

Effects of Micro Credit on Welfare of Households: The Case of Ainamoi Sub County, Kericho County, Kenya

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Abstract:

This study examined factors affecting access of micro credit, the levels availed and their effects on households' incomes and expenditures in Kericho County, specifically in Ainamoi Sub County, Kenya. In the study area, different portfolios have been used to extend credit, suggesting ability to reach a wide section of all cadres of the population. However, the impact on the welfare across beneficiaries had not been established. This study sought to fill this knowledge gap. To capture this, a sample of 96 households which had accessed micro credit was compared with a similar number which had not accessed micro credit. Stratification of households was done according to their membership to microfinance institutions. Random sampling method was used to select loan beneficiary households. The data was collected by administration of a structured questionnaire and it was analyzed using the SPSS and other statistical techniques. Heckman selection model was applied to identify the factors and their effect on the level of participation of households in the micro credit. Difference in difference (DID) model was used to analyze the effects of micro credit on incomes and expenditure of households. From the findings, this study concluded that participation in microcredit program resulted in improvement of the beneficiaries' quality of life. From the study, Policy implications were drawn for improving access and the levels of participation in micro credit programme.

Key words: Micro credit, Households, Heckman selection model, Difference in Difference.

Introduction

Micro finance is a specialized field that combines banking with social goals, skills and systems offering credit. Micro finance institutions focus on building this capacity, not just moving money. This is to enable them provide the poor with a wide range of financial services that are convenient, flexible and affordable. In addition the poor need financial advice on how to invest and manage income from investment made (World Bank, 2001).

Micro finance sector plays an important role in development by facilitating both the accumulation and mobilization of capital for investment and supply access to working capital. As development takes place, credit for instance helps poor entrepreneur to take advantage of the emergent entrepreneurial opportunities (Hossain, 1988). This process enables the working poor to become self-reliant and in turn, improve the lives of family members, community and society. Over time the microfinance industry recognized that the poor who lacked access to traditional formal financial services required a variety of products to meet their needs, not just micro credit and therefore micro credit evolved into microfinance (Muganga, 2010).

In Kenya, micro finance has experienced considerable transformation over the past twenty years, growing from a fledgling industry dominated by a few donor and church based nongovernmental organizations to a vibrant sector increasingly driven by commercialization. Microfinance is now recognized as legitimate providers of financial services and has the key to unlocking economic growth for entrepreneurs and poor families (K.N.B.S, 2007).

Empowerment theory points out that given opportunity human beings will undergo transformative process within their human existence from a state of powerlessness to the state of relative control over one's overall existence by taking control over their destiny and making use of their immediate environment for a sustainable improvement in their livelihoods and better standards of living. Microfinance is emerging as a tool of community empowerment and poverty alleviation and surrounds the discussion of empowerment theory (Friedman, 1992).

While exploring the impacts of microfinance in Pakistan, Haroon (2008) found that there was significant and positive relationship between micro credit assessed and household expenditures, incomes, assets. However their impact on education and health were not statistically significant relationships, while there was no significant impact of the interventions on women empowerment.

2 Methodology

2.1 Data source and sampling technique:

The study was done in Ainamoi Sub County located south west of the Rift Valley region, which covers an area of 258.5 square kilometers. It lies between 0 degrees 30' and 1 degree 02' south, and 35 degrees 04' and 0 degrees 15' east. It borders Kisumu County to the north, Kipkelion Sub County to the east, Belgut Sub County to the west and Bomet County to the south. The sub county is the seat of Kericho County Government and hence both the executive and the legislative arms of government have their headquarters located here. Farming is the dominant economic activity where large scale tea estates have been established by multinational companies such as Unilever and James Finlay. Sugarcane and coffee are grown on the lower parts. Dairy farming is a major activity especially in the higher altitude areas. Financial services are provided by 8 banks and 6 micro finance institutions

Stratified random sampling was used to collect data. The first stage was to stratify the beneficiaries of credit according to the MFIs they belonged. In the second stage a list of regular borrowers was made from a record of active borrowers (this were borrowers who obtained loans from the MFIs and were paying their loans in installments actively) the borrowers from each of the strata were selected using random sampling. The third stage was to get the control group. A group closely identical to borrowers was identified as the control group within the vicinity of borrowers. These were persons who had formed groups for the purpose of taking the loans but had not yet received. For comparison purposes, an equal number of non-borrowers were selected.

2.2 Sample size:

The sample size of 96 was arrived at based on the formula of (Israel, 1992).

$$2450/1+2450(0.1)^2 = 96$$
$$n = \frac{N}{1 + N(e)^2}$$

Where,

n = optimal sample size,

N = Universal population,

e = Probability error (the desired precision 0.1 for 90% confidence interval)

A sample size of 96 respondents was obtained. The sample was proportionately distributed among the beneficiaries of MFIs as shown in Table 1.

