 are males.

### 2.2. Data Sources

As part of the study, both primary and secondary sources of data were collected. The primary sources were collected by conducting a household level survey using structured questionnaire, interview, and focus group discussion.

### 2.3. Sample Size Determination and Selection Scheme

According to Kothari, C. [25], if the sample size ('n') is too small, it may not serve to achieve the objectives and if it is too large, we may incur a huge cost and waste resources. As a rule, the sample should be of optimal size, that is, neither excessively large nor excessively small. Technically, the sample size should be large enough to provide a confidence interval of the desired width, and as such, some logical process must determine the size of the sample before the sample is drawn from the universe. As a result, to compute the sample size. Kothari (2004) used the following sample size for an unknown population:

$$n = \frac{Z^2 P(1-P)}{e^2} = \frac{1.96^2 * (0.5)(0.5)}{0.05^2} = 384$$

Where, n - desired sample size

Z - Values of standard variate at 95% confidence interval (Z = 1.96) and to be worked out from table showing area under normal curve.

P - Estimated proportion of households participating in vegetables contract farming

e = given precision rate or acceptable error

**Table 1.** Sample size allocation to each kebele.

S. N	Name of the kebeles	Number of household head in each kebeles	Sample taken from the kebeles
1	Hisu	1495	58
2	Ilu Sanbitu	1513	58
3	Salka	1871	72
4	Hasanbarera	1098	42
5	Shallo	1021	39
6	Alage	1059	41
7	Obora	1922	74
TOTAL		9979	384

Source: Sinana District administration data (2021)

### 2.4. Methods of Data Analysis

To analyze the data descriptive analyses like average, standard deviation, frequency and percentages were employed to the trends of major variables. In regression analysis, the Heckman sample selection model was used to model the relationship between access to credit and its effect on a household's income. Access to credit is a selection variable and it is dichotomous which takes the value of "1" if the smallholder received credit from any institution in the last three years; otherwise "0". Total annual income is a continuous outcome variable. Therefore, one of the models that can be employed in such a situation is the Heckman sample selection model.

The structure of the sample selection model (in its simplest parametric form) is a two-equation system: the first equation is the *Selection equation is access to credit* ( $Y_{1i}$  = if the smallholder received credit in the last three years, 0 otherwise).

$$Y_{1i} = \begin{cases} 1 & \text{if } z_i' \gamma + \varepsilon_i \geq 0 \\ 0 & \text{if } z_i' \gamma + \varepsilon_i < 0 \end{cases} \quad (1)$$

Which determines the observebility or not for all the members in the sample of the second equation, the Outcome equation is total household income which includes off/nonfarm income, crop income, livestock income and farm related incomes.

$$Y_{2i} = X_i \beta + u_i \quad (2)$$

Where  $Y_{2i}$  is the dependent variable of principal interest, which is observed only when  $Y_{1i} = 1$ ;  $x_i$  and  $z_i$  are vectors of exogenous variables;  $\beta$  and  $\gamma$  are vectors of unknown parameters;  $\varepsilon_i$  and  $u_i$  are error terms with zero mean and with  $E[u_i | \varepsilon_i] \neq 0$ .

### 3. Results and Discussion

#### 3.1. Descriptive Result

**Table 2.** Two-sample t-test with equal variances of continuous variables used in the model.

Variables	Did any member of your household received credit in cash last three years?			St Err	t value	p value
	Mean for 'no'	Mean for 'yes'	difference			
Age of the household head	47.95	50.31	-2.34	1.224	-1.95*	0.055
Family size	5.04	5.005	0.032	0.262	0.1	0.904
Landholding size	0.83	0.99	-0.166	0.075	-2.2**	0.028
Annual income	37,636.82	64,515.28	-26,878.46	3960.49	-6.8***	0.000
Number of oxen owned	1.86	1.64	0.222	0.127	1.75*	0.081
Distance to a nearby road	2.94	2.95	-0.005	0.296	0.16	0.987
Education	3.98	4.54	-0.56	0.334	-1.7*	0.095
Number of extension visits	8.87	10.49	-1.62	1.196	-1.35	0.176

Source: computed from Own survey data (2022)

*Family size:* The mean household size for non-credit users and credit users is 5.04 and 5.005 persons, respectively. The t-test for equality of means has an insignificant p-value.