2.3 Data collection procedures:

To capture the differences in household's incomes, expenditures and other variables of interest of borrower and non-borrowers, a structured questionnaire was administered to both groups. The information was collected on both social and economic factors. The primary data was collected using semi-structured questionnaires. The respondents were allowed a period of 1 week to fill the questionnaire then, the questionnaires were collected promptly and examined to ensure completeness.

2.4 Data analytic methods:

Heckman two-step stage model as proposed by (Heckman, 1979) was used to determine factors affecting access to micro credit and the levels of the access. Difference in difference model as advanced by (Coleman, 1999) was slightly modified and used to analyze the effects of micro credit on household income and expenditures.

The decision to either participate in micro-credit group or not and level of participation are dependent variables and therefore were estimated independently. Heckman two-step procedure was identified as an appropriate model for such independent estimation. Heckman two-step model involves estimation of two equations: Selection equation in the first step and outcome equation in the second step (Heckman, 1979). First was to determine whether a household participated in micro-credit programme or not then second was to establish the level of participation (the amount of loans). The total amount of loan is conditional on the decision to participate in micro-credit.

Heckman Two Stage Model Specification.

Step 1. (Selection equation)

The probit model identifies the probability of group participation and consequently identifies the factors which influences participation specified as shown below,

$$P_i(0, 1) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

$$P_i(0, 1) = \beta_0 + \beta_1 age + \beta_2 gender + \beta_3 edulevel + \beta_4 descmaking + \beta_5 hsize + \beta_6 occup + \beta_7 Creditaccs + \beta_8 dstbtwnmbrs + \beta_{10} grpcomp + \beta_{11} mbrshpreqmnt + \varepsilon \dots \dots \dots (1)$$

Step 2. (Outcome equation)

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \beta_n \lambda_n + \varepsilon$$

$$\text{Total amount of loan}(Y_i) = \beta_0 + \beta_1 age + \beta_2 gender + \beta_3 Educ + \beta_4 Hsize + \beta_5 Occup + \beta_6 Creditaccs + \beta_7 Fqcyloanss + \beta_8 Mbrcntrbn + \beta_9 Grpdcs + \beta_{10} Grpsiz + \beta_{11} Lansiz + \beta_{12} ImpAss + \varepsilon \dots \dots \dots (2)$$

Difference in Difference Model.

The third objective was analyzed using single difference model advanced by (Coleman, 1999). It was slightly modified and used to analyze data. In this model, differences in incomes (or other variables of interest) of the beneficiaries was obtained by comparing before they accessed the credit and after five years of assessing credit.

Those differences were analyzed using the model stated below.

$$Y_{ij} = X_{ij}\alpha + M_{ij}\gamma + T_{ij}\delta + e_{ij} \dots \dots \dots (3)$$

Where;

Y_{ij} is an outcome on which impact is measured for household i in location j , X_{ij} is a vector of household characteristics, M_{ij} is the amounts of credit assessed by the beneficiaries. $T_{ij}\delta$ is a variable to capture the treatment effects on households that self-selected into the program and are already accessing loans. The coefficient δ on T_{ij} is the main parameter of interest and measures the average impact of the program. A positive and significant δ would indicate that microfinance is having a beneficial effect on borrowers. If program placement is random, then the above equation should yield efficient and unbiased estimates.

3. Results and Discussions

This chapter presents the results and discussion through descriptive and inferential statistics.

Here, hypotheses that had been generated earlier in the first sections are tested, helping to understand the quantitative results as analyzed.

In the first part, discussions on socio economic and institutional factors affecting access to micro credit are dealt with. Factors affecting the levels of credit assessed are dealt in part two while part three measures the impact of microfinance on household income. All through, the explanatory power of the models used was first tested to ascertain their usefulness and help in forming an opinion on the integrity of the results that had been obtained. The results of the tests carried to determine the explanatory power of the model from all the three sections were found to be satisfactory.

3.1 Socioeconomic and institutional factors affecting household access to micro credit.

The results of a two stage Heckman selection model are presented in Table 4. It shows both the socioeconomic and institutional factors that influence participation in microcredit.

A total of 9 explanatory variables were considered and the results of the analysis are presented in Table 3. The overall power of the model used was found to be satisfactory at 8.497. The significant variables were: age, household size, gender, education, occupation, and farming experience.

The influence of age on access to microcredit was positive and significant at 5%. The beneficiaries of microcredit are in most cases households already established whose focus is to expand their operations or start off farm business. Such a group is associated with older persons. They have assets which are used as collateral to acquire loans. These results are however not consistent with those of (Karami, 2008).

Effect of household size on access to microcredit was negatively significant at 10%. This result points out that large households are likely to have problems in servicing the loans because repayment is expected to run concurrently with other financial commitments of bringing up the larger family.

There was a tendency for a majority of MFI beneficiaries to be women and since most of them lacked access to suitable collateral, the effect of gender on access to credit was negative and significant at 1%. Literature on effects of education on access to micro credit such as Baklouti (2013) pointed a positive influence. These are consistent with the findings of this study which are positive and significant at 10%. However, Muturi (2014) revealed that the level of education of the beneficiaries was negatively related to access to micro credit.

The alternative occupations a beneficiary might have been engaged other than farming as a source of income, significantly and negatively influenced at 1%. Beneficiaries who engaged themselves on off-farm activities such as schooling, businesses and formal employment had less time to pursue on-farm diversification. The findings concur with that of Rana *et al.*, (2000) who found that households who received off-farm income were less likely to pursue on-farm diversification as a method of reducing financial risk.

The effects of farming experience on access to micro credit were statistically significant at 10%. Beneficiaries were actively engaging in farming activities and investing significant amount of funds from micro credit accessed on farming activities. Borrowers with farming experience readily sought credit based on the past experience with MFIs.

From the above findings it was concluded that social, economic and institutional factors affected and influenced household participation in micro credit programmes and therefore the null hypothesis was rejected.

3.2 Analysis of factors determining the levels of micro credit assessed by households.

The second objective was to evaluate the factors that determine the levels of micro credit assessed and the results are presented in Table 4.

Age (AGE) positively influenced the level of micro credit significant at 5%. Because of increased number of activities; older farmers would likely engage microcredit. To sustain the increased activities more resources are needed hence resulting in increased borrowing. This observation concurs with those made by Swain (2001).

Education level was positively significant at 10%. Educated beneficiaries took more credit than their less educated counterparts. This was attributed to the reason that the attitude towards risk changes with increase in the level of information through education.

The influence of gender was negatively significant at 10%. This was attributed to the fact that there was beneficiary's gender imbalance being that the majority were women. Women invested in new opportunities which promised higher and consistent incomes. They serviced their loans promptly and were able to access more loans. The male receivers of loan, on the other hand, used the money to expand their existing enterprises which often had failed in the past to generate consistent income resulting in many cases of default. This resulted in limited access to new loans. These findings are consistent with those of Tajet *et al.*, (2008).

Based on these findings, it was concluded that the levels of participation in micro credit programmes was affected by the social, economic and institutional factors. With this justification the null hypothesis was rejected.

3.3 Effect of micro credit on household income.

The effects of micro credit on household incomes are presented in Tables 5 and 6.

Table 5 shows the results of the estimated model which is a logarithmic function where the dependent variable is natural logarithm of income which is welfare indicator. The standard DD results, indicate that the household welfare measured by household annual income has substantially improved for the borrowing group between 2008 and 2012. The average household annual income for the borrowing households has increased by roughly 30.32% over 5 years and is statistically significant at the 10% level. This is consistent with the results of Abadie, (2005a). However; the significant improvement (of 30.32%) in household annual income for the borrowing group could be a combined result of time influence and microcredit programme impact. To isolate the true programme impact on the borrowing households, the potential time trend must be controlled for Li, *et al.* (2011).

The average household annual income for the non-borrowing households had risen by roughly 4.08% over 5 years, while borrowers' income had increased by 30.32% over the same period and is statistically significant at the 10% level. The average outcome changes for the non-borrowing group between 2008 and 2012 are used to approximate the time trend suffered by the borrowing group. The standard DD estimation suggests that the average household annual income for the borrowing households rose by 26.24% (the difference between the mean gains for the two groups,) as a direct result of programme participation and this positive impact is statistically significant at the 10% level.

The standard DD estimation assumes that no variables other than treatment variables would affect the trend of outcome investigated (Y_{it}) between the borrowing and non-borrowing groups. This assumption can be violated if the two groups of households are different and unbalanced in the household characteristics that are probably associated with (Y_{it}). Therefore, the standard DD method without controlling for other variables is likely to yield biased impact estimation (Li, *et al.*, 2011).

To address the potential deficiencies of standard difference in difference method, welfare impact was evaluated using the adjusted difference in difference based on fixed effect regression suggested in equations 4, 5 and 6. Table 6 shows that the overall power of the model was satisfactory at 0.8305. The F-statistics is statistically significant at the 1% level and therefore strongly reject the null hypothesis in favour of the fixed effects model in correcting for selection bias in the impact estimation.