*Landholding size:* The mean landholding size for the credit users and non-users is 0.99 ha and 0.83ha, respectively. The Independent t-test for the equality of means reveals that it is statistically significant difference between the two groups at  $p < 0.05$ . As shown in table 2, the t-test result reveals that land ownership for credit users are greater than that of non-users.

*Annual income:* The average annual income for the non-credit users is 37,636.82ETB and the average for the credit users is 64,515.28ETB. The mean difference in average income is statistically significant at a 1% significance level, showing that there is a clear relationship between income and access to credit.

*Age of the household head:* In terms of age, the mean age of non-credit users was 47.95 and for credit users it was 50.31. The t-test result reveals that there is statistically significant difference between the two groups at less than 10 percent significance level.

*Number of oxen owned:* From the livestock types owned, oxen is very crucial in order to undertake farm operations on time. A pair of oxen is the minimum requirement that should be owned by a household to perform farming operations. Oxen are the main traction power for land cultivation and

preparation in the study area. In line with this, the average oxen owned by the sample non-credit users households is 1.86 and for credit users is 1.64. There statistically significant difference between credit users and non-users in terms of oxen owned at less than 10% significance level.

*Distance to a nearby road:* It refers to the distance between farmer's residence and the nearby all-weather road measured in kilometers. The closer the farmer's residence to the road, the lesser would be the access to credit services. The mean distance from the road to household's home for non –credit user is 2.94km and for credit users is 2.95 km. There is no significant difference between the two groups.

*Education:* It is measured in years of schooling of the household head. Education is a key human capital factor. It enhances farmers' ability to receive, decipher, and comprehend information relevant to making innovative decisions in their farm activities. The year of schooling for non-credit users is 3.98 grades and for credit users is 4.54 grades. There is a statistically significant difference between the two groups at 10% significance level.

*Number of Extension visits:* This continuous variable refers to the number of contacts made with extension agents per cropping season. On the average, there is no significance mean difference between the two groups in terms of the number of extension visits.

**Table 3.** Tabulation of dummy variables used in the model.

Variables	Category	Did any member of your household received credit in cash last three years?			Pearson Chi2
		No	Yes	Total	
Membership to multi-purpose cooperatives	no	117 (60.94%)	75 (39.06%)	192 (100%)	19.26***
	Yes	74 (38.54%)	118 (61.46%)	192 (100%)	
Gender of household head	Female	14 (46.67%)	16 (53.33%)	30 (100%)	0.12
	Male	177 (50%)	177 (50%)	354 (100%)	

Source: computed from Own survey data (2022)

*Membership in multi-purpose cooperatives:* from the total members of multi-purpose cooperatives, 118 (61.46%) are credit users and among non-members of multi-purpose cooperatives, 75 (39.06%) are credit users. The chi-square (chi-square = 19.26) result indicated that there is a statistically significant association between membership to

multi-purpose cooperatives and access to credit at less than 1% significance level. This shows that membership in multi-purpose cooperatives is helpful to get credit.

*Gender of household head:* as can be seen from table 3, 30 (17 percent) households are headed by females whereas 354 (92.19percent) households are male-headed. The researcher

compares the credit users and non-users and found that 177 (50 percent) of households under the headship of males and 16 (53.33 percent) of female-headed households are credit users. Further, the Pearson chi-square test of association with access to credit is also insignificant. This descriptive analysis indicates that there is no gender gap in credit provision by credit-providing institutions.

### 3.2. Results of the Heckman to Stage Model

The standard Heckman assumes that there is a correlation between  $\varepsilon_i$  and  $u_i$ . The  $\text{Rho} = 0.81$  indicates the correlation coefficient between error terms between the selection equation and outcome equation are positively related. Because  $\chi^2(1) = 10.68$  and  $\text{Prob} > \chi^2 = 0.0011$ , this clearly justifies the application of Heckman selection equation with these data.

Table 4. Heckman selection model result.