From the findings it was concluded that participating in the microcredit programme on average increased the households' annual income. Other than micro credit, gender had a positive and significant impact while marital status variable had a negative and significant impact on household income. Thus, the households will benefit more as they become more involved in the programme. The empirical findings of the impact of borrowings are consistent with the findings of Nguyen *et al.* (2007) whose results showed a positive and significant relationship between the loan borrowing and a set of household outcomes including income.

4. Conclusions and Policy Implications

This study empirically evaluated the impact of micro credit on households' welfare. Using Heckman selection models it was established that age, education, farm experience of the participants positively and significantly affected household and individual access to micro credit while household size, gender and occupation negatively affected the access. On the level of the micro credit access, the results revealed that education level and age of the participants positively and significantly influenced the amounts of credit assessed while on the other hand the gender of the participants negatively and significantly influenced it.

These results suggest that the average household annual income for the borrowing households had risen by 26.24 % (the difference between the mean gains between the two groups could relate to impact) as a direct result of programme participation and this positive impact was statistically significant at the 10% level. Further by standardizing the difference in difference estimation method, the results confirmed that participating in micro credit programmes helped to improve households' welfare by raising household income by 12.5 %. The results further confirm that the total amount of loans obtained had a positive and significant impact on welfare outcomes investigated suggesting that households' benefits increased when they access more and bigger loans.

This study recommends more individuals and farming households should be enrolled in microfinance programmes. To ensure this wider access, it is important for the government to formulate policies related to easing microfinance access; in particular the regulatory framework of microfinance institutions should be responsive to the changing individual and household portfolios of financial services of the population.

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Table I: Distributions of the respondents.

MFI	Membership	Sample size
Faulu Kenya	700	27
SMEP	300	12
Ecolof	350	14
KWFT	650	25
WEF	450	18
Total	2450	96

Table 2. Description of Variables and Signs used in Heckman Two Stage Model

Variable Code	Variable	Measurement of the variables	Expected Sign
Dep variable			
TYPHSHOLD	Type of household (participant/non-participant)	Dependent variable for selection equation (Dummy), participant=1 otherwise=0	+/-
LVLOFPART	Level of participation (number of loans)	Dependent variable for outcome equation	+/-
AGE	Age in years	Age of the borrower (continuous)	+/-
GENDER	Gender	Gender of the borrower (Dummy 1 =Male, 0= Female)	+/-
EDUC	Education	Education level of the borrower (highest level attained)	+/-
H/SIZE	Household size	Size of the household (continuous)	+
FARMSIZE	Farm size	Size of the farm continuous.	+
OCCUP	Occupation	Formal/informal	+/-
CREDTACCS	Credit access	Credit access by household (Dummy 1=access 0 = otherwise)	+/-
FQCYLOANS	Frequency of repaying loans	Number of loans repaid per month	+/-
LANSIZ	Land Size	The size of land owned	+/-

Table 3: Heckman selection equation results.

Variables	Coeff.	Std. Err.	Z	P> z
Age	0.018	0.007	2.38	0.017**
Household size	-0.110	0.058	-1.88	0.061*
Marriage	-0.057	0.112	-0.52	0.605
Gender	-1.632	0.269	-6.06	0.000***
Education	0.193	0.108	1.79	0.073*
Land size	0.057	0.075	0.76	0.449
Occupation	-1.565	0.405	-3.86	0.000***
Farming experience	0.050	0.026	1.92	0.055*
mills lambda l	8.497	4.058	2.09	0.036**

*, **, *** significant at 10%, 5% and 1%

Table 5: Standard DD estimates of mean logs of household income.

Outcome variable	Borrowing households(96)			Non- borrowing households(96)			DD Impact Estimator
	Year	Year	Differences	Year	Year	Differences	DD=D1-D2
	2008	2012	D1=YR ₁₂ -YR ₀₈	2008	2012	D2=YR ₁₂ -YR ₀₈	
INCOME	10.85 (0.733)	11.15* (0.0558)	0.30* (0.0573)	10.93* (0.0605)	10.97* (0.0580)	0.04* (0.0966)	0.26* (0.0864)

() numbers in parentheses are standard errors.

*, shows significance at 10%,

Table 6: Adjusted DD estimation of the impact of microcredit on household income

LNHAI	Coeff.	Std. Err.	T	P> t
Control variables				
Age	.0031	.0056	0.55	0.585
Householdsize	-.0297	.0295	-1.01	0.316
HDLand size	-.024	.0335	-0.72	0.471
Farmingexp	.016	.012	1.27	0.209
Maritalstatus	-.133	.050	-2.67	0.009***
Gender	.289	.147	1.96	0.054*
Education	-.009	.070	-0.14	0.889
Treatment variable				
LNTOTALLOAN	.125	.032	3.90	0.000***
F-statistics	53.91			0.000***
R ²	0.830			

*, **, ***Represents 10%, 5% and 1% significant level for the t-test respectively

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