Independent variables	Income (outcome)		Access to credit (selection)	
	Coef.	St. Err.	Coef.	St. Err.
Gender household head	20,480.9***	7619.403	-0.001	0.252
Age of household head	806.68***	239.756	0.002	0.007
Family size	1625.04*	965.577	0.02	0.027
Landholding in hectares	20,325.97***	4302.475	0.25**	0.11
Oxen owned in numbers	2,328.01	2384.761	-0.171***	0.058
Distance to a nearby town	2,198.95***	804.03	-0.009	0.022
Membership to cooperatives	4137.24***	540.082	0.598***	0.142
Number of Extension visit	779.15***	232.332	0.004	0.006
Education attainment of household head	2,294.99***	786.865	0.046**	0.021
Constant	-100,030.3***	16257.84	-0.645	0.43
Athrho	1.119***	0.342		
Lnsigma	10.553***	0.123		
rho	0.81***	0.12		
Sigma	38304.18***	4729.96		
Lamda	30914.7***	8146.74		
Number of observation = 384				
Chi-square= 350.016***				
Wald test of independency of equations ( $\rho = 0$ ): $\chi^2(1) = 10.68$ Prob > $\chi^2 = 0.0011$				

\*\*\* p<.01, \*\* p<.05, \* p<.1

Source: computed from Own survey data (2022)

#### Interpretation of common underlying factors

**Education attainment of household head:** Education is indispensable to make smallholder farmers to extract from different opportunities available in the society. This variable has a positive coefficient in outcome equation (=2,294.99ETB) and positive coefficient in selection equation (=0.046) and statistically significant at 1% and 5%, respectively. The probable justification is that education creates more opportunities, widening the scope of their business and helps them to apply for credit services and encourages them to produce market-oriented products. This makes them more profitable and an increase in years of schooling by one grade, increases households income by 2,294.99 ETB per annum. This result is congruent with the findings of previous literatures that literate farmers have more exposure to the external environment and information which helps them easily associate to credit sources [3]. This result confirmed the findings of Tran et al (2020) that households with better education would, on average, have higher percapita income and a greater chance of escaping poverty [23].

**Landholding in hectares:** Landholding has a positive impact on both participation in credit market and household income. An increase in landholding by 1 hectare increases household income on average by 20,325.97ETB. The probable justification is that land is conventional input in agriculture. The more land a farm owns, the more type of crops and livestock he/she produces.

**Membership to cooperatives:** cooperatives usually create market linkages to its members. Members sell their outputs to cooperatives and cooperatives sale is at central market. Being membership in to cooperatives helps farmers to get cheap credit from cooperatives nearer to them and this increases smallholder farmers by 4,137.24ETB. This is consistent with the findings of Assifaw and Adeba that membership of farmer's multipurpose cooperatives positively affected access to credit [3].

## 4. Conclusions and Recommendations

The main objective of this research was to investigate the effect of micro-credit on rural households' income in the case of Sinana district, bale zone, oromia national regional state, Ethiopia. Multi-stage sampling technique was followed to draw sample household heads. Initially, seven kebeles were selected from 20 kebeles in the wereda. Kothari, C. [25] sample size formula for unknown population size was used to calculate sample size. Accordingly, 384 sample household heads were considered for analysis. Samples were allocated to each kebeles proportional to the number of household heads in the kebele.

Both primary and secondary data sources were used as sources of data. Structured questionnaire was designed to collect primary data. Descriptive, inferential, and econometric techniques were applied for data analysis. The mean

comparison test revealed that on average the total annual income of smallholder farmers who received credit was better than non-beneficiaries by 26,878.46 Ethiopian Birr per annum. Heckman's two-stage econometric model was fitted. The result of the Heckman sample selection regression model revealed that revealed that educational attainment of household head, membership to cooperatives and land holding are the major common underlying factors positively and statistically significantly affecting access to credit and household income in Sinana District. The Wald chi-square test of independency of access to credit and total household income per annum ( $\rho = 0$ ) was tested and showed that there is a strong relationship between the two equations at a 1% significance level. Therefore, government and non-governmental institutions must expand credit services and solve the problem of credit rationing facing smallholder farmers in Ethiopia.

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